9 Noise and Vibration

9.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers the potential noise and vibration impacts as a result of the Proposed Project.

The Proposed Project is the restoration of disused quarry lands using clean soil and stone from construction and demolition. The Application Site (also referred to as 'Site') includes a disused quarry void and associated historical working areas. It also includes a private access road that connects the disused quarry to the public road network, and agricultural lands to the east of that road where it is proposed to locate the temporary facilities required to manage the importation of clean soil and stone required for the Proposed Project.

All lands within the Application Site are within the ownership of the Applicant, Bison Quarries Ltd (BQL). The Application site is located in townland of Coolsickin or Quinsborough, Co. Kildare.

This EIAR is submitted in support of an application under Section 37L of the Planning and Development Act 2000, as amended.

This chapter of the EIAR was prepared by SLR Consulting and authored by Alasdair Baxter, BSc. Hons (Dunelm), MSc., Member of the Institute of Acoustics. Alasdair has more than 20 years' experience in the assessment of environmental noise and vibration.

9.1.1 Technical Scope

The technical scope of this assessment is to consider the potential noise and vibration impacts associated the Proposed Project. This assessment considers the potential sources of change resulting from Project activities detailed in the project description (Chapter 2 of this EIAR) and summarised in Section 9.1.3.

The scope of this chapter includes the following:

- Review of activities proposed for construction phase and restoration phase, layout and available information;
- Review of historical noise and vibration monitoring records, where available;
- Review of site-specific noise and vibration limits (if applicable); and
- Prediction and evaluation of noise from the Proposed Project based on the estimates set out in Chapter 2 of the EIAR.

9.1.2 Geographical and Temporal Scope

The study area considered in this assessment comprises a buffer approximately 400 m beyond the Site Application Boundary (show in Figure 9-1). This area includes the receptors anticipated to be impacted by construction phase infilling activities. The closest receptors are located approximately 120 m west of the quarry boundary.

Representative Noise Sensitive Receptors (NSRs) considered within this assessment are listed in Table 9-1 and shown in Figure 9-1.

Table 9-1 - Identified representative NSRs

Receptor	Representative of	X	Y
NSR1	House to the east of the quarry entrance	663707	712935
NSR2	House east of the quarry	663827	713133
NSR3	Houses to the southwest of the quarry	663140	713013
NSR4	House to the southwest, west of the site entrance	663585	712857
NSR5	House to the southwest, south of the site entrance	663623	712871
NSR6	House northeast of the quarry	663804	713325

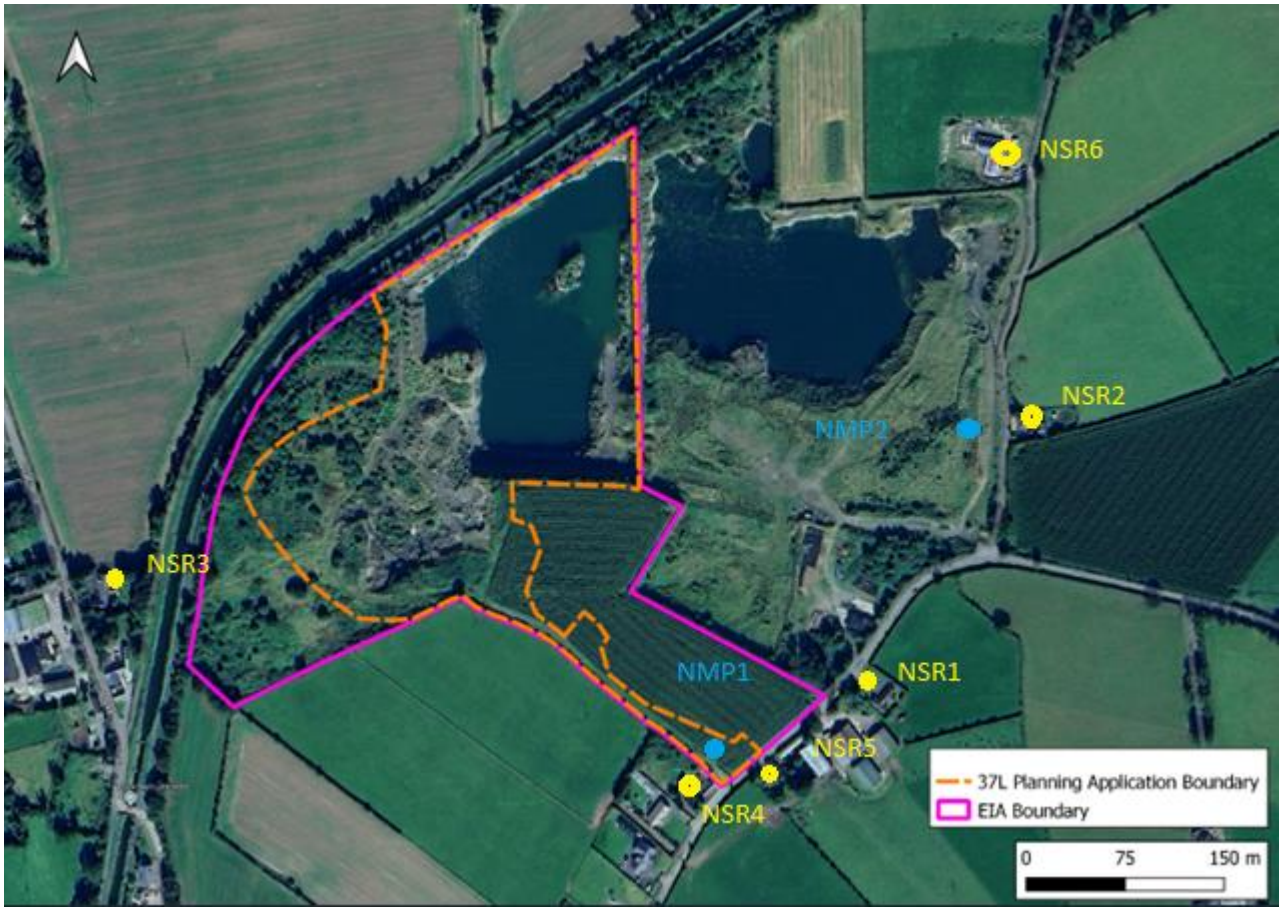

Figure 9-1 - Study area and Noise Sensitive Receptors (37 Planning Application Boundary represents the Application Site).

The potential for likely significant effects relates to activities within the construction phase (e.g. movement of plant and vehicles). The construction phase is anticipated to be 8-10 years in duration depending on market conditions (see Chapter 2 Project Description for detail). Given that the proposed restoration phase is short term (three years) and largely comprises aftercare activities for the restored lands within the Application Site, activities within this phase have been scoped out of this assessment.

9.1.3 Project Description Summary

The Proposed Project consists of the restoration of lands through the import of approximately 720,000 tonnes clean soil and stone as by-product (non-waste) from development sites to infill a disused historical quarry and raise ground levels to tie in with ground levels of surrounding land.

Restoration of the lands will be to agricultural grassland, an artificial waterbody, and a hedgerow habitat with the lands returned to their pre-extraction agricultural use.

The proposed duration of infilling is 10 years depending on market conditions for the anticipated acceptance of clean soil and stone, and a further 3 years for the completion of final restoration activities.

The Application Site is located in the townland of Coolsickin or Quinsborough, Co Kildare. The Application Site is accessed by a privately-owned access road connecting to a local road (L7049).

The following temporary facilities will be installed and maintained during the life of the Proposed Project:

- office and fully serviced welfare facilities;
- weighbridge and associated portacabin;
- closed-system wheel wash;
- 6 no. parking bays;
- 2 no. waste inspection bays and 1 no. bunded waste quarantine area;
- hardstanding area (vehicle movement and storage);
- surface water drainage infrastructure from hard standing and discharge to ground, including 2 no. interceptors and 2 no. soakaways;
- Security features, including security gates and fencing; and,
- Power supply. It is intended that approval will be sought for a connection to the ESB Network for the office and fully serviced welfare facilities. Diesel generators will be used to power mobile lighting, if required.

The Proposed Project site entrance and private access road will be upgraded and realigned. These will be retained following to completion of the Proposed Project.

A full project description in provided in Chapter 2 of this EIAR.

9.2 Policy and Legislation Context

9.2.1 Legislation

This assessment has been made with cognisance to relevant legislation, including but not limited to:

- European Union Directive 2011/92/EU as amended by Directive 2014/52/EU – these Directives required that certain private and public projects which are likely to have significant resultant environmental impacts are subject to a formalised Environmental Impact Assessment prior to their consent.
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) which amended the Planning and Development Act, 2000, and the Planning and Development Regulations, 2001. The 2014/52/EU Directive was transposed into Irish law through this Directive.

9.2.2 Policies and Plans

The Kildare County Development Plan 2023-2029 was adopted on 09 December 2022. The key policies and objectives of this plan are listed in Section 2.9.4 of the Project Description (Chapter 2).

9.2.3 Guidance

The following relevant guidance have been used and applied in this assessment:

9.2.3.1 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Jan 2016)

With regards to noise, the most recent Irish guidance was published in 2016 by the Environmental Protection Agency (EPA), Office of Environmental Enforcement (OEE), entitled 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)'.

NG4 sets methods for addressing noise from operations that fall under IPPC and Waste Licensing functions of the Environmental Protection Agency Office of Environmental Enforcement (OEE). NG4 provides detailed consideration of a range of noise related issues including basic background to noise issues, various noise assessment criteria and procedures, noise reduction measures, Best Available Techniques (BAT) and the detailed requirements for noise surveys. NG4 identifies typical limit values for noise from licensed sites as: Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$; Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$; and Night-time (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

NG4 identifies the following guidance as potentially appropriate for assessing noise, subject to the use of the methodology being considered and justified by a competent person:

- BS 4142: 2014 +A1 2019: Methods for rating and assessing industrial and commercial sound – evaluation of industrial and commercial noise sources at residential properties;

- BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings – outline guidance on noise matters and deals specifically with noise within buildings; and
- BS 5228-1: 2009 + A1: 2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise – outline guidance on prediction and control of noise from construction and open sites.

9.2.3.2 BS7445-1:2003 Description and Measurement of Environmental Noise. Guide to Quantities and Procedures

BS7445 provides guidance on appropriate environmental noise monitoring, including specification of equipment and appropriate calibration intervals, suitable weather conditions and observations to note regarding the nature of the noise environment.

9.2.3.3 ISO 9613-2, Second Edition, 2024. Acoustics-Attenuation of sound during propagation outdoors-Part 2: General method of calculations

ISO 9613 describes a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level under meteorological conditions.

9.2.3.4 Design Manual for Roads and Bridges (DMRB)

DMRB provides standards and advice regarding the assessment, design and operation of roads in the UK and sets out screening criteria, by which percentage changes in traffic flow can be related to a predicted change in road traffic noise and vibration. The guidance also provides significance criteria, by which the percentage of people adversely affected by traffic noise can be related to the total noise or vibration level due to road traffic, or the increase over an existing level.

DMRB provides a method for predicting the Basic Noise Level (BNL), a measure of the source noise level of a road. The BNL is a function of the composition, flow and speed of traffic and the quality of the road surface. Changes in the BNL, arising from changes in traffic flow, may be used as a means of determining the significance of operational noise effects.

9.3 Assessment Methodology and Significance Criteria

Baseline conditions at the closest residential receptors to the quarry have been characterised using monitoring data collected after quarry operations ceased, during 2024.

This document presents a comprehensive noise assessment based on the criteria specified in the EPA's *'Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA 2022), and with reference to *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA 2022) .

9.3.1 Noise Survey

Baseline conditions at the closest residential receptors to the quarry have been characterised using monitoring data collected during 2024 by WSP Ireland Consulting Ltd[1].

This document presents a comprehensive noise assessment based on the criteria specified in the EPA's *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports* and with reference to *'ISO 1996,2, 2007: Acoustics – Description, Measurement and Assessment of environmental noise'*.

9.3.1.1 Noise Measurement Indices

At the measurement positions, the following noise level indices have been recorded:

- $L_{Aeq,T}$ – the A-weighted equivalent continuous sound pressure level over the measurement period T, effectively represents an "average" energy level of all the sampled levels. The ambient sound level is usually measured as an $L_{Aeq,T}$ and is made up of all the sound in the area from sources near and far;
- $L_{A90,T}$ – the A-weighted noise level exceeded for 90% of the measurement period, T. This parameter is often used to describe the" background" noise level, it gives a clear indication of the underlying noise level, or the level that is almost always there in between intermittent noisy events; and
- $L_{Amax,T}$ – the A-weighted maximum noise level of the measurement period, T. This parameter is often used to identify single loud noise events.

9.3.1.2 Measurement Method

Monitoring was undertaken using a Cirrus Class I integrating sound level meter (SLM). The SLM was within its two-year laboratory calibration period, and a calibration check was performed before and after each measurement, with no drift in calibration noted.

Monitoring was undertaken at two noise monitoring positions (NMP) for a duration of 4 hours at NMP1 and ca. 2hrs at NMP2. The noise indices L_{Aeq}, L_{A90} and L_{Amax} were recorded. Weather conditions were in accordance with the requirements of BS7445 and BS4142 throughout the survey with low wind speeds, no rain and dry roads. Noise monitoring locations are shown in Figure 9-1. Full monitoring data is provided in Appendix 9A.

9.3.1.3 Evaluation Criteria

Appropriate criteria have been adopted for the derivation of impact magnitude and are provided in

Table 9-2. The criteria have been adapted from DMRB. DMRB provides criteria for construction phases of developments, which are appropriate for this evaluation.

[1] It is noted that the historical quarrying operations at the Application Site ceased in 2006.

Table 9-2 - Impact Magnitude Criteria

Exceedance of Threshold Value, dB $L_{Aeq,T}$	Subjective Reaction	Impact Magnitude
≥5	Clearly perceptible	High adverse
≥3, <5	Perceptible	Medium adverse
>0, <3	Barely perceptible	Low adverse
≤0	Inaudible	No change / none

The criteria in

Table 9-2 have been used to determine the significance of noise effects for receptors of different sensitivities, as shown in **Table 9-3**.

Table 9-3 - Assumed sensitivity of representative NSRs

Magnitude	Level of significance, relative to sensitivity of receptor		
	Low	Medium	High
High	Moderate	Moderate/Large	Large
Medium	Slight	Moderate	Moderate
Low	Neutral	Slight	Slight
No change / none	Neutral	Neutral	Neutral

This assessment considers that effects of moderate and large significance are significant, and that effects of neutral and slight significance are not significant.

All NSRs considered in this assessment are assumed to be of 'High' sensitivity.

9.3.1.4 Target Noise Levels

The EPA has produced the Environmental Management Guidelines 2006. The document references to '*A Guidance Note for Noise in Relation to Scheduled Activities'*. It deals with the approach to be taken in the measurement and control of noise and provides advice in relation to the setting of emission limits values and compliance monitoring.

Noise from the activities on site should not exceed the following noise limits at the nearest NSR:

- Daytime - 08:00 – 20:00. Target level - L_{Aeq1hr} = 55 dBA

9.3.1.5 Method of Prediction

A 3D model was constructed within noise prediction software CadnaA and noise levels were predicted at the representative NSRs. The software enables prediction of noise levels under atmospheric conditions using the method provided in BS5228.

Appropriate source noise terms from BS5228 were applied to all plant present on site. **Table 9-4** presents the sound power data and sources included in the noise model. The type and number of plant operating during the construction have been based on the details within Chapter 2 Project Description.

Table 9-4 - Source Noise Terms

Item	Resultant sound power level, dBA	Data source	Effective Height, m	Utilisation, on-time, mins/No
Bulldozer	108.0	BS_5228_2009_C2_10	2	600
Excavator	104.0	BS:5228 C2_2	2	600
Haul Trucks (line source, 4 per hour)	104.1	BS:5228 C2_32	2	4 per hour
Tractor and water bowser	111.5	BS_5228_2009_C6_38	1	615
Haul Truck dumping fill	108.2	BS_5228_2009_C1_11	2	2 per hour

Based on the above timing of activities one scenario has been modelled to establish baseline noise impacts during operations. The scenario detailed above represents activities

during the construction phase, considered to be the likely noisiest phase of operations and hence a worst-case scenario.

To demonstrate compliance for the 55 dBA fixed limit, an extreme worst-case noise scenario for utilisation times has been assigned for the full 10hr day. This has been set for the mobile plant (dozer and excavator) distributing the received material. Similarly, a worst-case utilisation has been assigned to the tractor and water bowser. It is anticipated that for majority of the Proposed Project there will be one operative undertaking plant operations and as such the concurrent utilisation of each plant throughout the day is unlikely. In addition, the infrequent HGV trips importing fill will likely not require full day machine operation to distribute the material in the particular working areas. Operatives will also take breaks at various points during the day totalling approximately 1 hour of plant down-time.

9.3.1.6 Model settings

A typical air temperature of 10^{o}C and relative humidity of 70% have been assumed within the model. Ground absorption within the quarry has been assumed to be G=0, representative of hard ground conditions. The ground absorption for the area surrounding the Site has been modelled as G = 0.5 representative of mixed ground conditions.

Local topography has been included within the model for all scenarios, using detailed contour line data provided by WSP.

9.3.2 Vibration

No blasting or pneumatic rock breaking are proposed as part of the Proposed Project and vibration is, therefore, not considered further within this report.

9.4 Baseline Conditions

The results of the noise monitoring campaign from 2024 are presented in Table 9-5.

Table 9-5 - Noise Survey Results 2024 (dB(A))

NMP	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A90,T}$
NMP1	45.2	73.7	36.0
NMP2	42.2	79.3	33.2

Predicted noise levels resulting from Proposed Project activities is presented in Section 8.5.

9.5 Do Nothing Scenario

In the do-nothing scenario it is predicted that there would no changes to the baseline noise conditions in the Application Site.

9.6 Potential Effects

9.6.1 Noise impacts

Recorded baseline noise levels include noise from all sources, including road traffic from the surrounding road network. Noise modelling has predicted noise from construction phase infilling activities to determine the likely worst-case contribution to the noise environment. The predicted noise levels are presented in **Table 9-6**. The magnitude of impact and significance of effect have been determined with reference to criteria provided in

Table 9-2 and **Table 9-3** respectively.

Table 9-6 - Evaluation of Predicted worst-case levels against daytime target level

Noise Sensitive Receptor	Predicted Noise Level dB(A)	Predicted level minus target level, 55 dB(A) $L_{Aeq,1hour}$	Magnitude of Impact	Significance of effect
NSR1	51.1	-3.9	No change	Neutral
NSR2	49.7	-5.3	No change	Neutral
NSR3	49.7	-5.3	No change	Neutral
NSR4	51.3	-3.7	No change	Neutral
NSR5	52.2	-2.8	No change	Neutral
NSR6	49.9	-5.1	No change	Neutral

Predicted noise levels at all NSRs are below the daytime target level (55 dB(A) L_{Aeq}) during this conservatively predicted scenario. The highest predicted levels were at NSR5, with predicted levels 2.8 dB below the daytime target level.

Noise effects at all NSRs associated with construction phase infilling activities during the daytime period have been evaluated as being of 'neutral' significance and are therefore 'not significant'.

9.7 Mitigation Measures and Monitoring

No mitigation measures or monitoring is proposed.

9.8 Residual Effects

The assessment concludes that the Proposed Project will not give rise to significant adverse effects on NSRs. In all cases the residual adverse effect is Not Significant and not greater than of 'neutral' significance.

9.9 Cumulative Effects

No cumulative effects are anticipated.

9.10 Difficulties Encountered

Assumptions have been made with regards to the nature and volume of plant to be used during construction phase. The rationale for these assumptions is set out in Chapter 2 of this EIAR (Project Description), and where relevant, within this chapter.

9.11 References

Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Jan 2016)

BS5288: 2009+A1:2014 Code of practice for noise and vibration control on open sites: Part 1 Noise and Part 2 Vibration

BS7445-1:2003 Description and Measurement of Environmental Noise. Guide to Quantities and Procedures

ISO 9613-2, Second Edition 2024-12-15. Acoustics-Attenuation of sound during propagation outdoors-Part 2: General method of calculations

EPA, 2006, Environmental Management Guidelines-Environmental Management in Extractive Industry (Non-Scheduled Minerals)

Design Manual for Roads and Bridges (DMRB)

Appendix 9A

Measured Noise Levels

Table 0-1 - Measured Noise Levels, NMP1

Time	LAeq (dB)	LAFMax (dB)	Ln3 (10) (dB)	Ln5 (90) (dB)	Instrument
07/06/2024 10:02	56.7	83.5	49.9	37.6	G053886
07/06/2024 10:15	50.3	73	47.1	37.6	G053886
07/06/2024 10:30	46.5	62.3	49	35.8	G053886
07/06/2024 10:45	45.8	73.7	42.4	36.7	G053886
07/06/2024 11:00	44.8	63.7	47.1	35.7	G053886
07/06/2024 11:15	43.8	61.3	46.8	35.9	G053886
07/06/2024 11:30	42.5	62.8	42.8	35.6	G053886
07/06/2024 11:45	41.9	64	43.9	35	G053886
07/06/2024 12:00	43.3	64.3	44.7	34.9	G053886
07/06/2024 12:15	42.3	59.2	45.1	35.5	G053886
07/06/2024 12:30	42.5	64.7	43.8	36.5	G053886
07/06/2024 12:45	48.5	68	45.3	35.2	G053886
07/06/2024 13:00	40.5	55.1	42.9	35.3	G053886
07/06/2024 13:15	45.8	65.8	44.6	36.8	G053886
07/06/2024 13:30	42.5	64.4	43.3	35.1	G053886
07/06/2024 13:45	45.3	63.8	46.1	35.4	G053886
07/06/2024 14:00	44.3	61.4	46.1	38.7	G053886
07/06/2024 14:15	45.7	61.7	47.8	37	G053886

Table 0-2 - Measured Noise Levels, NMP2

	Leq	Lmax	L10	L90
07/06/2024 11:40	47.6	78.6	45.3	33.4
07/06/2024 11:50	38.8	58.7	40.4	32.2
07/06/2024 12:00	39.5	61.1	38.4	31.1
07/06/2024 12:10	38.5	53.4	41.3	33.7
07/06/2024 12:20	41.3	56.2	44.7	31.6
07/06/2024 12:30	38.2	56	40.3	33.4
07/06/2024 12:40	43.3	63.7	39.8	32.5
07/06/2024 12:50	39.6	50.6	41.6	35.4
07/06/2024 13:00	37.7	61.1	38.8	33.1
07/06/2024 13:10	39.3	53	42.3	33.1
07/06/2024 13:20	40.6	59	43.5	34.6
07/06/2024 13:30	37.1	56.7	37.9	31.9
07/06/2024 13:40	35.2	47.8	37	31.9
07/06/2024 13:50	38.9	55.4	41.9	32.7
07/06/2024 14:00	48.6	79.3	46.1	37.6