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INTRODUCTION

Background

10.1 This chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, provides supporting information to accompany a planning application to Meath County Council by Kilsaran Concrete Limited Company (Kilsaran). It primarily addresses potential noise and vibration related impacts from the proposed continuation of use and extension of the existing quarry at Rathcore, Co. Meath.

10.2 The development will consist of:

- Permission for continued use of the previously permitted developments under P. Reg. Ref. No's. 01/1018 (PL17.127391); 95/1416 (PL17.099325) and 91/970 (PL17.089787) to include the existing quarry, drilling, blasting, crushing and screening of rock and related ancillary buildings and facilities;
- Permission for continued use of the previously permitted developments under P. Reg. Ref. No. TA/120923 consisting of a discharge water treatment facility comprising two lagoons (30m x 13m), an oil interceptor, a reed bed (27m x 10m) and a concrete canal with "V" notch weir;
- Permission for a small lateral extension of c.0.9 hectares from the existing quarry area of c.9.7 hectares as permitted under P. Ref. 01/1018 (PL17.127391) to give an overall extraction footprint of c.10.6 hectares;
- Permission for the deepening of the overall extraction area (c.10.6 hectares) by 2 no. 15m benches to a final depth of c.45m AOD from the current quarry floor level of c.75m AOD as permitted under P. Ref. P. Ref. 01/1018 (PL17.127391);
- Permission for a proposed new rock milling plant to be enclosed within a steel-clad building (c.575m^2 with roof height of 22.5m and exhaust stack height of 28.2m);
- Replacement of existing septic tank with a new wastewater treatment system and constructed percolation area;
- Restoration of the site to a beneficial ecological after-use;
- All associated site works within an overall application area of 31.1 hectares. The proposed operational period is for 20 years plus 2 years to complete restoration (total duration sought 22 years).

10.3 Further information on the site infrastructure, operations, environmental management systems, and controls at the existing and established quarry site is provided in Chapter 2 of this EIAR.

10.4 The existing permitted development provides for extraction of up to 350,000 tonnes of rock per year. The quarry will use the existing established site entrance and traffic routes. There will be no change to annual daily traffic movements associated with the continued extraction of rock at the site.

10.5 The noise impact assessment presented herein describes and assesses the existing noise baseline characteristics of the local area. The anticipated effects of the proposed development are then applied to these baseline conditions and the resulting noise impacts assessed. Mitigation measures are identified where necessary to eliminate or minimise adverse impacts, insofar as practical.

10.6 The number of blasts carried out at the quarry depends on market demand for construction materials. Blasting at Rathcore has previously been carried out once every 1 to 2 months on average, however no blasts have been carried out to date in 2023,with the last blast taking place in December 2022. Nevertheless, an operational vibration assessment has also been undertaken as part of this study.

10.7 In order to assist the understanding of acoustic terminology and the relative change in noise, a glossary of terms and phrases, which specifically relate to this chapter, is provided in **Appendix 10-A.**

Scope of Work

10.8 The following sections of this Chapter describe the potential noise impacts associated with the proposed continuation of use of the existing quarry and ancillary processing activities, the proposed quarry extension, and the proposed new rock milling plant. The following issues are addressed separately:

- methodology used to assess potential noise and vibration impacts from activities at properties (dwellings and farms) and sensitive ecological receptors;
- baseline conditions pertaining to existing background and ambient noise levels around the project site;
- noise and vibration impact evaluation criteria;
- prediction of the noise and vibration levels and identification of potential impacts;
- assessment of severity of impacts, with reference to the evaluation criteria;
- description of mitigation measures that will be incorporated into the design and operation of the scheme to eliminate or minimise the potential for noise and vibration impact;
- a summary of any residual impacts; and
- monitoring proposals.

Consultations / Consultees

10.9 A formal pre-planning consultation (ref. P.P. 8123) was held via MS Teams between planning, environment and transport staff of Meath County Council and representatives of Kilsaran, SLR Consulting and Hydro Environmental on the 15th September 2023.

10.10 Following a review of published development plans and the site survey, it was considered that there was no requirement for a separate formal consultation to be carried out regarding the potential noise and vibration impacts of the proposed development.

Contributors / Author(s)

10.11 SLR Consulting Ireland undertook the impact assessment presented in this Chapter on behalf of Kilsaran Concrete. The lead consultant for the study was Conor Hughes MSc. with the review carried out by Michelle Dawson MSc. MOIA.

Limitations / Difficulties Encountered

10.12 This assessment is compiled on the basis of published guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

REGULATORY BACKGROUND

10.13 The following sections describe the main legislative policy requirements in respect of noise and vibrations associated with the proposed development.

10.14 Currently, there is no national or regional legislation which specifically addresses noise and vibrations for the mineral extraction and production of aggregates. However, there are a number of guidance documents that are relevant in the context of noise and vibrations action planning.

Noise

Planning Policy and Development Control

National Planning Framework – Project Ireland 2040

10.15 The National Planning Framework (NPF) 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to a variety of sectors. It emphasises that the planning process will play a key role in realising the potential of the extractive industries and protecting reserves of aggregates and minerals. Aggregates and mineral extraction will continue to be enabled where this is compatible with protection of the environment.

10.16 There are no specific policies in relation to noise emissions and vibration levels in the NPF for construction aggregates. The general objective is to facilitate the development while at the same time protect the environment.

10.17 The Project Ireland 2040 National Planning Framework does make reference to noise in general terms under section 9.4 *Creating a Clean Environment for a Healthy Society* in acknowledging that noise is unwanted sound but is an inevitable consequence of everyday life and it becomes a problem when it occurs in the incorrect place or at the incorrect time or on a frequent or recurring basis. The National Planning Framework aims to support the following measures:

- Noise Management and Action Planning

  "Measures to avoid, mitigate, and minimise or promote the pro-active management of noise, where it is likely to have significant adverse impacts on health and quality of life, through strategic noise mapping, noise action plans and suitable planning conditions".

- Noise, Amenity and Privacy

  "This includes but is not limited to, good acoustic design in new developments, in particular residential development, through a variety of measures such as setbacks and separation between noise sources and receptors, good acoustic design of buildings, building orientation, layout, building materials and noise barriers and buffer zones between various uses and thoroughfares".

- Quiet Areas

  "The further enjoyment of natural resources, such as our green spaces and sea frontage, through the preservation of low sound levels or a reduction in undesirably high sound levels, is particularly important for providing respite from high levels of urban noise. As part of noise action plans, an extra value placed on these areas, in terms of environmental quality and the

consequential positive impact on quality of life and health, due to low sound levels and the absence of noise, can assist in achieving this".

10.18 National Planning Framework Objective 65 on noise states:

"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."

10.19 There are no specific policies relating to noise emissions in the National Planning Framework for extractive industry or related production activities.

Local Planning Policy - Meath County Development Plan 2021-2027

10.20 The Meath CDP 2021-2027 has the following objectives in Chapter 6 *Infrastructure Strategy*:

- **INF OBJ 72** *"To continue to monitor air and noise quality results submitted from selected locations throughout the County in co-operation with the Health Service Executive and the Environmental Protection Agency".*
- **INF OBJ 74** *"To support and facilitate the preparation of strategic noise maps and action plans, in conjunction with EMRA, that support proactive measures to avoid, mitigate and minimise noise, in all instances where it is likely to have adverse impacts".*

Standards and Guidance

British Standard 5228: 2009+A1:2014

10.21 British Standard 5228-1:2009+A:2014 *Noise and vibration control on construction and open sites, Part 1: Noise* (BS5228) sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities. It can be used to predict noise levels arising from the operations of proposed minerals extraction sites. BS5228 also sets out tables of sound power levels generated by a wide variety of mobile equipment.

10.22 Noise levels generated by site operations and experienced at local receptors will depend upon a number of variables, the most significant of which are:

- the amount of noise generated by plant and equipment being used at the development site, generally expressed as a sound power level;
- the periods of operation of the plant at the development site, known as the "on-time";
- the distance between the noise source and the receptor, known as the "stand-off";
- the attenuation due to ground absorption or barrier screening effects; and
- any reflections of noise due to the presence of hard vertical faces (i.e. walls).

Planning Practice Guidance 2014

10.23 The web-based Planning Practice Guidance (PPG) sets out the Government's planning policies for England and has a specific category for mineral developments.

10.24 With respect to noise, it requires those making mineral development proposals to carry out a noise impact assessment which should identify all sources of noise and, for each source, take into account

the emission level, its characteristics, proposed operating location, on-time and its potential impact at the nearby noise-sensitive receptors.

10.25 The guidelines provide advice on noise from temporary activities at mineral extraction sites, the recommended derivation of free-field criteria for normal daytime operations, and the absolute criterion of 70 dB $L_{Aeq,1hr}$ for temporary operations.

EPA Publication

10.26 The EPA publication *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*[1] recommends the following in respect of noise:

In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:

- Daytime : 08:00–20:00 h L_{Aeq} (1h) = 55 dB(A)
- Night-time : 20:00–08:00 h L_{Aeq} (1h) = 45 dB(A)

***Note**: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dB(A).*

Vibration

Standards and Guidance

British Standard 6472:2008

10.27 British Standard 6472:2008 *Guide to Evaluation of Human Exposure to Vibration in Buildings* gives guidance on human exposure to blasting induced vibration in buildings. It is applicable to blasting associated with rock extraction.

10.28 BS6472 gives details of the maximum satisfactory magnitudes of vibration for residential properties for quarries that carry out up to three blasting events per day; which is shown in **Table 10-1.** This table relates to the magnitude of vibration below which the probability of adverse comment is low.

Table 10-1
Maximum Satisfactory Magnitudes of Vibrations with Respect to Human Response for Up to Three Blasting Events per Day

Place	Time	Satisfactory Magnitude (Peak Particle Velocity, mm/sec)
Residential	Day (08.00 – 18.00 M to F) (08.00 – 13.00 Sat) Night Other Times	6.0 to 10.0 2.0 4.5
Offices	Any Time	14.0
Workshops	Any Time	14.0

[1] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

British Standard 7385-2:1990

10.29 British Standard 7385-2:1990 *Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Groundborne Vibration* gives guidance on vibration limits to prevent building damage. It is applicable to blasting associated with rock extraction.

10.30 The damage threshold criteria provided in BS7385 are based on systematic studies using a carefully controlled vibration source in the vicinity of buildings. Vibration limits for transient vibrations (such as those associated with blasting operations) above which cosmetic damage could occur are provided in **Table 10-2** below.

Table 10-2
Transient Vibration Guide Values for Cosmetic Damage

Type of Building	PPV (mm/sec) 4 to 15 Hz	PPV (mm/sec) 15 Hz and Above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/sec	50 mm/sec
Unreinforced or light framed structures Residential or light commercial buildings.	15 mm/sec at 4Hz increasing to 20 mm/sec at 15 Hz	20 mm/sec at 15Hz increasing to 50 mm/sec at 40 Hz and above.

10.31 The definition of "cosmetic damage" is the formation of hairline cracks or the growth of existing cracks in plaster, dry wall surfaces, or mortar joints. BS7385-2 notes that the probability of damage tends towards zero at 12.5mm/sec peak component particle velocity.

EPA Guidance

10.32 EPA Guidance on Quarries and Ancillary Activities suggest limit values for groundborne vibrations and air overpressure:

Groundborne vibration

Peak particle velocity = 12 mm per second, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 hertz).

Air overpressure

125 dB (Linear maximum peak value), with a 95 % confidence limit. Any blasting will be restricted to normal hours (e.g. 11:00 -17:00 hrs Monday to Friday). Advance notification of blasting will be provided to nearby residents within 600m through use of written notes, signage at site entrance, telephone, or warning sirens or a combination of these methods.

10.33 The DoEHLG (2004) Guidelines for Planning Authorities (Quarries and Ancillary Activities: Guidelines for Planning Authorities, DoEHLG 2004) suggest similar limit values.

Noise Impact

10.34 The impact of operational noise upon residential receptors is determined with reference to The EPA publication Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Mineral,[2] daytime : 08:00–20:00 h LAeq (1h) of 55 dB(A).

[2] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

10.35 The magnitude of operational noise upon residential receptors has been detailed in **Table 10-3**.

Table 10-3
Operational Noise at Residential Receptors – Impact Magnitude

Magnitude	Description
Major	Limit value exceeded by more than 5 dB
Moderate	Limit value exceeded between 3.0 and 4.9 dB
Minor	Limit value exceeded between 1.0 and 2.9 dB
Negligible	Limit value exceeded between 0.1 and 0.9 dB
None	Limit value not exceeded

Vibration Impact

10.36 The impact of vibration upon residential receptors is determined with reference to EPA Guidance on Quarries and Ancillary Activities which suggest the vibration levels from blasting should not exceed a peak particle velocity of 12mm/s.

10.37 The impact magnitude of vibration upon residential receptors has been detailed in **Table 10-4**. A Major impact has been identified at 15mm/s which is 3mm/s above the Threshold Limit of 12mm/s.

Table 10-4
Vibration levels at Residential Receptors – Impact Magnitude

Magnitude	Description
Major	Limit value exceeded by more than 3 mm/s
Moderate	Limit value exceeded between 2.1 and 2.9 mm/s
Minor	Limit value exceeded between 0.6 and 2.0 mm/s
Negligible	Limit value exceeded between 0.1 and 0.5 mm/s
None	Limit value not exceeded

Noise and Vibration Effect

Noise

10.38 Generic noise effects are detailed below. The have been taken from the IEMA *Guidelines for Environmental Noise Impact Assessment*. Where an adverse impact is identified, the guidelines present the following generic relationship between noise impact and noise effect:

- Negligible Impact Noise Effect: “Noise impacts can be heard, but do not cause any change in behaviour or attitude, e.g. turning up volume on television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is perceived change in the quality of life”;
- Minor Impact Noise Effect: “Noise impact can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows.

Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life";

- Moderate Impact Noise Effect: "Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area"; and
- Major Impact Noise Effect: "Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory".

Vibration

10.39 Vibration impacts are not as defined, but below is a description of the blasting process and the level of PPV at which humans typically detect vibration, with commentary on structural damage also provided.

10.40 Drilling of holes for blasting will involve the use of a mobile rig to drill holes through the upper rock surface parallel to the active face. The duration of drilling prior to each blast will vary with the number and depth of charge holes required. Drilling of holes will be carried out during permitted operational hours.

10.41 The duration of a blast in terms of noise is of short duration, similar to a clap of thunder. Blast-induced vibration is of short duration and transient in nature. A typical blast consists of a number of drilled holes into which are placed explosive charges. The charged holes are detonated individually by use of detonators each with different delays.

10.42 The main reason for complaints from blast-induced vibration is usually attributed to the fear of damage and/or nuisance rather than actual damage or nuisance itself. The human body is very sensitive to vibration; this can result in concerns being raised at vibration levels well below the threshold of cosmetic damage to buildings or the levels stated in the existing planning conditions.

10.43 In general terms a person will become aware of blast-induced vibration at levels of around 0.3 mm/second peak particle velocity (ppv). However, people are very poor at determining relative magnitudes of vibration, for example, the difference between 4.0 mm/sec ppv and 6.0 mm/sec ppv is unlikely to be distinguishable by an individual person. Even though vibration levels between 0.6 mm/sec ppv and 50.0 mm/sec ppv are routinely experienced in everyday life within a property and are considered wholly safe, when similar levels are experienced through blasting operations, it is not unusual for such a level to give rise to subjective concern.

10.44 With regard to physical damage to properties, extensive research has been carried out around the world, the most prominent being undertaken by the United States Bureau of Mines (USBM). Damage to a structure could occur if the dynamic stresses induced in a structure exceed the allowable design stress for the specific building material. Classifications of building damage range from very fine plaster cracking up to major cracking of structural elements.

10.45 When defining damage to buildings, the following classification is used:

- cosmetic – the formation of hairline cracks or the growth of existing cracks in plaster, dry wall surfaces, or mortar joints;
- minor – the formation of large cracks or loosening or falling of plaster on dry wall surfaces, or cracks through bricks/concrete blocks;

- major or Structural – damage to structural elements of the building.

10.46 Studies by USBM concluded that vibration levels in excess of 50 mm/sec ppv are required to cause structural damage. The onset of cosmetic damage can be associated with lower levels. Vibration levels between 19 mm/sec ppv and 50 mm/sec ppv are generally considered safe. It should be noted that these limits are for the worst-case structure conditions and that they are independent of the number of blasting events and their durations.

Significance of Effect

10.47 The significance of the noise and/or vibration effect will depend on the receptor type and its sensitivity to the noise impact. The sensitivity of the receiving environment is shown in **Table 10-5**.

Table 10-5
Sensitivity Criteria for Acoustic Receptors

Sensitivity	Definition
Very High	Residential properties (night-time), Schools and healthcare building (daytime)
High	Residential properties (daytime), Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas
Low	Industrial areas

The sensitivity of the receiving environment together with the magnitude of impact defines the level of effect as shown in **Table 10-6**.

Table 10-6
Level of Effect Matrix

Magnitude	Sensitivity			
	Very High	High	Medium	Low
Major	Major	Major	Major	Moderate
Moderate	Major	Moderate	Moderate	Minor
Minor	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible
None	None	None	None	None

Noise and Human Health

10.48 Environmental noise exposure response relationships and thresholds for health endpoints for industry are not available at European or Irish level in legislation or guidelines.

Site Specific Emission Limit Values

Noise

10.49 Condition no's 7, 8 and 19 of PL 17.127391 conditions imposed on the operation of the Rathcore quarry states:

- Condition 7

The conditions attached to planning permission register reference number P91/970 in respect of wheel washing facilities, dust control and noise limits, procedures for blasting, blast vibration and air over-pressure limits, and environmental monitoring shall continue to apply to the proposed development, except as may otherwise be required by the conditions of this order.

- Condition 8

Operational sirens and similar, in routine use on site shall be modified and maintained so as not to be audible at any noise sensitive location, other when used in as a warning signal for blasting operations.

- Condition 19

The noise levels generated during the operation of the quarry shall not exceed 55dB(A) Laeq T when measured at the site boundaries. When measuring the specific noise, the time T shall be any 15-minute period during which the sound emission from the quarry is at its maximum level.

Vibrations

10.50 Condition no's 20 and 21 of the PL17.127391 for the site states:

- Condition 20

The following procedure shall be observed with regard to blasting:

*(**a**) A standard fixed time for blasting shall be agreed with the planning authority.*

*(**b**) Blasting shall not take place outside the hours of 1100 to 1800, Monday to Friday inclusive.*

*(**c**) Notification of each blast shall be given in writing 24 hours in advance of the blast to occupiers of houses within a 500-metre radius of the quarry and to the planning authority.*

*(**d**) A notice shall be erected and kept on display at the entrance to the quarry stating the time and day of the next blast.*

*(**e**) A siren shall be sounded for 5 minutes prior to each blast and an on-off sequence for the final minute shall be used.*

- Condition 21

*(**1**) The transmitted ground vibration arising from any blast carried out on the site, when measured on the foundations of the house nearest the location of the blast and not owned by the developer or on a part of the house in close contact with the foundations, shall not exceed a peak particle velocity of 12 millimetres per second in any one of three mutually orthogonal planes.*

*(**2**) The air over pressure arising from any blast carried out on the site when measured outside the house that is nearest the location of the blast and not owned by the developer shall not exceed 125 dB(linear) at frequencies of 2 hertz or over.*

RECEIVING ENVIRONMENT

Study Area

10.51 Rathcore Quarry is located about 1 kilometre southwest of Rathcore and about c. 3 kilometres to the northwest of Enfield village. Entrance to the existing quarry is from a local road to the south of Rathcore village; refer to **Figure 10-1**.

10.52 The quarry site is surrounded by agricultural lands. The external site boundary and remaining internal field boundaries consist of a combination of mature hedgerows with sporadic mature trees and fence lines.

10.53 Residences within the general area are confined to the public roads. The public road which fronts onto the western landholding boundary runs in a northeast – southwest direction. There are two residences located along this road directly north of the quarry. There is one residence directly opposite the site entrance while there is a cluster of houses located to the southwest of the site at the intersection of the local county roads.

10.54 The quarry development is adjoined by agricultural fields on all sides, both under pasture and arable. St. Gorman's Well, an artesian thermal spring, lies c. 1.6km to the west of the site.

10.55 The wider landscape is dominated by a mixture of pasture and arable fields, bound by mostly dense tree lined hedgerows. Field sizes range from small to large, with the smaller fields typically being under pasture and the larger ones used for growing crops. Apart from a number of small blocks of woodland, there are no wooded areas within the surrounding area. Other elements in the landscape include a network of local and regional roads, with associated dispersed residential development, as well as scattered farmsteads.

10.56 The nearest dwellings to the site boundary are identified on **Figure 10-1**.

Baseline Study Methodology

Noise

10.57 Noise compliance monitoring surveys have been carried out at Rathcore Quarry by Kilsaran's environmental monitoring consultants. The methodology of the surveys and the results are set out below. The weather conditions during the survey periods were acceptable for noise monitoring, being generally dry with little or no wind.

10.58 Quarry operational noise measurements were taken using a Type 1 sound level meter. The sound level meter was calibrated before the measurements, and its calibration checked after by the operator. No calibration drifts were found to have occurred during surveys. All noise equipment had been calibrated to a traceable standard by UKAS (United Kingdom Accreditation Service) accredited laboratories within 12 months preceding the surveys.

10.59 At the measurement positions, the following noise level indices were recorded:

- $L_{Aeq,T}$ is the A-weighted equivalent continuous noise level over the measurement period, and effectively represents an "average" value.
- $L_{A90,T}$ is the A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.
- $L_{A10,T}$ is the A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe traffic noise.

10.60 The monitoring periods chosen are considered to give representative daytime noise levels at the nearest noise sensitive receptors.

10.61 During the surveys, the sound level meter was located in free-field conditions (i.e. at least 3.5m from the nearest vertical reflecting surface, with the microphone approximately 1.5m above ground level).

10.62 All noise levels are recorded in 'A-weighted' decibels, dB(A). A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted in dB(A) relative to a sound pressure of 20 Pa.

Vibrations

10.63 The closest vibration sensitive receptors to the blasting activities within the application area are located within 500m distance. Vibration attenuation increases with distance; thus, vibration impacts at any receptors located further away from the site boundary would be lesser.

10.64 All blasting operations at Rathcore Quarry have been monitored at neighbouring residences by Irish Industrial Explosives. Groundborne vibration and air overpressure levels have been and are measured and recorded for each blast. The blast monitoring locations are shown on **Figure 10-1.**

Sources of Information

10.65 Baseline information was gathered through a combination of desk-based study and technical assessments consistent with current standard methodologies and published best practice guidelines, in order to provide relevant data to allow an assessment of likely significant effects of the proposed development on sensitive receptors within the zone of influence.

Field Survey / Monitoring

Noise

10.66 The noise monitoring locations used for the purposes of the baseline noise survey, shown in **Figure 10-1**, comprise the following:

- N1 – to the north of the application area; and
- N2 – to the southwest of the application area.

10.67 The compliance noise monitoring is carried out at the planning application site boundary. The results of monitoring confirm quarry compliance with the existing noise emission limits and the monitoring results carried out are presented in **Table 10-7**, with the L_{Aeq} logarithmic average values are provided in **Table 10-8**.

Table 10-1
Summary of Measured Noise Levels, Free Field dB

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
09/01/2017	N1	12:04	44.3	46.9	39.7
09/02/2017	N1	11:50	47.6	46.4	38.6
08/03/2017	N1	12:12	51.6	52.8	44.9
03/04/2017	N1	12:27	43.6	49.1	42.1

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
05/05/2017	N1	12:13	49.0	50.9	44.2
08/06/2017	N1	12:29	49.9	50.1	41.2
06/07/2017	N1	12:45	49.1	51.9	37.6
08/08/2017	N1	12:36	49.2	48.3	42.6
05/09/2017	N1	12:34	48.0	50.5	36.2
05/10/2017	N1	11:59	54.0	54.4	52.9
07/11/2017	N1	12:29	51.0	52.1	47.0
05/12/2017	N1	11:28	52.4	52.0	50.3
08/01/2018	N1	12:18	48.2	50.6	43.9
08/02/2018	N1	11:35	44.5	45.2	43.7
15/03/2018	N1	14:18	44.7	45.6	35.8
10/04/2018	N1	15:34	42.1	43.5	39.8
02/05/2018	N1	11:56	52.7	55.8	40.3
11/06/2018	N1	09:07	46.4	49.2	34.8
05/07/2018	N1	10:40	48.3	44.2	36.4
10/08/2018	N1	12:57	49.6	49.1	35.9
10/09/2018	N1	10:18	48.3	49.7	40.3
15/10/2018	N1	13:35	52.6	53.8	49.6
06/11/2018	N1	12:34	44.1	46.4	40.7
05/12/2018	N1	13:39	44.7	45.8	36.8
10/01/2019	N1	11:10	46.2	49.0	41.2
07/02/2019	N1	11:18	50.9	53.1	47.6
07/03/2019	N1	13:13	47.7	45.5	37.4
03/04/2019	N1	10:50	46.6	46.9	39.4
03/05/2019	N1	09:02	48.3	49.9	46.0
07/06/2019	N1	13:47	49.8	52.7	44.0
03/07/2019	N1	13:02	48.0	48.3	45.1
02/08/2019	N1	10:40	49.2	48.2	46.2
06/09/2019	N1	10:30	54.3	52.2	42.2
03/10/2019	N1	09:02	43.0	45.0	40.0
05/11/2019	N1	09:02	49.0	49.3	47.0
06/12/2019	N1	11:10	42.4	44.1	38.2
10/01/2020	N1	09:10	50.1	48.0	40.4
07/02/2020	N1	08:25	47.7	49.4	42.4
06/03/2020	N1	09:00	42.8	45.4	36.3

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
26/05/2020	N1	11:36	49.0	54.0	35.0
19/06/2020	N1	14:13	51.0	50.0	39.0
15/07/2020	N1	10:16	46.0	49.0	39.0
10/08/2020	N1	09:25	45.0	44.0	34.0
08/09/2020	N1	12:09	46.0	47.0	41.0
08/10/2020	N1	11:50	46.0	48.0	35.0
10/11/2020	N1	10:52	41.0	44.0	33.0
07/12/2020	N1	10:26	41.0	43.0	34.0
14/01/2021	N1	10:31	44.0	47.0	40.0
05/02/2021	N1	10:17	43.0	46.0	36.0
04/03/2021	N1	11:07	48.0	51.0	37.0
09/04/2021	N1	10:17	46.0	49.0	31.0
06/05/2021	N1	13:29	44.0	47.0	32.0
03/06/2021	N1	10:20	47.0	50.0	45.0
09/07/2021	N1	11:05	44.0	46.0	36.0
06/08/2021	N1	09:15	46.0	50.0	41.0
06/09/2021	N1	10:40	40.0	41.0	36.0
07/10/2021	N1	11:58	46.0	48.0	39.0
08/11/2021	N1	12:02	41.0	43.0	37.0
02/12/2021	N1	12:02	48.0	50.0	34.0
10/01/2022	N1	12:45	43.0	43.0	39.0
03/02/2022	N1	09:12	49.0	51.0	39.0
07/03/2022	N1	09:51	47.0	48.0	36.0
06/04/2022	N1	08:57	47.0	51.0	39.0
05/05/2022	N1	09:03	48.0	52.0	38.0
08/06/2022	N1	09:05	48.0	52.0	39.0
13/07/2022	N1	09:35	39.0	41.0	34.0
08/08/2022	N1	09:52	38.0	41.0	31.0
07/09/2022	N1	08:44	42.0	46.0	33.0
07/10/2022	N1	09:12	43.0	45.0	39.0
07/11/2022	N1	09:41	44.0	46.0	39.0
07/12/2022	N1	09:28	41.0	44.0	34.0
12/01/2023	N1	09:29	53.0	56.0	43.0
09/02/2023	N1	09:33	45.0	48.0	33.0

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
20/03/2023	N1	09:33	51.0	53.0	38.0
06/04/2023	N1	09.51	48.0	52.0	36.0
08/05/2023	N1	10:34	47.0	50.0	38.0
06/06/2023	N1	11:34	49.0	50.0	32.0
06/07/2023	N1	09:03	44.0	45.0	35.0
09/08/2023	N1	09:43	48.0	44.0	26.0
09/01/2017	N2	12:13	46.0	45.7	37.5
09/02/2017	N2	11:55	45.6	47.2	40.7
08/03/2017	N2	12:07	52.7	51.5	43.7
03/04/2017	N2	12:34	46.1	50.4	44.1
05/05/2017	N2	12:18	52.9	55.7	48.6
08/06/2017	N2	12:4;4	48.9	49.8	42.3
06/07/2017	N2	12:51	43.5	42.6	38.6
08/08/2017	N2	12:42	51.2	52.8	47.3
05/09/2017	N2	12:45	57.2	49.6	36.7
05/10/2017	N2	11:55	52.6	53.7	50.0
07/11/2017	N2	12:33	52.8	54.0	49.0
05/12/2017	N2	11:38	52.6	53.7	51.2
08/01/2018	N2	12:23	47.5	50.4	43.4
08/02/2018	N2	11:23	52.5	53.4	48.9
15/03/2018	N2	14:25	51.0	46.1	41.4
10/04/2018	N2	15:40	54.6	50.5	43.4
02/05/2018	N2	11:51	51.4	52.4	39.3
11/06/2018	N2	09:13	42.1	44.5	32.3
05/07/2018	N2	10:46	47.6	46.7	40.0
10/08/2018	N2	13:01	48.0	50.1	37.3
10/09/2018	N2	10:24	44.9	48.3	36.8
15/10/2018	N2	13:42	45.6	46.3	44.3
06/11/2018	N2	12:02	46.9	46.6	36.5
05/12/2018	N2	13:47	45.2	48.0	36.2
10/01/2019	N2	11:16	48.7	50.7	40.9
07/02/2019	N2	10:49	53.9	55.8	46.8
07/03/2019	N2	13:09	44.3	44.1	35.1
03/04/2019	N2	11:45	50.2	52.7	44.6

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
03/05/2019	N2	08:53	51.8	51.2	48.9
07/06/2019	N2	14:01	47.4	51.0	45.1
03/07/2019	N2	13:15	47.6	48.9	46.6
02/08/2019	N2	10:34	45.2	47.2	41.5
06/09/2019	N2	11:15	48.6	51.3	42.8
03/10/2019	N2	08:52	50.0	53.0	45.0
05/11/2019	N2	09:45	52.9	53.9	51.1
06/12/2019	N2	11:00	50.3	50.8	49.3
10/01/2020	N2	09:00	55.7	54.2	52.7
07/02/2020	N2	08:28	55.9	56.9	54.6
06/03/2020	N2	08:55	55.9	57.7	55.8
26/05/2020	N2	11:25	47.0	50.0	41.0
19/06/2020	N2	14:17	45.0	48.0	39.0
15/07/2020	N2	10:51	45.0	48.0	40.0
10/08/2020	N2	09:21	52.0	51.0	48.0
08/09/2020	N2	12:17	50.0	52.0	45.0
08/10/2020	N2	12:17	48.0	50.0	53.0
10/11/2020	N2	11:29	48.0	51.0	44.0
07/12/2020	N2	10:34	43.0	45.0	39.0
14/01/2021	N2	10:41	53.0	56.0	48.0
05/02/2021	N2	09:37	54.0	54.0	49.0
04/03/2021	N2	11:03	50.0	52.0	56.0
09/04/2021	N2	10:21	48.0	49.0	34.0
06/05/2021	N2	13:35	44.0	47.0	38.0
03/06/2021	N2	10:27	49.0	50.0	47.0
09/07/2021	N2	11:41	46.0	47.0	37.0
06/08/2021	N2	09:23	52.0	55.0	49.0
06/09/2021	N2	10:45	45.0	46.0	41.0
07/10/2021	N2	12:04	49.0	52.0	44.0
08/11/2021	N2	12:08	42.0	44.0	40.0
02/12/2021	N2	11:17	51.0	54.0	49.0
10/01/2022	N2	12:54	51.0	52.0	49.0
03/02/2022	N2	09:20	51.0	52.0	50.0
07/03/2022	N2	10:00	51.0	52.0	50.0

Date	Location	Time	$L_{Aeq\ 30min}$	L_{A10}	L_{A90}
06/04/2022	N2	09:20	51.0	53.0	49.0
05/05/2022	N2	09:13	50.0	52.0	38.0
08/06/2022	N2	09:40	51.0	53.0	48.0
13/07/2022	N2	09:40	49.0	51.0	47.0
08/08/2022	N2	10:02	42.0	44.0	30.0
07/09/2022	N2	08:54	52.0	56.0	45.0
07/10/2022	N2	09:20	48.0	50.0	44.0
07/11/2022	N2	09:50	50.0	51.0	47.0
07/12/2022	N2	09:40	52.0	53.0	49.0
12/01/2023	N2	09:41	53.0	55.0	59.0
09/02/2023	N2	09:39	52.0	53.0	50.0
20/03/2023	N2	09:39	51.0	53.0	49.0
06/04/2023	N2	10:06	51.0	53.0	49.0
08/05/2023	N2	10:43	51.0	53.0	49.0
06/06/2023	N2	11:44	49.0	53.0	38.0
06/07/2023	N2	09:11	43.0	46.0	38.0
09/08/2023	N2	09:55	49.0	49.0	43.0

Table 10-2
Summary of Measured Noise Levels, Free Field dB (Average Values)

Location	Receptors effected	Period	L_{Aeq}
N1	R5, R6, R23	Daytime	48.0
N2	R1, R2, R4	Daytime	50.6

Vibrations

10.68 Ground vibration and air overpressure are measured for each blast. The blast monitoring locations are shown on **Figure 10-1** and are described as follows:

- B1 - North of quarry at R5 (O'Sullivan residence)
- B2 - South of quarry at R9 (Gorry residence)
- B3 – North of quarry at R6 (Flynn residence)
- B6 – Southwest of quarry at R16/R17 (Souhan residence)
- B7 – Southwest of quarry at R2/R3 (Devine Residence)

10.69 **Table 10-9** details blast monitoring results at the quarry from 2017 to 2022. No blasting has taken place at the site since December 2022. The monitoring was carried out using mobile vibrograph units at these locations.

Table 10-3
Blast Monitoring Results

Date	Location	Particle velocity mm/sec			Air Overpressure
		Horizontal	Vertical	Transverse	
07/03/2017	**B1**	0.76	0.69	0.88	117.2
	B2	4.57	5.01	4.57	115.9
	B6	1.58	1.14	1.52	114.6
12/04/2017	**B2**	3.10	4.70	4.00	121.0
	B3	1.07	0.69	0.88	106.0
	B6	1.58	1.27	1.90	107.0
09/05/2017	**B3**	3.17	2.73	2.22	117.0
	B6	1.07	0.82	1.07	120.6
	B7	2.98	3.81	1.77	103.5
07/06/2017	**B2**	2.60	3.30	4.10	101.0
	B6	2.09	1.39	2.09	112.8
	B7	4.90	4.60	5.40	115.0
05/07/2017	**B2**	2.09	2.47	2.41	117.0
	B6	1.33	1.39	1.46	94.0
	B7	4.88	6.98	3.38	103.5
04/08/2017	**B2**	2.35	2.85	2.22	118.0
	B6	1.77	1.77	1.52	91.5
	B7	4.88	4.88	3.68	95.9
21/08/2017	**B1**	1.84	1.65	1.52	115.0
	B6	1.65	2.41	1.48	101.9
	B7	4.82	4.57	2.73	103.5
21/09/2017	**B2**	1.58	2.47	2.03	95.9
	B3	1.58	1.33	2.67	112.0
	B6	1.20	0.88	0.95	91.5
	B7	3.11	2.54	2.47	119.4
25/01/2018	**B3**	3.81	3.42	2.73	116.9
	B6	1.39	1.07	1.07	111.8
	B7	1.84	2.28	1.71	114.0
15/03/2018	**B2**	0.60	1.00	1.00	102.0
	B6	<0.5	<0.5	<0.5	<125

Date	Location	Particle velocity mm/sec			Air Overpressure
		Horizontal	Vertical	Transverse	
	B1	2.22	1.39	2.22	106.0
02/05/2018	**B1**	4.12	3.68	3.81	114.8
	B6	0.69	0.38	0.57	114.8
	B7	1.39	0.80	1.20	88.0
10/09/2018	**B6**	0.88	0.50	0.88	105.5
	B1	3.17	2.03	4.63	114.0
	B2	1.39	1.33	1.14	81.9
01/11/2018	**B6**	1.20	1.07	0.82	108.8
	B1	2.34	2.34	1.77	88.0
	B2	1.58	1.65	1.27	113.1
03/12/2018	**B6**	1.33	0.63	1.01	109.2
	B1	1.01	1.07	0.82	115.9
	B2	4.31	6.22	5.33	112.0
16/01/2019	**B2**	7.11	5.14	8.19	114.4
	B6	1.46	1.14	1.07	113.5
	B1	1.14	1.65	1.39	120.2
01/03/2019	**B6**	1.46	0.88	1.14	112.6
	B1	1.77	2.98	2.79	116.4
	B2	2.60	2.09	1.52	112.8
19/03/2019	**B2**	2.54	3.17	6.28	110.0
	B6	0.76	0.63	0.69	104.0
	B1	0.76	0.88	0.50	116.4
05/04/2019	**B2**	5.39	7.68	5.52	107.5
	B6	1.77	1.01	1.14	115.6
	B1	0.76	1.01	0.44	116.3
22/05/2019	**B2**	4.50	6.98	4.44	112.0
	B6	1.01	0.88	0.76	109.9
	B1	0.63	0.76	0.76	108.0
06/06/2019	**B1**	1.14	1.01	0.76	117.0
	B2	3.36	2.66	2.28	108.0
13/08/2019	**B2**	10.47	10.54	9.90	113.5
	B6	1.65	1.58	1.07	110.6

Date	Location	Particle velocity mm/sec			Air Overpressure
		Horizontal	Vertical	Transverse	
	B1	1.39	1.84	0.95	115.6
19/09/2019	**B2**	3.93	6.54	2.92	109.9
	B6	0.69	0.69	0.63	114.2
	B1	4.38	5.27	5.39	110.6
15/01/2020	**B2**	4.63	5.08	5.14	110.9
	B6	1.06	0.63	0.76	117.0
	B1	2.60	6.47	3.81	122.4
05/03/2020	**B2**	4.12	5.27	6.16	88.0
	B6	0.88	0.57	0.76	115.0
	B1	4.38	4.00	5.39	111.2
05/08/2020	**B2**	6.60	3.75	1.40	114.4
	B6	1.40	0.60	1.40	115.0
	B1	1.00	1.20	1.20	113.0
04/11/2020	**B2**	7.94	7.49	8.32	108.0
	B6	0.95	0.51	1.08	114.0
	B1	0.89	0.70	1.27	113.0
16/12/2020	**B2**	4.19	6.10	6.10	101.0
	B6	1.02	0.70	0.83	102.0
	B1	1.08	1.14	1.14	114.0
02/03/2021	**B2**	5.21	4.89	6.60	119.0
	B6	1.27	0.57	1.02	110.0
	B1	1.02	1.33	1.65	98.0
10/06/2021	**B2**	2.70	1.20	1.60	111.0
	B6	<0.51	<0.51	<0.51	<120.0
	B1	0.40	0.60	0.40	117.0
10/08/2021	**B2**	3.18	2.03	2.73	113.0
	B6	1.72	1.46	1.27	88.0
	B1	0.51	0.76	0.45	114.0
15/09/2021	**B2**	5.59	5.53	7.56	107.0
	B6	1.02	0.70	0.83	116.0
	B1	1.08	1.33	1.14	115.0
16/02/2022	**B2**	2.60	3.75	3.11	104.0

Date	Location	Particle velocity mm/sec			Air Overpressure
		Horizontal	Vertical	Transverse	
	B6	0.57	0.45	0.51	101.0
	B1	0.70	1.02	0.89	119.0
01/09/2022	**B2**	5.27	4.26	4.38	122.7
	B6	1.43	0.45	0.70	118.8
	B1	1.02	1.21	0.95	113.3
08/12/2022	**B2**	5.14	3.75	3.24	112.0
	B6	<0.51	<0.51	<0.51	<120.0
	B1	1.21	0.95	0.70	112.6

10.70 All blasts are monitored, with records kept detailing the results of vibration, air over pressure, and the blast design as part of the environmental monitoring programme implemented at the quarry.

10.71 The blast monitoring results at Rathcore Quarry indicate that blasting operations have complied with condition limits imposed on the Quarry, and the recommended limits for the industry.

Sensitive Receptors

Human Receptors

10.72 Sensitive locations are those where people may be exposed to noise from the existing or planned activities. The closest receptors to the application site have been identified. The relevant receptors are shown in **Figure 10-1**.

10.73 There are 7 sensitive receptors identified as representative of the closest distances to the application site. A summary of the closest sensitive receptors in each direction surrounding the planning application area is presented in **Table 10-10** below.

Table 10-4
Noise Sensitive Receptors

Receptor Reference	Receptor	Sensitivity
R1	Residential	Medium
R2	Residential	Medium
R4	Residential	Medium
R5	Residential	Medium
R6	Residential	Medium
R23	Residential	Medium
R101	Residential (under construction)	Medium

Ecological Receptors

10.74 The application site is not subject to any statutory nature conservation designation. Ecological receptors of concern are those areas designated under EU Habitats Directive (92/43/EEC).

10.75 The nearest ecological receptor is the Royal Canal pNHA [002103], located 2.5 km south of the site.

10.76 Based on the nature, size and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 or designated sites is up to a maximum radius of 2km from the application site unless there are any potential source-pathway-receptor links between the proposed development at Rathcore and any Natura 2000 or designated site(s) beyond this distance.

IMPACT ASSESSMENT

Noise

Impact Assessment Methodology

10.77 To determine the noise impact at the site, SLR Consulting Ireland carried out a noise prediction assessment, whereby the levels of noise were calculated at the nearest noise sensitive receptors (residences) shown on **Figure 10-1**. The operational $L_{Aeq,\ 1hr}$ noise predictions at each receptor location are based on the prediction protocol for assessment methodology based on BS5228: Part 1 (2009) + A1:2014 "*Code of Practice for Noise and Vibration Control on Construction and Open Sites".*

10.78 The following noise sources have been considered in the noise assessment for the overburden stripping:

- excavator;
- dumper.

10.79 For the purposes of the overburden stripping assessment a reduction of -10 dB(A) for full noise screening by existing berms has been adopted for all receptors. In addition, for the purposes of this noise assessment, it is assumed that all of the noise sources are active for 80% of the time except for the processing plant at 50%, drill rig at 40% and HGVs which have been included with a 50% on-time[3]. The distances to the receptors are calculated from the activity noise source located at the closest distance to the sensitive receptor. On this basis, it is considered that the noise assessment is very conservative.

10.80 The EPA Guidance on Quarries and Ancillary Activities suggest noise limit values are 55dB $L_{Aeq,\ 1hr}$ for daytime normal operations.

10.81 The following noise sources have been considered in the noise assessment for the stone extraction within the planning application area:

- drilling rig;
- excavator;
- dumper;

[3] Based on operators previous experience of the site taking account for normal operational adjustments, equipment maintenance and breakdowns, market demand and conditions, etc.

- aggregate processing plant;
- generator;
- HGV;
- existing limestone processing plant; and
- proposed new limestone milling plant.

10.82 For the purposes of operational rock extraction and processing assessment, a reduction of -10 dB(A) for full noise screening by proposed berms and the quarry face has been adopted. In addition, for the purposes of this noise assessment, it is assumed that all of the noise sources are active for 80% of the time except for the processing plant at 50%, drill rig at 40% and HGVs which have been included with a 50% on-time[4]., at the distances stated/closest to the sensitive receptors during the working hours of the development. The distances to the receptors are calculated from the activity noise source located the closest distance to the sensitive receptor. The residence locations are shown on **Figure 10-1.**

10.83 On this basis, it is considered that the noise assessment is very conservative. The measured average level of noise arising / measured from the existing operations within the overall site was used in the assessment.

10.84 The average L_{Aeq} values of the measured noise levels from 2017 to 2023 (used in this assessment) with corresponding receptors are provided in **Table 10-11**.

Impact Assessment

10.85 The noise impact assessment was undertaken to calculate the level of noise arising from the site activity at the nearest sensitive receptors shown on **Figure 10-1**. Detailed noise assessment calculations are provided in **Appendix 10-B**.

Table 10-5
Predicted Operational Noise Levels

Activity	Location	Receptor	Period	Criterion	$L_{Ar,\ 1hr}$ dB(A)	Difference
Overburden stripping	N2	R1	Daytime	55	40	-15
	N2	R2	Daytime	55	42	-13
	N2	R4	Daytime	55	46	-9
	N1	R5	Daytime	55	43	-12
	N1	R6	Daytime	55	40	-15
	N1	R23	Daytime	55	34	-21
	N2	R101	Daytime	55	45	-10
Stone Extraction & Aggregate / Lime	N2	R1	Daytime	55	47	-8
	N2	R2	Daytime	55	48	-7
	N2	R4	Daytime	55	54	-1

[4] Based on operators previous experience of the site taking account for normal operational adjustments, equipment maintenance and breakdowns, market demand and conditions, etc.

Processing Activities	N1	R5	Daytime	55	54	-1
	N1	R6	Daytime	55	51	-4
	N1	R23	Daytime	55	41	-14
	N2	R101	Daytime	55	50	-5

10.86 It can be seen in **Table 10-11** that the noise criterion limits (55 dB(A)) for stripping activities are met at all the noise sensitive locations.

10.87 It can be seen in **Table 10-11** that the noise criterion limits for stone extraction are met at all the noise sensitive locations.

10.88 To identify the potential impact of continuous (full-time) site activities at the proposed quarry development, operational levels have been compared to guidance limits for minerals operations, and the Impact then identified with reference to **Table 10-3** of this Report. The assessment is shown in **Table 10-12** below.

Table 10-6
Operational Noise Levels – Impact Magnitude

Activity	Location	Receptor	Period	$L_{Ar, 1hr}$ dB(A)	Limit	Difference	Impact
Overburden stripping	N2	R1	Daytime	40	55	-15	None
	N2	R2	Daytime	42	55	-13	None
	N2	R4	Daytime	46	55	-9	None
	N1	R5	Daytime	43	55	-12	None
	N1	R6	Daytime	40	55	-15	None
	N1	R23	Daytime	34	55	-21	None
	N1	R101	Daytime	45	55	-10	None
Stone Extraction & Aggregate / Lime Processing Activities	N2	R1	Daytime	47	55	-8	None
	N2	R2	Daytime	48	55	-7	None
	N1	R4	Daytime	54	55	-1	None
	N1	R5	Daytime	54	55	-1	None
	N1	R6	Daytime	51	55	-4	None
	N2	R23	Daytime	41	55	-14	None
	N1	R101	Daytime	50	55	-5	None

10.89 With reference to The EPA publication Environmental Management Guidelines for Environmental Management in the Extractive Industry presented in **Table 10-3**, the noise impact within the application area from plant associated with any overburden stripping at the nearest receptors is None.

10.90 With reference to The EPA publication Environmental Management Guidelines for Environmental Management in the Extractive Industry presented in **Table 10-3**, the noise impact within the

application area from plant associated with the rock extraction and aggregate / lime processing activities at the nearest receptors is None.

10.91 In view of the above findings, additional mitigation measures to reduce the noise impacts of Stone Extraction & Aggregate / Lime Processing Activities associated with the planned development are not required.

10.92 With reference to the calculated noise levels presented it is considered that the levels presented are a worst case, and in reality the nearest NSRs to the Site, in particular R4 and R5, benefit from significant shielding from existing embedded mitigation in the form of substantial bunds at the perimeter of the Quarry. The performance of the bunds is reflected in the compliance monitoring at N1 and N2 (see **Table 10-7**) where the measured noise levels are well below the limit of 55dB(A)[5].

Vibration

10.93 Historical blast monitoring results at Rathcore Quarry confirm that the blasting operations at the quarry have complied with the DoEHLG (2004) and EPA (2006) recommended threshold limit values for groundborne vibration (12 mm/sec peak particle velocity) and air overpressure (125 dBL Linear max peak with a 95% confidence limit).

10.94 The comprehensive environmental monitoring programme implemented at the quarry confirms that the quarry has operated within the recommended blasting emission limit values set out in the best practice guidelines for the sector.

10.95 As the limit is met it is considered that there are no effects predicted on any designated or Natura 2000 sites.

MITIGATION MEASURES

Noise

10.96 Where necessary, the three established strategies for impact mitigation are avoidance, reduction and remedy. Where it is not possible or practical to mitigate all impacts, then the residual impacts must be clearly described in accordance with the system for impact description set out in the EPA Guidelines. The adoption of Best Practicable Means is generally considered to be the most effective means of controlling noise emissions. The quarry has been successfully operating well within the EPA recommended limits for noise, as clearly demonstrated through **Table 10-7**. There is a range of inherent mitigation measures in place at the existing quarry which will continue to be implemented at the proposed development, such as those outlined below.

10.97 In addition, the proposed new rock milling plant will be located on the existing quarry floor to maximise screening by the existing quarry faces. The noise model only allows for a maximum of -10dB for shielding by screening mitigation (as permitted by BS5228), whereas actual screening mitigation measures at the site are in reality more effective as borne out in the comprehensive monitoring results contained in **Table 10-7**.

10.98 The following best practice measures will continue to be implemented wherever practicable at the proposed site to minimise the potential noise impact of on-site activities:

10.99 **Screening:-**

[5] Only 4 marginal exceedances of 55dB(A) out of 158 measurements.

- existing perimeter berms and hedge planting will be retained and supplemented where necessary;
- the proposed new rock milling plant will be located on the existing quarry floor to maximise screening by the existing quarry faces.

10.100 **Machinery and Plant:-**

- all mobile plant used at the development will have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments;
- all plant items will be properly and regularly maintained and operated according to the manufacturers' recommendations, in such a manner as to avoid causing excessive noise (i.e. all moving parts are kept well lubricated, all cutting edges are kept sharpened, the integrity of silencers and acoustic hoods are maintained);
- all plant will be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers will be replaced immediately;
- the proposed new rock milling plant will be within an enclosed unit which will be further enclosed within a steel-clad building to minimise noise.

10.101 **Traffic:-**

- all operations on site will be programmed to be carried out during daytime hours only;
- care will be taken when loading vehicles to reduce or minimise potential disturbance to local residents;
- access / internal haul roads will be kept clean and maintained in a good state of repair, i.e. any potholes are filled, and large bumps removed, to avoid unwanted rattle and "body-slap" from heavy goods vehicles;
- vehicles waiting within the quarry will be prohibited from leaving their engines running and there should be no unnecessary revving of engines.

10.102 Experience from this and other quarry sites has shown that by implementing these measures, typical noise levels from daytime operations can bring about a reduction of 5dB(A) or more in ambient noise levels.

Vibrations

10.103 The blast design and blasting methodology for the site operations carried out within the planning application area have been and will be optimised to ensure that the levels have been and are within existing site emission limits.

10.104 The following measures have been and are implemented at the planning application area to minimise disturbances due to blasting operations. These mitigation measures are in accordance with the 'best practice / mitigation' measures:

- blasting is carried out between the hours of 10:00 hrs to 17:00 hrs from Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the operator). A blast must be carried out on site on the specified day, as concerns over security does not allow for explosives to be stored on site;
- blasting is not carried out on Saturdays, Sundays or public holidays;

- blast notifications are provided for residences within 500m of the quarry and by pre and post siren warnings;
- all blasting operations have been and are carried out by a certified 'shotfirer' in accordance with the relevant health and safety regulations;
- the optimum blast ratio is maintained, and the maximum instantaneous charge is optimised.
- to avoid any risk of damage to properties in the vicinity of the site, the groundborne vibration levels from blasting does not exceed a peak particle velocity of 12 mm/sec.

Unplanned Events (i.e. Accidents)

10.105 Accidents, malfunctions and unplanned events refers to events or upset conditions that are not part of any activity or normal operation of the proposed extraction as has been planned. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during proposed continuation of use and extension of existing quarry activities.

10.106 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation.

10.107 Considering the proposed continuation of use and extension of the existing quarry there is no need to use any warning sirens or warning sounds in relation to unplanned events in relation to noise impact events.

10.108 In terms of noise impacts the following unplanned events could have an effect on the local area:

- equipment malfunction;
- vehicle collision.

10.109 In relation to noise impacts of any unplanned events, are considered to be negligible, as they have no potential to increase noise levels at sensitive receptors.

10.110 In terms of blasting the following unplanned events could have an effect on the local area:

- fly rock;
- premature blast;
- misfires;
- blast induced seismicity.

10.111 The following blast management (vibration suppression) measures are, and will continue to be implemented at Rathcore Quarry to avoid unplanned events:

- blasting is carried out between the hours of 10:00 hrs to 17:00 hrs from Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the operator). A blast must be carried out on site on the specified day, as concerns over security does not allow for explosives to be stored on site;
- there is no blasting carried out on Saturdays, Sundays or public holidays;
- blast notification is provided by pre and post siren warnings as well as formal pre-blast notification to local residents. Exclusion zone is erected during blasts;

- all blasting operations are carried out by qualified personnel in accordance with the relevant health and safety regulations;
- the optimum blast ratio is maintained, and the maximum instantaneous charge is optimised.

10.112 In relation to blasting impacts of any unplanned events, are considered to be negligible, as they have no potential to increase vibration levels at sensitive receptors.

RESIDUAL IMPACT ASSESSMENT

Cumulative Impacts

10.113 A search of the myplan.ie and An Bord Pleanála online planning portal searches was carried out to determine if there were any other planned developments in the vicinity (c. 1km radius) of the application site that have recently been granted permission or are currently under consideration and which have the potential to have a significant adverse cumulative impacts on the local environment.

10.114 Since the time of the last planning application at Rathcore Quarry (planning ref. TA/161227 (ABP-PL.249132, Progressive Genetics has secured planning permission (planning ref. TA/180007 for partial change of use of the nearby Rathcore golf club-house for use as offices and a call centre and will have up to 20 staff.

10.115 Progressive Genetics traffic will use the L6225-18 road whilst the quarry's main traffic route is the L6226, and this coupled with the relative small workforce associated with the call centre is not expected to have any likely significant adverse impact on traffic volumes on the local road network.

10.116 It is considered in light of the available assessments that the proposed development will not have any significant adverse cumulative effect on noise and vibrations.

'Do-nothing Scenario'

10.117 At present, the noise environment within the study area is dominated by road traffic noise emanating from the local roads, natural sounds such as farmyard animals or barking dogs are also audible.

10.118 Over time, it is anticipated that the volume of road traffic in general, will increase as economic activity increases and that this in turn is likely to lead to an increase in ambient and background noise levels.

Interaction with Other Impacts

10.119 The potential impact of noise and vibrations generated by the proposed development on sensitive receptors including sensitive ecological receptors and people living in the area has been assessed in this chapter of the EIAR. The impact of the proposed development activity on these receptors is further considered in Chapter 4 'Population and Human Health' and Chapter 5 'Biodiversity'.

MONITORING

Noise

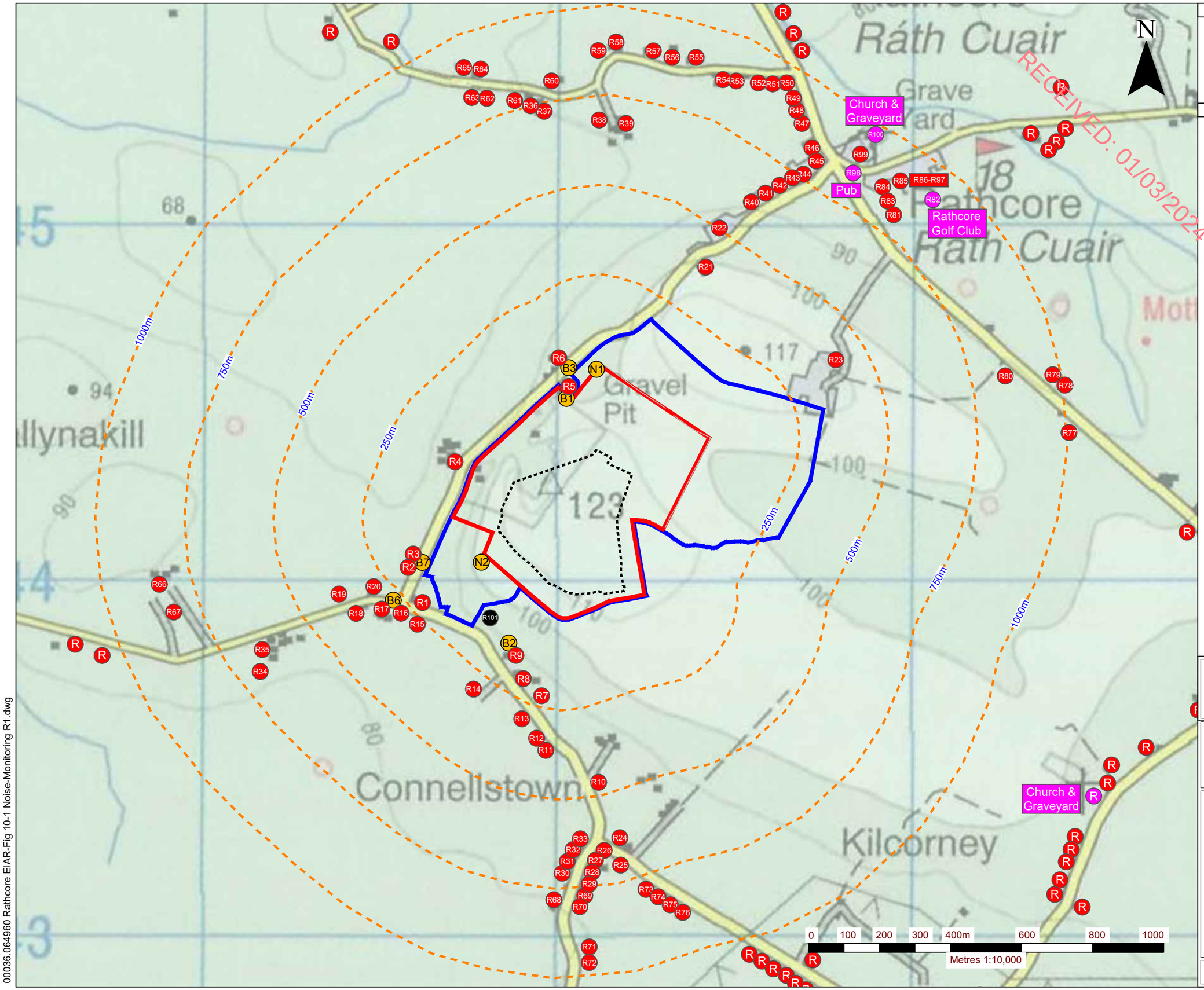
10.120 Noise monitoring shall continue to be undertaken around the application site. Noise monitoring locations shall be reviewed and revised where and as/when necessary. The results of the noise monitoring shall be submitted to Meath County Council on a regular basis for review and record purposes.

Vibrations

10.121 Monitoring of blasts (both for groundborne vibration and air overpressure) has been and will continue to be carried out at the site. The blast monitoring results will continue to be submitted on a regular basis to Meath County Council for record purposes.

FIGURES

Figure 10-1
Receptors and Noise Monitoring Locations



NOTES

Extract from Ordnance Survey 2500 Scale Digital Mapping
3053-B, 2984-C, 3054-A

CYAL 50381397
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LEGEND

- LANDHOLDING BOUNDARY (c.53.8 HA.)
- APPLICATION AREA (c.31.1 HA.)
- LIMIT OF EXCAVATION (c.10.6 HA.)
- DISTANCE OFF-SET FROM PLANNING APPLICATION BOUNDARY
- RESIDENCE RECEPTOR LOCATIONS WITHIN 1KM OF APPLICATION SITE BOUNDARY
- NON-RESIDENCE RECEPTOR LOCATIONS WITHIN 1KM OF APPLICATION SITE BOUNDARY
- RESIDENCE RECEPTOR LOCATIONS >1KM FROM APPLICATION SITE BOUNDARY
- RESIDENCE CURRENTLY UNDER CONSTRUCTION
- NOISE MONITORING LOCATIONS (N1 / N2)
- BLAST MONITORING LOCATIONS (B1 / B2 / B3 / B6 / B7)

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EXISTING ENVIRONMENTAL NOISE & BLAST MONITORING & RECEPTOR LOCATIONS

FIGURE 10-1

Scale: 1:10,000 @ A3
Date: FEBRUARY 2024

00036.064960 Rathcore EIAR-Fig 10-1 Noise-Monitoring R1.dwg

APPENDICES

APPENDIX 10-A
Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10.A
Noise Levels Commonly Found In the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at one metre away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is

often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax} L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

APPENDIX 10-B
Noise Assessment

SOIL STRIPPING NOISE ASSESSMENT

Activity	Receptor	Activity LAeq (dB) at 10m Distance		Reflection	Screening	Activity Distance (m)		Noise Attenuated with Distance dB(A)		Noise Levels dB(A)		Operational Noise Levels dB(A)
		Excavator	Dumper	dB(A)	dB(A)	Excavator	Dumper	Excavator	Dumper	Excavator	Dumper	
Soil Stripping	R1	74	75	3	-10	325	325	-30	-30	37	38	40
	R2	74	75	3	-10	275	275	-29	-29	38	39	42
	R4	74	75	3	-10	165	165	-24	-24	43	44	46
	R5	74	75	3	-10	235	235	-27	-27	40	41	43
	R6	74	75	3	-10	320	320	-30	-30	37	38	40
	R23	74	75	3	-10	650	650	-36	-36	31	32	34
	R101	74	75	3	-10	180	180	-25	-25	42	43	45

ROCK EXTRACTION NOISE ASSESSMENT

		Activity L_{Aeq} (dB) at 10m Distance									Activity Distance (m)							Noise Attenuated with Distance dB(A)							Activity L_{Aeq} (dB)							Duration Activity (h)
Activity	Receptor	Drilling Rig	Excavator	HGV	Processing Plant	Generator	Limestone Plant	Proposed Milling Plant	Reflection dB(A)	Screening dB(A)	Drilling Rig	Excavator	HGV	Processing Plant	Generator	Limestone Plant	Proposed Milling Plant	Drilling Rig	Excavator	HGV	Processing Plant	Generator	Limestone Plant	Proposed Milling Plant	Drilling Rig	Excavator	HGV	Processing Plant	Generator	Limestone Plant	Proposed Milling Plant	Operational Noise Levels dB(A)
	R1	79	75	72	82	55	74	74	3	-10	285	285	285	505	530	565	570	-29	-29	-29	-34	-34	-35	-35	43	39	36	41	14	32	32	47
	R2	79	75	72	82	55	74	74	3	-10	245	245	235	440	465	505	530	-28	-28	-27	-33	-33	-34	-34	44	40	38	42	15	33	33	48
	R4	79	75	72	82	55	74	74	3	-10	155	155	75	175	170	235	340	-24	-24	-18	-25	-25	-27	-31	48	44	47	50	23	40	36	54
	R5	79	75	72	82	55	74	74	3	-10	185	185	110	175	185	125	215	-25	-25	-21	-25	-25	-22	-27	47	43	44	50	23	45	40	54
	R6	79	75	72	82	55	74	74	3	-10	270	270	185	240	230	200	305	-29	-29	-25	-28	-27	-26	-30	43	39	40	47	21	41	37	51
	R23	79	75	72	82	55	74	74	3	-10	650	650	465	875	910	825	745	-36	-36	-33	-39	-39	-38	-37	36	32	32	36	9	29	30	41
	R101	79	75	72	82	55	74	74	3	-10	180	180	190	470	510	520	475	-25	-25	-26	-33	-34	-34	-34	47	43	39	42	14	33	33	50