May 2025

Environmental Impact Assessment Report (EIAR) – Volume 3

Appendices Part 2

Proposed Whitestown Sand & Gravel Quarry

On behalf of

Mr. James Metcalfe & Mr. Thomas Metcalfe

Whitestown Lower, Co. Wicklow

MALONE O'REGAN ENVIRONMENTAL

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Environmental Impact Assessment Report (EIAR) – Volume 3

Proposed Whitestown Sand & Gravel Quarry

Mr. James Metcalfe & Mr. Thomas Metcalfe

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APPENDIX 11

APPENDIX 11-1

Glossary of Acoustic Terminology

Abbreviation / Description Descriptor	
A Weighted	A time weighting given to noise values to amend the values to suit the human ear response to the various frequency components of the sound.
Acoustic environment	Sound from all sound sources as modified by the environment (BS ISO 12913-1:2013).
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far. *Note: The ambient sound comprises the residual sound and the specific sound when present.*
Ambient sound level, L_a = $L_{Aeq,\,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T. *Note: the ambient sound level is a measure of the residual sound and the specific sound when present.*
Background sound level, $L_{A90,\,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
dB (decibel)	A relative unit of measurements, based on a logarithmic scale to describe the ratio between the measured level and a reference or threshold level of 0dB. Unless otherwise stated 0dB within this report is $2x10^{-5}$ pascals (Pa).
Day	A 24 hour period from midnight to midnight.
Daytime	A 12 hour period between 07:00 – 19:00 hours, as per NG4
Evening-Time	A 4 hour period between 19:00 – 23:00 hours, as per NG4
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,\,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T=t_2-t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given the following equation: $L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]dt\right\}$ where: p_0 is the reference sound pressure (20 μPa); and $p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t *Note: The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.*
$L_{AN,T}$	The Fast interval, A-Weighted noise level in the for the 'N' percentile of the sampling interval 'T'.
$L_{A10,T}$	The A-Weighted noise level for the 10%ile of the sampling interval 'T', typically utilised to represent peak noise events such as intermittent passing traffic.
$L_{A90,T}$	The A-Weighted noise level in the lower 90 percentile of the sampling interval 'T', excludes intermittent features typical of traffic. See also background sound level.
$L_{A95,T}$	The A-Weighted noise level for the 95%ile of the sampling interval 'T'. Representative of steady noise events at a monitoring location.

$L_{Aeq,T}$	The equivalent continuous sound level, used to describe the fluctuating noise in terms of a single noise level over the same sampling time period (T). Also see ambient sound.
L_{den}	Day-evening-night equivalent level, calculated as: $Lden = 10Log\frac{1}{24}\left(12*10\frac{Lday}{10}+4*10\frac{Levening+5}{10}+8*10\frac{Lnight+10}{10}\right)$ Where the L_{day}, $L_{evening}$ and L_{night} are as defined in ISO1996-2:1987, and for the duration of 12 hours, 4 hours and 8 hours respectively, are A-weighted long term Leq sound level.
L_{day}	Day equivalent level. A-weighted Leq sound level measured over the 12 hour period from 07:00 hours to 19:00 hours.
$L_{evening}$	Evening equivalent level. A-weighted Leq sound level measured during the evening period of 19:00 hours to 23:00 hours.
L_{Amax}	The maximum RMS A-Weighted sound pressure level occurring within a specified time period.
L_{night}	Night equivalent level. A-weighted Leq sound level measured during the night period of 23:00 hours to 07:00 hours.
Measurement time interval, T_m	total time over which measurements are taken. *Note: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*
Rating level, $L_{Ar,\ Tr}$	specific sound level plus any adjustment for the characteristic features of the sound.
Reference time interval, T_r	specified interval over which the specific sound level is determined. *Note: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h*
Residual sound	ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, L_r = $L_{Aeq,T}$	equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Specific sound level, L_s = $L_{Aeq,Tr}$	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
Specific sound source	sound source being assessed.
Night-Time	An 8 hour period between 23:00 – 07:00 hours, as per NG4
Noise Ambient	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far. Also see ambient sound.
Noise Background	The steady existing noise level present without contribution from any intermittent sources, The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, 'T' ($L_{AF90,T}$). Also see background sound level, $L_{A90,\ T}$.
Noise Specific	The sound arising from the source under investigation, disregarding all external and residual sources. Also see specific sound source.
NSR	Noise Sensitive Receptor - an identified dwelling, amenity area, recreational zone or other such place where a change in noise may result in a nuisance impact.
RMS	Root Mean Squared, mathematical method to account for swells and troughs within wave forms, such as sound.

Sound Power Level (L_W)	The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m2. Utilised to express the intensity at source of a noise emission.
Sound Pressure Level (L_P)	Fluctuations in air pressure caused by the passage of a sound wave. The measurement of sound/noise through the use of a sound level meter, is a representation of these fluctuations in air pressure as they pass the instrument microphone.
Time Weighting	One of the averaging time for noise monitoring instrumentation: F – Fast, instrument samples every 125 milliseconds; S – Slow, instrument samples every 1 second; I – Impulsive, instrument samples every 35 milliseconds.

Note:

Unless otherwise stated all broadband noise values are A-weighted with a fast response.

Where 0dB is referenced it refers to the threshold of hearing – $2x10^{-5}$Pa.

All 1/3 octave values are unweighted/linear. (z-weighted on the Bruel and Kjaer software)

APPENDIX 11-2

APPENDIX 11-2-1

Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Moving source, for method Industrial noise - ISO 9613

Name	Desc.	ISO H	ISO Terr.	HDef.	Weighting	Flow(D)	Flow(E)	Flow(N)	Avg.speed	Max.dist.	Lw 31	Lw 63	Lw 125	Lw 250	Lw 500
In	Trucks going onsite	0.75	--	Relative	A	41	--	--	10	25.00	--	79.10	87.80	91.90	96.50
Out	Trucks departing Site	0.75	--	Relative	A	41	--	--	10	25.00	--	--	--	--	--
Bulldozer	Bulldozer	0.75	--	Relative	A	938	--	--	10	25.00	0.00	83.80	93.90	90.40	97.80
Shovel	Loading shovel	0.75	--	Relative	Z	400	--	--	10	25.00	0.00	110.20	108.00	103.90	104.90
Dump truck	C10.19	0.75	--	Relative	A	656	--	--	10	25.00	0.00	99.80	105.90	108.40	109.80

E2169

Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Moving source, for method Industrial noise - ISO 9613

Name	Lw 1k	Lw 2k	Lw 4k	Lw 8k	Red 31	Red 63	Red 125	Red 250	Red 500	Red 1k	Red 2k	Red 4k	Red 8k
In	100.20	97.50	90.50	83.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Out	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulldozer	97.00	96.20	95.00	84.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shovel	107.30	106.00	103.90	101.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump truck	107.00	108.20	99.00	91.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

Name	Desc.	Height	Terrain L	HDef.	Type	DI	DI_Horz	DI_Vert	DI(0)	DI(10)	DI(20)	DI(30)	DI(40)	DI(50)	DI(60)	DI(70)	DI(80)
Loader	Wheeled loader - C.9.7	1.50	153.00	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scree.	Screening plant	2.00	151.00	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

Name	DI(90)	DI(100)	DI(110)	DI(120)	DI(130)	DI(140)	DI(150)	DI(160)	DI(170)	DI(180)	Ca(D)	Ca(E)	Ca(N)	Weighting	No refl.	No building	No ind.site	Lw 31
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	A	No	No	No	--
Scree.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	Z	No	No	No	--

Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

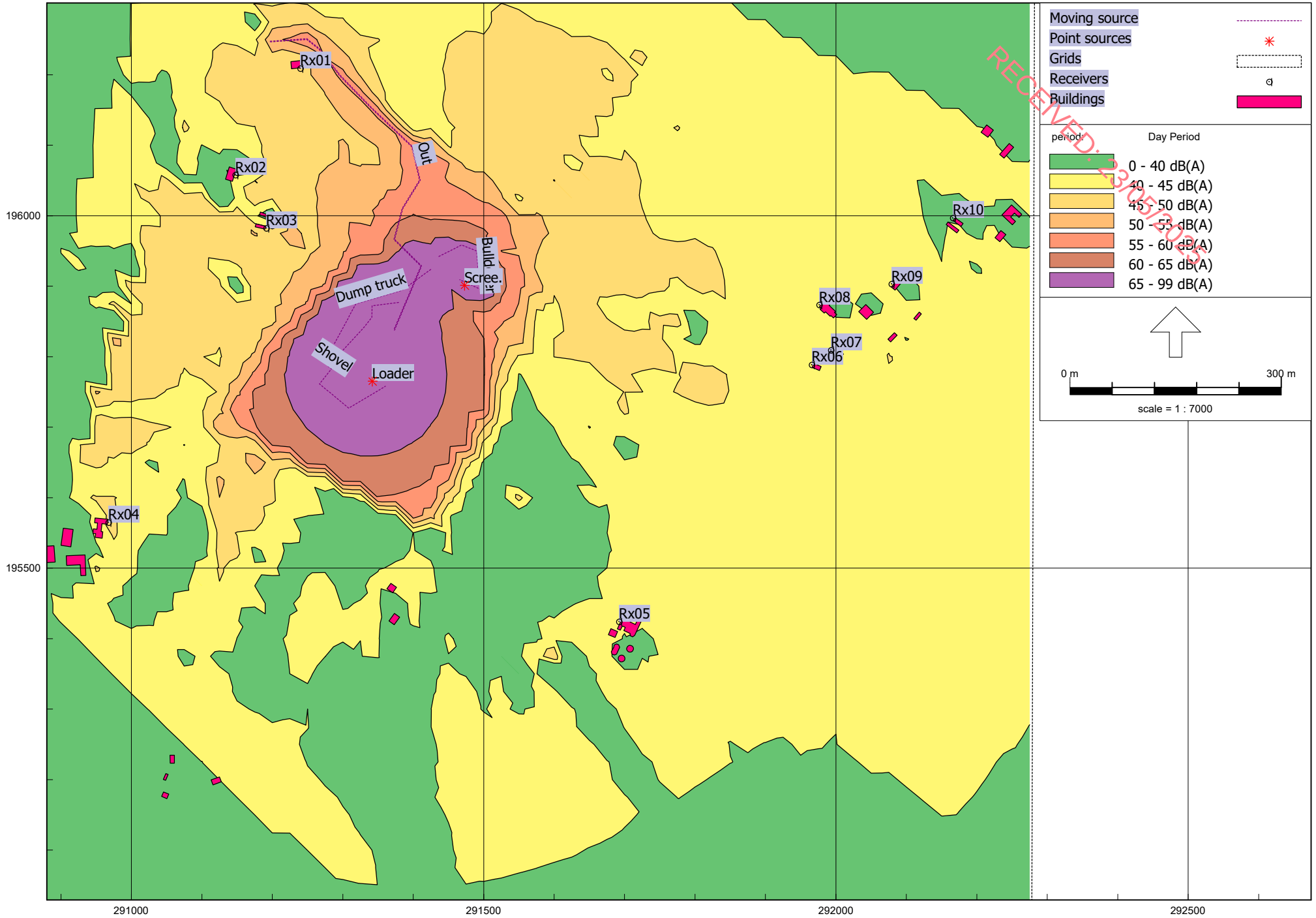
Name	Lw 63	Lw 125	Lw 250	Lw 500	Lw 1k	Lw 2k	Lw 4k	Lw 8k	Red 31	Red 63	Red 125	Red 250	Red 500	Red 1k	Red 2k	Red 4k	Red 8k
Loader	89.80	99.90	106.40	109.80	114.00	112.20	106.00	96.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scree.	98.10	89.30	89.00	85.10	85.10	83.40	77.40	67.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

E2169
Input - Sources and Receivers - Model 01

Model: Model 01
version of Area - Area
Group: (main group)
Listing of: Receivers, for method Industrial noise - ISO 9613

Name	Desc.	Terrain L	HDef.	Height A	Height B	Height C	Height D	Height E	Height F	Façade
Rx01	NSR01	160.90	Relative	1.50	4.00	--	--	--	--	No
Rx02	NSR02	162.63	Relative	1.50	4.00	--	--	--	--	No
Rx03	NSR03	157.00	Relative	1.50	4.00	--	--	--	--	No
Rx04	NSR04	161.00	Relative	1.50	4.00	--	--	--	--	No
Rx05	NSR05	155.06	Relative	1.50	4.00	--	--	--	--	No
Rx06		167.58	Relative	1.50	4.00	--	--	--	--	No
Rx07		169.85	Relative	1.50	4.00	--	--	--	--	No
Rx08	NSR06	165.30	Relative	1.50	4.00	--	--	--	--	No
Rx09		171.79	Relative	1.50	4.00	--	--	--	--	No
Rx10		174.47	Relative	1.50	4.00	--	--	--	--	No

APPENDIX 11-2-2



Model 01
28 Mar 2025, 10:15

Joanna Skorka - Malone O'Regan Environmental Services Ltd

APPENDIX 11-2-3

Report: Table of Results
Model: Model 01
LAeq: total results for receivers
Group: (main group)
Group Reduction: No

Name Receiver	Description	X	Y	Height	Day
Rx01_A	NSR01	291239.63	196209.22	1.50	49.4
Rx01_B	NSR01	291239.63	196209.22	4.00	50.2
Rx02_A	NSR02	291147.39	196058.13	1.50	40.3
Rx02_B	NSR02	291147.39	196058.13	4.00	45.5
Rx03_A	NSR03	291191.26	195982.60	1.50	49.5
Rx03_B	NSR03	291191.26	195982.60	4.00	51.1
Rx04_A	NSR04	290967.38	195564.97	1.50	39.8
Rx04_B	NSR04	290967.38	195564.97	4.00	46.9
Rx05_A	NSR05	291692.09	195424.27	1.50	42.6
Rx05_B	NSR05	291692.09	195424.27	4.00	43.1
Rx06_A		291965.80	195788.72	1.50	45.1
Rx06_B		291965.80	195788.72	4.00	45.4
Rx07_A		291992.98	195809.27	1.50	44.9
Rx07_B		291992.98	195809.27	4.00	45.3
Rx08_A	NSR06	291976.40	195873.58	1.50	43.4
Rx08_B	NSR06	291976.40	195873.58	4.00	43.7
Rx09_A		292078.78	195903.41	1.50	43.1
Rx09_B		292078.78	195903.41	4.00	43.5
Rx10_A		292166.01	195996.88	1.50	40.2
Rx10_B		292166.01	195996.88	4.00	40.6

All shown dB values are A-weighted

APPENDIX 11-2-4

Input - Sources and Receivers - Model 02

Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Moving source, for method Industrial noise - ISO 9613

Name	Desc.	ISO H	ISO Terr.	HDef.	Weighting	Flow(D)	Flow(E)	Flow(N)	Avg.speed	Max.dist.	Lw 31	Lw 63	Lw 125	Lw 250	Lw 500
Shovel	Loading shovel	0.75	--	Relative	Z	400	--	--	10	25.00	0.00	110.20	108.00	103.90	104.90
Shovel	Loading shovel	0.75	--	Relative	Z	828	--	--	10	25.00	0.00	110.20	108.00	103.90	104.90
In	Trucks going onsite	0.75	--	Relative	A	41	--	--	10	25.00	--	79.10	87.80	91.90	96.50
Out	Trucks departing Site	0.75	--	Relative	A	41	--	--	10	25.00	--	--	--	--	--
Bulldozer	Bulldozer	0.75	--	Relative	A	938	--	--	10	25.00	0.00	83.80	93.90	90.40	97.80
Dump truck	C10.19	0.75	--	Relative	A	656	--	--	10	25.00	0.00	99.80	105.90	108.40	109.80

Input - Sources and Receivers - Model 02

Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Moving source, for method Industrial noise - ISO 9613

Name	Lw 1k	Lw 2k	Lw 4k	Lw 8k	Red 31	Red 63	Red 125	Red 250	Red 500	Red 1k	Red 2k	Red 4k	Red 8k
Shovel	107.30	106.00	103.90	101.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shovel	107.30	106.00	103.90	101.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In	100.20	97.50	90.50	83.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Out	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bulldozer	97.00	96.20	95.00	84.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump truck	107.00	108.20	99.00	91.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

Name	Desc.	Height	Terrain L	HDef.	Type	DI	DI_Horz	DI_Vert	DI(0)	DI(10)	DI(20)	DI(30)	DI(40)	DI(50)	DI(60)	DI(70)
Excav	Wheeled excavator C4.10	1.50	144.30	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator		1.50	145.47	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wet	Screening Plant	2.00	146.71	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane	Crane	1.50	150.45	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scree.	Screening plant	2.00	151.00	Relative	Normal point source	none	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Input - Sources and Receivers - Model 02

Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

Name	DI(80)	DI(90)	DI(100)	DI(110)	DI(120)	DI(130)	DI(140)	DI(150)	DI(160)	DI(170)	DI(180)	Ca(D)	Ca(E)	Ca(N)	Weighting	No refl.	No building	No ind.site
Excav	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	A	No	No	No
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	A	No	No	No
Wet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	Z	No	No	No
Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	A	No	No	No
Scree.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	--	--	Z	No	No	No

Input - Sources and Receivers - Model 02

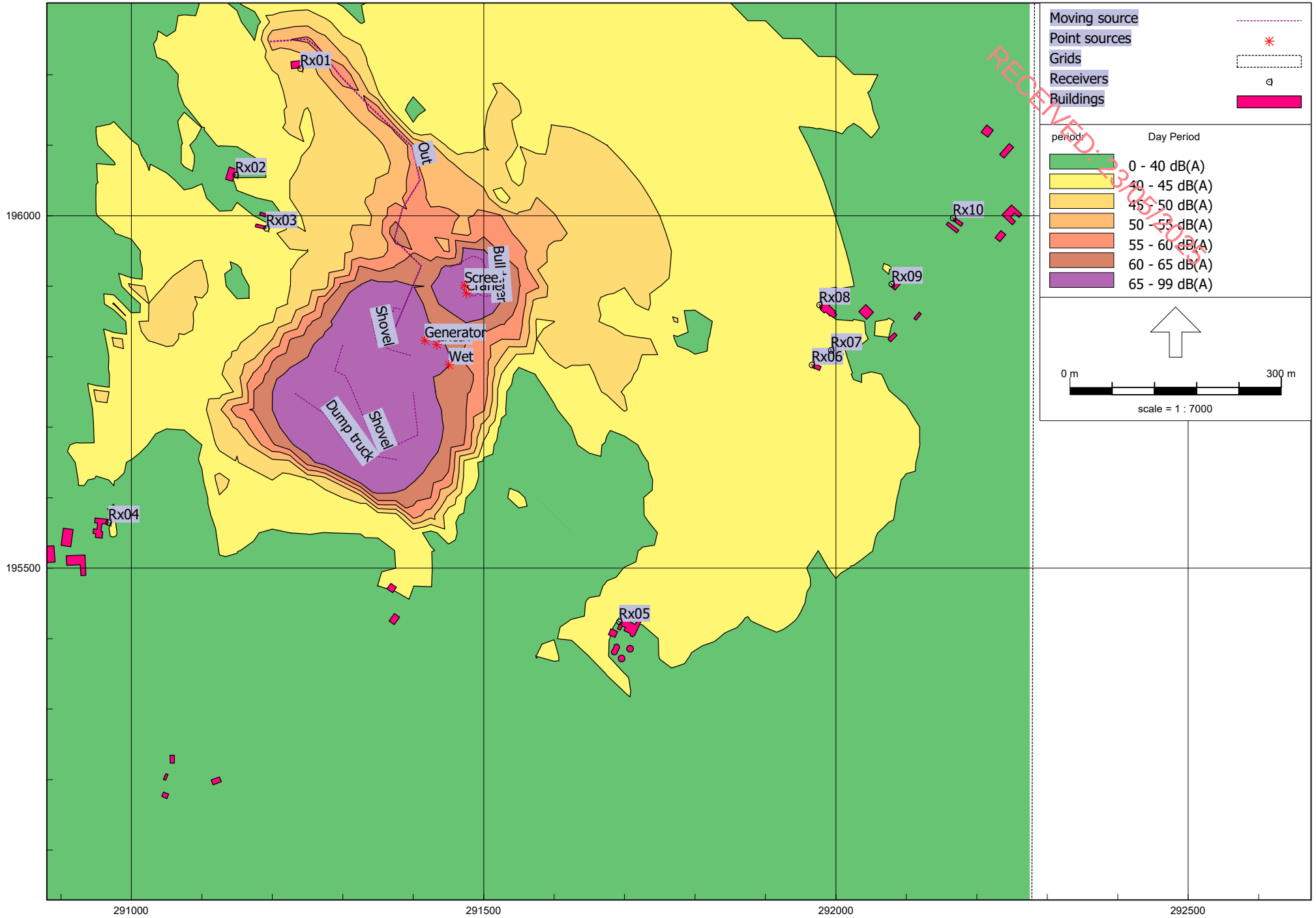
Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Point sources, for method Industrial noise - ISO 9613

Name	Lw 31	Lw 63	Lw 125	Lw 250	Lw 500	Lw 1k	Lw 2k	Lw 4k	Lw 8k	Red 31	Red 63	Red 125	Red 250	Red 500	Red 1k	Red 2k	Red 4k	Red 8k
Excav	0.00	65.80	71.90	82.40	88.80	90.00	86.20	80.00	71.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	58.80	82.90	84.40	85.80	88.00	85.20	81.00	70.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wet	--	95.00	94.00	92.00	89.00	87.00	88.00	85.00	81.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane	0.00	81.80	90.90	92.40	98.80	101.00	102.20	93.00	81.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scree.	--	98.10	89.30	89.00	85.10	85.10	83.40	77.40	67.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Model: Model 02
version of Area - Area
Group: (main group)
Listing of: Receivers, for method Industrial noise - ISO 9613

Name	Desc.	Terrain L	HDef.	Height A	Height B	Height C	Height D	Height E	Height F	Façade
Rx01	NSR01	160.94	Relative	1.50	4.00	--	--	--	--	No
Rx02	NSR02	163.09	Relative	1.50	4.00	--	--	--	--	No
Rx03	NSR03	157.00	Relative	1.50	4.00	--	--	--	--	No
Rx04	NSR04	161.00	Relative	1.50	4.00	--	--	--	--	No
Rx05	NSR05	155.06	Relative	1.50	4.00	--	--	--	--	No
Rx06		167.58	Relative	1.50	4.00	--	--	--	--	No
Rx07		169.85	Relative	1.50	4.00	--	--	--	--	No
Rx08	NSR06	165.30	Relative	1.50	4.00	--	--	--	--	No
Rx09		171.79	Relative	1.50	4.00	--	--	--	--	No
Rx10		174.47	Relative	1.50	4.00	--	--	--	--	No

APPENDIX 11-2-5



Model 02
2 Apr 2025, 10:03

Joanna Skorka - Malone O'Regan Environmental Services Ltd

APPENDIX 11-2-6

Report: Table of Results
Model: Model 02
LAeq: total results for receivers
Group: (main group)
Group Reduction: No

Name Receiver	Description	X	Y	Height	Day
Rx01_A	NSR01	291239.63	196209.22	1.50	46.2
Rx01_B	NSR01	291239.63	196209.22	4.00	47.5
Rx02_A	NSR02	291147.39	196058.13	1.50	37.4
Rx02_B	NSR02	291147.39	196058.13	4.00	43.6
Rx03_A	NSR03	291191.26	195982.60	1.50	45.6
Rx03_B	NSR03	291191.26	195982.60	4.00	46.9
Rx04_A	NSR04	290967.38	195564.97	1.50	33.5
Rx04_B	NSR04	290967.38	195564.97	4.00	42.1
Rx05_A	NSR05	291692.09	195424.27	1.50	42.6
Rx05_B	NSR05	291692.09	195424.27	4.00	43.2
Rx06_A		291965.80	195788.72	1.50	43.5
Rx06_B		291965.80	195788.72	4.00	43.9
Rx07_A		291992.98	195809.27	1.50	42.0
Rx07_B		291992.98	195809.27	4.00	42.4
Rx08_A	NSR06	291976.40	195873.58	1.50	41.8
Rx08_B	NSR06	291976.40	195873.58	4.00	42.2
Rx09_A		292078.78	195903.41	1.50	40.2
Rx09_B		292078.78	195903.41	4.00	41.3
Rx10_A		292166.01	195996.88	1.50	38.5
Rx10_B		292166.01	195996.88	4.00	39.3

All shown dB values are A-weighted

APPENDIX 11-3

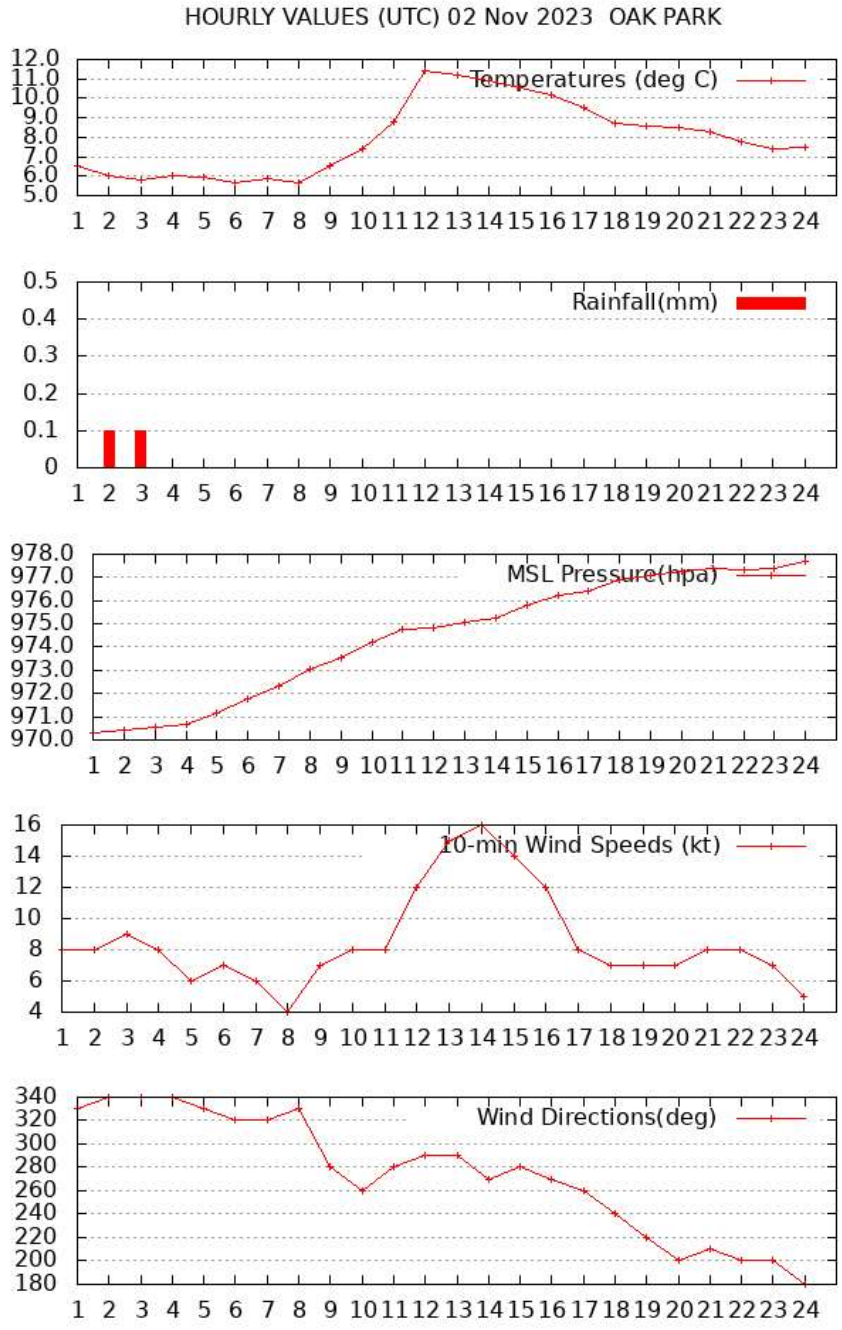
Daily Data

Weather station Data is available from 16/10/2015 to 01/04/2025

Select Station & Date: Station Oak Park Date 02/11/2023 Go

Weather Station Reports from Oak Park

Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)	Max Gust (>= 34 knots)	Sunshine (hours)
02/11/2023	0.2	11.5	5.4	3.9	8.4		



Daily Data

Climate

Climate of Ireland

Climate Change

Weather Extreme Records for Ireland

Major Weather Events

Summer Centre

Storm Centre

Past Weather Statements

Services

NFCS

Weather Observations Website WOW-IE

Available Data

What we measure

APPENDIX 11-4

CONTENTS

TABLES

PLATES

CHARTS

1 INTRODUCTION

This document supplies the frequency analysis charts, noise summary results and the sound level meter setup photos for each monitoring event.

Surveyor:	Dylan Morris	**Approver:**	Kenneth Goodwin
Revision Issue Number:	01	**Status:**	Final
Job Number:	E2169		

2 CALIBRATION OF SOUND LEVEL METER

The Sound Level Meter ('SLM') used was a

- NTI XL3 Audio Acoustic Hand-held Analyser SLM;

The SLM is Type 1 and equipped with Frequency Analysis Software.

The monitoring equipment was calibrated prior to and following the measurement period using a:

- Cirrus CR515 field calibrator (Serial Number 95601).

Broadband noise levels were measured using the A-weighted network, and a fast-sampling interval, unless otherwise stated.

Table 2-1: Calibration of the Sound Level Meter

Parameter	Detail
Project Name:	E2169
Device Info:	XL3, Serial No. A3A-00551-D1.
Mic Type:	NTI Audio M2230, SNo 13545
Mic Sensitivity:	41.75 mV/Pa, User calibrated 2023-11-02 09:35

3 NOISE SURVEY SUMMARY

Surveyor: Dylan Morris **Survey Date:** 02/11/2023

TN Issue Date: 19 May 2025

Scope: This noise survey was undertaken to characterise the acoustic environment at the proposed quarry. The attended summary noise results are presented in Table 3-1 below.

Table 3-1: Summary Noise Survey Results 2nd November 2023

Type	Date and Start Time	Duration	L_{Aeq} [dB]	$L_{90.0}$ [dB]	$L_{10.0\%}$ [dB]	L_{AFmax} [dB]	Commentary
NM1 R1	02/11/2023 09:37	0:30:00	58	37	61	74	Traffic on the N81 Dominant (W). N81 5-minute traffic count: 09:38-09:43= 14 vehicles passings. Truck passes on the N81 on seven occasions. Plane audible on two occasions (N). Birdsong audible throughout. Wind speed: 0-3m/s
NM1 R2	02/11/2023 10:07	0:30:00	56	37	61	74	Traffic on the N81 Dominant (W). N81 5-minute traffic count: 10:20-10:25= 12 vehicles passings. Truck passes on the N81 on nine occasions. Plane audible on two occasions (S). Birdsong audible throughout. Wind speed: 0-3m/s
NM2 R1	02/11/2023 11:17	0:30:00	47	41	49	70	Traffic on the N81 Dominant (W). Birdsong audible. Cattle audible near the SLM at 11:18-11:23. The L_{AFmax} peak is associated with vocalizations made from the cattle near the SLM. Distant HGV movements audible on multiple occasions. Wind speed: 0-3m/s
NM2 R2	02/11/2023 11:47	0:30:00	46	41	49	58	Traffic on the N81 Dominant (W).

Type	Date and Start Time	Duration	L_{Aeq} [dB]	$L_{90.0}$ [dB]	$L_{10.0\%}$ [dB]	L_{AFmax} [dB]	Commentary
							Birdsong audible. Distant HGV movements audible on multiple occasions. Wind speed: 0-3m/s

4 NOISE MONITORING LOCATIONS 1/3 OCTAVE CHARTS

4-1 NM1

Plate 1: NM1 Location

Chart 1: NM1 Run 1 1/3 Octave Frequency Analysis

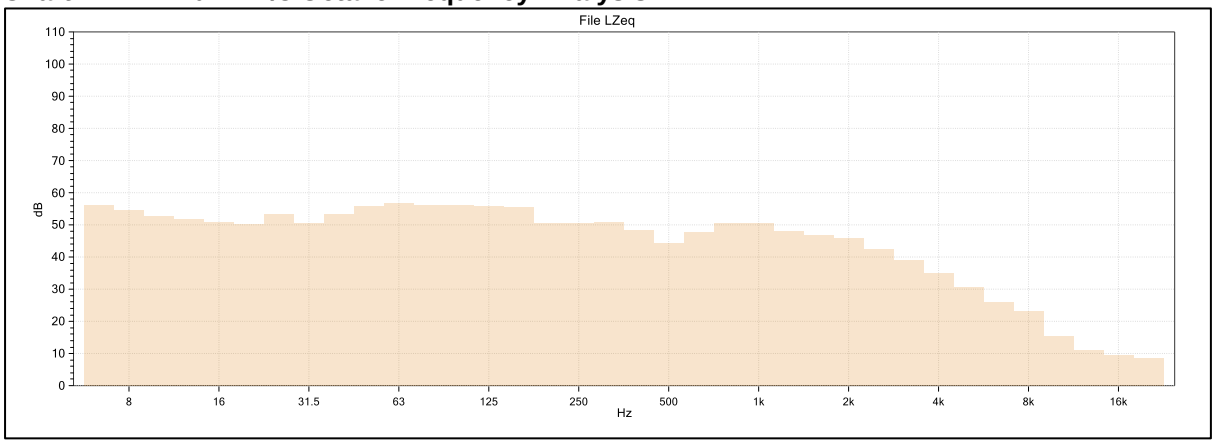
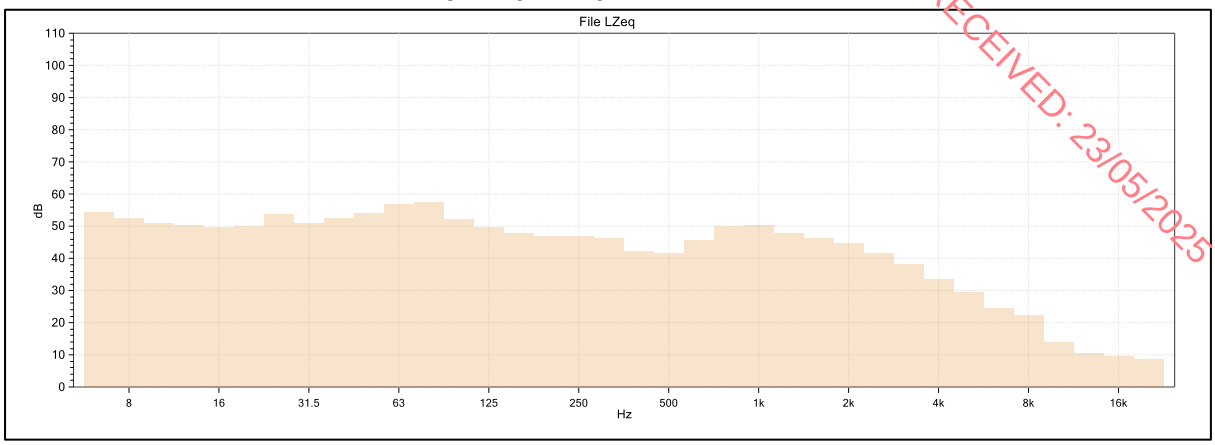


Chart 2: NM1 Run 2 1/3 Octave Frequency Analysis



4-2 NM2

Plate 2: NM2 Location

Chart 3: NM2 Run 1 1/3 Octave Frequency Analysis

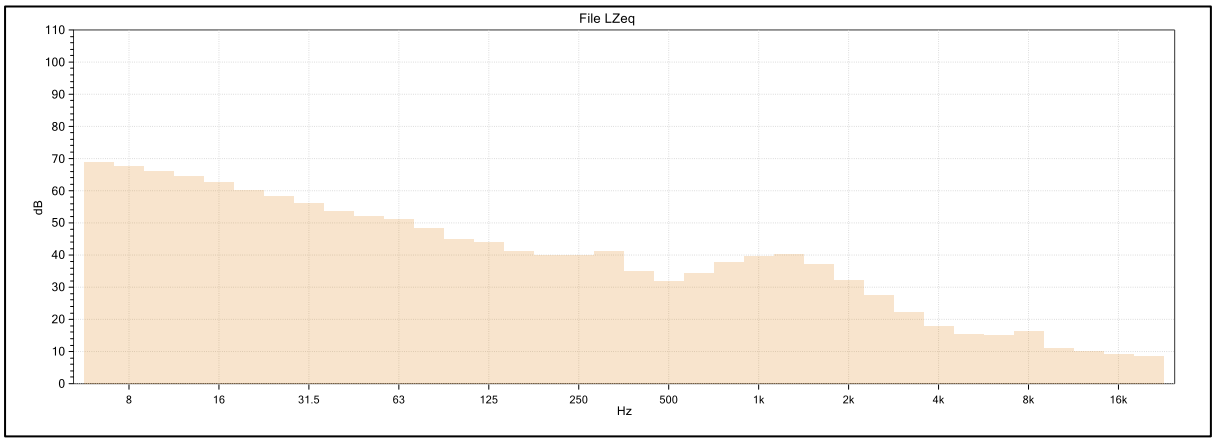
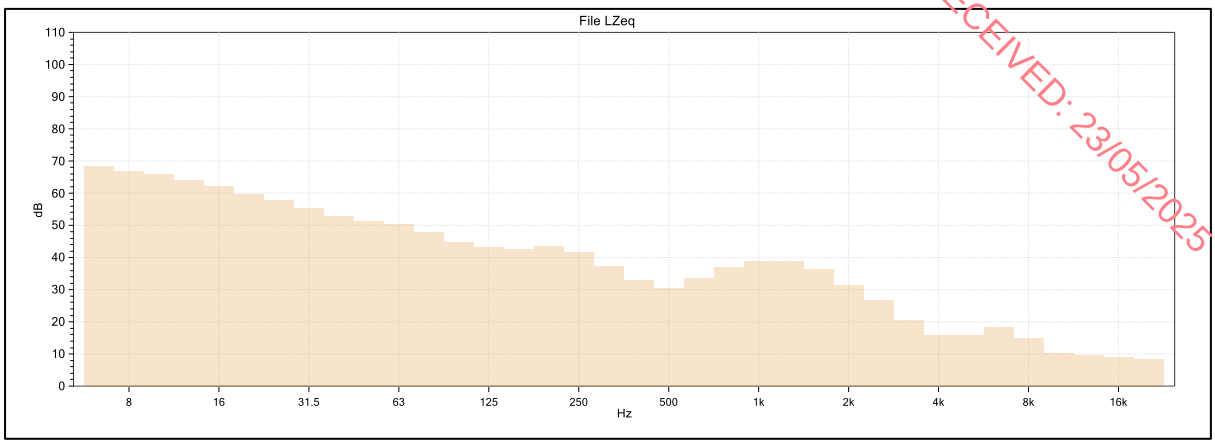


Chart 4: NM2 Run 2 1/3 Octave Frequency Analysis



APPENDIX 12

APPENDIX 12-1

Report on a Geophysical Survey at Whitestown Lower, Donard, Co. Wicklow

Archaeological Management Solutions

By Jeff O'Neill

With contributions by Finn Melia Detection

Device Consent No.: 24R0466

For Mr. James Metcalfe and Mr. Thomas Metcalfe

November 2024

TITLE PAGE

AMS Job No.:	J3488
Project Name:	Whitestown Lower, Donard, Co. Wicklow
Report Title:	Report on a Geophysical Survey at Whitestown Lower, Donard, Co. Wicklow
Client Name:	Mr. James Metcalfe and Mr. Thomas Metcalfe
Townland Name(s):	Whitestown Lower
Grid Reference (ITM):	691304 695804
Detection Consent No.:	24R0466
Date of Survey:	23–24 September 2024
Report Status/Revision:	1.5
Revision Date:	4 December 2024
Report Author:	Jeff O'Neill
Contributor:	Finn Melia
Technical Reviewer:	Dr James Bonsall
Copyeditor:	Bryn Coldrick
Approved By:	Dr James Bonsall
Date of Issue:	
File Name:	J3488_Whitestown_Lower_Geophysical Report_v.1.5

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Executive Summary

This report describes the results of an archaeological geophysical survey within Lands Made Available (LMA) at Whitestown Lower, Donard, Co. Wicklow. The geophysical survey was required as part of an archaeological assessment.

The Study Area consists of 7.6 hectares in total, located in the townlands of Whitestown Lower. The survey was confined within the LMA.

The area surveyed as part of this project yielded generally strong responses that revealed a range of possible archaeological features. In addition to commonly detected small pit-like features and historic field boundaries, approximately twelve anomalies of potential archaeological significance were identified. Eight of these anomalies are in the northern field and four are present in the southern field. These included large linears, curvilinears and a potential enclosing anomaly. This enclosing anomaly located in the northern field contained several potential internal features also. However, the varying strengths of the contrasts suggest different levels of subsurface disturbances or material composition, complicating interpretations as the anomalies may be from archaeological, modern or natural origins.

Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning authority may issue recommendations/ conditions.

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List of Figures

Abbreviations and Acronyms

Abbreviation/Acronym	Definition
AMS	Archaeological Management Solutions
DIER	Database of Irish Excavation Reports
ECa	Electrical Conductivity
EMI	Electromagnetic Induction
ERa	Apparent Electrical Resistivity
ERI	Electrical Resistivity
GIS	Geographic Information System
HCP	Horizontal Coplanar
ITM	Irish Transverse Mercator
LMA	Lands Made Available
MSa	Apparent Magnetic Susceptibility
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NMS	National Monuments Service
OS	Ordnance Survey
SMR	Sites and Monuments Record
WMS	Web Map Service

Coordinate Reference System

All grid coordinates in this report use the Irish Transverse Mercator (ITM) coordinate reference system unless otherwise stated.

1 Introduction

1.1 Project Background

This report describes the results of an archaeological geophysical survey carried out within Lands Made Available (LMA) at Whitestown Lower, Donard, Co. Wicklow (Figure 1). The geophysical survey was required as part of an archaeological assessment for a proposed quarry extension.

The Study Area consists of 7.6 hectares in total, located in Whitestown Lower townland and the survey was confined within the LMA. Access to the lands for the purposes of the survey was arranged by agreement between the archaeological consultant, and the landowners. The archaeological geophysical survey was undertaken on behalf of Mr. James Metcalfe and Mr. Thomas Metcalfe and comprised electromagnetic induction (EMI) survey.

1.2 Site Location

The survey areas were located in the townlands of Whitestown Lower, Co. Wicklow (Figure 1). The maximum area investigated was approximately 7.6 hectares, spread across two grassland fields (GS-01 to GS-2).

1.3 Soils and Geology

The local soils consist of well-draining fine loamy drift with siliceous stones. The quaternary comprises gravels derived from granite. The bedrock consists of dark slate-schist, quartzite and coticule (Butter Mountain Formation).

1.4 Ordnance Survey Mapping

Historical mapping for the site indicates that the current field boundaries were all present on the earliest Ordnance Survey (OS) mapping, with few changes occurring since (Figure 5). The changes that have occurred include four fields on the first-edition six-inch OS map (1837), rather than the two that currently exist.

1.5 Recorded Archaeological Sites

There are no archaeological sites listed in the Sites and Monuments Record (SMR) within the survey area (Figure 3). There is one SMR sites located within 500m of the survey areas. WI021-016---- (Redundant Record)[1] is located 271m southwest of Whitestown Lower (Figure 3).

[1] Listed in the SMR (1986) as 'Miscellaneous' on the basis that Whitestown House might be the location of a pre-1700 structure or castle site. There is no evidence of any archaeological material here (NMS 2012).

Table 1. SMR sites located within 500m of the Survey Area

Ref No.	Description	Townland	SMR ZoN Proximity
WI021-016----	Redundant Record	Whitestown Lower	Located 271m Southwest of WS-1

1.6 Purpose and Scope of the Assessment

The purpose of the geophysical survey was to identify any potential archaeological deposits that might be present in the survey area using the following objectives:

- Identify any geophysical anomalies of possible archaeological origin within the specified survey areas.
- Accurately locate these anomalies and present the findings in map form.
- Describe the anomalies and discuss their likely provenance in a written report.
- Incorporate all of the above in reports to the Client.
- Prepare and submit archives of the project data and reports.

1.7 NMI Topographical Finds

There are no stray finds recorded in the National Museum of Ireland's (NMI) online Finds Database, as available on Heritage Maps, within the immediate area of the proposed development.[2]

1.8 Built Heritage

There are no sites listed on the National Inventory of Architectural Heritage (NIAH) or the Record of Protected Structures (RPS) within the survey areas.

[2] https://heritagemaps.ie/WebApps/HeritageMaps/index.html this database only includes finds recorded in the National Museum of Ireland's (NMI) topographical files up to 2010 and is often found to be inaccurate and unreliable. [Accessed: 02 October 2024].

2 Methodology

2.1 Personnel

The survey was undertaken by Jeff O'Neill (Archaeological Geophysical Supervisor) and Finn Meila (Archaeological Geophysical Assistant). The methodology was approved by the Archaeological Licensing Section of the National Monuments Service (NMS) and Consent to use a Detection Device under Section 2 (2) of the National Monuments (Amendment) Act, 1987, was issued to Jeff O'Neill by the Minister for Housing, Local Government and Heritage: Consent No.: 24R0466. The report was written by Jeff O'Neill and Finn Melia.

2.2 Electromagnetic Induction Survey

The EMI technique has a long history of successfully identifying archaeology via the collection of inphase and quadrature data (Colani 1966; Colani & Aitken 1966; Howell 1966) to characterise the magnetic and conductivity properties of the underlying soil.

2.2.1 Data Capture

The EMI data were acquired using a GF Instruments CMD Mini-Explorer (Bonsall et al. 2014). The instrument collected both quadrature (later referred to here as apparent electrical conductivity) data and inphase data simultaneously. An apparent electrical conductivity (or ECa) survey produces data which are the reciprocal of apparent electrical resistivity data. Thus, a high conductivity anomaly, such as that caused by a ditch, will produce a comparable low resistance anomaly. Inphase data respond to the magnetic content of the underlying soil, as such inphase data are similar to magnetic susceptibility data; it is referred to here as apparent magnetic susceptibility (MSa).

The horizontal coplanar (HCP) configuration (in the vertical dipole orientation or the 'full depth' range) was used (as opposed to the half depth range offered by the horizontal dipole orientation ('Low') option). The depth range for the vertical dipole (recording data from three levels simultaneously) is 0.5m, 1.0m and 1.8m below the sensor. Quadrature data were acquired in mS/m to a resolution of 0.1 mS/m, and the inphase data were acquired in ppt to a resolution of 0.1ppt.

The CMD Mini-Explorer was mounted on a cart and acquired data gridlessly connected to a Carlson BRX7 GNSS Smart Antenna RTK GPS, achieving a spatial resolution of 0.1m accuracy. The data were collected along traverses spaced 0.5m apart, with data collected every 0.3 seconds along the traverse. The data were collected in continuous mode by a time-based sample trigger connected via Bluetooth to the instrument and the RTK GPS. The data were stored in an automatic data logger and downloaded to a field computer.

2.2.2 Data Processing

The ECa data were automatically converted to apparent electrical resistivity (or ERa) data in GF Instruments CMD PC download Software and are displayed in ohm metres. Both ERa and MSa data were gridded in Surfer to a spatial resolution of 0.5m x 0.25m.

2.2.3 Data Visualisation

The data were brought into QGIS as a GeoTIFF for display and interpretation as greyscale images. The analysis of archaeological features using horizontal coplanar (HCP) conductivity and inphase derived data is somewhat complicated due to a signal polarity change. The polarity shift in HCP occurs at depths greater than 1m. This means that the polarity of data from HCP Level 3 at a depth of investigation of 1.8m is reversed, i.e., low conductivity/magnetic susceptibility anomalies appear high and vice versa. It is worth noting that this polarity change is an inherent characteristic of HCP coils and has been well documented over the last 50 years by various studies (Tabbagh 1986; Linford 1998). Despite this potential confusion, the polarity shift does not hinder the ability to differentiate between anomalous contrasts and background responses, and all the datasets presented still reveal clear archaeological features.

2.3 Data Management, Processing, and Interpretation

This project used QGIS (Version 3.22.14) as a Geographical Information System (GIS) to manage the project. QGIS is an open-source GIS which can be used to create, edit, visualise, analyse and publish geospatial information.[3] This project used the long-term release version of the software (3.22.14) as the basic platform to access, view and analyse the geophysical visualisations produced in Magneto. QGIS also allowed us to compare the visualisations with other relevant geospatial databases, record the analysis through digitising the morphology and magnitude of anomalies identified, and output a table catalogue of this analysis and corresponding maps.

For the purposes of this project, the following datasets were also accessed and/or downloaded:

- Tailte Éireann historical maps and orthographic photographs of the Study Areas, viewed online;[4]
- Sites and Monuments Record (SMR) point and polygon vectors as a Web Map Service (WMS);[5]
- NIAH point vector (downloaded from www.archaeology.ie);

[3] QGIS. Quantum GIS v3.22.14. https://www.qgis.org/en/site/ [Accessed 10 October 2024].

[4] Accessed from: https://maps.archaeology.ie/HistoricEnvironment/ [Accessed 8 October 2024].

[5] SMR data accessed from: https://data.gov.ie/dataset/national-monuments-service-archaeological-survey-of-ireland [Accessed 10 October 2024].

- Rivers and lakes as a WMS (downloaded from https://gis.epa.ie/GetData);
- National soils database as a vector layer (downloaded from https://gis.epa.ie/GetData/Download);
- Townlands vector layer.[6]

The following vector layers were generated for the project:

- A polygon for the Survey Area.
- Polygons for each identified geophysical anomaly.

The dimensions of individual anomalies were calculated in QGIS using the measure tools. All anomalies are defined by polygons.

2.4 Standards

The geophysical survey and report follow the recommendations outlined by relevant best practice guidance documents as a minimum standard (Bonsall *et al*. 2014; David *et al*. 2008; Gaffney *et al*. 2002; Schmidt *et al*. 2015). Geophysical data, shapefiles, figures and the text have been archived following the recommendations of the Archaeology Data Service (Schmidt & Ernenwein 2011). Raw geophysical data and GIS shapefiles are available in the archive.

[6] Vector layer downloaded from: www.townlands.ie; townland names confirmed against the OS townlands list from https://data.gov.ie/dataset/townland.

3 Geophysical Survey Results

The anomalies identified in the survey predominantly consist of linear and curvilinear as well as potential pit-like features and a potential enclosing anomaly.

There were some field boundaries that were visible on early historical OS maps. The anomaly with the highest archaeological potential is WN-1 and its internal features WN-2 – WN-5. This may indicate a large enclosure of 80m with associated internal features, possibly structures. This is located in the northeast corner of the northern Whitestown Lower field.

Table 2. Electrical conductivity survey identified anomalies

Anomaly ID	Anomaly Type	Size	Description	Interpretation
WN-1	? Archaeology	80m x 7.5m	Subcircular poss. enclosure	This is located in the northeast corner of the northern field and may indicate a large enclosure with internal features.
WN-2	? Archaeology	8m x 6m	Possible Internal anomaly	This may represent an internal feature of WN-1.
WN-3	? Archaeology	11m x 2m	Possible Internal anomaly	This may represent an internal feature of WN-1.
WN-4	? Archaeology	8m x 3.5m	Possible Internal anomaly	This may represent an internal feature of WN-1.
WN-5	? Archaeology	9m x 3.5m	Possible Internal anomaly	This may represent an internal feature of WN-1.
WN-6	? Archaeology	2m x 1.5m	Potential pit	This may represent a pit like feature.
WN-7	? Archaeology	215m x 1 Metre	Very faint rectilinear anomaly	This faint feature may indicate the presence of a rectilinear anomaly, possible a large ditch, running east–west.
WN-08	? Archaeology	200m x 2m	Strong Linear anomaly	This anomaly appears in both datasets. This may represent a ditch running east–west along the centre of the survey area.
WS-In-01	? Archaeology	122m x 2m	Linear anomaly	It is a linear anomaly running north–south and may represent a possible ditch.
WS-02	? Archaeology	275m x 2.5m	Strong Linear anomaly	This anomaly appears in both datasets. This may represent a ditch running east–west along the centre of the study area.
WS-03	? Archaeology	49m x 2m	Linear anomaly	This anomaly appears in both datasets. This may represent a ditch running east–west along the eastern edge of the study area.
WS-04	? Archaeology	80m x 1.5m	Faint Linear Anomaly	This anomaly appears in the Inphase dataset only. This may represent a ditch running northeast–southwest along the centre of the study area.

4 Conclusions and Recommendations

The Electromagnetic Induction survey effectively characterised the extent of potential archaeological deposits across the site. The two fields surveyed as part of this project yielded generally strong responses that revealed a range of possible archaeological features. In addition to commonly detected small pit-like features and historic field boundaries, approximately twelve anomalies of potential archaeological significance were identified. An enclosing anomaly is present in the northeast of the north field. This anomaly, WN1, may represent an enclosure type feature with numerous internal anomalies present. This could represent an enclosure or ring-ditch with internal posts or slot-trenches.

Notable features include several curvilinear and rectilinear anomalies such as WN-1. These anomalies may indicate the presence of possible enclosing elements or may represent pre-OS field systems.

In summary, this survey has identified a mix of anomalies that may represent potential archaeological features, modern disturbances, and natural geological formations. The varying strengths of the contrasts suggest different levels of subsurface disturbances or material composition, complicating interpretations as the anomalies may be from archaeological, modern or natural origins.

Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning authority may issue recommendations/ conditions.

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Figures

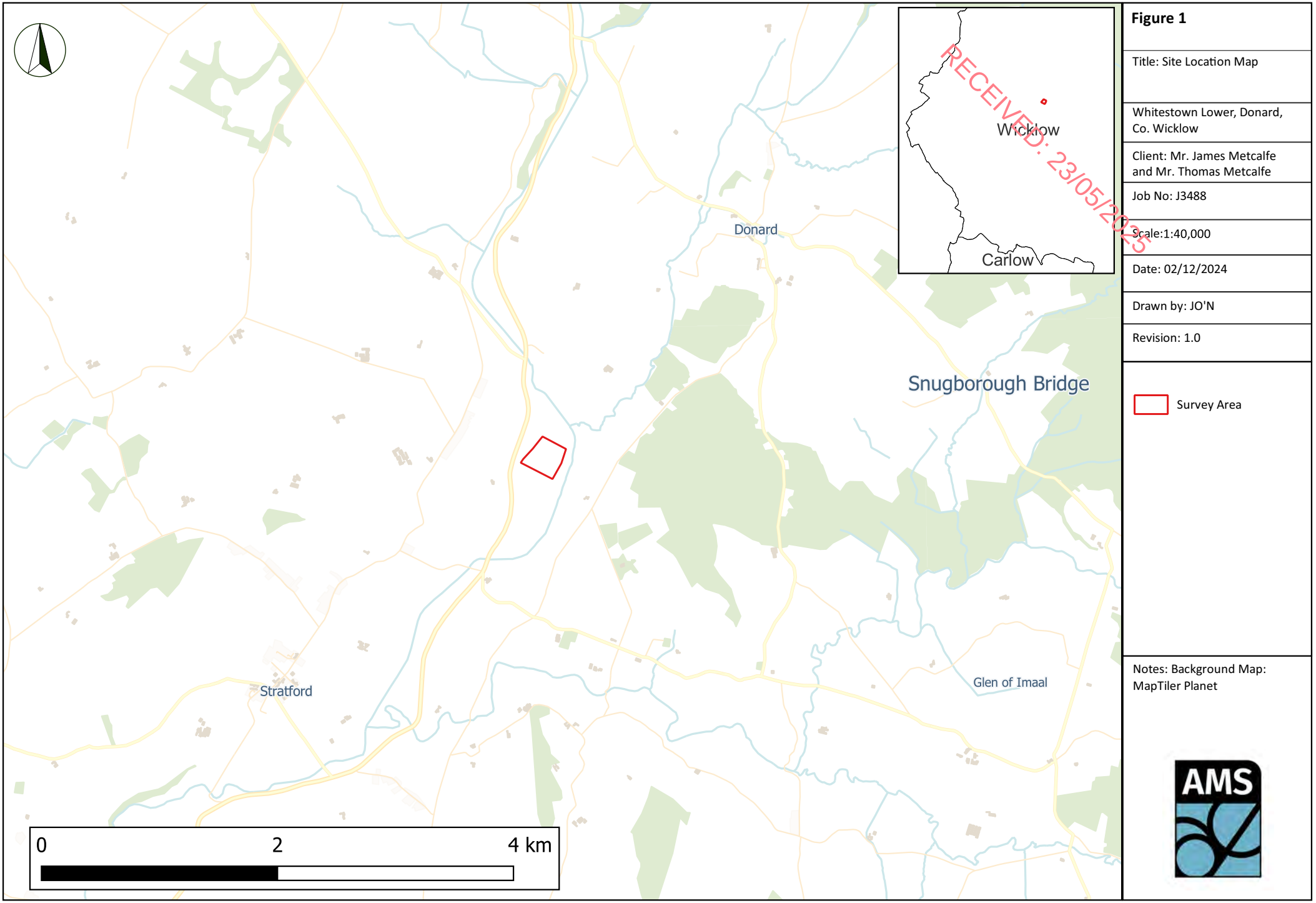


Figure 1

Title: Site Location Map

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:40,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

Survey Area

Notes: Background Map: MapTiler Planet

AMS

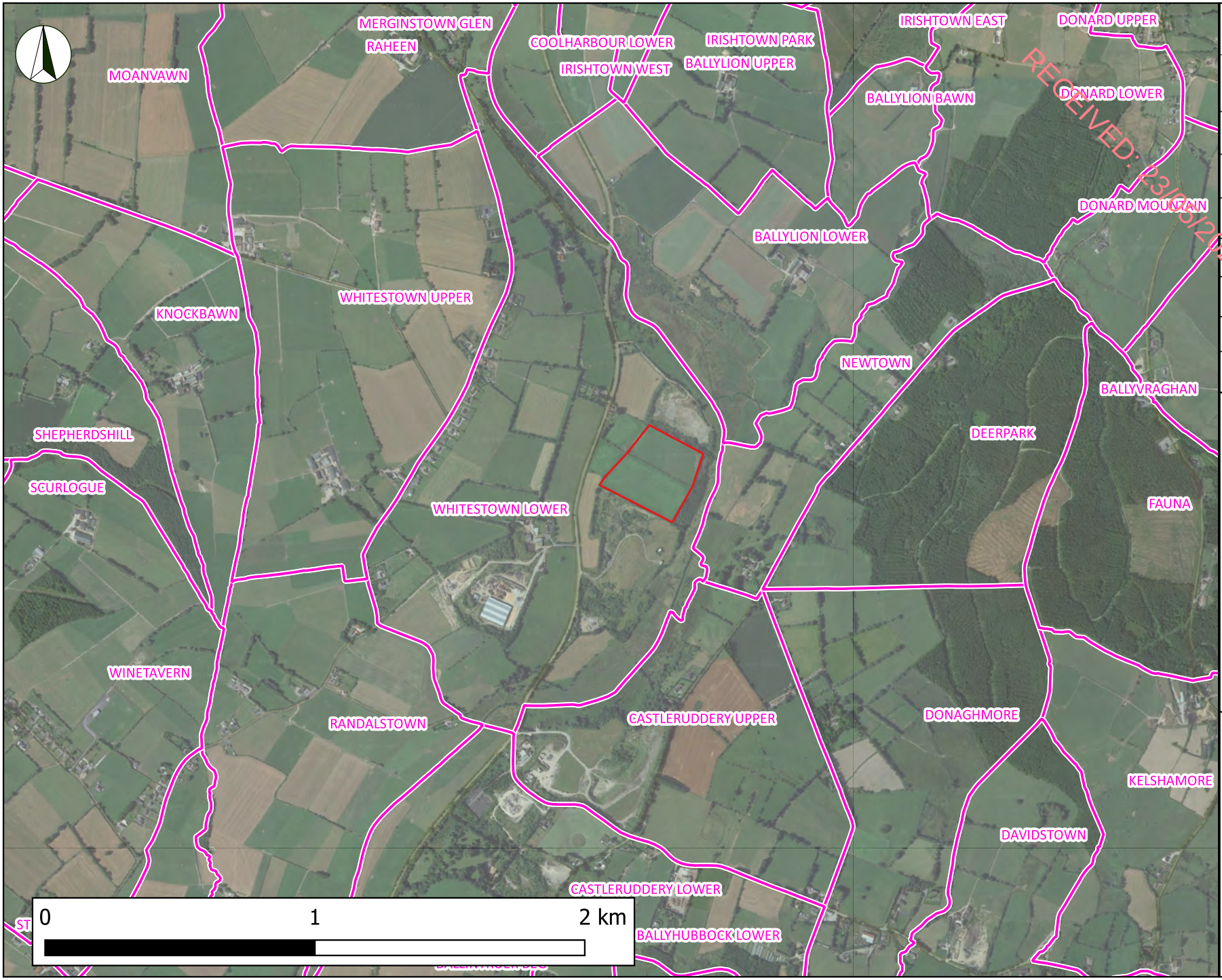


Figure 2

Title: Detailed Location Map

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:19,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

Survey Area

Townland

Notes: Background Map: Google Satellite ©2024 Google
Townland Data: © OSi

Figure 3

Title: Cultural Heritage Map

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:3,200

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

SMR Site

Survey Area

Notes: Background Map: Google Satellite ©2024 Google SMR Data: © Government of Ireland

AMS

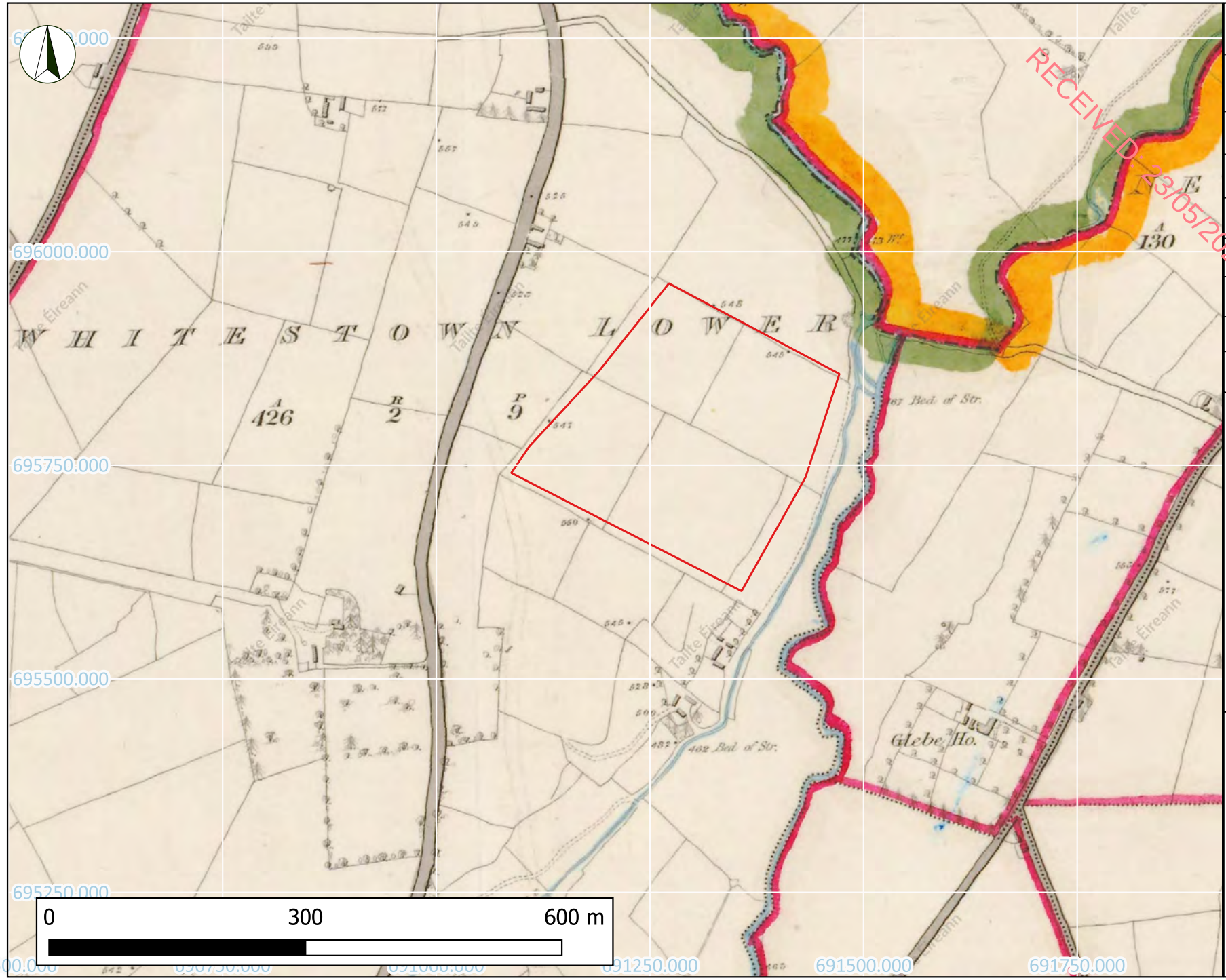


Figure 4

Title: Historic 6-Inch Ordnance Survey Map (1837)

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:6,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

Survey Area

Notes: Background Map: Historic 6-Inch Ordnance Survey Map (1837)

Figure 5

Title: Apparent Electrical Resistivity

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:2,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

Survey Area

Notes: Background Map:
Google Satellite: © 2024 Google Satellite
Resistivity 2 Data
EMI MRa Data Dynamic Range: 170Ω (Black) to 190Ω (White)

AMS

Figure 6

Title: Apparent Magnetic Suseptibility

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. Jamese Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:2,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

Survey Area

Notes: Background Map: Google Satellite: © 2024 Google Satellite
Inphase 2 Data EMI MSa Data Dynamic Range: 6.25 ppm (Black) to 6.53 ppm (White)

AMS

Figure 7

Title: Interpretation

Whitestown Lower, Donard, Co. Wicklow

Client: Mr. James Metcalfe and Mr. Thomas Metcalfe

Job No: J3488

Scale:1:2,000

Date: 02/12/2024

Drawn by: JO'N

Revision: 1.0

? Archaeology

Field Boundary

Survey Area

Notes: Background Map: Google Satellite: © 2024 Google Satellite

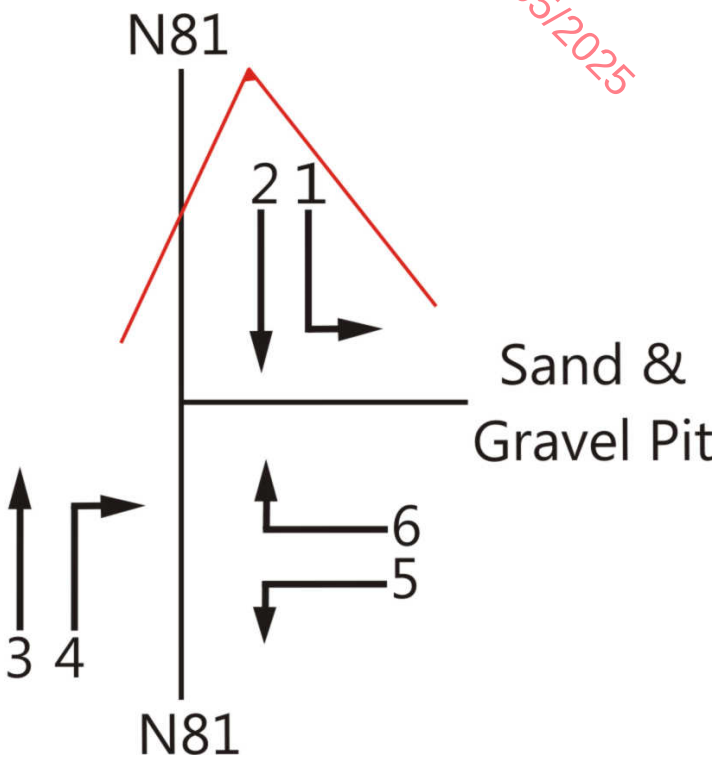
AMS

APPENDIX 13

APPENDIX 13-1

Site Location

Movement Numbers



Job number: TRA/24/006	Job Date: 23rd January 2024	Drawing No: TRA/24/006-01	traffinomics.ie
Client: PMCE	Job Day: Tuesday	Author: JW	

WHITESTOWN TRAFFIC COUNT **JANUARY 2024**

MANUAL CLASSIFIED JUNCTION TURNING COUNT **TRA/24/006**

SITE: 01 DATE: 23rd January 2024

LOCATION: N81/Sand & Gravel Pit Access DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	5	3	0	2	0	10	13	72	8	1	3	0	84	88
07:15	0	0	0	0	0	0	0	7	1	1	1	0	10	12	66	6	0	1	0	73	74
07:30	0	0	0	0	0	0	0	10	2	1	4	0	17	23	77	6	1	5	0	89	96
07:45	0	0	0	0	0	0	0	23	1	2	1	0	27	29	63	5	1	3	0	72	76
H/TOT	0	0	0	0	0	0	0	45	7	4	8	0	64	76	278	25	3	12	0	318	335
08:00	0	0	0	0	0	0	0	22	4	0	2	0	28	31	57	8	1	6	0	72	80
08:15	0	0	0	0	0	0	0	20	5	2	1	0	28	30	76	10	2	3	0	91	96
08:30	0	0	0	1	0	1	2	27	8	0	3	0	38	42	82	12	4	0	0	98	100
08:45	0	0	0	1	0	1	2	27	6	4	2	2	41	48	51	14	2	3	0	70	75
H/TOT	0	0	0	2	0	2	5	96	23	6	8	2	135	150	266	44	9	12	0	331	351
09:00	0	0	0	0	0	0	0	19	4	0	5	1	29	37	31	12	1	3	2	49	55
09:15	0	0	0	0	0	0	0	23	6	1	2	0	32	35	26	11	3	1	0	41	44
09:30	0	0	0	0	0	0	0	25	3	2	2	0	32	36	19	9	0	3	0	31	35
09:45	0	0	0	0	0	0	0	15	4	1	1	1	22	25	26	10	2	4	2	44	52
H/TOT	0	0	0	0	0	0	0	82	17	4	10	2	115	132	102	42	6	11	4	165	186
10:00	0	0	0	3	0	3	7	11	4	0	2	0	17	20	14	10	3	2	0	29	33
10:15	0	0	0	1	0	1	2	12	8	2	4	0	26	32	20	6	3	2	0	31	35
10:30	0	0	0	1	0	1	2	21	8	3	2	1	35	40	17	6	2	1	0	26	28
10:45	0	0	0	1	0	1	2	15	9	2	5	1	32	41	22	3	4	5	0	34	43
H/TOT	0	0	0	6	0	6	14	59	29	7	13	2	110	132	73	25	12	10	0	120	139
11:00	0	0	0	0	0	0	0	21	5	1	3	1	31	36	17	3	1	5	1	27	35
11:15	0	0	0	0	0	0	0	12	6	1	1	0	20	22	15	9	1	5	0	30	37
11:30	0	0	0	0	0	0	0	26	4	4	1	0	35	38	24	6	2	3	0	35	40
11:45	0	0	0	0	0	0	0	13	6	1	3	1	24	29	21	5	1	2	1	30	34
H/TOT	0	0	0	0	0	0	0	72	21	7	8	2	110	126	77	23	5	15	2	122	146
12:00	0	0	0	0	0	0	0	15	4	5	6	0	30	40	11	4	0	2	2	19	24
12:15	0	0	0	0	0	0	0	17	7	0	2	1	27	31	19	8	3	1	0	31	34
12:30	0	0	0	0	0	0	0	21	11	0	3	0	35	39	17	2	1	4	0	24	30
12:45	0	0	0	0	0	0	0	17	5	1	2	0	25	28	22	2	1	2	0	27	30
H/TOT	0	0	0	0	0	0	0	70	27	6	13	1	117	138	69	16	5	9	2	101	117

WHITESTOWN TRAFFIC COUNT **JANUARY 2024**

MANUAL CLASSIFIED JUNCTION TURNING COUNT **TRA/24/006**

SITE: 01 DATE: 23rd January 2024

LOCATION: N81/Sand & Gravel Pit Access DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	23	6	3	2	1	35	40	21	7	3	0	0	31	33
13:15	0	0	0	1	0	1	2	19	1	0	3	0	23	27	22	3	0	5	0	30	37
13:30	0	0	0	0	0	0	0	16	7	1	2	0	26	29	17	4	3	4	0	28	35
13:45	0	0	0	1	0	1	2	24	6	4	2	1	37	43	22	3	1	1	0	27	29
H/TOT	0	0	0	2	0	2	5	82	20	8	9	2	121	139	82	17	7	10	0	116	133
14:00	0	0	0	1	0	1	2	24	11	2	2	1	40	45	21	3	0	1	1	26	28
14:15	0	0	0	1	0	1	2	21	9	2	2	1	35	40	13	4	4	2	2	25	32
14:30	0	0	0	0	0	0	0	24	4	1	7	3	39	52	25	6	0	3	1	35	40
14:45	0	0	0	0	0	0	0	25	4	0	3	0	32	36	26	6	3	2	1	38	43
H/TOT	0	0	0	2	0	2	5	94	28	5	14	5	146	172	85	19	7	8	5	124	143
15:00	0	0	0	0	0	0	0	23	5	1	4	0	33	39	14	7	3	5	1	30	39
15:15	0	0	0	0	0	0	0	28	11	2	1	0	42	44	22	3	1	4	0	30	36
15:30	0	0	0	0	0	0	0	27	3	2	4	0	36	42	32	5	0	0	1	38	39
15:45	0	0	0	0	0	0	0	45	6	1	3	0	55	59	26	4	0	0	0	30	30
H/TOT	0	0	0	0	0	0	0	123	25	6	12	0	166	185	94	19	4	9	2	128	144
16:00	0	0	0	1	0	1	2	66	20	3	2	1	92	97	22	2	0	0	1	25	26
16:15	0	1	0	0	0	1	1	46	11	3	4	0	64	71	29	9	1	5	0	44	51
16:30	0	0	0	0	0	0	0	59	16	2	2	1	80	85	20	8	2	2	0	32	36
16:45	0	0	0	0	0	0	0	54	22	2	2	0	80	84	21	4	2	2	1	30	35
H/TOT	0	1	0	1	0	2	3	225	69	10	10	2	316	336	92	23	5	9	2	131	147
17:00	0	0	0	0	0	0	0	53	22	0	3	1	79	84	18	4	1	0	0	23	24
17:15	0	0	0	0	0	0	0	69	13	2	4	0	88	94	19	5	1	0	0	25	26
17:30	0	0	0	0	0	0	0	83	1	1	2	0	87	90	31	2	0	1	0	34	35
17:45	0	0	0	0	0	0	0	72	7	2	2	1	84	89	26	3	1	0	1	31	33
H/TOT	0	0	0	0	0	0	0	277	43	5	11	2	338	357	94	14	3	1	1	113	117
18:00	0	0	0	0	0	0	0	64	8	2	1	0	75	77	28	3	0	1	1	33	35
18:15	0	0	0	0	0	0	0	60	3	1	0	0	64	65	25	2	1	0	0	28	29
18:30	0	0	0	0	0	0	0	53	4	0	0	1	58	59	22	2	0	0	0	24	24
18:45	0	0	0	1	0	1	2	42	2	1	0	0	45	46	127	1	0	0	0	128	128
H/TOT	0	0	0	1	0	1	2	219	17	4	1	1	242	246	202	8	1	1	1	213	216
P/TOT	0	1	0	14	0	15	33	1444	326	72	117	21	1980	2189	1514	275	67	107	19	1982	2174

WHITESTOWN TRAFFIC COUNT **JANUARY 2024**

MANUAL CLASSIFIED JUNCTION TURNING COUNT **TRA/24/006**

SITE: 01 DATE: 23rd January 2024

LOCATION: N81/Sand & Gravel Pit Access DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	2	0	2	5	0	0	0	0	0	0	0	0	0	0	2	0	2	5
09:30	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
H/TOT	0	0	0	2	0	2	5	0	0	0	2	0	2	5	0	0	0	2	0	2	5
10:00	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	1	0	1	2
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	1	0	1	2	0	0	0	2	0	2	5	0	0	0	1	0	1	2
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2

WHITESTOWN TRAFFIC COUNT **JANUARY 2024**

MANUAL CLASSIFIED JUNCTION TURNING COUNT **TRA/24/006**

SITE: 01 DATE: 23rd January 2024

LOCATION: N81/Sand & Gravel Pit Access DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
13:30	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	1	0	1	2
14:00	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
14:30	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	1	0	1	2
14:45	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2
H/TOT	0	0	0	2	0	2	5	0	0	0	3	0	3	7	0	0	0	2	0	2	5
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0
16:30	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0
H/TOT	0	0	0	2	0	2	5	0	0	0	2	0	2	5	0	0	0	0	0	0	0
17:00	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0
17:15	0	0	1	0	0	1	2	0	0	0	1	0	1	2	0	0	1	0	0	1	2
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	1	1	0	2	4	0	0	0	2	0	2	5	1	0	1	0	0	2	3
18:00	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	1	0	1	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	2	0	2	5	0	0	0	2	0	2	5	0	0	0	0	0	0	0
P/TOT	2	0	1	12	0	15	31	0	0	0	14	0	14	32	1	0	1	9	0	11	23

APPENDIX 13-2

PMCE Ltd Lower Commons Road Dublin 22 Licence No: 261601

Filtering Summary

Land Use	02/H	EMPLOYMENT/QUARRY
Selected Trip Rate Calculation Parameter Range	10.00-40.00 hect AREA	
Actual Trip Rate Calculation Parameter Range	10.00-40.00 hect AREA	
Date Range	Minimum: 01/01/86	Maximum: 09/11/10
Parking Spaces Range	All Surveys Included	
Days of the week selected	Tuesday	2
	Wednesday	2
	Friday	1
Main Location Types selected	Edge of Town	1
	Free Standing (PPS6 Out of Town)	4
Inclusion of Servicing Vehicles Counts	Servicing vehicles Included	X - Selected
	Servicing vehicles Excluded	6 - Selected
Population within 500m	All Surveys Included	
Population <1 Mile ranges selected	1,000 or Less	1
	1,001 to 5,000	2
	5,001 to 10,000	2
Population <5 Mile ranges selected	25,001 to 50,000	1
	50,001 to 75,000	2
	75,001 to 100,000	1
	125,001 to 250,000	1
Car Ownership <5 Mile ranges selected	0.6 to 1.0	4
	1.1 to 1.5	1
PTAL Rating	No PTAL Present	5
Filter by Site Operations Breakdown	All Surveys Included	

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : H - QUARRY
TOTAL VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	DC	DORSET	1 days
05	EAST MIDLANDS		
	NN	NORTH NORTHAMPTONSHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days
09	NORTH		
	DH	DURHAM	1 days
	HP	HARTLEPOOL	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Site area
Actual Range:	10.00 to 40.00 (units: hect)
Range Selected by User:	10.00 to 40.00 (units: hect)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/86 to 09/11/10

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Wednesday	2 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	1
Free Standing (PPS6 Out of Town)	4

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Out of Town	4
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	X days - Selected
Servicing vehicles Excluded	6 days - Selected

Secondary Filtering selection:

Use Class:

B2	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Filter by Site Operations Breakdown:
All Surveys Included

Population within 500m Range:
All Surveys Included

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
5,001 to 10,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	2 days
75,001 to 100,000	1 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Not Known	2 days
No	3 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 DC-02-H-02 STONE QUARRY DORSET
SOUTHWELL STREET
NEAR PORTLAND
SOUTHWELL
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 40.00 hect
Survey date: WEDNESDAY *03/09/97* *Survey Type: MANUAL*

2 DH-02-H-01 LIMESTONE QUARRY DURHAM
STONYBECK LANE
NEAR DURHAM
BISHOP MIDDLEHAM
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 10.00 hect
Survey date: TUESDAY *02/12/08* *Survey Type: MANUAL*

3 GM-02-H-01 STONE QUARRY GREATER MANCHESTER
GEORGE'S LANE
HORWICH

Edge of Town
No Sub Category
Total Site area: 17.00 hect
Survey date: FRIDAY *09/08/91* *Survey Type: MANUAL*

4 HP-02-H-01 QUARRY HARTLEPOOL
HART VILLAGE
HARTLEPOOL

Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 22.80 hect
Survey date: TUESDAY *09/11/10* *Survey Type: MANUAL*

5 NN-02-H-01 GRAVEL QUARRY NORTH NORTHAMPTONSHIRE
WOLLASTON ROAD
BOZEAT
WELLINGBOROUGH
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 14.50 hect
Survey date: WEDNESDAY *26/11/08* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/H - QUARRY
TOTAL VEHICLES
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	5	20.86	0.393	5	20.86	0.153	5	20.86	0.546
07:30 - 08:00	5	20.86	0.249	5	20.86	0.211	5	20.86	0.460
08:00 - 08:30	5	20.86	0.230	5	20.86	0.163	5	20.86	0.393
08:30 - 09:00	5	20.86	0.201	5	20.86	0.221	5	20.86	0.422
09:00 - 09:30	5	20.86	0.259	5	20.86	0.240	5	20.86	0.499
09:30 - 10:00	5	20.86	0.268	5	20.86	0.192	5	20.86	0.460
10:00 - 10:30	5	20.86	0.153	5	20.86	0.173	5	20.86	0.326
10:30 - 11:00	5	20.86	0.182	5	20.86	0.182	5	20.86	0.364
11:00 - 11:30	5	20.86	0.173	5	20.86	0.163	5	20.86	0.336
11:30 - 12:00	5	20.86	0.173	5	20.86	0.153	5	20.86	0.326
12:00 - 12:30	5	20.86	0.105	5	20.86	0.153	5	20.86	0.258
12:30 - 13:00	5	20.86	0.153	5	20.86	0.163	5	20.86	0.316
13:00 - 13:30	5	20.86	0.192	5	20.86	0.201	5	20.86	0.393
13:30 - 14:00	5	20.86	0.230	5	20.86	0.240	5	20.86	0.470
14:00 - 14:30	5	20.86	0.249	5	20.86	0.211	5	20.86	0.460
14:30 - 15:00	5	20.86	0.221	5	20.86	0.259	5	20.86	0.480
15:00 - 15:30	5	20.86	0.192	5	20.86	0.182	5	20.86	0.374
15:30 - 16:00	5	20.86	0.182	5	20.86	0.125	5	20.86	0.307
16:00 - 16:30	4	22.45	0.156	4	22.45	0.134	4	22.45	0.290
16:30 - 17:00	4	22.45	0.134	4	22.45	0.156	4	22.45	0.290
17:00 - 17:30	4	22.45	0.067	4	22.45	0.111	4	22.45	0.178
17:30 - 18:00	4	22.45	0.033	4	22.45	0.234	4	22.45	0.267
18:00 - 18:30	4	22.45	0.011	4	22.45	0.089	4	22.45	0.100
18:30 - 19:00	4	22.45	0.011	4	22.45	0.011	4	22.45	0.022
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			4.217			4.120			8.337

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	10.00 to 40.00 (units: hect)
Survey date date range:	01/01/86 - 09/11/10
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX 14

APPENDIX 14-1

1 LANDSCAPE AND VISUAL METHODOLOGY

1.1 Assessment Methodology

Production of this Landscape and Visual Impact Assessment involved:

- A desktop study to establish an appropriate study area, relevant landscape and visual designations in the current 2022-2028 Wicklow County Development Plan as well as other sensitive visual receptors. This stage culminates in the selection of a set of potential viewpoints from which to study the effects of the proposal;
- Fieldwork to establish the landscape character of the receiving environment and to confirm and refine the set of viewpoints to be used for the visual assessment stage;
- Assessment of the significance of the landscape impact of the development as a function of landscape sensitivity weighed against the magnitude of the landscape impact; and
- Assessment of the significance of the visual impact of the development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact. This aspect of the assessment is supported by photomontages prepared in respect of the selected viewpoints.
- Incorporation of mitigation measures to reduce potential impacts and estimation of residual impacts once mitigation has become established.

1.2 Landscape Impact Assessment Criteria

This part of the LVIA provides an assessment of how the introduction of the proposed development will affect the physical features and fabric of the landscape, and then how the proposals influence landscape character with reference to published descriptions of character and an understanding of the contemporary character of the landscape as informed through desktop and site studies.

When assessing the potential landscape effects of the development, the value and sensitivity of the landscape receptor is weighed against the magnitude of impact to determine the significance of the landscape effect. Criteria outlined below are used to guide these judgements.

1.2.1.1 Landscape Sensitivity

The sensitivity of the landscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. In accordance with GLVIA3, the sensitivity of a landscape receptor (Landscape Character Area or feature) is derived from combining judgements in relation to its susceptibility to change and its value. The judgement reflects such factors as its quality, value, contribution to landscape character and the degree to which the particular element or characteristic can be replaced or substituted. Landscape Sensitivity is classified using the following criteria set out out in **Table 1.1.**

Table 1.1 Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.

High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration..
Negligible	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

1.2.2 Magnitude of Change – Landscape

The magnitude of change is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development and to a lesser extent the duration and reversibility of that effect. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the immediate setting that may have an effect on the landscape character. **Table 1.2** outlines criteria used to inform this judgement.

Table 1.2 Magnitude of Landscape Impacts

Magnitude of Impact	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an extensive change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to a considerable change of the landscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to noticeable changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements that would lead to discernible changes in landscape character, and quality.

Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable leading to no material change to landscape character, and quality.

1.3 Visual Impact Assessment Criteria

This part of the LVIA provides an assessment of how the introduction of the proposed development will affect views within the landscape. It therefore needs to consider:

- Direct impacts of the proposed development upon views through intrusion or obstruction;
- The reaction of viewers who may be affected, e.g. residents, walkers, road users; and
- The overall impact on visual amenity.

It has been deemed appropriate to structure the assessment around a series of representative viewpoint locations. All viewpoints are located within the public domain and are representative of views available from main thoroughfares and pedestrian areas within the vicinity of the proposed development. The selected viewpoints are considered to be comprehensive in communicating the variable nature of the visual effects.

When assessing the potential visual effects of the development, the sensitivity of the visual receptor is weighed against the magnitude of the visual impact to determine the significance of the visual effect. Criteria outlined below are used to guide these judgements.

1.3.1 Sensitivity of Visual Receptors

As with landscape sensitivity, the sensitivity of a visual receptor is categorised as Very High, High, Medium, Low, and Negligible. Unlike landscape sensitivity however, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity the viewer is engaged in and whether this heightens their awareness of the surrounding environment.

A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each viewpoint location.

1.3.1.1 Susceptibility of Receptors

In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are:

- "*Residents at home;*
- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;*
- *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area; and*
- *Travellers on road, rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened*".

Visual receptors that are less susceptible to changes in views and visual amenity include;

- "*People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life*".

1.3.1.2 Values Associated with the View

1. **Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;
2. **Views from within highly sensitive landscape areas**. Again, highly sensitive landscape designations are usually part of a county's Landscape Character Assessment, which is then incorporated within the County Development Plan and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;
3. **Primary views from dwellings**. A proposed development might be seen from anywhere within a particular residential property with varying degrees of sensitivity. Therefore, this category is reserved for those instances in which the design of dwellings or housing estates, has been influenced by the desire to take in a particular view. This might involve the use of a slope or the specific orientation of a house and/or its internal social rooms and exterior spaces;
4. **Intensity of use, popularity**. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;
5. **Connection with the landscape**. This considers whether or not receptors are likely to be highly attuned to views of the landscape i.e. commuters hurriedly driving on busy national route versus hill walkers directly engaged with the landscape enjoying changing sequential views over it;
6. **Provision of elevated panoramic views**. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;
7. **Sense of remoteness and/or tranquillity.** Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;
8. **Degree of perceived naturalness**. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;
9. **Presence of striking or noteworthy features.** A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
10. **Historical, cultural and / or spiritual significance.** Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;

11. **Rarity or uniqueness of the view**. This might include the noteworthy representativeness of a certain landscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;
12. **Integrity of the landscape character**. This looks at the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
13. **Sense of place**. This considers whether there is special sense of wholeness and harmony at the viewing location; and
14. **Sense of awe**. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity, and no relative importance is inferred by the order of listing.

It is recognised that a viewer's interpretation and experience of the landscape can have preferential and subjective components. Where relevant, judgements are made on those elements of the landscape that are considered to contribute more prominently and positively to the visual landscape resource as well as those elements that contribute negatively. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

1.4 Magnitude of Change – Visual

The magnitude of change is again a product of the scale, extent, or degree of change that is likely to be experienced as a result of the proposed development. This is directly influenced by its 'visual presence / prominence', as experienced by visual receptors in the landscape. These terms are somewhat quantitative in nature, and essentially relate to how noticeable or 'dominant' the proposal is within a particular view. Aside from the obvious influence of scale and distance, a development's visual presence is influenced by the extent and complexity of the view, contextual movement in the landscape, the nature of its backdrop, and its relationship with other focal points or prominent features within the view. It is often, though not always, expressed using one of the following terms: Minimal; Sub-dominant; Co-dominant; Dominant; Highly dominant. Criteria used to inform judgements are provided in **Table 1.4**.:

Table 1.3 Magnitude of Visual Impact

Criteria	Description
Very High	Complete or very substantial change in view, dominant, involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g., through removal of key elements.
High	A major change in the view that is highly prominent and has a strong influence on the overall view. This may involve the substantial obstruction of existing views or a complete change in character and composition of baseline, e.g. through removal of key elements or the introduction of new features that would heavily influence key elements.
Medium	Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e., pre-development view through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.

Low	Minor change in baseline, i.e. pre-development view - change would be distinguishable from the surroundings whilst composition and character would be similar to the pre change circumstances.
Negligible	Very slight change in baseline, i.e. pre-development view - change would be barely discernible. Composition and character of view substantially unaltered.

1.4.1 Significance of Effect

The significance of a landscape or visual effect is based on a balance between the sensitivity of the receptor and the magnitude of change, and is categorised as Profound, Substantial, Moderate, Slight, or Imperceptible. Intermediate judgements are also provided to enable an effect to be more accurately described where relevant. 'No Effect' may also be recorded as appropriate where the effect is so negligible it is not noteworthy.

The significance category judgement is arrived at using the Significance Matrix at **Table 1.3** as a guide. This applies the principle of significance being a function of magnitude weighed against sensitivity, but employs slightly different terminology that avoids the potentially confusing use of the term 'significant' (as recommended by GLVIA3 Statement of Clarification 1/13 (Landscape institute, 10th June 2013)).

Indicative criteria descriptions used in relation to the significance of effect category are presented at **Table 1.5**.

Table 1.4 Impact Significance Matrix

	Sensitivity of Receptor				
Scale/Magnitude	*Very High*	*High*	*Medium*	*Low*	*Negligible*
Very High	Profound	Profound-substantial	Substantial	Moderate	Minor
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Table 1.5 Indicative significance of effect criteria descriptions

Criteria	**Landscape**	**Visual**
Profound	There are notable changes in landscape characteristics over an extensive area or a very intensive change over a more limited area.	The view is entirely altered, obscured or affected.

Substantial	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area or an intensive change over a more limited area.	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. There are minor changes over some of the area or moderate changes in a localised area.	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Slight	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Imperceptible	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.	An effect capable of measurement but without noticeable consequences. Although the development may be visible, it would be difficult to discern resulting in minimal change to views.

It is important that the likely effects of the proposals are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making a planning decision.

As such, whilst the significance matrix and criteria provide a useful guide, the significance of an effect is ultimately determined by the landscape specialist using professional judgement, and also in the context of occasionally using hybrid judgements to account for nuance.

Effects assessed as 'Substantial' or greater (shaded cells) are considered to be the most notable in landscape and visual terms, and may be regarded as 'Significant', albeit it is important to note that this is not a reflection on their acceptability in planning terms.

1.5 Quality and Timescale of Effects

In addition to assessing the significance of landscape effects and visual effects, the EPA Guidance for EIAs[1] requires that the quality of the effects is also determined. In relation to the quality of effects, Table 3.4 of the current EPA Guidance states that these could be 'Positive', 'Neutral' or 'Negative/Adverse Effects'. A description of each is included below;

- *"Positive Effects: A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).*

[1] Environmental Protection Agency (EPA) publication *'Guidelines on the Information to be contained in Environmental Impact Statements* (2022)

- *Neutral Effects: No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.*
- *Negative/Adverse Effects: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).”*

Landscape and Visual effects are also categorised according to their duration:

- Temporary – Effects lasting less than a year;
- Short Term – Effects lasting one to seven years;
- Medium Term – Effects lasting seven to fifteen years;
- Long Term – Effects lasting fifteen to sixty years; and
- Permanent – Effects lasting over sixty years.