November 2024

Environmental Impact Assessment ('EIAR') Volume 3 – Appendices 9-12

Continuance of Use & Extension to Ballyburn Pit

On behalf of

Dan Morrissey & Co. (Plazamount Ltd)

Ballyburn Upper, Gorteenvacan, Knockbane, Castledermot, Co. Kildare

MALONE O'REGAN ENVIRONMENTAL

QUALITY
I.S. EN ISO 9001:2015
NSAI Certified

MALONE O'REGAN

Form ES - 04

MALONE O'REGAN ENVIRONMENTAL

Ground Floor – Unit 3
Bracken Business Park
Bracken Road, Sandyford
Dublin 18, D18 V32Y
Tel: +353- 1- 567 76 55
Email: enviro@mores.ie

Title: Environmental Impact Assessment ('EIAR') Volume 3 – Appendices 9-12, Continuance of Use & Extension to Ballyburn Pit, Dan Morrissey & Co. (Plazamount Ltd), Ballyburn Upper, Gorteenvacan, Knockbane, Castledermot, Co. Kildare

Job Number: E2122

Prepared By: Caoimhe Fox **Signed:** _____

Checked By: David Dwyer **Signed:** _____

Approved By: Kenneth Goodwin **Signed:** _____

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
01	13/11/24	Report	FINAL	CF	DD	KG

Environmental Impact Assessment ('EIAR') Volume 3 – Appendices 9-12

Continuance of Use & Extension to Ballyburn Pit

Dan Morrissey & Co. (Plazamount Ltd)

Ballyburn Upper, Gorteenvacan, Knockbane, Castledermot, Co. Kildare

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Mineral Dust Risk Assessment

Dan Morrissey & Co. (Plazamont Ltd.)

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1 DISAMENTIY DUST RISK ASSESSMENT

The IAQM Guidance aims to provide advice on robust and consistent good-practice approaches that can be used to assess the operational phase dust impacts from quarry activities. [1]

1.1 Identification of Sensitive Receptors

For the sensitivity of people and their property to dust soiling, the IAQM recommends the use of professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies. The following classification was used to define a receptor with High, Medium or Low sensitivity to dust soiling:

High Sensitive Receptor

- Users can reasonably expect enjoyment of a high level of amenity; or,
- The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

Indicative examples of a high-sensitivity receptor included dwellings, medium and long-term carparks, and car showrooms.

Medium Sensitive Receptor:

- Users would expect to enjoy a reasonable level of amenity but would not reasonably expect to enjoy the same level of amenity as in their home; or,
- The appearance, aesthetics or value of their property could be diminished by soiling; or,
- The people or property would not reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.

Indicative examples include parks and places of work.

Low Sensitivity Receptor

- The enjoyment of amenity would not reasonably be expected; or,
- There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or,
- There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.

Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads.

1.2 Determining the Residual Source of Emissions

The following examples show the residual source emissions for a number of activities, illustrating the factors that may be considered when determining the potential impact.

Figure 1-1: Site Preparation/ Restoration

LARGE	SMALL
Large working area	Small working area
High bunds	Low bunds
High volume of material movement	Low volume of material movement
High no. heavy plant	Low no. heavy plant
Minimal seeding/sealing of bund surface	Bunds seeded/sealed immediately
Material of high dust potential	Material of low dust potential

An example of a large potential dust magnitude from site preparation/restoration may include factors such as a working area >10ha, bunds >8 m in height, >100,000 m^3 material movement, >10 heavy plant simultaneously active, bunds un-seeded, fine grained and friable material. Conversely, a small potential dust magnitude may include a site with a working area <2.5ha, bunds <4m in height, <20,000 m^3 material movement, <5 heavy plant simultaneously active, all bunds seeded, material with a high moisture content.

Figure 1-2: Mineral Extraction

LARGE	SMALL
Large working area	Small working area
High energy extraction methods	Low energy extraction methods
Material of high dust potential	Material of low dust
Potential high extraction rate	Low extraction rate

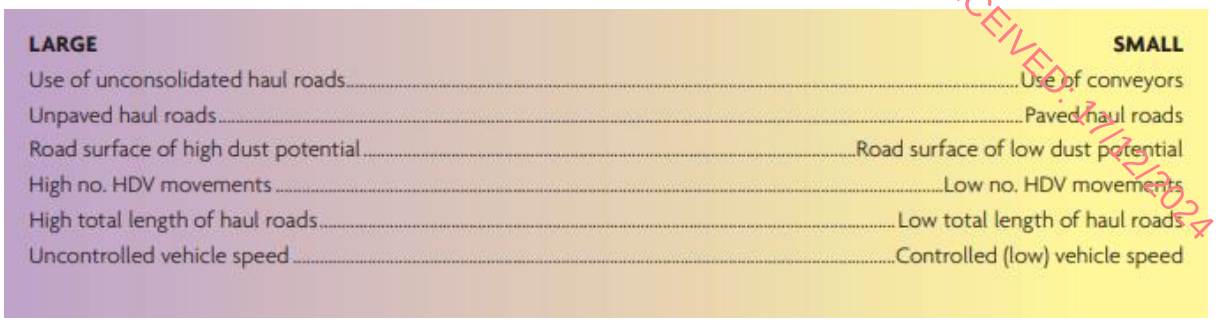
An example of a large potential dust magnitude from mineral extraction may include a working area >100 ha, drilling and blasting frequently used, dusty mineral of small particle size and/or low moisture content, 1,000,000 tpa extraction rate. A small potential magnitude may include working area <20 ha, hydraulic excavator, coarse material and/or high moisture content, <200,000 tpa extraction rate.

Figure 1-3: Materials Handling

LARGE	SMALL
High no. heavy plant	Low no. heavy plant
Unconsolidated/bare surface	Hard standing surface
Activities close to site boundary	Activities within quarry void
Material of high dust potential	Material of low dust potential

An example of a large potential dust magnitude from materials handling may include factors such as >10 loading plant within 50m of a site boundary, transferring material of a high dust potential and/or low moisture content on dry, poorly surfaced ground. Conversely, a small potential dust magnitude may include <5 plant, more than 100 m of a site boundary, within the quarry void or clean hardstanding, transferring material of low dust potential and/or high moisture content.

Figure 1-4: On-site Transportation

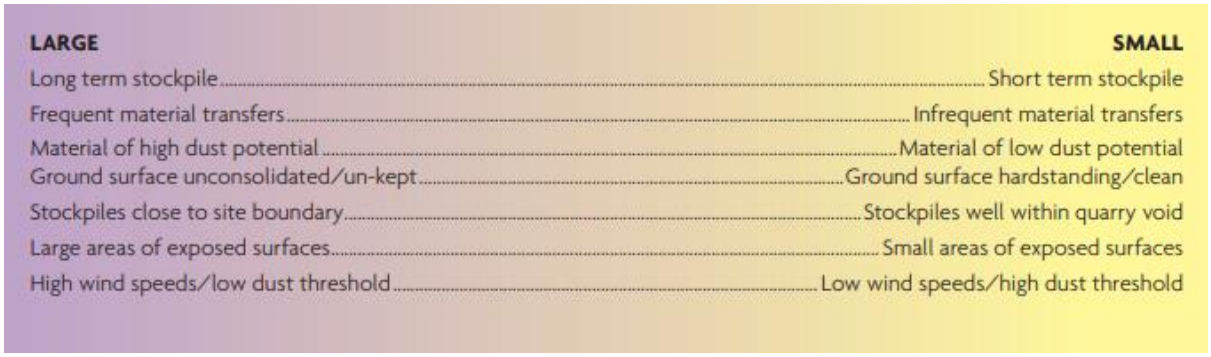


An example of a large potential dust magnitude from on-site transportation could include >250 movements in any one day on unpaved surfaces of potentially dusty material. A small potential magnitude may include the employment of covered conveyors used for the majority of the on-site transportation of material, <100 movements of vehicles per day, with surface materials of compacted aggregate, <500 m in length and a maximum speed of 15 mph.

Figure 1-5: Mineral Processing

An example of a large potential dust magnitude from mineral processing may include factors such as a mobile crusher and screener with concrete batching plant on-site, processing >1,000,000 tpa of material with a high dust potential and/or low moisture content e.g. hard rock. Conversely, a small potential dust magnitude may include a site with a fixed screening plant with effective design in dust control, processing <200,000 tpa of material with a low dust potential and/or high moisture content e.g. wet sand and gravel.

Figure 1-6: Stockpiles / Exposed Surfaces



An example of a large potential dust magnitude from stockpiles and exposed surfaces could include a stockpile with a total exposed area >10 ha in an area exposed to high wind speeds located <50 m of the site boundary. Daily transfer of material with a high dust potential and/or low moisture content. Stockpile duration >12 months and quarry production >1,000,000 tpa. A small potential magnitude may include stockpile duration of <1 month with a total area <2.5 ha in an area of low wind speeds, located >100 m from the site boundary. Weekly transfers of material with a low dust potential and/or high moisture content. Quarry production <200,000 tpa.

Figure 1-7: Off-site Transportation

An example of a large potential dust magnitude from off-site transportation could include total HDV >200 movements in any one day on unsurfaced site access road <20 m in length with no HDV cleaning facilities. No road sweeper available. A small potential magnitude may include <25 HDV movements per day, paved surfaced site access road >50 m in length, with effective HDV cleaning facilities and procedures, the employment of an effective road sweeper.

1.3 Estimation of the Pathway Effectiveness

The site-specific factors considered to determine the Effectiveness of the Pathway were distance and direction of receptors relative to prevailing wind directions. Receptors were identified within 400m of the dust emission source. Table 1-1 shows the categorisation of the frequency of potentially dust winds, based on the meteorological data from a nearby weather station.

Table 1-1: Categorisation of Frequency of Potentially Dust Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Table 1-2 below shows the categorisation of receptors, based on their distance to the dust emission source.

Table 1-2: Categorisation of Receptor Distance from Source

Distance Category	Criteria
Distant	Receptor is between 200m and 400m from the dust source
Intermediate	Receptor is between 100m and 200m from the dust source
Close	Receptor is less than 100m from the dust source

Table 1-3 below shows the determination of the Pathway Effectiveness based on the frequency of potentially dusty winds and the distance of the receptor from the dust emission source.

Table 1-3: Classification of the Pathway Effectiveness

Receptor Distance Category	Frequency of Potentially Dusty Winds			
	Infrequent	Moderately Frequent	Frequent	Very Frequent
Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

1.4 Estimation of the Dust Impact Risk and Effects

Table 1-4 shows the estimation of the Dust Impact Risk based on the Residual Source of Emission and Pathway Effectiveness classifications

Table 1-4: Estimation of Dust Impact Risks

Pathway Effectiveness	Residual Source Emission		
	Small	Medium	Large
Highly Effective Pathway	Low Risk	Medium Risk	High Risk
Moderate Effective Pathway	Negligible Risk	Low Risk	Medium Risk
Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

Table 1-5 below dhows the estimate of the likely magnitude of Disamenity Effects based on the receptor sensitivity and the risk of dust impacts.

Table 1-5: Descriptors for magnitude of Dust Effects

Receptor Distance Category	Receptor Sensitivity		
	Low	Medium	High
High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk	Negligible effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk	Negligible effect	Negligible effect	Slight Adverse Effect
Negligible Risk	Negligible effect	Negligible effect	Negligible effect

2 REFERENCES

[1] IAQM, “Guidance on the Assessment of Mineral Dust Impacts for Planning,” Institute of Air Quality Management, London, 2016.

APPENDIX 9-2

Dust Monitor Service/Calibration Certificate

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Instrument Details			Calibration No: 18408
Customer: MALONE O'REGAN ENVIRONMENTAL			
Instrument: Osiris	*Serial Number:* TNO4361	*Software Version:* O4.28	
Date of Last Service:	02/02/2022	*Date Supplied New:*	

Calibration Factors prior to Servicing			
Measured Flow Rate: 700 *cc/min*		*Total pump useage:* 4895 *hours*	
TSP: 1.0	*PM10:* 1.0	*PM2.5:* 1.0	*PM1.0:* 1.0
Inhalable: /	*Thoracic:* /	*Respirable:* /	*PM2.0:* /

Fault Report:

Old mechanical pump failed max flow 750 when it should be 900+

Work Carried Out:

Service and Calibration. Replaced pump with ultra pump and set flow to 600.

Charge battery ☑. *Change reference filter* ☑.

Photometer Scale 2141	*Laser current* 36 mA	*Flow rate* 600 cc/min	*Stray light* 0 *mV*
Wind inputs OK ☑	*External inputs OK* ☑	*Inlet Heater OK* ☑	*Alarm output OK* ☑
Clean-Air filter OK ☑	*Backup-Filter OK* ☑	*PC-Link OK* ☑	*Telemetry OK* ☑

Parts Required:

Phot Serial Number:	**5867**	***Pump Serial Number:***	**U0521129**

Instrument Calibration against Reference Instrument

reading is with new calibration factor applied

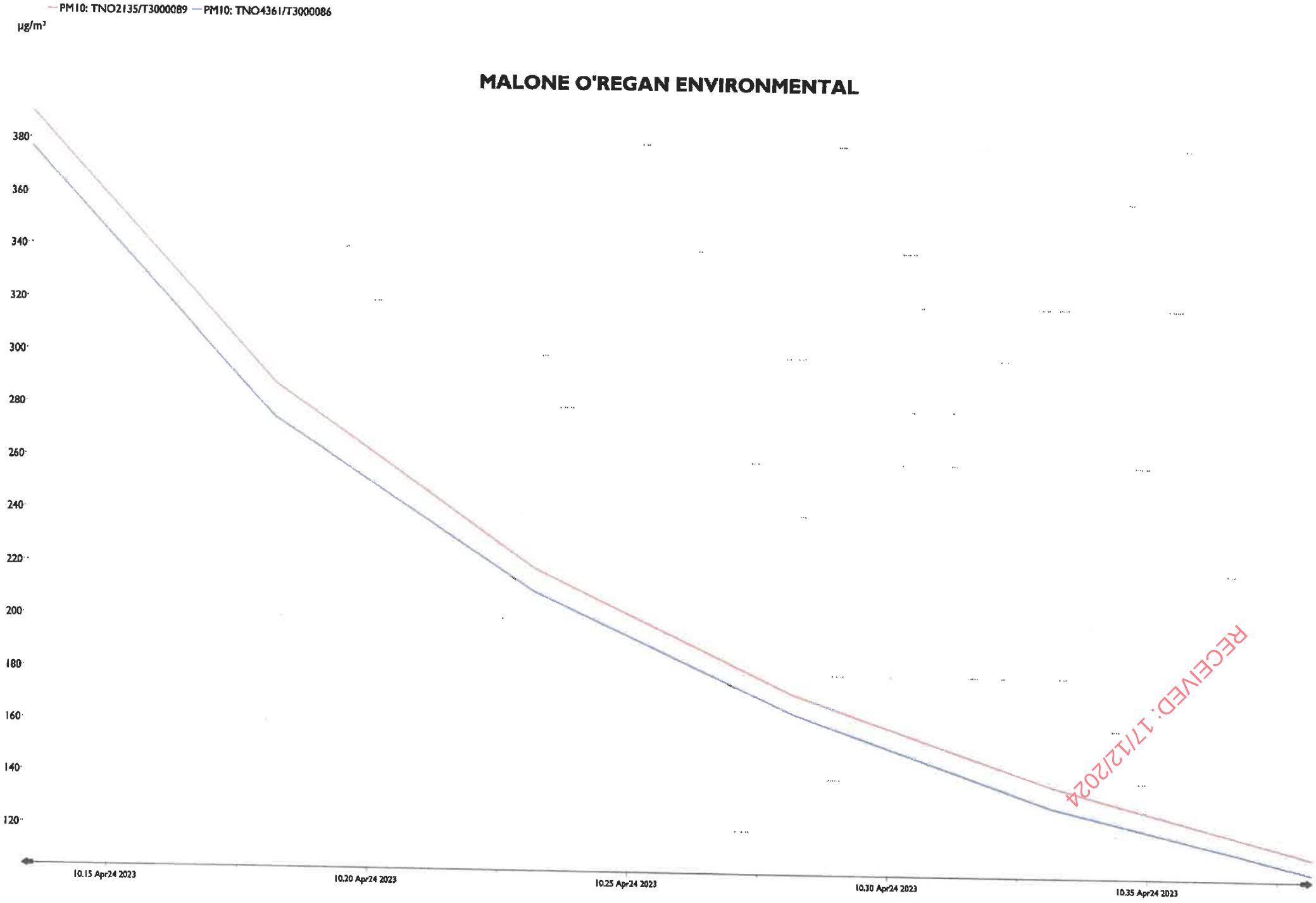
Fraction	*Zero*	*Reading*	*Reference*	*New Cal. Factor*
TSP	0.0 *µg/m^3*	227.2 *µg/m^3*	242.4 *µg/m^3*	1
PM10	0.0 *µg/m^3*	211.7 *µg/m^3*	221.1 *µg/m^3*	1
PM2.5	0.00 *µg/m^3*	194.65 *µg/m^3*	204.34 *µg/m^3*	1
PM1.0	0.00 *µg/m^3*	118.06 *µg/m^3*	116.31 *µg/m^3*	1

Reference Instrument: TNO2135		***Date Reference Calibrated:*** 15/05/2023	

Signed: Daniel Baldwin	***Date:*** 24/04/2023	***Temperature:20.0 °C***

Calibration Due: 24/04/2025

Turnkey Instruments Ltd
1 Dalby Court, Gadbrook Business Centre, Northwich, Cheshire CW9 7TN
Tel: 01606 330020 Fax: 01606 331526
www. turnkey-instruments.com



APPENDIX 10

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APPENDIX 10-1

1 CHARACTERISING CLIMATE HAZARDS

1.1 Frequency of Climate Hazards according to Annex B [1]

Table 1-1: Classifying the frequency of climate hazards

Frequency	Frequency Occurrence in a Year	Description
Very Frequent	>100%	Occurs several times in a single year
Frequent	50 to 100%	Occurs once in a 1-to-2-year period
Common	10 to 50%	Occurs once in a 2-to-10-year period
Occasional	1 to 10%	Occurs once in a 10–100-year period
Rare	<1%	occurs once in over 100 years

1.2 Vulnerability Types

Table 1-2: Description of different vulnerability types [1]

Vulnerability Type	Frequency Occurrence in a Year
Physical Vulnerability	Properties of an asset related to the structure or facilities can exacerbate/reduce the impacts before, during, or after a hazard event e.g. poor design and the construction of building, provision of active cooling. **or;** Ability of a population/persons to access equipment or resources that can exacerbate/reduce the impacts before, during, or after a hazard event.

1.3 Level of Impacts

Table 1-3: Description of the level of impacts [1]

Impact	Description	Level of Impact
Catastrophic	Widespread service failure with services unable to cope with wide-scale impacts	5
Major	Services seen to be in danger of failing completely with sever/widespread decline in service provision	4
Moderate	Service provision under severe pressure. Appreciable decline in service provision at a community level	3

Impact	Description	Level of Impact
Minor	Isolated but noticeable examples of service declines	2
Negligible	Appearance or threat but no actual impact on service provision	1

1.4 Magnitude of Impact for Asset Damage Category

Table 1-4: Magnitude of impact relating to Asset Damage [1]

Risk Area	Negligible	Minor	Moderate	Major	Catastrophic
Asset Damage	Impact can be absorbed through normal activity	An adverse event that can be absorbed by taking business continuity action	A serious event that requires additional emergency business continuity	A critical event that requires extraordinary / emergency business continuous actions	Disaster with the potential to lead to shutdown or collapse or loss of assets network

2 IDENTIFICATION OF CLIMATE HAZARDS

2.1 Kildare County Council Climate Change Adaption Strategy

The Kildare County Council Climate Change Adaption Strategy has evaluated the risks due to climate change using the following scale (Table 2-1 below) [2] The Risk is measured as a product of the Consequence and Likelihood relating to hazards

Table 2-1: Kildare County Council Risk Scale

Consequence Description	Consequence Score	Likelihood Description	Likelihood Score
Catastrophic	5	Almost Certain	5
Major	4	Likely	4
Moderate	3	Possible	3
Minor	2	Unlikely	2
Negligible	1	Rare	1

2.2 ThinkHazard

ThinkHazard is a web-based tool enabling non-specialists to consider the impacts of disasters on new development projects, commissioned by the Global Facility for Disaster Reduction and Recovery [3]. Hazards are provided at a local administrative resolution and is based on the following scale (Table 2-2).

Table 2-2: Hazard Classification provided by ThinkHazard

Scale	Description
High	Users should be highly aware of potential severe damage from this hazard for the project location. Without taking measures to mitigate the hazard and risk, high levels of damage can be expected to occur within the project or human lifetime
Medium	Users should be aware of potentially damaging effects of this hazard for the project location. Potentially damaging events can be expected to occur within the project or human lifetime and measures to mitigate the hazard and risk should be considered.
Low	Potentially damaging events are less likely to occur within the project or human lifetime but are still possible. Measures to mitigate the hazard and risk would be prudent at critical locations.
Very Low	Available data suggests that potentially damaging effects are unlikely to occur, on average, in the project or human lifetime.

2.3 Climate Change Adapt (European Commission)

The Climate -ADAPT platform is maintained by the European Commission and the European Environment Agency. Climate -ADAPT aims to support Europe in adapting to climate change, helping users to access and share data. The platform includes a database that contains quality checked information and country level reports [4].

At the time of writing, the Climate ADAPT platform does not provide a quantitative assessment on the level of risks associated with the potential hazards to a country.

2.4 Climate Hazards associate with the Proposed Development

Table 2-3 below highlights the hazards identified through desk-based research.

Table 2-3: Hazards identified as relevant from available resources

Source	Hazards Identified	Category of Risk (if applicable)
Kildare County Council Climate Action Plan [2]	• Heatwaves; • Cold weather; • Dry Spells; • Windstorms; • Flooding; • Extreme Rainfall	• Major; • Minor; • Moderate; • Major; and, • Critical.
ThinkHazard [3]	• Wildfire; • River Flood; • Urban Flood; and; • Extreme Heat.	• Medium; • Low • Low; • Low
Climate-ADAPT [4]	• Temperature (extreme highs and lows, wildfires); • Winds (Storms); • Water (Drought, Floods, Extreme Rainfall; and, • Solid Mass.	**Not Identifiable**

3 REFERENCES

[1] GOI, "Technical Annex B Climate Change Risk Assessment," Government of Ireland , Dublin, 2023.

[2] Kildare County Council, "Kildare County Council, Climate Change Adaption Strategy 2019-2024," Kildare County Council, Naas, 2019.

[3] GFDRR, "Think Hazard," Global Facility for Disaster Reduction and Recovery, 30 June 2020. [Online]. Available: https://thinkhazard.org/en/about. [Accessed 16 February 2023].

[4] EC, "Climate Adapt," European Commission , 2023. [Online]. Available: https://climate-adapt.eea.europa.eu/#t-countries. [Accessed 16 08 2023].

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APPENDIX 11

APPENDIX 11-1

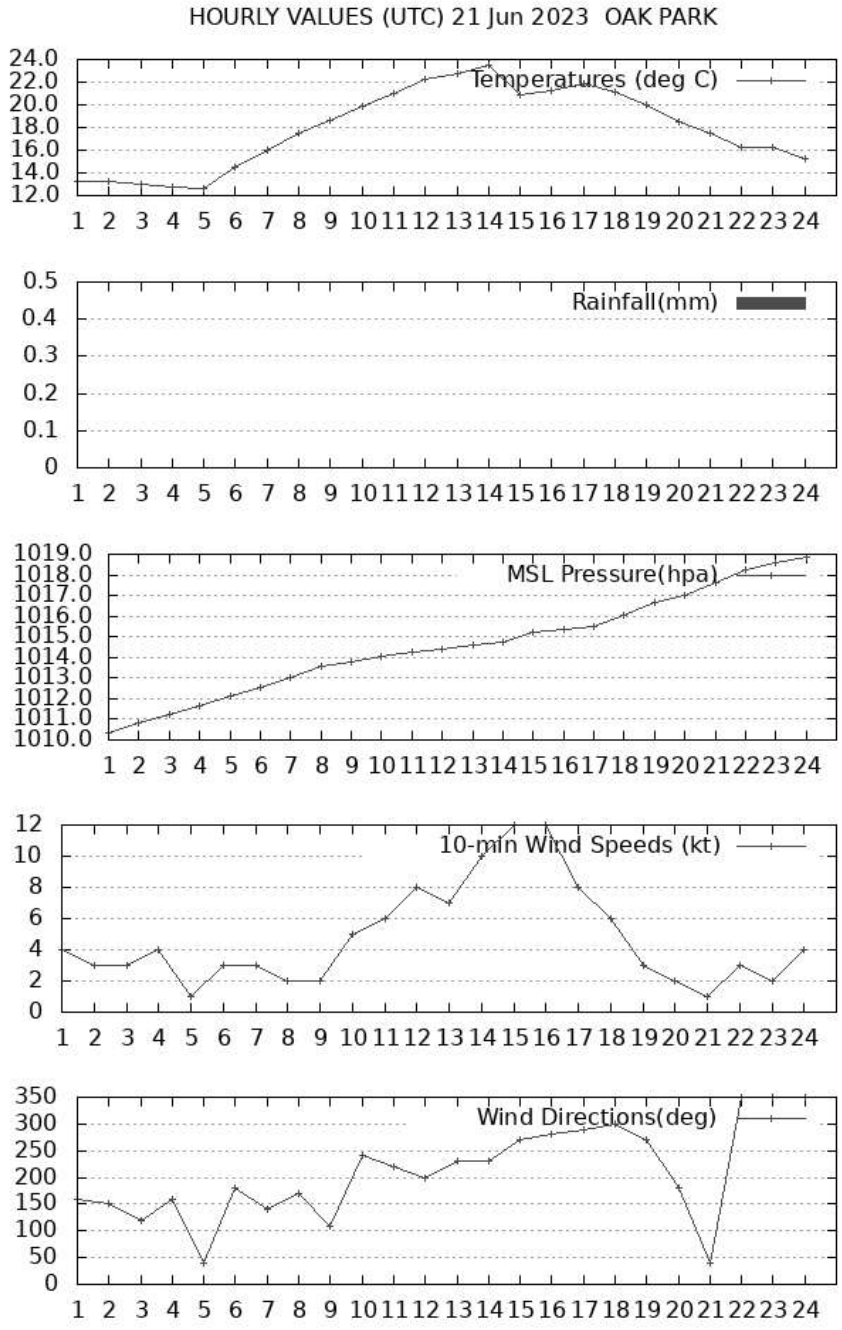
Daily Data

Weather station Data is available from 16/10/2015 to 07/10/2024

Select Station & Date: Station Oak Park Date 21/06/2023 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)
21/06/2023	tr	23.7	12.2	10.0	4.8		



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

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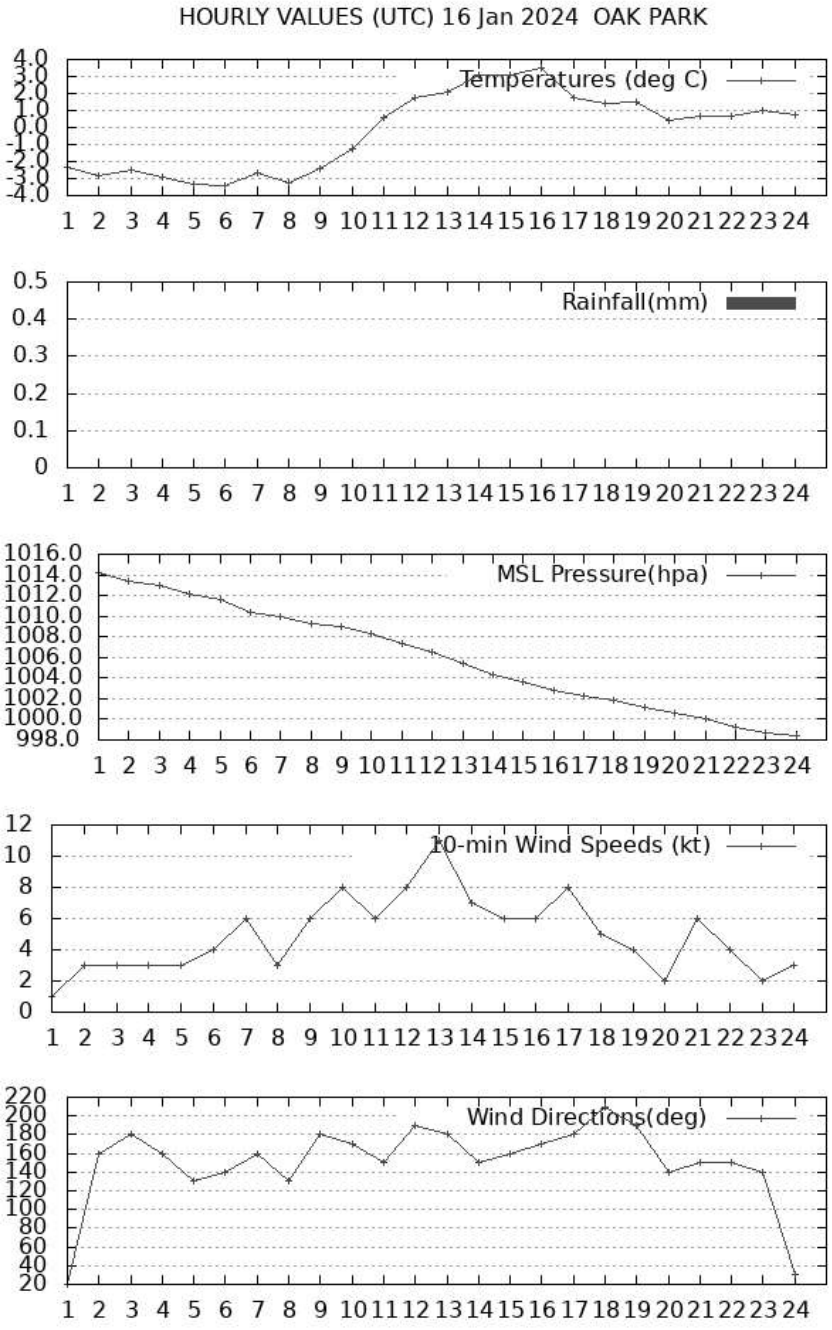
Daily Data

Weather station Data is available from 16/10/2015 to 07/10/2024

Select Station & Date: Station Oak Park Date 16/01/2024 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)
16/01/2024	0.0	4.0	-3.6	-10.2	5.0		



Daily Data

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Climate of Ireland

Climate Change

Weather Extreme Records for Ireland

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NOISE CHARTS AND PLATES

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1 INTRODUCTION

This document supplies the Frequency Analysis Charts for each monitoring event.

2 CALIBRATION OF SOUND LEVEL METER

A NTi XL2 Audio Acoustic Hand-held Analyser sound level meter ('SLM') was used for this survey.

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

- Bruel and Kjaer Type 4321 (Serial Number 2217952); and,
- Larson Davis CAL 200 (Serial Number 20830)

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

SLM	Serial No.	Calib. Preamp ID No	[Calibration] Calib. Time	[Calibration] Sensitivity	[Calibration] Calibration Input	[Calibration] Calibration Type	Calibrator
NTI	A2A-18871-E0	M2230	26/06/23 09.12	42.5	TopSocket	External reference	Bruel and Kjaer
NTI	A2A-18871-E0	M2230	16/01/24 10.06	43.8	TopSocket	External reference	Larson Davis

3 NM1

Plate 3-1: NM1 Location

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

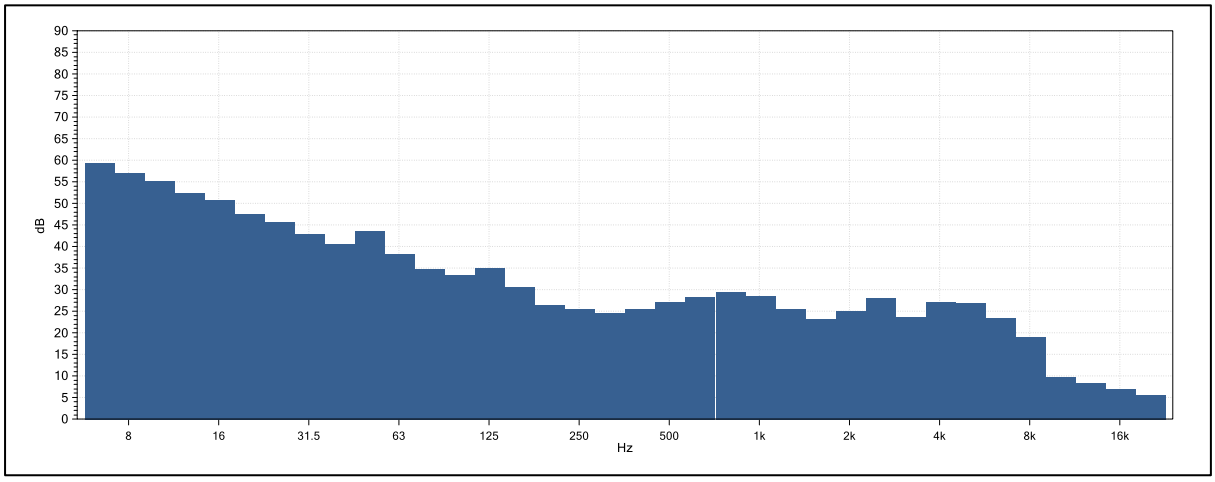
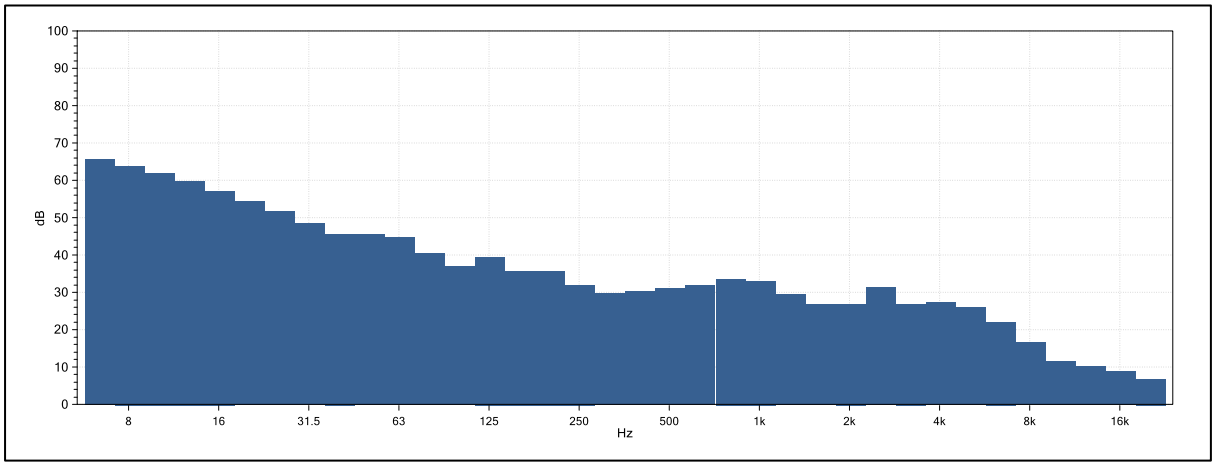


Chart 3-2: NM1 Run 2 Day 1/3 Octave Frequency Analysis



4 NM2

Plate 4-1: NM2 Location

Chart 4-1: NM2 Run 1 Day 1/3 Octave Frequency Analysis

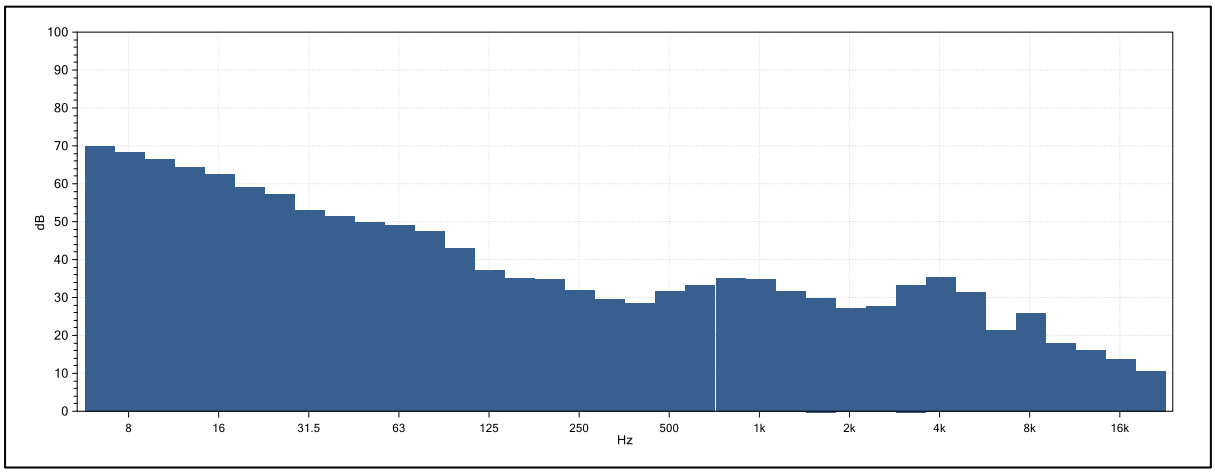
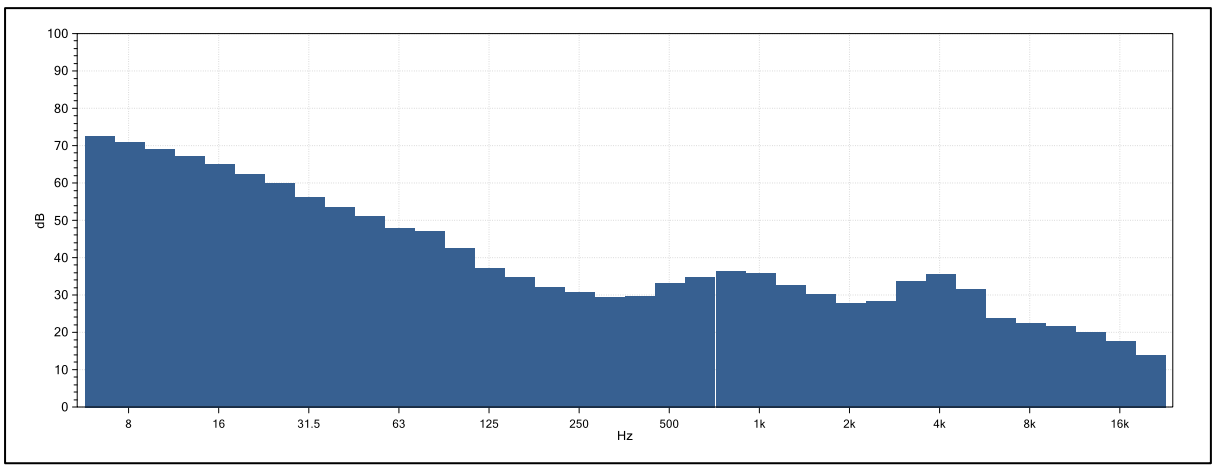


Chart 4-2: NM2 Run 2 Day 1/3 Octave Frequency Analysis



5 NM3

Plate 5-1: NM3 Location

Chart 5-1: NM3 Run 1 Day 1/3 Octave Frequency Analysis

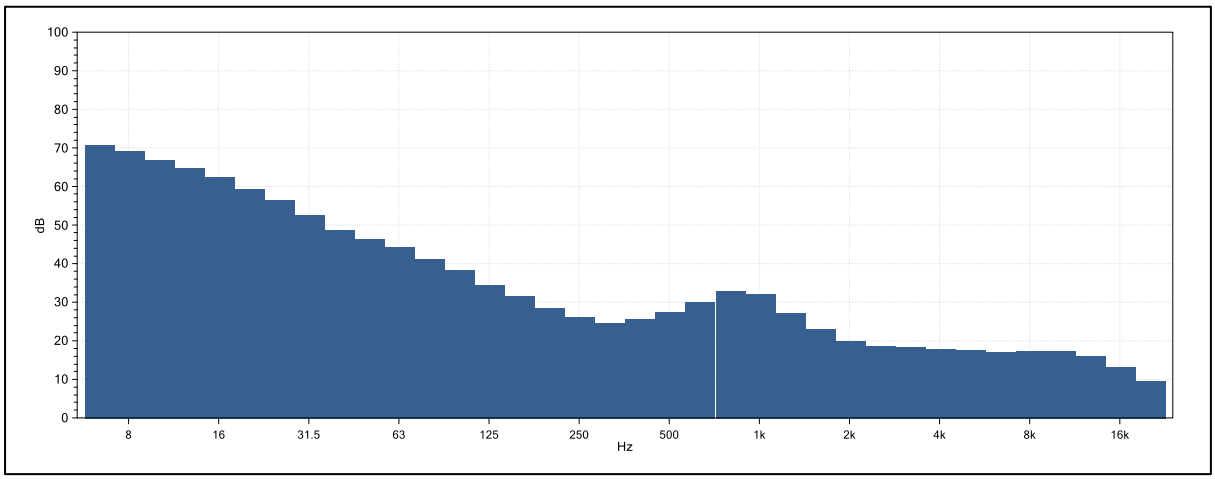
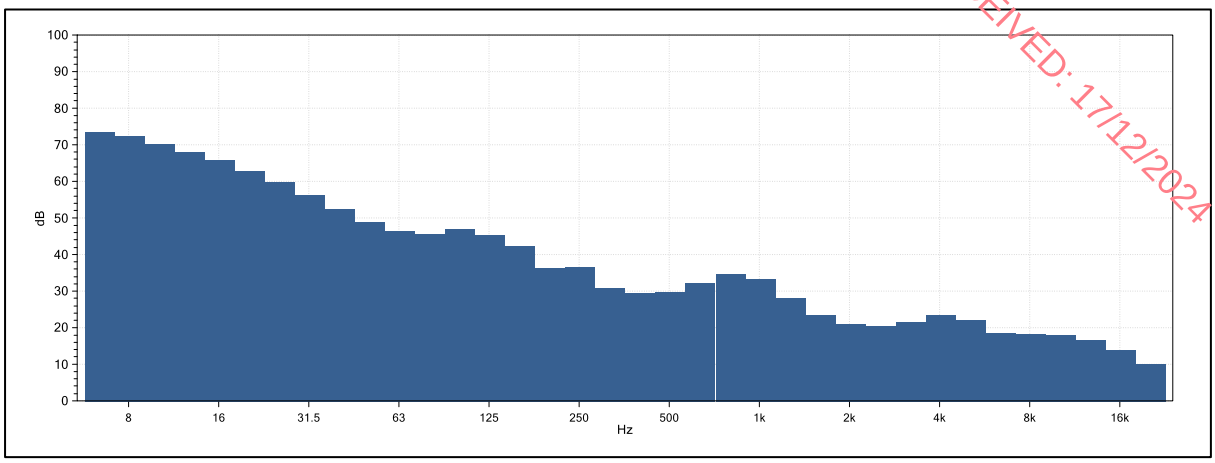


Chart 5-2: NM3 Run 2 Day 1/3 Octave Frequency Analysis



6 NM4

Plate 6-1: NM4 Location

Chart 6-1: NM4 Run 1 Day 1/3 Octave Frequency Analysis

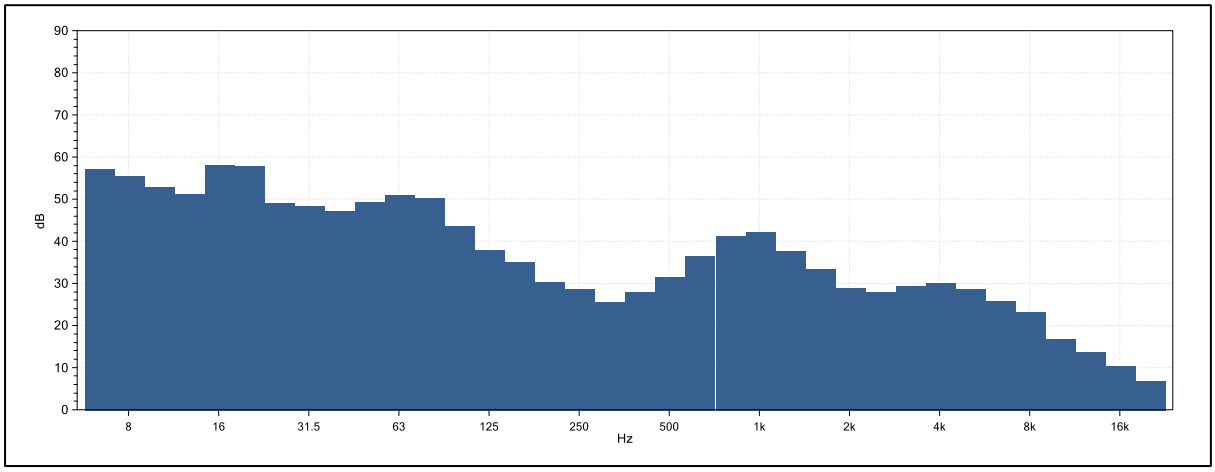
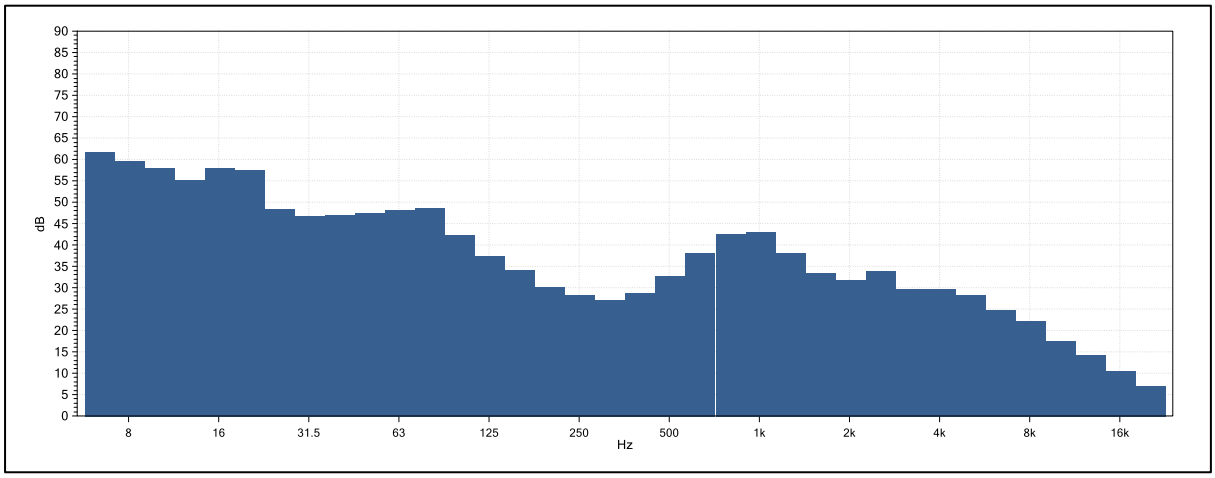


Chart 6-2: NM4 Run 2 Day 1/3 Octave Frequency Analysis



7 NM5

Plate 7-1- NM5 Location

Chart 7-1- NM5 Run 1 Day 1/3 Octave Frequency Analysis

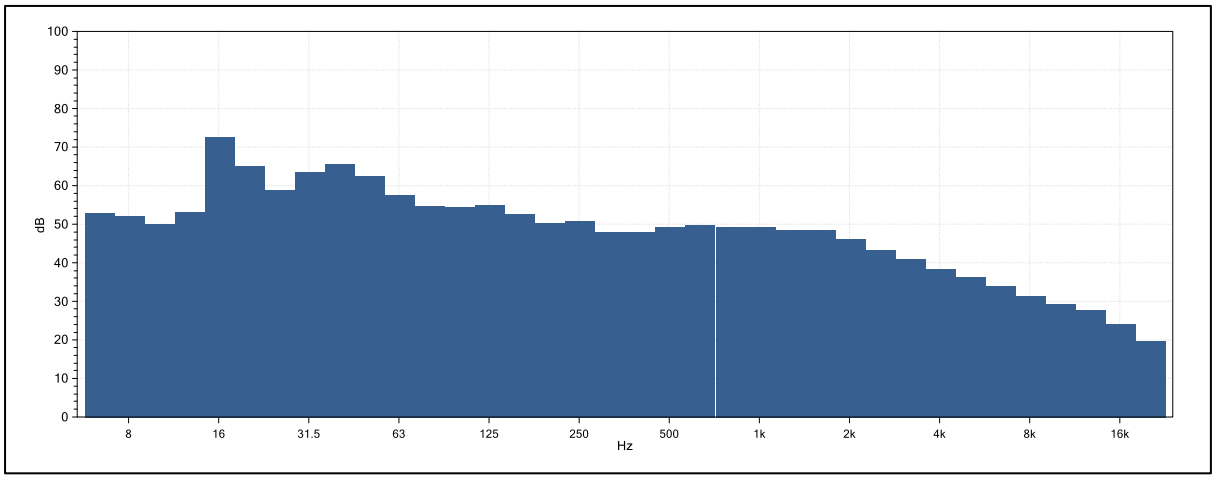
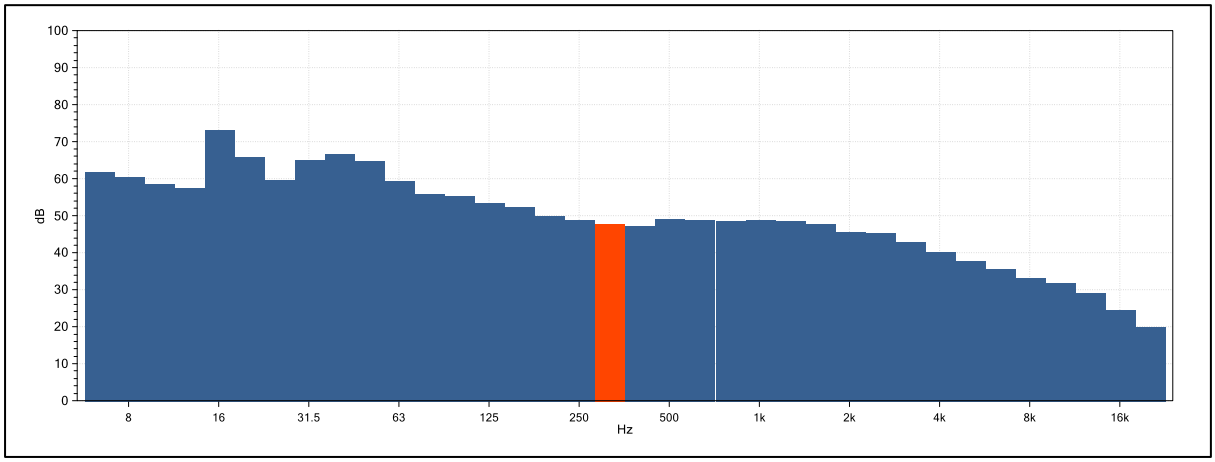


Chart 7-2- NM5 Run 2 Day 1/3 Octave Frequency Analysis



APPENDIX 12

APPENDIX 12-1

Appendix 12.1
Recorded Monuments in the Study Area

KD039-016001- Gorteenvacan Enclosure
Aerial photograph (CUCAP AYL 46) shows faint cropmarks of circular enclosure (est max. diam. c. 40m), described in 1955 as platform ringfort defined by earth and stone bank with entrance at W. Situated in complex of sub-rectangular enclosures defined by fosses, probably fields (see field system No. KD039-016001-.

KD039-016002- Gorteenvacan Field system
See KD039-016001-. Irregular system of fields showing as cropmarks of fosses on aerial photograph (CUCAP AYL 46). Ringfort/enclosure (KD039-016001) incorporated in system.

KD039-024--- Knocknagee Enclosure
Marked on the 1837 OS 6-inch map as a large oval enclosure (max dims c. 70m N-S x c. 50m E-W). No visible surface traces. Probably a ringfort site.

KD039-026--- Gorteenvacan Cist
Cist containing cremated bone, a vase food vessel and another vessel opened in the 1890's. A second vessel, possibly an urn, was destroyed by finders searching for gold.

KD040-029---- Gorteenvacan Castle - unclassified
According to a lease of 1608 Richard Eustace was required to 'build the said castle of Gurtinavackan substantially with lime and stoane, a story height above the vault, with a battlement, and a slate roof ... and make a stoane walle round about the towne and make a strong gate of oak timber and boords' (FitzGerald 1915-17, 161). It is shown on the 1907 OS 6-inch map as a circular mound, where the castle was built. There is a cropmark of a rectangular enclosure, probably a moated site, in an adjacent field to the S (KD040-030----).

KD040-029001- Gorteenvacan Mound
This site may represent the site of Gorteenvacan Castle (KD040-029----). Visible as a distinct cropmark of a mound surrounded by a narrow fosse on aerial photograph (CUCAP BGH 44). No visible surface traces.

KD040-030----- Gorteenvacan Moated site
Aerial photograph (CUCAP AYL 48) shows a cropmark of the S, W and N sides of a large rectangular enclosure consisting of an earthen bank with an external fosse (dims. of interior, c 100m x c 50m). Cropmarks of the bank and fosse are visible at ground level. Also visible on a 1990 G. Barrett aerial photo (GB90.CL.33) Situated in undulating pasture land, with a ridge which is possibly natural, closing off the site at the E. A possible castle site (No. KD040-029----) lies to the N.

KD040-031----- Ballyhade Church
The site was already marked as 'site of' on the 1837 OS 6-inch map. Situated in a shallow valley. No visible surface traces.

KD040-032----- Ballyhade Burial ground
A small, low, approximately circular mound (max. diam. 13.3m; H. 0.5m) at end of low ridge. It is enclosed by a low granite wall with traces of a fosse. There are a number of granite gravestones, two of which have dates, the earlier being 1791. No visible trace of any structure.

APPENDIX 12-2

Appendix 12.2
Sites in the Sites and Monuments Record in the Study area

KD039-054---- Prumplestown Upper Barrow – unclassified
Cropmark of circular-shaped area (approx. diam. 8m) in centre of a larger enclosure (approx. diam. 20m) visible on Google earth aerial imagery. See attached image taken from Google Earth aerial photographs taken

KD040-061----- Gorteenvacan Enclosure
Aerial photograph (GB96.FZ.37) shows cropmark of a circular enclosure defined by a fosse and with an entrance facing south-east.

KD040-071----- Ballyburn Upper Field system
Cropmark of two rectangular shaped enclosures (approx. diam. 30m) with a linear ditch running along W side visible on Google earth aerial imagery taken 14/07/2018.

CW002-018----- Gorteengrone Enclosure
Aerial photograph (GB90.BU.15, 13 July 1990) shows cropmark of a curvilinear enclosure defined by a fosse. A rectangular enclosure (KD040-030----) is located c. 160m to the N.