



11 NOISE AND VIBRATION

11.1 Introduction

This chapter of the remedial Environmental Impact Assessment Report (rEIAR) has been prepared by Wave Dynamics Limited an Acoustic Consultancy specialising in noise and vibration. It assesses the historical potential effects and significant effects of the Development at Clogrennane, Co. Carlow.

This chapter of the rEIAR provides a baseline assessment of the environmental setting of the Development Site, as described in Chapter 3, in terms of environmental noise and vibration and discusses the potential likely significant effects that may have arisen from the historic extraction activities at the Development. The assessment considers the noise and vibration impact of the construction phase and operational phase on the surrounding environment. Mitigation measures are included, where relevant, to ensure the proposed development was constructed and operated to ensure minimal impact on the receiving noise climate and noise sensitive receptors.

Please note that for the purposes of this chapter, where:

- The 'Development' is referred to, this relates to all of the project components described in Chapter 3; and,
- The 'Development Site' is referred to, this relates to the primary study area for the rEIAR, as delineated by the rEIAR Site Boundary.

11.1.1 Statement of Authority

The section was completed by Shannon Doherty | Senior Consultant. Shannon is a Senior Acoustics Consultant with over 12 years' experience in noise and vibration, including noise monitoring surveying, assessment and noise control. He has a BSc (Hons) in Music Technology from Queens University Belfast as well as a Post Graduate Diploma in Acoustics and Noise Control from the Institute of Acoustics. Shannon has experience working on major residential, infrastructure, energy and brownfield/greenfield development projects in the UK and Ireland.

This section was peer reviewed by James Cousins, Managing Director | Principal Consultant with Wave Dynamics who has extensive experience in assessing noise and vibration impacts. James is an experienced acoustic consultant. His qualifications include; BSc (Hons) in Construction Management and Engineering, Pg Cert in Construction Law and Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Competence Cert in Building Acoustic Measurements. James is a member of both Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

11.1.2 Description of the Development Site

The subject site encompasses a total area of approximately c. 41.86 hectares. Historical excavation has removed materials over an area of approximately 8.66 hectares. The land is located within the townland of Clogrennane, Co. Carlow and directly sits along the Co. Laois/Co. Carlow border. The site is approximately 6 km south west of Carlow town and approximately 3 km north-west of Ballinabranna. Substitute Consent is being sought to

regularise the historic sandstone extraction and processing at the site. Figure 11.1 below shows the historical development boundaries of the site.



Figure 11.1: Historical Development Boundaries

Table 11.1 below outlines the site development history and approximate extraction area in m².

Approximate Extraction Area	Area m ²	Extraction Estimate Volume (m ³)
2005	136,118	62,000
2010	62,951	470,000
2012	72,867	550,000
2019	82,798	620,000
2025	87,516	650,000

Table 11.1: Site Development History

11.2 Methodology

Assessment of the noise impacts has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter. In addition to specific noise guidance documents, the following guidelines were considered and consulted for the purposes of this chapter:



- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports Draft August 2017
- Transport Infrastructure Ireland (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2014)
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- • BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).
- EPA NG4 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)
- Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004
- Carlow County Council Noise Action Plan (2024 – 2028) (Carlow County Council).

The noise and vibration study has been undertaken using the following methodology:

- A baseline noise environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment and to assess the character of the existing noise.
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development.
- Predictive statistical calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site; and
- Mitigation measures have been proposed to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development.

11.3 Assessment Criteria

This chapter assesses potential noise and vibration effects that may have arisen from the Development through three distinct means;

- An assessment on the likely historical changes in the acoustic environment, at audible noise sensitive locations.
- An assessment on the likely historical site specific noise emissions that were audible at noise sensitive locations rated against industry standard limits for noise and vibration.
- A review of the site history of complaints and enforcement where noise or vibration is presented as a nuisance/effect.

11.3.1 Construction Phase - Noise

There is currently no statutory Irish guidance for construction noise requirements from noise during the construction phase of a project. In the absence of specific noise limits, the appropriate criteria for the allowable construction noise levels may be found in British



Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.

The standard (BS5228-1:2009+A1) provides examples of acceptable limits for construction and/or demolition noise in both subjective and objective form. For example, paragraph E.2 of the standard states:

“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”

Paragraph E.2 goes on to state:

“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas”.*

Typically, the local councils refer to BS 5228 Part 1 as a method to control construction noise from sites on the local environment. This standard is therefore the de facto appropriate standard in the absence of regulatory guidance.

Based on paragraph E.2 of BS 5228 the following criteria is adopted for this project:

- For residential properties it is considered appropriate to adopt the 65dB(A) criterion for
- non-residential locations it is considered appropriate to adopt the higher category values of 70dB(A) during the day. These will only be assessed as noise sensitive during office hours.

For the purpose of this assessment buildings other than dwellings which have a residential function will be considered for the lower noise limit, this includes Hotels, B&B's, Student Accommodation, Co Living Developments etc. This is in line with the guidance and definition of noise sensitive residences of EPA NG4. Table 11.2 below outlines the project criteria in tabular form.

Assessment category and threshold value period	Threshold value, in decibels (dB) (L _{Aeq})		
	Category A ¹	Category B ²	Category C ³
Daytime (07:00 – 19:00) and Saturdays (07:00 – 14:00)	65	70	75
Evenings and weekends ⁴	55	60	65



Night-time (23:00 to 07:00hrs)	45	50	55
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Table 11.2: Construction Noise Criteria.

- 1) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- 2) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
- 3) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category B values.
- 4) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

11.3.2 Construction Phase – Vibration

The recommended vibration limits to avoid cosmetic damage to buildings, as set out in:

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

The standards note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented below major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in Definitions of the damage categories are presented in BS 7385-1:1990.

Vibration PPV at the closest part of sensitive property to the source of vibration		
Frequency		
4 to 15 Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

Table 11.2: Vibration Limits

Note 1: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded

Note 2: It should be noted that these values are at the base of the building.

11.3.3 Operational Phase – Extraction

EPA NG4

EPA NG4 outlines that noise attributable solely to onsite activities from a licenced premises should not exceed the following limits:

- Daytime (07:00hrs – 19:00hrs) – 55dB $L_{A,T}$
- Evening (19:00hrs – 23:00hrs) – 50dB $L_{A,T}$
- Nighttime (23:00hrs – 07:00hrs) – 45dB $L_{Aeq,T}$

During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations. A penalty of 5dB for tonal and/or



impulsive elements is to be applied to the daytime and evening measured $L_{Aeq,T}$ values to determine the appropriate rating level ($L_{Ar,T}$). In all cases, an assessment by a competent person will be required. During the night-time period no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL.

In addition to the adoption of the EPA NG4 criteria the nearby quarry Clogrennane Lime Limited has noise limits set as follows (EPA (Environmental Protection Agency) waste license (P0400-01):

- 55 dBA LAeq (30 mins) for Daytime: 07:00hrs - 19:00hrs.

Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004

The primary regulation and guidance for the activities of Quarries and Ancillary in Ireland include the Environmental Protection Agency (EPA) Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004.

The guidelines are intended to offer guidance to planning authorities on planning for the quarrying industry through the development plan and determining applications for planning permission for quarrying and ancillary activities (Part A) and to be a practical guide to the implementation of section 261 of the Planning and Development Act, 2000 (Part B).

Chapter 3 of the guidelines provides the following recommendations for emission limit values (ELVs):

“Noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor.”

- 55 dBA LAeq (1hr) for Daytime: 08:00hrs - 20:00hrs.
- 45 dBA LAeq (1hr) for Night-time: 20:00hrs - 08:00hrs.

Error! Reference source not found. 11.3 below outlines Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004 Emission Limit Levels.

Assessment Category and Threshold Value Period	Threshold Value dB (L_{Aeq})
Daytime (08:00 hrs. – 20:00 hrs.) and Saturdays (07:00 – 14:00)	55
Nighttime (20:00hrs: 08:00hrs)	45

Table 11.1: Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004 Emission Limit Levels.

Carlow County Council Noise Action Plan

The main potential source of operational noise from the development is the excavational plant. There are no specific requirements for operational noise from quarries within the Carlow County Council Noise Action Plan 2024-2028. In our experience Councils would apply the following;



- *Daytime 55 dB (A) Leq*
- *Night-time 45 dB (A) Leq (or exceptionally 40 dB(A) Leq)*

Adopted Criteria for the Operational Phase

Considering the development will operate during the daytime period the appropriate daytime criteria for the development in line with typical council Noise Action Plans, Quarry's and Ancillary Activities Guidelines and EPA NG4 is:

- 55 dBA L_{Aeq} (1hr) for Daytime: 08:00hrs - 20:00hrs.

11.3.4 Operational Phase – Additional Vehicular Activity on Public Roads

The noise impact from roads is typically assessed based on the noise impact from the additional volume of road traffic on the adjoining roads.

Design Manual for Roads and Bridges Volume 11, Section 3, Part 7, LA 111 Noise and Vibration

This assessment is based on the guidance given in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 7, LA 111. This document sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation. The Design Manual for Road and Bridges (DMRB), Volume 11, Part 3 Section 7 HD213/11 Revision 1, Noise and Vibration, gives advice on the appraisal of noise and vibration impacts due to changes in road traffic noise and vibration for trunk roads. The DMRB identifies various stages of assessment, with each stage becoming increasingly detailed. The objective of the DMRB noise assessment is to establish the magnitude of the significance of noise changes for areas where existing traffic is likely to at least increase by 25% or reduce by 20%. The DMRB advises that these changes are equivalent to a change in noise level of 1 dB(A), which is the minimum change that can be detected by the human ear in the short term (e.g. on opening of a development or scheme).

The DMRB assessment methodology dictates that all properties experiencing changes in noise greater than 1 dB(A) should be assessed. Properties experiencing a change in noise of less than 1 dB(A) do not need to be considered, the inference being that such a slight change in the level of noise is so small as to be negligible. A doubling or halving of the total flow of traffic would cause the noise level to change by 3 dB(A) which is considered the minimum perceptible change under normal conditions. A change in the noise level of 1 dB(A) is generally only perceptible under controlled conditions. However, the DMRB indicates that those subjected to a sudden change in noise level as low as 1 dB(A), such as that which accompanies the opening of a road scheme, may just perceive the change and experience either a benefit or disbenefit.

11.3.5 Operational Phase – Vibration

Following a review of the operations based on the information provided to us there are no relevant sources of vibration associated with the operational phase of the Development, therefore, vibration criteria has not been specified for this phase.

11.4 Existing Receiving Environment

An attended noise survey was conducted to assess the background noise levels and the typical noise sources and levels from the operation of the proposed quarry located in Clogrennane, Co. Carlow.

The attended measurement survey included measurements around the perimeter of the site. The purpose of these measurements was to measure the existing noise climate and use these measurements for predicting the noise impact of the proposed development on the surrounding area.

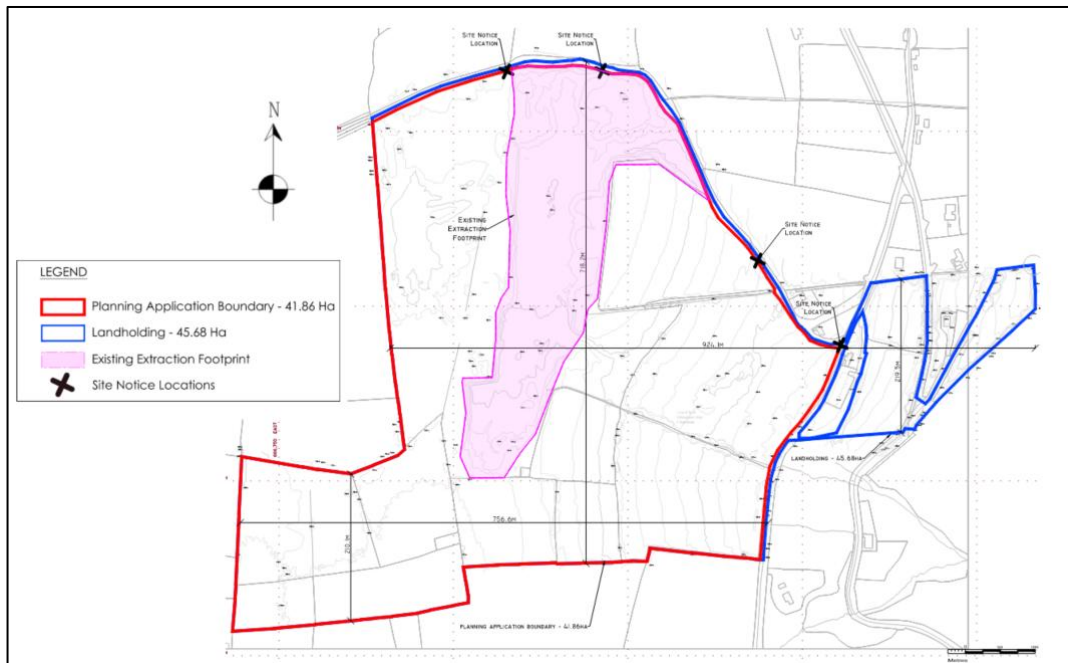


Figure 11.2: Planning Application Boundary

Attended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. Attended measurements were taken for varying durations based on objective. Background noise measurements were taken over 30-minute and 15-minute periods. Care was taken to avoid any effect on the measurements; the sound level meter was positioned at approximately 1.5m above ground level.



Figure 11.3: Noise measurement setup.

Noise Measurement Equipment

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for both the attended and unattended measurements. Table 11.4 below summarises the measurement equipment used.

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM4	Nti XL2-TA	A2A-23316-E1	UK-23-100	01/09/2025
Sound Level Meter	SLM7	Nor 140	1405924	U48184/ U47386	25/07/2026
Sound Level Meter	SLM8	Nor 140	1403345	U44270/ U44269	16/05/2025
Calibrator	CAL3	Nor 1251	32096	AC240251	03/07/2025

Table 11.4: Measurement equipment used.

Subjective Noise Environment

During the attended noise survey following noise sources were identified:

- Birdsong,
- Planes high overhead,
- Cars passing on the local roads,
- Wind blowing foliage.

Noise Measurement Results

This section outlines the results of the attended noise measurements.



Attended Measurement Results

Table 11.5 outlines the results of the attended measurement survey.

Measurement				Measured Noise Levels (re 20µPa)		
Location	Date	Time (hrs)	Duration (mins)	L _{Aeq} dB	L _{AFmax} dB	L _{A90} dB
A1	07/03/2025	09:45	15	42	57	37
A1	07/03/2025	10:00	15	40	56	37
A1	07/03/2025	10:15	15	41	57	35
A1	07/03/2025	10:30	15	42	64	34
A1	07/03/2025	10:45	15	40	61	36
A1	07/03/2025	11:00	15	39	55	36
A1	07/03/2025	11:15	15	39	51	35
A4	07/03/2025	10:13	30	38	69	38
A4	07/03/2025	10:45	15	43	73	39
A4	07/03/2025	11:00	15	38	57	42
A4	07/03/2025	11:15	15	39	61	42
A4	07/03/2025	11:30	15	39	56	43
A4	07/03/2025	11:45	15	36	55	38
A4	07/03/2025	12:00	15	35	51	38
A4	07/03/2025	12:15	15	37	65	37
A3	11/03/2025	13:24	30	42	62	31
A5	11/03/2025	13:55	30	39	58	33
A3	11/03/2025	13:34	30	43	59	33
A3	11/03/2025	14:34	30	42	58	32
A5	11/03/2025	14:25	30	38	56	32
A2	11/03/2025	14:15	15	44	57	37
A2	11/03/2025	14:30	15	43	57	36
A2	11/03/2025	14:45	15	43	59	37
A2	11/03/2025	15:00	15	43	57	37
A2	11/03/2025	15:15	15	44	65	36
A2	11/03/2025	15:30	15	45	59	38
A2	11/03/2025	15:45	15	45	71	38

Table 11.5: Attended measurement results.

Discussion of Measurement Results

The attended background measurements were taken on a weekday with to establish the existing noise conditions at the boundary of the site. The noise around was primarily by road traffic noise. Other sources included birdsong, planes overhead, and wind in foliage.

Weather Conditions for Monitoring Period

Good weather conditions were noted during the attended and unattended survey, with winds typically less than 5 m/s and no rain and clear skies.

11.4.1 Measurement Locations

The following measurement locations around the boundary of the site were selected for the baseline noise survey and to measure the background noise levels at and around the site at Clogrennane, Co. Carlow. The measurement locations A1- A5 can be seen in Figure 11.4 below.

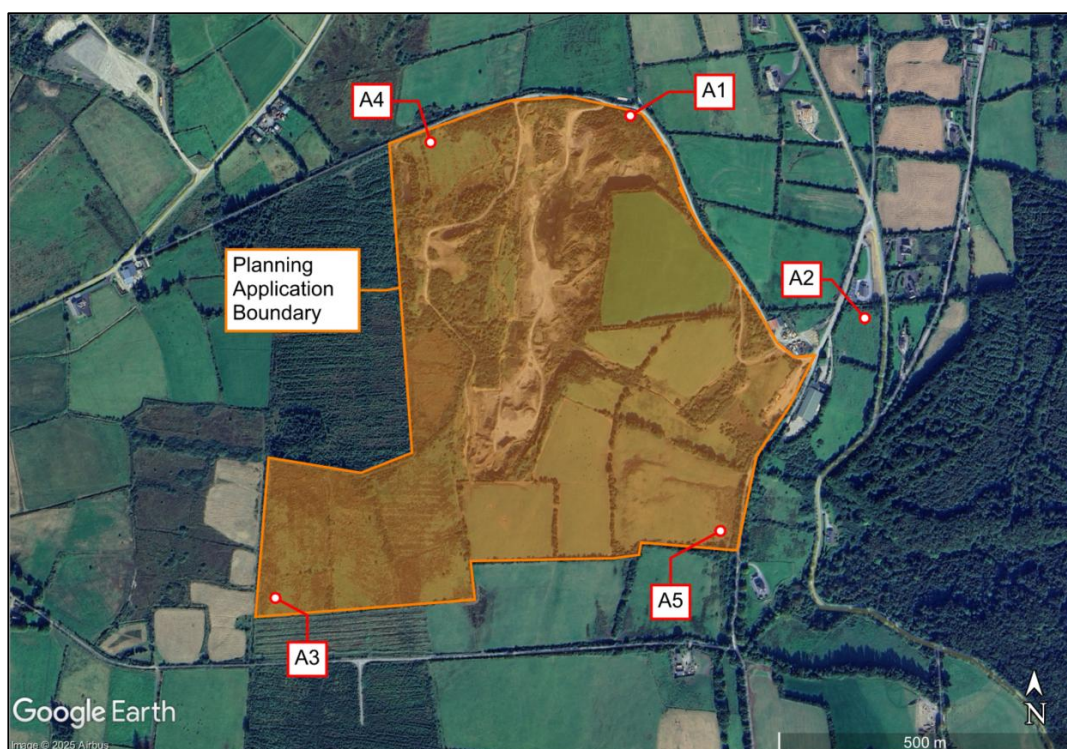


Figure 11.4: Noise Monitoring Locations A1 – A5

11.4.2 Survey Periods

The attended noise measurements were undertaken on the 7th of March 2025 and on the 11th of March 2025.

Discussion of Measurement Results

The measurements were taken on a weekday to provide an accurate understanding of the noise climate during operational times for the quarry.

11.5 Noise Sensitive Locations

Based on the location of the site, the construction works and its proximity to the residential receptors the following noise sensitive receptors have been identified and are illustrated in Figure 11. 5 below.

The noise sensitive locations are as follows;

- NSL1 are residential dwellings located approx. 441m southeast of the southernmost boundary of the approximate extraction area.
- NSL 2 are residential properties located approx. 380m to the east of the approximate extraction area.
- NSL 3 are a cluster of residential properties located approx. 315m east of the easternmost boundary of the approximate extraction area.
- NSL 4 are a cluster of residential properties located approx. 220m northeast of the approximate extraction area.
- NSL 5 is a residential property located approx. 550m west of the approximate extraction area.

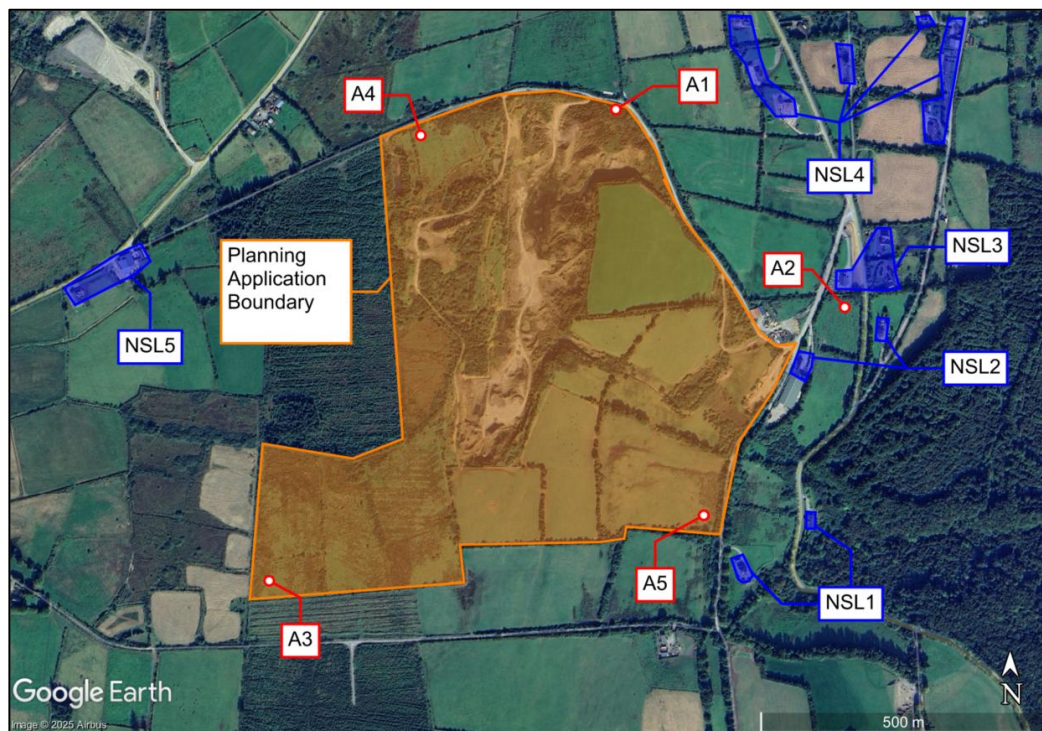


Figure 11.5: Noise Sensitive Locations & Noise Monitoring Locations

11.6 Construction Noise Limits

The criteria for the project is based on the criteria outlined in Section 11.3 and the background noise in the area. The project criteria for construction noise is outlined below in Table 11.6. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from constriction activities is set as follows for the closest noise sensitive locations:



Construction Noise Limits			
Noise Sensitive Location	Distance To the Centre of The Site	Ambient Noise dB(A) L_{Aeq}	Noise Limit dB(A) ¹ L_{Aeq}
NSL1	441	39	65
NSL2	380	43	65
NSL3	315	43	65
NSL4	220	39	65
NSL5	550	35	65

Table 11.6: Construction noise limits.

1) 65 dB (A) lower threshold limit

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the noise generated by construction activities exceeds the appropriate category value, then a significant effect is deemed to occur.

11.7 Construction Phase

This Section outlines the construction phase noise and vibration predictions associated with the construction phase (site preparation) of the Development.

11.7.1 Construction Phase Noise

It is assumed the construction phase (site preparation) consisted of the stripping of the soil/vegetation from the quarry and the construction of soil embankments. The site preparation phase would have required the use of excavators, dumpers, bulldozers, lorry's and vibratory rollers. Historical construction noise for the site has been predicted based on the information provided.

General day to day activities that would have had a negligible effect such as surveying, planting of embankments, have been omitted. Similarly, activities that are characteristic of the rural area such as fencing and hedgerow maintenance have not been assessed.

A summary of the site preparation equipment, durations and operating times are provided in Table 11.7. The prediction methodology in BS5228 has been used to calculate the noise level over a typical day for each of the main construction stages.

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level at 10m dB(A))	On Time of 10 hr day
Stripping of the Quarry	Excavators	77	6 Hours
	Dumper 7t	81	5 Hours
	Lorry Idling	80	3 Hours
	Bulldozer	75	4 Hours
	Vibratory Roller	74	2 Hours

Table 11.7: Proposed construction equipment, noise levels, and assumed on time.



The closest noise sensitive locations have been identified as the residential dwellings located in proximity to the extraction area.

Table 11.8 summarises the predicted historical construction noise levels at each of the identified noise sensitive locations. Examination of the results indicate the construction noise **without mitigation** is predicted would have complied with relevant construction noise limits during all stages of site preparation.

Location	Noise Limit	Predicted historical noise levels (construction noise + ambient) with <u>no</u> mitigation L _{Aeq} , dB
		Stripping of the Quarry
NSL1	65	48
NSL2	65	49
NSL3	65	51
NSL4	65	55
NSL5	65	48

Table 11.8: Predicted historical noise levels WITHOUT mitigation during site preparation.

Location	Noise Limit	Noise reduction required at each stage of site preparation to meet criteria (dBA)
		Stripping of the Quarry
NSL1	65	0
NSL2	65	0
NSL3	65	0
NSL4	65	0
NSL5	65	0

Table 11.9: Attenuation required based on the predicted historical construction noise levels.

It is predicted that noise mitigation measures would have not been required during the construction phase of the Development.

11.7.2 Construction Phase Vibration

Following a review of the operations based on the information provided to us there are no relevant sources of vibration associated with the historical construction phase of the Development, therefore, vibration criteria has not been specified for this phase.

11.8 Operational Phase

This Section outlines the historical operational phase noise and vibration predictions associated with the operational phase of the Development.



11.8.1 Operational Phase Noise

The historical operational noise impact from the development includes:

- Historical operational noise from quarrying activities throughout the approximate extraction area.

Historically within the site, operational phase activities included screening, loading material, excavating material, infilling material and the inward /outward transport of material on lorries. For the purpose of the assessment the historical plant and equipment for the quarry has been assessed based on assumed plant and machinery from quarries of similar size and purpose, and reference taken from BS 5228-1.

The noise impact assessment for the quarry has been developed based on the attended noise survey, the approximate extraction area and predicted noise sources. As the site has potential to create noise impact at daytime, a worst-case scenario has been developed for the daytime period predicting the noise impact at the nearest noise sensitive locations.

Operational Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level (L _{Aeq} at 10m dB(A))	On Time of 10 hr day
Stripping of the Quarry	Excavators	77	8 Hours
	Dumper 7t	81	5 Hours
	Lorry Idling	80	1 Hours
	Tracked Crusher	82	5 Hours
	Loading Shovel	82	5 Hours
	Screen Stockpiler	81	5 Hours

Table 11.10: Historical operational plant, noise levels, and duration.

Assumptions

The following general assumptions were made as part of the historical operational assessment:

- Assumed daytime operation (worst case).
- Position of plant and equipment assumed as locations are dynamic given the use of the site.
- Assumed an 80% on time for excavators.
- Assumed a 50% on time for all other machinery aside from lorries.
- Assumed 10% on time for lorries inwards/outwards.
- Assumed plant and equipment are not left to idle while not in use.
- Predictions based on the drawings, layouts, information provided and professional experience from similar projects.
- Assumed data as per the tables above.



- It is recognised that the location of the plant and machinery during the operational phase will be dynamic. For the purposes of the assessment the average locations were used.

For the historical predictions the noise levels were predicted at the nearest noise sensitive receptor therefore these are based on a worst-case scenario.

Location	Operational Daytime Noise Limit (dBA) Leq	Historical Worst Case Daytime Predicted (dBA) Leq 10hr (08:00-18:00)
NSL1	55	52
NSL2	55	53
NSL3	55	55
NSL4	55	58
NSL5	55	50

Table 11.2: Predicted historical operational noise levels at each NSL.

Table 11.11 details predicted worst-case noise levels at each NSL from operational activities undertaken at the closest point of the approximate extraction area boundary to each NSL. These operational noise predictions are deemed to be worst case based on the following:

- Free field conditions are assumed, and ground effects are ignored;
- Equipment is assumed to be operational at closest point of the approximate extraction area boundary to the noise sensitive locations (NSL's) (resulting in over-estimation);
- Predictions are based on the noisiest pieces of equipment simultaneously operational; and
- No barrier effects have been applied.

11.8.2 Operational Phase Vibration

Following a review of the operations based on the information provided to us there are no relevant sources of vibration associated with the historical operational phase of the Development, therefore, vibration criteria has not been specified for this phase.

11.9 Construction and Operational Phase Traffic

The site is bounded by a private rural road that is connected to the L7129 Road to the west and the L7134 Road to the east. The M9 motorway can be accessed via junction 6 approximately 5.5km to the south east of the site.

Noise impacts from historic traffic associated with the quarry operations has been considered. During the historical construction and operational phases of the Development, site related construction traffic and HGV's would be operational transporting material to and from the Development. This would have resulted in increased traffic volumes along the local road network.

The Design Manual for Roads and Bridges (DMRB) states that it takes a 25% increase in traffic flows in order to get a 1dBA increase in traffic noise levels. Historical traffic flow



increases associated with the Development would be significantly less than 25% and hence traffic noise level increases would have been significantly less than 1dBA. It is generally accepted that it takes an approximate 3dBA increase in noise levels to be perceptible to the average person (Ref: Planning Policy Guidance Note 24 [PPG24 - Planning & Noise]). Construction and operational traffic noise levels associated with the Development did not have a negative impact on nearby noise sensitive locations (NSLs). The magnitude of effect is no impact.

Magnitude of Impact	Increase in Traffic Noise Levels (dB)
No Impact	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

Table 11.3: Likely Effect Associated with Change in Construction Traffic Noise Levels.

11.10 “Do Nothing” Impact

Under the Do-Nothing scenario, the prevailing noise environment at the closest noise sensitive locations would remain in line with those measured during the baseline study and hence will be of neutral effect in terms of noise.

11.11 Avoidance, Remedial & Mitigation Measures

11.11.1 Historical Mitigation Measures

To date, no records of noise complaints have been received by the applicant as a result of activities associated with the Development.

Plant operating hours were from approx. 07:00 to 18:00 Monday to Friday and 07:00 to 13:00 on Saturdays. No quarrying activities took place on Sundays or Public Holidays.

During the operational phase of the development, the associated plant and equipment was predominantly situated in proximity to the working face of the quarry at various intervals throughout its operational lifetime. This strategic placement effectively mitigated noise emissions from on-site operations, as the equipment was often shielded by the site’s topography and was not fixed in a singular location. The following mitigation measures were implemented during the operational phase of the development:

- All equipment, both fixed and mobile, was maintained to a high standard to minimize any tonal or impulsive sounds.
- All equipment was systematically throttled down or switched off when not in use.
- The drop heights of materials were minimized to reduce noise.
- Rubber linings were utilized on chutes and transfer points to further attenuate sound.



- Where feasible, plant and machinery were enclosed or clad to enhance noise reduction.
- Internal routes were carefully designed to minimize noise emissions from vehicles on site.

11.11.2 Recommended Mitigation Measures

Construction Phase (Site Preparation) Noise & Vibration

This stage of works has now ceased. No mitigation required relating to noise control or vibration control.

Operational Phase Noise & Vibration

This stage of works has now ceased. No mitigation required relating to noise control or vibration control.

The worst-case predicted operational noise levels are included in Table 11.11. These predicted operational noise levels indicate that the nearest noise sensitive locations to the Development would have experienced noise levels that are below or slightly above the applicable noise threshold limit as designated by Quarry's and Ancillary Activities Guidelines and EPA NG4: 55 dBA $L_{Aeq (1hr)}$ for Daytime: 08:00hrs - 20:00hrs.

In the instance where predicted operational noise levels were slightly above the 55 dBA $L_{Aeq (1hr)}$ noise threshold i.e. NSL 4, it must be noted that these predictions are worst case, and in reality, operational noise levels would be lower. These operational noise predictions are deemed to be worst case based on the following:

- Free field conditions are assumed, and ground effects are ignored;
- Equipment is assumed to be operational at closest point of the approximate extraction area boundary to the noise sensitive locations (NSL's) (resulting in over-estimation);
- Predictions are based on the noisiest pieces of equipment simultaneously operational; and
- No barrier effects have been applied.

Predicted noise levels from historical operational activities have been predicted to comply with the Quarry's and Ancillary Activities Guidelines and EPA NG4: 55 dBA $L_{Aeq (1hr)}$ for Daytime: 08:00hrs - 20:00hrs, as best practice measures would have been employed to ensure that operational phase noise levels would be reduced to the lowest possible levels.

11.12 Residual Impacts

The impact of residual noise, considering the emissions, phasing, and intensity of site activities, alongside the mitigation measures implemented and the context of the existing ambient environment, is assessed to be not significant on a local scale. Furthermore, it is regarded as imperceptible in the broader environment, particularly given the absence of submissions, complaints, or enforcement actions related to noise or vibration.

The development has undergone a comprehensive assessment and has been determined to comply with the established noise and vibration limits during both the site preparation phase and the operational phase.



11.13 Monitoring

11.13.1 Construction Phase

There is no historical noise and vibration monitoring relating to the construction phase of the Development. Historically there was no complaints regarding noise and vibration during the construction phase.

11.13.2 Operational Phase

There is no historical noise and vibration monitoring relating to the operational phase of the Development. Historically, there was no complaints regarding noise and vibration during the operational phase.

11.14 Restoration Phase

Restoration of the site will commence once bedrock extraction has concluded. All quarrying activities will cease, and existing site infrastructure and plant will be cleared and transported off-site for disposal, recycling, or resale. Restoration will include:

- Proposed native woodland mosaic to promote and enhance ecological corridors and increase habitat biodiversity. Woodland to include high and low canopy trees in addition to understory and shrub species.
- Soil storage areas to be planted with woodland mosaic.
- Existing boundary vegetation to be retained and protected.
- Proposed settlement pond.
- Proposed beams used to regrade steep slope faces
- Proposed riparian planting
- Quarry floor will be allowed to naturally regenerate.

Based on the above, the restoration of the Proposed Development Site will have a neutral impact. No negative effects on the noise and vibration impacts are expected during the restoration phase or post restoration. The restoration will have a positive effect in terms of returning the proposed extraction area back to its existing agricultural use.

11.15 Interactions

The interaction between Noise and Vibration and other Chapters in this EIAR is primarily limited to Chapter 13 Traffic and Transportation. This noise and vibration assessment chapter has been prepared in consideration of and in conjunction with the relevant outputs of the Traffic and transportation chapter where appropriate.

The interaction between noise and traffic is through the generation of construction and operational stage traffic. Overall predictions are that there has been no significant noise impact generated during either the construction (site preparation) or operational phase of the Development, in the context of existing traffic flows.

11.16 Difficulties Encountered When Compiling

No difficulties were encountered when compiling this section.



11.17 References

- 1) ISO 9613-1:1993 Acoustics Attenuation of sound during propagation outdoors.
- 2) ISO 9613-2:1996 Acoustics Attenuation of sound during propagation outdoors
- 3) Part 2: General method of calculation
- 4) Part 1: Calculation of the absorption of sound by the atmosphere
- 5) EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- 6) EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- 7) EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports Draft August 2017;
- 8) EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015);
- 9) Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004
- 10) Carlow County Council Noise Action Plan (2024-2028)
- 11) BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;
- 12) 11) BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration;
- 13) BS8233:2014 Guidance on sound insulation and noise reduction for buildings.
- 14) Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development (Northern Ireland);
- 15) British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.