

Appendix 17-1- Shadow Flicker Modelling Report



SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.80	2.50	3.20	4.90	5.80	5.00	4.60	4.60	3.90	3.20	2.20	1.60

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
393	303	276	405	526	735	1,200	1,383	1,106	886	782	765	8,760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

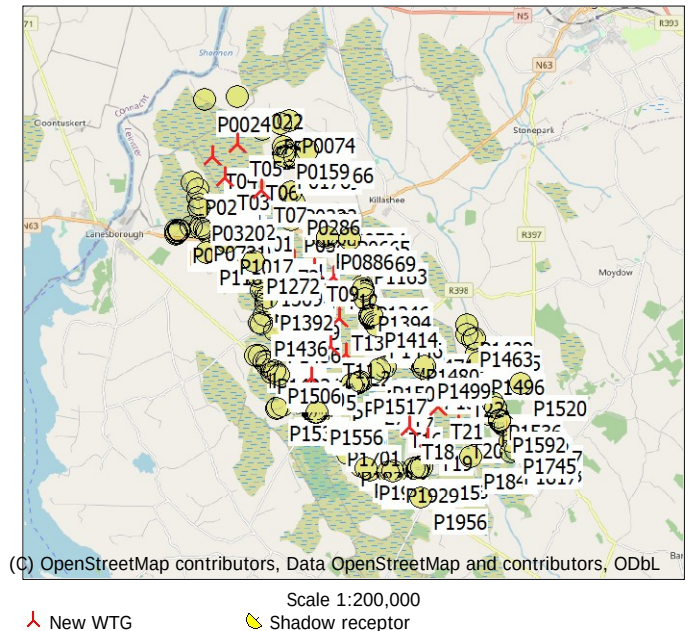
Height contours used: Site Topography

Receptor grid resolution: 1.0 m

All coordinates are in

Irish ITM-IRENET95 (IE), geocentric, GRS80

WTGs



	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.					Calculation distance [m]	RPM [RPM]
T01	604,227	769,638	44.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T02	603,784	769,930	40.9	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T03	603,631	770,710	44.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T04	603,273	771,269	39.7	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T05	603,935	771,598	42.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T06	604,401	770,970	39.1	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T07	604,567	770,387	40.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T08	605,467	768,512	46.8	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T09	605,988	768,296	45.7	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T10	606,513	768,082	45.7	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T11	606,428	766,264	48.1	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T12	606,826	766,064	51.7	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T13	606,675	767,005	45.7	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T14	605,796	765,861	45.1	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T15	605,928	765,412	42.1	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T16	608,184	764,439	52.4	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T17	607,954	764,866	54.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T18	608,541	764,122	49.5	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T19	609,013	763,846	52.8	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T20	609,820	764,155	59.6	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T21	609,286	764,676	51.4	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0
T22	609,854	765,244	54.0	GE WIND ENERGY 6000 60... Yes	GE	WIND ENERGY	6000-6,000	6,000	165.0	107.5	1,819	0.0

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
P0022	603,934	772,861	41.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0024	603,078	772,769	42.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0074	605,331	772,217	42.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0090	604,851	772,180	43.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0111	605,086	772,139	42.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0115	605,146	772,129	42.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0125	604,618	771,973	40.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0159	605,160	771,540	43.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0164	605,824	771,455	43.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0

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SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

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No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
P0166	605,817	771,442	43.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0168	605,186	771,416	43.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0169	605,777	771,411	43.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0170	605,813	771,401	43.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0172	605,170	771,336	43.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0173	605,405	771,309	42.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0174	605,337	771,299	42.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0175	605,286	771,295	43.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0176	605,190	771,272	43.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0177	605,489	771,255	41.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0178	605,446	771,254	42.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0180	605,407	771,250	42.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0181	605,299	771,237	42.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0182	605,236	771,235	43.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0204	602,767	770,602	47.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0211	602,904	770,424	53.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0232	605,359	770,329	50.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0245	602,904	770,195	52.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0286	605,451	770,051	46.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0294	602,965	770,018	49.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0320	602,918	769,910	48.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0524	606,677	769,693	44.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0525	605,374	769,691	51.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0589	605,379	769,600	50.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0665	606,785	769,499	45.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0685	602,981	769,452	45.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0704	602,734	769,426	45.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0730	603,083	769,385	45.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0731	602,995	769,385	45.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0747	602,337	769,309	43.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0748	602,409	769,305	44.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0750	603,135	769,300	45.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0751	602,399	769,300	43.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0768	603,158	769,273	45.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0776	602,363	769,257	43.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0778	606,277	769,254	45.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0785	602,343	769,239	43.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0791	602,320	769,229	44.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0804	606,369	769,223	46.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0824	606,344	769,208	45.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0852	606,201	769,179	45.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0886	606,355	769,151	46.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0969	606,930	769,082	52.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P0986	603,482	769,060	47.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1017	603,675	769,013	46.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1121	604,526	768,885	47.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1133	604,252	768,860	45.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1143	604,285	768,844	46.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1149	604,316	768,827	47.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1163	607,226	768,773	49.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1173	604,353	768,748	47.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1182	603,138	768,715	41.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1206	603,095	768,659	42.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1261	604,371	768,546	45.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1272	604,373	768,493	45.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1278	604,329	768,459	44.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1284	604,377	768,399	45.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1291	604,372	768,348	45.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1294	604,336	768,325	44.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1301	604,420	768,273	46.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1304	604,438	768,245	46.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1306	604,451	768,209	46.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1309	604,465	768,179	46.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1314	604,498	768,088	46.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0

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SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

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No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
P1319	604,788	768,019	49.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1327	604,602	767,952	46.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1341	607,277	767,838	51.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1343	604,618	767,814	44.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1346	607,297	767,766	51.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1350	604,567	767,745	42.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1353	607,377	767,729	53.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1355	607,306	767,721	51.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1371	607,324	767,636	51.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1375	604,702	767,631	44.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1392	604,732	767,552	44.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1394	607,344	767,521	50.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1399	604,703	767,467	43.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1406	604,724	767,356	44.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1409	604,913	767,284	50.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1411	607,464	767,096	51.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1413	604,661	767,075	43.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1414	607,529	767,066	52.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1416	607,477	767,057	52.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1417	607,485	767,034	53.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1421	607,502	766,997	53.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1430	607,575	766,911	53.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1433	604,532	766,892	46.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1436	604,581	766,839	46.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1437	607,607	766,838	53.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1438	610,042	766,834	53.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1446	607,631	766,798	54.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1451	607,671	766,760	53.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1454	607,731	766,730	53.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1456	604,949	766,688	46.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1458	607,706	766,685	53.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1463	610,051	766,591	60.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1465	610,243	766,473	56.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1466	610,204	766,436	57.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1471	608,477	766,364	54.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1480	608,618	766,120	55.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1481	610,308	766,064	59.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1484	604,447	766,010	42.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1485	604,523	766,001	43.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1486	608,709	765,974	56.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1491	604,738	765,861	48.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1493	604,669	765,854	45.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1495	608,762	765,850	56.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1496	610,377	765,845	57.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1497	608,885	765,772	59.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1498	604,732	765,758	47.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1499	608,905	765,745	59.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1500	607,886	765,712	54.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1501	608,879	765,691	57.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1502	607,798	765,686	55.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1504	607,742	765,661	56.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1505	604,868	765,654	50.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1506	604,943	765,597	50.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1507	604,884	765,554	49.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1508	607,581	765,551	56.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1510	605,051	765,514	51.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1512	609,095	765,472	57.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1515	607,251	765,349	56.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1516	607,151	765,339	56.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1517	607,203	765,333	56.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1519	607,170	765,312	56.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1520	611,488	765,290	62.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1521	607,136	765,279	56.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1523	606,992	765,233	55.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0

To be continued on next page...

SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

...continued from previous page

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
P1524	607,038	765,230	55.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1526	606,683	765,074	52.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1527	606,647	765,048	52.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1531	610,724	764,762	56.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1534	605,149	764,690	45.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1536	610,819	764,665	56.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1537	605,026	764,641	45.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1538	610,833	764,637	56.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1539	604,979	764,634	45.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1542	606,008	764,585	49.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1545	606,059	764,555	52.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1546	606,050	764,554	52.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1548	606,070	764,537	53.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1550	606,036	764,535	51.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1552	606,033	764,530	51.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1553	606,077	764,529	53.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1554	606,029	764,524	51.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1556	606,087	764,518	54.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1557	606,024	764,516	51.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1558	606,093	764,512	54.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1559	606,021	764,509	51.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1560	606,018	764,504	51.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1562	606,102	764,499	54.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1563	605,970	764,499	49.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1564	606,109	764,492	55.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1565	610,614	764,479	62.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1566	606,119	764,479	55.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1567	605,999	764,471	50.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1568	606,125	764,470	55.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1569	606,001	764,462	50.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1570	606,006	764,453	50.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1571	606,008	764,446	50.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1573	606,010	764,439	50.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1575	606,012	764,432	50.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1587	610,888	764,377	56.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1589	606,179	764,360	56.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1592	610,919	764,329	55.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1593	610,915	764,300	55.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1594	610,937	764,272	55.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1595	610,958	764,244	54.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1596	610,985	764,233	54.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1600	611,002	764,204	55.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1602	611,022	764,191	55.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1605	611,081	764,171	55.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1697	611,357	763,955	57.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1701	606,529	763,950	53.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1713	606,531	763,921	53.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1745	611,180	763,757	57.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1808	611,339	763,515	56.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1817	611,228	763,489	57.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1832	606,904	763,427	56.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1845	610,145	763,335	57.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1902	607,242	763,084	57.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1906	608,843	763,071	58.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1907	608,785	763,071	59.2	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1915	608,643	763,045	55.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1917	607,371	763,034	56.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1923	608,760	762,992	58.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1924	608,725	762,992	58.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1925	608,014	762,989	54.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1927	607,498	762,978	56.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1929	608,105	762,955	55.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1930	608,197	762,952	54.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1931	607,972	762,940	53.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0

To be continued on next page...

Project:

Derryadd Wind Farm

Description:

Proposed wind farm at Derryadd, Co. Longford

Licensed user:

Tobin Consulting Engineers
 Block 10-4, Blanchardstown, Corporate Park
 IE-DUBLIN 15
 +353 1 80304 01
 Michael Nolan / michael.nolan@tobin.ie
 Calculated:
 14/11/2024 14:15/3.6.361

TOBIN
 CONSULTING ENGINEERS

SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

...continued from previous page

No.	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
			[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
						[m]	[°]		[m]
P1933	607,497	762,902	55.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P1956	608,832	762,255	54.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
P2005	604,530	768,026	46.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0

Calculation Results

Shadow receptor

No.	Shadow, worst case			Shadow, expected values	
	Shadow hours	Shadow days	Max shadow	Shadow hours	
	per year	per year	hours per day	per year	
	[h/year]	[days/year]	[h/day]	[h/year]	
P0022	0:00	0	0:00	0:00	
P0024	16:22	46	0:27	2:17	
P0074	21:01	72	0:24	3:11	
P0090	20:32	50	0:36	3:29	
P0111	15:20	56	0:30	2:35	
P0115	20:08	68	0:29	3:12	
P0125	56:50	115	0:50	9:22	
P0159	48:58	104	0:53	8:31	
P0164	16:12	68	0:24	2:36	
P0166	16:32	67	0:24	2:39	
P0168	59:05	135	0:54	10:10	
P0169	18:06	72	0:25	2:54	
P0170	16:52	67	0:24	2:43	
P0172	69:56	153	0:51	11:50	
P0173	57:51	155	0:36	9:20	
P0174	66:23	158	0:39	10:44	
P0175	70:54	159	0:40	11:31	
P0176	78:47	164	0:45	13:03	
P0177	43:48	137	0:34	7:13	
P0178	49:30	153	0:35	8:05	
P0180	56:42	166	0:37	9:12	
P0181	73:56	165	0:41	11:56	
P0182	81:53	169	0:44	13:19	
P0204	55:04	127	0:57	10:28	
P0211	100:17	197	0:51	19:01	
P0232	83:21	194	0:59	15:54	
P0245	69:12	182	0:42	12:39	
P0286	54:28	139	0:42	10:31	
P0294	63:45	177	0:46	11:41	
P0320	44:57	111	0:44	8:38	
P0524	11:30	51	0:23	1:40	
P0525	20:08	64	0:32	3:48	
P0589	20:39	60	0:33	4:04	
P0665	17:38	66	0:23	2:35	
P0685	60:24	122	0:44	11:36	
P0704	37:39	109	0:34	7:29	
P0730	32:16	105	0:33	6:12	
P0731	40:49	104	0:36	7:46	
P0747	9:58	40	0:24	2:03	
P0748	11:59	44	0:25	2:26	
P0750	25:22	90	0:34	5:02	
P0751	11:48	44	0:25	2:24	
P0768	24:14	83	0:35	4:52	
P0776	11:11	44	0:24	2:16	
P0778	27:55	70	0:37	4:12	
P0785	10:47	43	0:24	2:11	
P0791	10:07	41	0:23	2:03	
P0804	29:09	81	0:35	4:27	
P0824	30:39	84	0:35	4:41	
P0852	34:05	76	0:40	5:11	
P0886	40:55	96	0:36	6:16	
P0969	24:47	81	0:32	3:55	
P0986	10:49	43	0:21	1:58	

To be continued on next page...

Project:

Derryadd Wind Farm

Description:

Proposed wind farm at Derryadd, Co. Longford

Licensed user:

Tobin Consulting Engineers
 Block 10-4, Blanchardstown, Corporate Park
 IE-DUBLIN 15
 +353 1 80304 01
 Michael Nolan / michael.nolan@tobin.ie
 Calculated:
 14/11/2024 14:15/3.6.361

TOBIN
 CONSULTING ENGINEERS

SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

...continued from previous page

No.	Shadow, worst case		Shadow, expected values	
	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
P1017	0:00	0	0:00	0:00
P1121	21:24	49	0:38	3:43
P1133	12:14	37	0:30	2:05
P1143	13:44	42	0:31	2:20
P1149	14:40	44	0:31	2:30
P1163	51:44	146	0:41	8:02
P1173	17:24	49	0:34	3:00
P1182	0:00	0	0:00	0:00
P1206	0:00	0	0:00	0:00
P1261	23:24	63	0:35	4:19
P1272	23:37	65	0:34	4:29
P1278	22:02	65	0:33	4:14
P1284	24:48	73	0:35	4:50
P1291	24:54	72	0:34	4:51
P1294	23:25	72	0:34	4:34
P1301	28:41	81	0:36	5:38
P1304	30:26	84	0:37	6:00
P1306	32:04	87	0:37	6:25
P1309	34:06	91	0:38	6:52
P1314	43:56	113	0:38	8:47
P1319	42:48	123	0:35	8:09
P1327	44:41	106	0:40	8:29
P1341	92:18	160	0:52	16:14
P1343	13:51	65	0:27	2:47
P1346	113:06	198	0:48	19:35
P1350	10:52	40	0:25	2:14
P1353	84:52	186	0:43	14:43
P1355	114:46	197	0:46	19:47
P1371	98:36	198	0:45	16:59
P1375	17:54	60	0:27	3:35
P1392	26:04	78	0:28	4:57
P1394	84:26	190	0:47	14:26
P1399	22:13	67	0:26	4:09
P1406	8:18	44	0:16	1:31
P1409	11:44	60	0:20	2:16
P1411	65:21	150	0:48	10:51
P1413	16:54	64	0:24	2:23
P1414	66:33	153	0:45	10:59
P1416	69:57	154	0:47	11:43
P1417	72:50	159	0:47	12:17
P1421	76:57	165	0:46	13:02
P1430	77:24	174	0:42	13:05
P1433	9:14	38	0:24	1:25
P1436	10:17	40	0:25	1:35
P1437	69:31	187	0:41	11:56
P1438	0:00	0	0:00	0:00
P1446	63:38	160	0:40	11:06
P1451	57:35	148	0:38	10:11
P1454	49:53	136	0:36	8:57
P1456	52:24	145	0:35	8:07
P1458	54:25	143	0:37	9:52
P1463	0:00	0	0:00	0:00
P1465	0:00	0	0:00	0:00
P1466	0:00	0	0:00	0:00
P1471	12:28	59	0:21	2:01
P1480	14:01	58	0:26	2:19
P1481	37:07	56	0:58	5:16
P1484	16:48	61	0:28	2:56
P1485	19:22	67	0:29	3:23
P1486	27:35	82	0:29	4:12
P1491	36:03	109	0:36	6:44
P1493	31:47	103	0:34	5:56
P1495	44:57	108	0:33	6:49

To be continued on next page...

Project:

Derryadd Wind Farm

Description:

Proposed wind farm at Derryadd, Co. Longford

Licensed user:

Tobin Consulting Engineers
 Block 10-4, Blanchardstown, Corporate Park
 IE-DUBLIN 15
 +353 1 80304 01
 Michael Nolan / michael.nolan@tobin.ie
 Calculated:
 14/11/2024 14:15/3.6.361

TOBIN
 CONSULTING ENGINEERS

SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

...continued from previous page

No.	Shadow, worst case		Shadow, expected values	
	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
P1496	70:54	104	0:52	10:25
P1497	38:57	116	0:35	6:11
P1498	36:51	103	0:35	7:01
P1499	38:05	105	0:36	6:09
P1500	30:16	86	0:40	5:50
P1501	38:53	105	0:36	6:18
P1502	41:26	118	0:41	7:51
P1504	56:38	131	0:41	10:23
P1505	52:19	110	0:48	10:03
P1506	66:09	119	1:00	12:47
P1507	57:53	116	0:55	11:15
P1508	95:01	192	0:53	15:44
P1510	99:58	160	0:57	19:01
P1512	82:59	161	0:48	13:13
P1515	75:34	192	0:46	12:55
P1516	65:41	179	0:42	11:44
P1517	69:44	182	0:44	12:15
P1519	66:57	178	0:43	11:58
P1520	5:11	24	0:20	0:55
P1521	66:01	181	0:42	11:58
P1523	69:18	199	0:38	12:57
P1524	66:51	190	0:39	12:25
P1526	86:06	174	0:49	16:20
P1527	84:33	161	0:51	16:00
P1531	77:55	170	0:41	14:19
P1534	0:00	0	0:00	0:00
P1536	61:37	152	0:37	11:26
P1537	0:00	0	0:00	0:00
P1538	57:52	147	0:36	10:44
P1539	2:02	25	0:07	0:22
P1542	0:00	0	0:00	0:00
P1545	0:00	0	0:00	0:00
P1546	0:00	0	0:00	0:00
P1548	0:00	0	0:00	0:00
P1550	0:00	0	0:00	0:00
P1552	0:00	0	0:00	0:00
P1553	0:00	0	0:00	0:00
P1554	0:00	0	0:00	0:00
P1556	0:00	0	0:00	0:00
P1557	0:00	0	0:00	0:00
P1558	0:00	0	0:00	0:00
P1559	0:00	0	0:00	0:00
P1560	0:00	0	0:00	0:00
P1562	0:00	0	0:00	0:00
P1563	0:00	0	0:00	0:00
P1564	0:00	0	0:00	0:00
P1565	40:12	94	0:45	7:18
P1566	0:00	0	0:00	0:00
P1567	0:00	0	0:00	0:00
P1568	0:00	0	0:00	0:00
P1569	0:00	0	0:00	0:00
P1570	0:00	0	0:00	0:00
P1571	0:00	0	0:00	0:00
P1573	0:00	0	0:00	0:00
P1575	0:00	0	0:00	0:00
P1587	23:21	69	0:35	4:12
P1589	0:00	0	0:00	0:00
P1592	22:24	70	0:34	4:03
P1593	22:46	69	0:35	4:08
P1594	22:02	69	0:34	4:02
P1595	21:22	68	0:34	3:57
P1596	20:26	68	0:33	3:48
P1600	19:51	67	0:32	3:44

To be continued on next page...

SHADOW - Main Result

Calculation: 22 No. Turbine - Model Run #3

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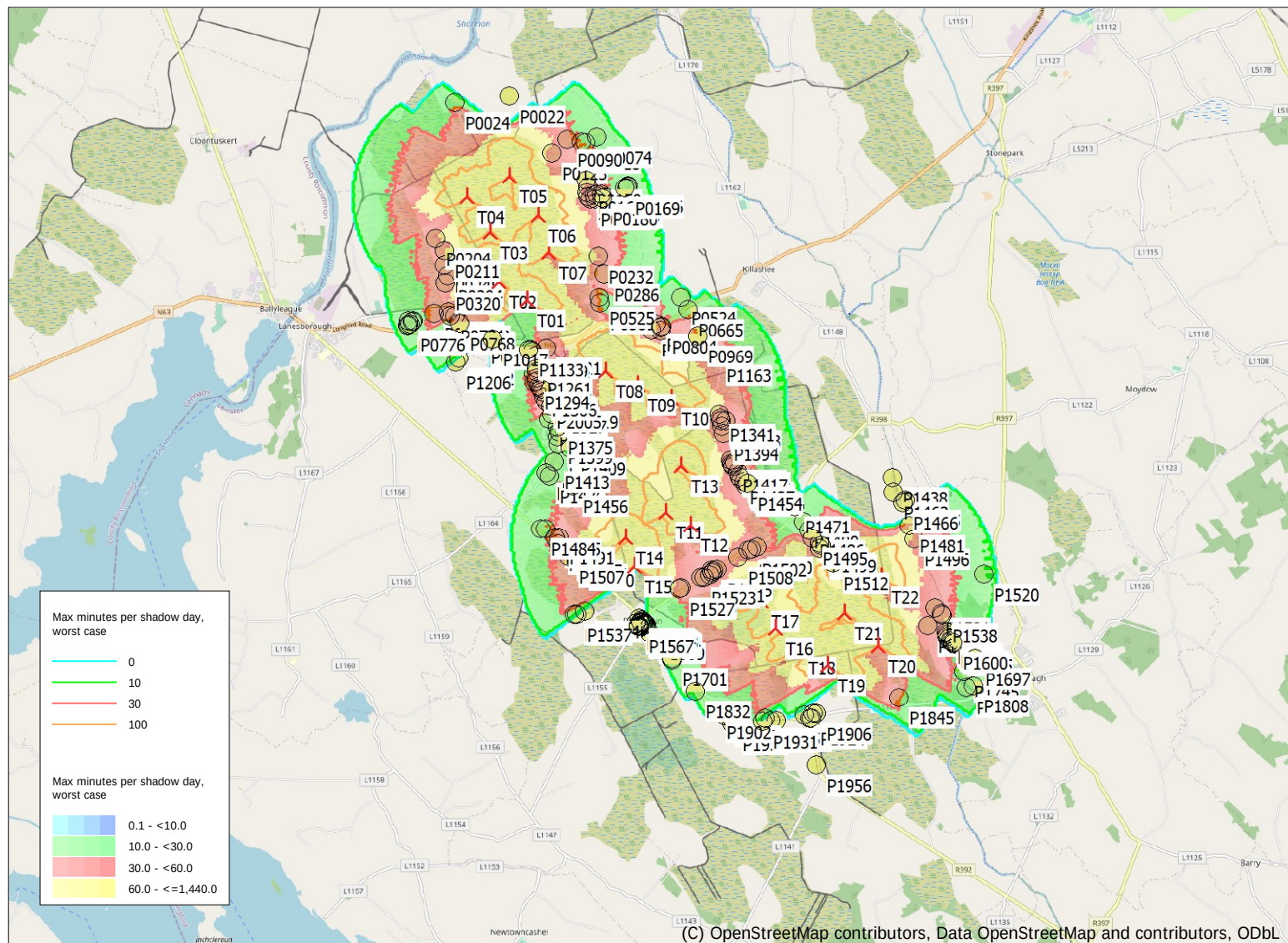
No.	Shadow, worst case		Shadow, expected values	
	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
P1602	18:56	66	0:32	3:35
P1605	12:34	37	0:30	2:22
P1697	7:19	30	0:24	1:28
P1701	25:00	94	0:23	4:45
P1713	23:29	92	0:23	4:28
P1745	11:24	40	0:27	2:15
P1808	8:58	38	0:23	1:50
P1817	12:09	45	0:25	2:28
P1832	8:57	61	0:19	1:47
P1845	21:54	61	0:35	4:27
P1902	1:53	26	0:06	0:20
P1906	0:00	0	0:00	0:00
P1907	0:00	0	0:00	0:00
P1915	0:00	0	0:00	0:00
P1917	0:00	0	0:00	0:00
P1923	0:00	0	0:00	0:00
P1924	0:00	0	0:00	0:00
P1925	0:00	0	0:00	0:00
P1927	11:01	50	0:21	2:11
P1929	0:00	0	0:00	0:00
P1930	0:00	0	0:00	0:00
P1931	0:00	0	0:00	0:00
P1933	15:43	70	0:21	2:58
P1956	0:00	0	0:00	0:00
P2005	56:24	126	0:39	10:55

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

No.	Name	Worst case [h/year]	Expected [h/year]
T01	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (23)	138:26	25:37
T02	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (24)	192:11	35:40
T03	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (25)	170:53	31:59
T04	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (26)	8:08	1:25
T05	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (27)	106:00	18:51
T06	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (28)	179:27	31:15
T07	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (29)	204:02	35:31
T08	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (30)	250:24	45:51
T09	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (31)	211:40	38:21
T10	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (32)	177:26	32:17
T11	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (33)	151:42	27:33
T12	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (34)	204:53	34:48
T13	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (35)	232:21	40:15
T14	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (36)	228:12	42:35
T15	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (37)	180:59	33:27
T16	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (38)	88:00	13:49
T17	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (39)	259:09	41:22
T18	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (40)	27:33	4:55
T19	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (41)	46:34	9:04
T20	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (42)	132:26	24:09
T21	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (43)	72:29	11:59
T22	GE WIND ENERGY 6000 6000 165.0 !O! hub: 107.5 m (TOT: 190.0 m) (44)	237:23	39:13

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

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



Project:
Derryadd Wind Farm
Description:
Proposed wind farm at Derryadd, Co. Longford

SHADOW -
Map
Calculation:
22 No. Turbine - Model Run #3

Licensed user:
Tobin Consulting Engineers
Block 10-4, Blanchardstown, Corporate Park
IE-DUBLIN 15
+353 1 80304 01
Michael Nolan / michael.nolan@tobin.ie
Calculated:
14/11/2024 14:15/3.6.361

TOBIN
CONSULTING ENGINEERS

Map: EMD OpenStreetMap, Print scale 1:100,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 606,103 North: 766,690
New WTG Shadow receptor
Flicker map level: Site Topography
Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1.5 m