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Introduction

Background

- 10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential noise and vibration effects of the proposed development at Mounthall & Cummer townlands, Camross, County Laois.
- 10.2 The proposed development being applied for under this current planning application is shown on EIAR **Figures 2-2 to 2-7** and will consist of:
- Continued use and extension to existing permitted sand and gravel pit registered under Section 261 of the Planning & Development Act 2000, as amended (site ref. QY05/10) within an overall application area of c. 12.2 hectares;
 - Extraction of sand and gravel (dry working) over an area of c. 8 hectares with processing and washing of material on site (closed loop water recycling system with associated silt storage lagoons 1,952.25m²), and all ancillary works and structures;
 - Site facilities consisting of mobile processing plant, portacabin site office (6.25m²), portacabin welfare facility (18.9m²), serviced portaloo toilet, bunded fuel storage and refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash, water supply borehole, perimeter berms, vegetation planting and fencing;
 - Access to the site will be via the existing sand & gravel pit entrance;
 - Restoration of the site to agricultural lands; and
 - The proposed extraction operational period is for 10 years plus 1 year to complete restoration (total duration sought 11 years).
- 10.3 It is anticipated that the construction works required to facilitate the operational phase of the development would be completed over a 6-month period. The construction stage works will comprise the following:
- Installation of site facilities consisting of mobile aggregate processing plant, weighbridge office, welfare facility including canteen and cloakroom, serviced portaloo toilet, refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash and water supply borehole.
 - Construction of silt storage lagoons associated with the washing plant closed loop water recycling system.
 - Construction of perimeter screening berms using soils stripped from the Phase 1 extraction area. The screening berms will be c. 2 m in height and will be located along the northern boundary of Phase 3 adjacent to residence R1, and along the eastern boundary of Phase 2 adjacent to residences R2/R3.
 - Provision of acoustic fencing adjacent to residences R1 to the north and R2/R3 to the east.
 - Vegetation planting with native species will be carried out around the periphery of the application area.
 - Re-routing of the 5 no. electricity poles located within the proposed extension extraction area to traverse the periphery of the site.

- 10.4 The operational phase will see sand and gravel extraction carried out within an overall extraction area of c. 8 hectares, over a 10-year period at an average rate of 80,000 tonnes per annum.
- 10.5 It is proposed to completed extraction in 3 phases. Extraction will be commenced initially in the southeast of the site (Phase 1) to permit construction of acoustic fencing, screening berms and vegetation.
- 10.6 Perimeter screening berms along the northern and eastern boundaries of the extension extraction area will be constructed using the stripped topsoil and overburden soils from Phase 1 in the vicinity of residences R1 and R2/R3. Acoustic fencing structure will be constructed in two locations, each c.150 m in length along the application boundary with residences R1 to the north and R3 to the east.

Methodology

- 10.7 The following sections of this EIAR Chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:
- regulatory control framework for noise and vibration;
 - methodology used to assess potential 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 impact evaluation criteria;
 - prediction of the noise 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 impact, and
 - a summary of any residual impacts.
- 10.8 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 of the EIAR, is provided in **Appendix 10-A**.

Consultations / Consultees

- 10.9 A formal pre-planning consultation meeting was held online between officials of Laois County Council, SLR and the Applicant on the 1st May 2024.
- 10.10 A pre-planning consultation document was issued to 13 no. statutory consultees which included the EPA, An Taisce, the HSE and the Heritage Council. The full list of statutory consultees and summaries of their responses is provided in **Chapter 1**, sections 1.33 to 1.40 and **Table 1-1**.
- 10.11 Feedback of most relevance and considered in the assessment of noise and vibration was received from the Health Service Executive (HSE) Environmental Health Department who made the following comments in their consultation response:

“The potential impacts for noise and vibration from the proposed development on all noise sensitive locations must be clearly identified in the EIAR. The EIAR must also consider the appropriateness and effectiveness of all proposed mitigation measures to minimise noise and vibration. A baseline noise monitoring survey should be undertaken to establish the

existing background noise levels. Noise from any existing industry/quarries or any potential sources in the area should not be included as part of the background levels.

In addition, an assessment of the predicted noise impacts during the construction phase and the operational phase of the proposed Quarry development must be undertaken which details the change in the noise environment resulting from the proposed development.

Details of the location and frequency of noise monitoring for the proposed development should be included in the EIAR to be submitted as part of the Planning Application.”

- 10.12 Details of the assessment, the range of mitigation measures to be implemented at the site and, the schedule of future monitoring are provided later in the chapter.
- 10.13 In addition, consultation has been undertaken directly with EIA specialist contributors such as ecology in the preparation of the noise assessment.
- 10.14 Following this, and a review of published development plans and site surveys, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of noise & vibration for the purposes of this assessment. There was however significant consultation with other specialist contributors to this EIA Report.

Contributors / Author(s)

- 10.15 The noise impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Ronan Murphy MIOA BSc Environmental Management, Diploma Acoustics and Noise Control. Ronan is Principal Acoustic Consultant with 18 years of experience.

Sources of Information

- 10.16 The prevailing noise levels at noise sensitive locations in the vicinity of the site and haulage routes was determined through onsite measurements. Empirical source data for expected activities during the construction and operational phases was then used to calculate potential noise impacts arising at the same noise sensitive locations.

Limitations / Difficulties Encountered

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

Potential Impacts of the Proposed Development

Study Area

- 10.18 The application site is located within the townlands of Mounthall and Cummer, Camross, County Laois. The application site and the overall site are located within a rural agricultural landscape.
- 10.19 There are isolated private residential properties and agriculture farms located throughout the surrounding rural landscape, predominantly along the local road network.
- 10.20 Two local roads bound the application site at its southern and eastern boundaries. Access to the existing permitted pit is from local tertiary road L10317 located at the eastern site boundary. The preferred haul route for vehicles will be via local primary road L10317 to the L1031 located to the south and from there to the R440 regional road and national network beyond.

Nearest Noise Sensitive Receptors

- 10.21 Noise sensitive locations are defined in the Environmental protection Agency *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016) as:

“Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels”.

- 10.22 The closest receptors have been identified and assessed based on their distance to key working areas proposed as part of the application. The relevant receptors within a 500m radius are presented in **Table 10-1** below.

Table 10-1 Sensitive Receptors located within 500 m of redline boundary

Receptor	Receptor	Construction			Operational			
		Site preparation (all areas), storage lagoons ¹	Foundation (all work), including fuel pad	Weighbridge, wheelwash and welfare/office units	General Extraction P1	General Extraction P2	General Extraction P3	Aggregate Processing
R1	Residential	25	55	55	145	105	40	145
R2	Residential/Comm.	85	450	450	330	95	305	355
R3	Residential	85	465	465	310	100	300	340
R4	Residential	260	605	605	505	270	480	545
R5	Residential	235	650	655	245	305	415	365
R6	Residential/Comm.	245	605	610	250	425	435	360
R7	Residential	300	730	730	310	400	500	440
R8	Residential/Comm.	385	795	795	390	525	605	525
R9	Residential	475	860	860	480	640	685	605
R10	Residential	345	410	450	455	560	400	455
R11	Residential	275	360	360	545	430	445	545
R12	Residential/Comm.	305	395	395	545	395	440	550
R13	Residential	350	500	500	585	380	490	600
R14	Residential	395	605	605	655	430	570	675
R15	Residential	305	705	705	590	370	580	640

¹ Distances are to the site boundary (red line application boundary) with the exception of R2, R3 and R4 where distances are to the closest area of works (i.e. screening berm construction) as no operational works to be carried out between screening berm and eastern site boundary

Receptor	Receptor	Construction			Operational			
		Site preparation (all areas), storage lagoons ¹	Foundation (all work), including fuel pad	Weighbridge, wheelwash and welfare/office units	General Extraction P1	General Extraction P2	General Extraction P3	Aggregate Processing
R16	Residential	330	725	725	640	395	605	670
R17	Residential	350	735	735	645	420	625	690
R18	Residential	400	770	770	695	460	665	735
R19	Residential	415	790	790	725	480	685	755
R20	Residential	450	820	820	750	515	720	790

- 10.23 It is important to note that noise sensitive receptor R1 is the landowner's residence. In order to reflect potentially reduced sensitivity of the residents to noise generated from the site, it is reasonable to adopt some leniency in impact ratings and thresholds. This approach is reflected in environmental noise guidance documents including ETSU-R-97. The proposed thresholds for this location have been discussed further in Sections 10.82 and 10.87.
- 10.24 Additional consideration has been given to the proximity of potentially noise sensitive ecological receptors in the vicinity of the site.
- 10.25 There are three designated sites within a 2 km radius of the application site at Mounthall. These sites are identified in **Table 10-2** below.

Table 10-2 Ecological Receptors within 2 km of site

Natura 2000 Site	Site Code	Approximate distance to site (m)
Slieve Bloom Mountains SPA	004160	On site boundary
Slieve Bloom Mountains SAC & pNHA	000412	1,800 m

- 10.26 It is understood that the SPA and SAC provide potential nesting and foraging sites for Hen Harriers particularly within areas of heathland. Two representative areas of heath habitat have been included in the assessment. SPA(1) is located c. 250m SW of the application area adjacent to residence receptor (R6) and is included as the closest area of heath habitat but is unlikely to be used by Hen Harrier for breeding purposes as noted in Section 4 of the Natura Impact Statement (NIS). SPA(2) is located c. 1800m W of the site in an upland area and more likely to be used by Hen Harrier for breeding purposes.

Potential Noise Impacts from the Proposed Development

- 10.27 The proposed development will include a number of activities and processes that have the potential to generate noise impacts, these include:
- Additional vehicular movement on the surrounding road network, both initially during the construction stage and longer term due to the export of material from the site;
 - The proposals include the construction of new site infrastructure. Ground clearance and excavation with heavy machinery as well as general construction work during this period will have the potential to give rise to noise impacts offsite;
 - Once operational, the extraction process will require use of heavy machinery for removal and handling of material, a number of plant items including processing plant will also have the potential to generate noise impacts.
- 10.28 In addition to ongoing material extraction and processing, the proposed development will also include the restoration of the site to agricultural land as well as the formation of boundary treatment.
- 10.29 The proposed hours for operations (extraction, processing and haulage) at the site will be 07.00 hours to 18.00 hours Monday to Friday inclusive and 07.00 hours to 14.00 hours on Saturdays. No operations will be carried out on Sundays or Public Holidays². The nature of mechanical plant onsite is such that no plant or process will be run outside of normal operational hours, and as such there is no risk of noise impacts arising during the evening or night period.

² DoEHLG 2004 Quarry & Ancillary Activities Guidelines for Planning Authorities – Section 4.7 (b)

Potential Vibration Impacts from the Proposed Development

- 10.30 The nature of onsite operations (i.e. no blasting, piling or drilling) and the distance to the nearest noise sensitive locations is such that the risk of vibration impacts occurring during either the construction or operational phases is negligible and has therefore not been assessed further as part of this assessment.
- 10.31 It has been found that ground vibration produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces (TII, 2004). Considering the low traffic speeds and good state of repair of the L10317, potential vibration impacts from road traffic are deemed to be negligible and have not been assessed further as part of this assessment.

Interaction with Other Impacts

- 10.32 The potential impact of noise generated by the proposed development on sensitive receptors including residents and sensitive ecological receptors 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'.

Planning and Development Framework

- 10.33 The following sections outline the overarching planning policy and legislation relevant to noise management in the extractive industry at the proposed site.

National Planning Framework – Project Ireland 2040

- 10.34 The National Planning Framework (NPF) 2040³ (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.
- 10.35 National Planning Framework Objective 65 addresses noise related impact of development and identifies a requirement for Planning Authorities to:
- 10.36 *"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."*
- 10.37 There are no specific policies in relation to noise emissions in NPF for mineral extraction or production of construction aggregates and materials. The stated general development objective is to facilitate the development while at the same time protect the environment.

Local Planning Policy – Laois County Development Plan 2021-2027

- 10.38 The current Laois County Development Plan details policies and objectives which provide for the planning and future sustainable development of the County between 2021 and 2027.
- 10.39 The development outlines the following Noise Pollution Policy Objectives.
- ES 43 Require an assessment of impact of the developments on noise levels, having regard to the provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003 and the EPA Noise Regulations 1994 when assessing planning applications.***

³ Draft First Revision to the National Planning Framework (issued July 2024)

ES 44 Support the implementation of the Noise Directive 2002/49/EC and associated Environmental Noise Regulations 2006.

ES 45 Ensure that relevant planning applications comply with the provisions of any Noise Action Plan or noise maps relating to the area.

ES 46 Restrict development proposals causing noise pollution in excess of best practice standards.

ES 47 Regulate and control activities likely to give rise to excessive noise, other than those activities which are regulated by the EPA.

ES 48 Ensure new development does not cause an unacceptable increase in noise levels affecting noise sensitive properties. Proposals for new development with the potential to create excessive noise will be required to submit a construction and/or operation management plan to control such emissions.

ES 49 Require activities likely to give rise to excessive noise to install noise mitigation measures and monitors. The provision of a noise audit may be required where appropriate.

10.40 In line with policy objective ES 43 regarding the assessment of new development, reference should be made to the relevant provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003 and the EPA Noise Regulations 1994.

10.41 Section 106 and 107 of the Environmental Protection Agency Act 2003, outline powers in respect of the Agency and Local Authority to stipulate noise limits and controls on licenced activities.

10.42 Section 108 (i) of the EPA Act provide a definition of what constitutes a nuisance noise. This is defined as:

Where any noise which is so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place, a local authority, the Agency or any such person may complain to the District Court and the Court may order the person or body making, causing or responsible for the noise to take the measures necessary to reduce the noise to a specified level or to take specified measures for the prevention or limitation of the noise and the person or body concerned shall comply with such order.

10.43 The Act does not outline specific noise thresholds or limits, however. For activities not required to obtain a licence from the Agency it is necessary to make reference to appropriate best practice guidance and standards to determine appropriate criteria to ensure that the requirements of Section 108 Part i. The guidance and standards relevant to the proposed development have been discussed in the following sections.

Guidance Documents and Assessment Criteria

Noise arising during the construction stage

10.44 There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. British Standard BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise* is typically adopted by local authorities for the control of construction noise impacts.

- 10.45 One of the approaches for deriving appropriate construction noise limits is for the designation of a noise sensitive receptor into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.
- 10.46 BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. **Table 10-3** sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 10-3 Applicable Construction Noise Thresholds (BS5228-1:2014+A1:2019)

Assessment Category and Threshold Value Period		Threshold Values, $L_{Aeq,T}$ dB		
		Category A ^{Note A}	Category B ^{Note B}	Category C ^{Note C}
Night (23:00 to 07:00 hrs)		45	50	55
Evenings and Weekends ^{Note D}		55	60	65
Daytime (07:00 – 19:00 hrs) and Saturdays (07:00 – 13:00 hrs)		65	70	75
Note A	Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are <u>less</u> than these values			
Note B	Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values			
Note C	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are <u>higher</u> than category A values			
Note D	Periods defined as 19:00 to 23:00 hrs weekdays, 13:00 to 23:00 hrs Saturdays and 07:00 to 23:00 hrs Sundays.			

- 10.47 Clarification on the construction stage noise thresholds applicable in this instance has been provided in Sections 10.81, 10.86 and 10.87.

Noise arising from onsite operations

- 10.48 The EPA (2006) publication Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EMG-EME1)⁴ 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 dBA*
 - Night-time: 20:00–08:00 h L_{Aeq} (1h) = 45 dBA*
 - 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 dBA.)*
- 10.49 It is noted that the EU Noise Directive (2002/49/EC) as well as more recent noise guidance issued by the Agency (*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016)) provide updated definitions

⁴ https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

of day and night periods. Current best practice introduces an additional evening period and considers day and night periods as follows:

- Daytime (0700 to 1900 hrs);
- Evening (1900 to 2300 hrs); and
- Night (2300 to 0700 hrs).

10.50 The DoEHLG (2004) Guidelines for Planning Authorities (*Quarries and Ancillary Activities: Guidelines for Planning Authorities*⁵) recommends similar limit values.

10.51 The EMEI guidelines also provide some guidance in respect of low background noise levels, tonal noise and environmental mitigation works:

- Where existing background noise levels are very low, lower noise ELVs may be appropriate;
- Audible tones or impulsive noise should be avoided at night;
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.

10.52 In relation to short-term temporary activities such as construction of screening bunds, due to the reduced duration of these works and the direct and potentially long-term benefits arising, it would be deemed appropriate that noise from these works should be limited to the values derived from the ABC Method of BS 5228-1:2009+A:2014 *Noise and Vibration Control on Construction and Open Sites - Noise* as described in Section 10.45 – 10.46.

10.53 Additional guidance such as the World Health Organisation (WHO) *Environmental Noise Guidelines for the European Region* (2018) provides guidance on protecting human health from exposure to environmental noise. The guidance does not provide any interim targets for noise exposure.

10.54 Clarification on the operational stage noise thresholds applicable in this instance has been provided in Sections 10.86 and 10.87.

Guidance on Effects of Industrial Noise on Wildlife

10.55 The primary species of concern in respect of the adjacent protected areas is the Hen Harrier, which relies on the heath habitat for nesting and forage opportunities.

10.56 Currently, there are no statutory or guideline thresholds for noise exposure for potentially noise sensitive ecological receptors at either habitat or species-specific level.

10.57 Empirical research completed to date indicates that disturbance to avians is wholly linked to discrete (or impulsive) noise events but that the magnitude, frequency, predictability, spatial distribution and duration of disturbance varies considerably depending on a range of factors including species susceptibility to disturbance, the degree of previous exposure IECS 2009 report (Cutts et al., 2009) and the characteristics of the noise itself.

10.58 The links between visual and audible stimuli were also noted to be key components of disturbance in a number of studies (Smit and Visser, 1993 and Brown, 1990), in that many species required sight of the source of noise to be disturbed.

⁵ https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

- 10.59 Two of the studies set out potential impact classification rating based on disturbance observations recorded for that particular habitat, species and noise generating operation. The rating suggested that maximum noise levels arising from irregular noise events (i.e. those with discrete or impulsive qualities) may give rise to moderate impacts between 50 and 70 dB, with low to moderate impacts occurring for regular or consistent noise of similar levels. The acoustic parameter is understood to correspond to an $L_{Amax(F)}$.
- 10.60 Another issue noted amongst studies is that deriving ratings to describe avian disturbance is complicated by the fact avian hearing sensitivities range significantly between species. The use of standard acoustic weightings used for assessment of human receptors (A or C weighting) would also not reflect the sensitivity of the receptor species.
- 10.61 In respect of the proposed development and the adjacent and nearby SPA, pNHA and SAC. Whilst empirical data suggests that noise with discrete or impulsive qualities measured at levels of between 50 and 70 dB $L_{Amax(F)}$ may indicate potential moderate impacts, the use of this metric to gauge potential disturbance from sources or species not observed during any of the particular studies introduces a significant degree of uncertainty.
- 10.62 An additional qualitative review should also be conducted to consider:
- To what degree does the character of additional noise from the development vary from that already present in the vicinity of possible nesting or foraging habitats;
 - Whether the working area would have a line of sight to nesting or foraging habitats that would support empirical studies that disturbance is more likely to occur; and
 - What area of the habitat is impacted by noise from the development, is there sufficient alternative nesting and foraging habitat to minimise the potential impact of any potential disturbance.

Noise arising from vehicular traffic on public roads

- 10.63 There are no specific guidelines of limits relating to traffic related sources along the local or surrounding roads. In this instance, in order to assess the potential noise impact from any changes in road traffic, **Table 10-4** offers guidance as to the likely impact associated with a particular change in traffic noise level (Highways Agency Design Manual for Roads and Bridges HA 213/08).

Table 10-4 Likely Impacts Associated with Change in Traffic Noise Level (DMRB, 2011)

Change in Sound Level	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
> 5	Major

Quantifying significance of noise impacts

- 10.64 The *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA) are generally recognised as established good practice standards for scope, content, and methodology of noise impact assessment.
- 10.65 These guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. These

guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. An example impact scale offered by the IEMA guidelines is shown in Table 10-5.

Table 10-5 Example Impact Scale from the Change in Sound Levels (IEMA)

Long-Term Impact Classification	Short-Term Impact Classification	Sound Level Change dB L_{pAeqT} (+ive or -ive) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3.0 dB and < 5 dB
Moderate	Major	≥ 5.0 dB and < 10 dB
Major		≥ 10.0

10.66 The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

10.67 To determine the overall noise impact, the magnitude and sensitivity Noise Effects Descriptors are presented in **Table 10-6**.

Table 10-6 Example of Relative Change Impact Rating (HS2 EIAR from IEMA)

Noise Effect Levels	Description
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a highly sensitive noise receptor
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a highly sensitive noise receptor
Moderate	A 3 to 4.9 dB L_{Aeq} change in a sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in a sound level at a receptor of some sensitivity
None / Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

10.68 As recognised in the IEMA guidance, there are however many factors which affect people's perception and their responses to noise. Guidance on assessment of the magnitude of noise impact and the significance of the effects are presented in **Table 10-7**.

Table 10-7 Relationship between Noise Impact, Effect and Significance (IEMA)

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)		Significance
Substantial	Beneficial	Receptor Perception = Marked Change Causes a material change in behaviour and/ or attitude, e.g., individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect)
Moderate		Receptor Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g., turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	↑ (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect)
Slight		Receptor Perception = Just Noticeable Improvement Noise impact can be heard but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	↓ Less Likely to be Significant
Negligible	N/A = no discernible effect on receptor		Not Significant
Slight	Adverse	Receptor perception = non-intrusive Noise impact can be heard, but does not cause change in behaviour or attitude, e.g., turning up volume of television, speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Less Likely to be Significant Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect)
Moderate		Receptor Perception = Intrusive 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-waking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	↑ Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect)
Substantial		Receptor perception = Disruptive Causes material change in behaviour and /or attitude, e.g., avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	More Likely to be Significant
Severe		Receptor Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g., regular sleep	Significant

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)	Significance
	deprivation / awakening; loss of appetite, significant, medically definable harm, e.g., auditory and non-auditory.	

Receiving Environment

Survey Methodology

- 10.69 An environmental noise survey was completed to establish the prevailing noise levels in the vicinity of the nearest noise sensitive receptors to the site and associated haul routes.
- 10.70 The survey was conducted by SLR Consulting Personnel in accordance with the procedures outlined in ISO 1996-2:2017 *Acoustics — Description, measurement and assessment of environmental noise - Determination of sound pressure levels*.
- 10.71 The noise monitoring locations selected for the purposes of the baseline noise survey are shown in **Figure 10-1** and comprise the following:
- **N1** located at the site entrance on the eastern boundary, representative of prevailing noise levels for residential properties located on the L10317 local road;
 - **N2** located on the eastern boundary of the site, representative of prevailing noise levels at the rear of residential properties located at the junction of the L10317/L1031;
 - **N3** located east of the site adjacent the L1031; and,
 - **N4** located west of the site adjacent the L1031.
- 10.72 All measurements were completed using a Class 1 Sound Level Meter (Larson Davis 831 SLM). The sound level meter was calibrated before and after the survey. The calibration deviation was determined to fall within the acceptable range based on the meter specification (+/- 0.8 dB in this instance). The sound level meter was calibrated to traceable standard by a UKAS (United Kingdom Accreditation Service) accredited laboratory within 12 months preceding the measurement.
- 10.73 Measurements were completed at the four measurement positions between the hours of 11:58 and 16:30 hrs on Tuesday, 9th January 2024, noise levels were measured for a period of 1 hour at each of the monitoring positions.
- 10.74 In addition to subjective observations on key sources contributing to the prevailing noise climate, the following noise level indices were recorded:
- $L_{Aeq,T}$ - The A-weighted equivalent continuous noise level over the measurement period, and effectively represents an “average” value.
 - $L_{Amax(F),T}$ - The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the “Fast” time weighting.
 - $L_{Amin(F),T}$ - The minimum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the “Fast” time weighting.
 - $L_{A90,T}$ - The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.

- $L_{A10,T}$ - The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe intermittent noise sources such as road traffic.
- 10.75 The weather conditions were generally conducive to environmental noise surveys with light to gentle northerly breeze (<4 m/s) present. External ambient air temperature of ~4°C was observed although a temperature inversion was not deemed to be present based on subjective observations of contributory noise sources.
- 10.76 All measurements were completed under free-field conditions (i.e., at least 3.5 m from the nearest vertical reflecting surface, with the microphone approximately 1.5 m above ground level).
- 10.77 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.

Survey Results

10.78 Noise monitoring results for the baseline survey on are provided in Table 10-8.

Table 10-8 Summary of Measured Noise Levels, Free Field dB

Location	Time	Sound Pressure Levels (dB 2×10^{-5} Pa)				
		$L_{Aeq,1hr}$	$L_{Amax(F),1hr}$	$L_{Amin(F),1hr}$	$L_{A10,1hr}$	$L_{A90,1hr}$
N1	10:49-11:04	44	75	33	43	37
N2	12:36-12:51	49	79	27	43	31
N3	14:39-14:54	58	84	31	55	37
N4	16:36-16:51	58	86	24	49	29

- 10.79 The following observations are made in respect of the baseline noise monitoring undertaken around the application site:
- Measured noise levels at monitoring point **N1** were influenced by road traffic from the L1031 to the south and very limited traffic on the L10317;
 - Measured noise levels at monitoring point **N2** were influenced by road traffic from the L1031 to the south and very limited traffic on the L10317, noise from the adjacent farm yard was audible intermittently;
 - Measured noise levels at monitoring point **N3** were influenced by road traffic from the L1031. A tractor was operating in the adjacent farm yard for a period; and
 - Measured noise levels at monitoring point **N4** were influenced by road traffic from the L1031, a tractor was operating in the farmyard to the north for a limited period.

Clarification of Assessment Criteria

Construction Stage Noise Limits

- 10.80 The hours of construction for the proposed development will be limited to the daytime period, Monday to Friday from 07:00 to 18:00 hrs, and on Saturdays from 07:00 to 14:00 hrs.

- 10.81 The applicable construction noise limits based on the prevailing noise climate have been summarised in **Table 10-9**.

Table 10-9 Proposed Construction Noise Limits

Monitoring Location	Baseline Noise Level ($L_{Aeq,1hr}$ dB), rounded to nearest 5 dB	BS5228-1:2014+A1:2019 ABC Method Category	Applicable Noise Threshold ($L_{Aeq,12hr}$)
N1	45	A	65
N2	50	A	65
N3	60	A	65
N4	60	A	65

- 10.82 Based on the reduced sensitivity of receptor R1⁶, it is deemed appropriate that a 5 dB relaxation on the ABC Method thresholds be applied. A threshold of 70 dB $L_{Aeq,12hr}$ will therefore apply at receptor R1.

Operational Stage Noise Limits

- 10.83 The hours of operation for the proposed development will be limited to the daytime period, Monday to Friday from 07:00 to 18:00 hrs, and on Saturdays from 07:00 to 14:00 hrs.
- 10.84 Noise levels measured during the baseline noise survey do not indicate what would constitute an area of low background noise levels in accordance with best practice.
- 10.85 As such, in order to avoid adverse impacts, site specific operational noise, as measured at the nearest noise sensitive receptor, shall be limited to 55 dB $L_{Aeq,1hour}$ during the daytime period of 0700 to 1800 hrs.
- 10.86 It must be noted that for operational stage works involving the construction boundary screens, or other similar environmental measures, it would be appropriate that noise from these activities be limited to 65 dB $L_{Aeq,T}$ as measured at the nearest noise sensitive locations.
- 10.87 Based on the reduced sensitivity of receptor R1, it is deemed appropriate that a 5 dB relaxation on the standard EPA limits would be appropriate. A threshold of 60 dB $L_{Aeq,1hr}$ will therefore apply at receptor R1.
- 10.88 In line with the recommendations set out in the EPA *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*, tonal or impulsive noise shall not be present at the nearest noise sensitive location outside of the permitted daytime hours.
- 10.89 Tonal noise shall be assessed in accordance with procedures outlined in ISO 1996-2:2017 *Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels*.

Assessment of Likely Significant Effects

Do-nothing Scenario

- 10.90 At present, the prevailing noise climate is influenced predominantly by intermittent road traffic along the local roads and agricultural activity on the adjacent landholdings.

⁶ Landowner residence

- 10.91 Over time, changes in the prevailing noise levels would be impacted by variations in road traffic volumes as well as changes in the land use of the adjacent sites. Whilst it is expected that road traffic volumes would gradually increase, it would be difficult to assume whether the adjacent landholdings would remain in dairy and beef farming activities. Overall, it would be expected that prevailing noise levels would remain generally similar in the medium term.

Potential Impacts during the Construction Stage

- 10.92 A limited period of construction is expected to facilitate site infrastructure, key works shall include construction and installation of:
- Mobile aggregate processing plant, portacabin site office, portacabin welfare facility, serviced portaloo toilet, refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash and water supply borehole;
 - Silt storage lagoons;
 - Construction of perimeter screening; and
 - Fencing and acoustic fencing to perimeter of site.
- 10.93 A range of construction plant items will be required to facilitate the construction of the new site infrastructure, these shall include:
- 30 tonne excavator with digging bucket and breaker;
 - Dumper truck for removal of topsoil;
 - Loader for backfilling aggregate;
 - Hand tools (angle grinder, nail gun, circular saw) for construction and installation of formwork and cutting rebar for foundation and ramps;
 - Concrete truck for installation of subbase;
 - Petrol poker for settling concrete in formwork;
 - Telehandler for movement of materials; and,
 - Mobile crane for lifting and installation of weighbridge and platform;
- 10.94 Construction noise calculations have been conducted generally in accordance with British Standard BS5228-1:2009+A1:2014.
- 10.95 As the construction programme would be subject to tender process, a construction programme including specific plant items is not available at this stage and predictions of construction related noise cannot be completed without introducing a degree of uncertainty.
- 10.96 The proposed construction works would be completed in a number of phases; however, it is expected that the works would be completed consecutively with no period of overlap due to the likelihood of the same machinery being required for each phase of work.
- 10.97 It is possible to reduce this uncertainty somewhat by presenting assessing a worst-case noise levels using empirical source data set out in guidance set out in BS5228-1:2009+A1:2014.
- 10.98 **Table 10-10** outlines source data based on the list of plant items listed above.

Table 10-10 Source Data for Construction Stage Assessment

Phase	Source	BS5528 Ref	Noise Level at 10 m (dB LAeq,1hr)	Qty	20LogN Corr.	Activity as % of 12 hr	Corr. to LAeq,12hr	Activity LAeq,12hr	Phase Total LAeq,12hr
Site preparation (all areas), storage lagoons	Ground excavation/earthworks, Tracked excavator (170 kW/30 t)	C.2.16	75	1	-	50	-3	72	85
	Distribution of material, Articulated dump truck (tipping fill) (187 kW/23 t)	C.2.32	74	1	-	50	-3	71	
	Earthworks, Articulated dump truck x (194 kW/25 t)	C.5.16	81	1	-	50	-3	78	
	Transport of material, Articulated dump truck x (239 kW/23 t)	C.10.19	87	1	-	50	-3	84	
Foundation (all work), including fuel pad	Ground excavation/earthworks, Tracked excavator (170 kW/30 t)	C.2.16	75	1	-	67	-2	73	83
	Transport of material, Wheeled loader x (184 kW/23 t)	C.10.17	84	1	-	50	-3	81	
	Pumping concrete, Concrete mixer truck	C.4.27	79	1	-	67	-2	77	
	Concreting other, Poker vibrator (2.2 kW)	C.4.34	69	1	-	67	-2	67	
	Miscellaneous, Hand Tools	Other	59	1	-	67	-2	57	
Weighbridge, wheelwash and welfare/office units	Distribution of material, Telescopic handler (60 kW/10 t)	C.2.35	71	1	-	50	-3	68	79
	Craneage for piling (lifting piles, casings, etc), Wheeled mobile crane (/70 t)	C.3.30	70	1	-	50	-3	67	
	Lorry movements on access road, Lorry x (350 kW/36 t)	C.11.5	80	1	-	67	-2	78	
	Miscellaneous, Hand Tools	Other	59	1	-	50	-3	56	

- 10.99 The proposed earth screening berms and acoustic fencing will offer further screening potential depending on location of the works area. For the operational phase a screening correction of -15 dB has been applied to the nearest properties to the proposed acoustic screen (R1 to R4 and R11 to R14). Elsewhere, the topography of the extraction areas is such that a screening factor of approximately -7 dB is deemed appropriate for receptors elsewhere.
- 10.100 A correction of +3 dB has been applied to all predicted values to determine reflections from the façade. No correction has been applied to receptor positions in the SPA.
- 10.101 All sources have been modelled at a height of 2 metres above ground.
- 10.102 Propagation assumes 80% soft ground cover for all receptors with the exception of R1 to R3 reduced distance requires hard ground correction as per BS5228-1.
- 10.103 The predicted noise levels for each of the nearest NSR during the construction phase has been summarised in **Table 10-11**.

Table 10-11 Predicted Construction Stage Noise Levels

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB L _{Aeq,12hr})	Predicted Construction Noise Level (dB L _{Aeq,12hr})		
			Site preparation (all areas), storage lagoons	Foundation (all work), including fuel pad	Weighbridge, wheelwash & welfare/office units
R1	-15	70	65	56	52
R2	-15	65	55	38	34
R3	-15	65	55	38	34
R4	-15	65	45	35	31
R5	-7	65	54	43	39
R6	-7	65	53	43	39
R7	-7	65	52	42	38
R8	-7	65	50	41	37
R9	-7	65	48	40	36
R10	-7	65	51	47	42
R11	-15	65	45	40	36
R12	-15	65	44	39	35
R13	-15	65	42	37	33
R14	-15	65	41	35	31
R15	-7	65	52	42	38
R16	-7	65	51	42	38
R17	-7	65	50	42	38
R18	-7	65	49	41	37
R19	-7	65	49	41	37
R20	-7	65	48	41	37

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,12hr}$)	Predicted Construction Noise Level (dB $L_{Aeq,12hr}$)		
			Site preparation (all areas), storage lagoons	Foundation (all work), including fuel pad	Weighbridge, wheelwash & welfare/office units
SPA(1) Heath @ 250m	-7	NA	53	41	37
SPA(2) Heath @ 1,800m	-7	NA	36	31	27

- 10.104 The predicted construction noise levels as presented in **Table 10-11** demonstrate that construction noise levels will fall below the adopted threshold of 65 dB $L_{Aeq,12hr}$ at the nearest noise sensitive locations.
- 10.105 Notwithstanding the findings of the construction phase noise impact assessment, best practice construction noise and vibration management practice should be adhered to and implemented as a matter of course. Further information on these practices has been outlined in Section 10.147.
- 10.106 The predicted construction noise levels at the SPA(1) are expected to fall in the region of 37 to 50 dB $L_{Aeq,1hr}$ for the nearest area of heath and 27 to 33 dB $L_{Aeq,1hr}$ in the upper areas of the mountain at SPA(2). It must be noted that noise levels predicted in accordance with BS5528-1 calculation methods introduce some uncertainty at distances greater than 300 metres due to impact of meteorological conditions on attenuation.
- 10.107 In the context of the disturbance impact rating described in Section 10.57, the predicted values are also presented in terms of the $L_{Aeq,T}$ rather than $L_{Amax(F)}$ parameter more representative of discrete or impulsive noise events. It would be expected that $L_{Amax(F)}$ levels could be of the order of 15 to 20 dB higher than the equivalent $L_{Aeq,T}$ values due to the intermittent nature of some of the sources. The resultant calculated max values in the vicinity of the SPA areas would be of the order of 52 to 70 dB $L_{Amax(F)}$ for the nearest area of the heath habitat, SPA(1) or 42 to 53 dB $L_{Amax(F)}$ for the nearest optimal heath nesting and foraging habitat, SPA(2).
- 10.108 While the predicted levels in the nearest area of heath are above the impact rating referenced in Section 10.57, it is important to note that:
- The nearest area of heath habitat, SPA(1) is located immediately adjacent an active farm (R6), and noise with discrete or impulsive characteristics from typical farming activities would already form part of the prevailing noise climate, the additional noise from the proposed development would not constitute a significant variance from what is already present; and
 - Neither of these heath areas reviewed would have a clear line of sight to the plant and machinery so the visual stimuli required to induce disturbance would largely be absent.

Potential Impacts during the Operational Stage

- 10.109 During the operational phase, extraction and processing of sand and gravel will be completed over a 10 year with an average of 80,000 tonnes of material exported per year.
- 10.110 The primary noise generating processes and mechanical plant items expected to be operational during this period include:
- 23 tonne Loading shovel;

- 40 tonne excavator;
- 40 tonne rigid dump trucks (Scania R500 XF or similar);
- Mobile aggregate screens, 2 total; and
- An aggregate washing plant.

10.111 The nature of operational stage activities is such that processes, plant and machinery is largely similar to that arising during the construction stage. As such noise calculations have been conducted generally in accordance with British Standard BS5228-1:2009+A1:2014.

10.112 **Table 10-12** outlines source data based on the list of plant items listed in 10.110.

Table 10-12 Source Data for Operation Stage Assessment

Phase	Source	BS5528 Ref	Noise Level at 10 m (dB LAeq,1hr)	Qty	20LogN Corr.	Activity as % of 1 hr	Corr. to LAeq,1hr	Activity LAeq,1hr	Phase Total LAeq,1hr
General Extraction (all phases)	Ground excavation/earthworks, Tracked excavator (226 kW/40 t)	C.2.14	79	1	0	50	-3	76	82
	Transport of material, Wheeled loader (184 kW/23 t)	C.10.17	84	1	0	50	-3	81	
Aggregate Processing	General wheeled loader operations, Loading gravel to lorry (193 kW/23 t)	C.10.10	85	1	0	33	-5	80	86
	Semi-mobile screen/stockpiler, Screen stockpiler (51 kW/17 t)	C.10.15	81	2	6	33	-5	82	
	HGV movements on access road	C.11.4-20	82	1	0	33	-5	77	
	Washing Plant, Screen stockpiler (56 kW/15 t)	C.10.14	81	1	0	33	-5	76	

- 10.113 The proposed earth screening berms and acoustic fencing will offer further screening potential depending on location of the works area. For the operational phase a screening correction of - 5 dB has been applied to the nearest properties to the proposed acoustic screen (R1 to R4). Elsewhere, the topography of the extraction areas is such that a screening factor of approximately -7 dB is deemed appropriate for receptors elsewhere.
- 10.114 A correction of + 3 dB has been applied to all predicted values to determine reflections from the façade. No correction has been applied to receptor positions in the SPA.
- 10.115 All sources have been modelled at a height of 2 metres above ground.
- 10.116 Propagation assumes 80% soft ground cover for all receptors with the exception of R1 to R3 where hard ground has been assumed due to the short distance.
- 10.117 The predicted noise levels for each of the nearest NSR during the operational phase has been summarised in **Table 10-13**.

Table 10-13 Predicted Operational Stage Noise Levels

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB L _{Aeq,1hr})	Predicted Operational Noise Level (dB L _{Aeq,1hr})		
			General Extraction Phase 1 with Aggregate Processing Occurring	General Extraction Phase 2 with Aggregate Processing Occurring	General Extraction Phase 3 with Aggregate Processing Occurring
R1	-15	60	52	55	61
R2	-15	55	45	54	47
R3	-15	55	45	53	47
R4	-15	55	41	45	42
R5	-7	55	53	54	53
R6	-7	55	53	53	52
R7	-7	55	52	52	51
R8	-7	55	50	50	49
R9	-7	55	48	49	48
R10	-7	55	50	50	52
R11	-15	55	40	43	43
R12	-15	55	40	43	43
R13	-15	55	40	43	42
R14	-15	55	39	42	41
R15	-7	55	47	51	49
R16	-7	55	47	50	48
R17	-7	55	47	50	48
R18	-7	55	46	49	48
R19	-7	55	46	49	47

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,1hr}$)	Predicted Operational Noise Level (dB $L_{Aeq,1hr}$)		
			General Extraction Phase 1 with Aggregate Processing Occurring	General Extraction Phase 2 with Aggregate Processing Occurring	General Extraction Phase 3 with Aggregate Processing Occurring
R20	-7	55	46	49	47
SPA(1) Heath @ 250 metres	-7	NA	51	50	50
SPA(2) Heath @ 1,800 metres	-7	NA	35	36	36

- 10.118 It can be seen from the results presented in **Table 10-13** that the noise levels generated during the operational phase will fall below the adopted threshold of 55 dB $L_{Aeq,1hr}$ at all locations with the exception of R1 where the predicted levels for Phase 3 extraction with the aggregate plant operating will be expected to fall in the region of 61 dB $L_{Aeq,1hr}$ which represents a 1 dB increase above the adopted relaxed criteria of 60 dB $L_{Aeq,1hr}$. A 1 dB variation in noise levels would typically be regarded as imperceptible for the majority of the population.
- 10.119 The predicted construction noise levels at the SPA are expected to fall in the region of 50 to 51 dB $L_{Aeq,1hr}$ for the nearest area of heath, SPA(1) and 35 to 36 dB $L_{Aeq,1hr}$ in the upper areas of the mountain, SPA(2). It must be noted that noise levels predicted in accordance with BS5528-1 calculation methods introduce some uncertainty at distances greater than 300 metres due to impact of meteorological conditions on attenuation.
- 10.120 In the context of the disturbance impact rating described in Section 10.57, the predicted values are also presented in terms of the $L_{Aeq,T}$ rather than $L_{Amax(F)}$ parameter more representative of discrete or impulsive noise events. It would be expected that $L_{Amax(F)}$ levels could be of the order of 15 to 20 dB higher than the equivalent $L_{Aeq,T}$ values due to the intermittent nature of some of the sources. The resultant calculated max values in the vicinity of the SPA areas would be of the order of 65 to 71 dB $L_{Amax(F)}$ for the nearest area of the SPA with heath habitat, SPA(1) or 50 to 56 dB $L_{Amax(F)}$ for the nearest optimal heath nesting and foraging habitat, SPA(2).
- 10.121 While the predicted levels in the nearest area of heath are above the impact rating referenced in Section 10.57, it is important to note that:
- The nearest area of heath habitat, SPA(1) is located immediately adjacent an active farm (R6), and noise with discrete or impulsive characteristics from typical farming activities would already form part of the prevailing noise climate, the additional noise from the proposed development would not constitute a significant variance from what is already present; and
 - Neither of these heath areas reviewed would have a clear line of sight to the plant and machinery so the visual stimuli required to induce disturbance would largely be absent.

Additional Traffic on Public Roads

- 10.122 In addition to site-based construction and operational noise, there is potential for noise impacts to arise due to additional traffic on the local road network.

- 10.123 As described previously, access to the site for all traffic will be via L1031¹⁷ tertiary local road, the haul route for extracted materials will be via the L1031, with 100% of heavy goods movements to and from the site traveling east on the L1031 towards the R440 regional road.
- 10.124 The potential impact of additional road traffic noise from the site can be considered by reviewing the contribution of scheme traffic to the existing traffic volumes on the local road network.
- 10.125 Typically, an increase of 25% in road traffic volumes would be required to give rise to a 1 dB increase in road traffic noise levels. For reference, increases in noise levels of the order of 1 to 2 dB are typically imperceptible under normal conditions.
- 10.126 The estimated annual average daily traffic (AADT) data values for the L1031 and L10317 with and without the development in place have been presented in **Table 10-14**.

Table 10-14 Additional Development Road Traffic on Local Road Network

Road	Year	Do Minimum (without S&G Pit)			Do Something (with S&G Pit)			Relative Increase	
		AADT	HGVs	HGVs%	AADT	HGVs	HGVs%	AADTs	HGVs
L1031 (E)	2025	358	31	9%	390	55	14%	9%	77%
	2030	383	35	9%	415	59	14%	8%	69%
	2040	404	40	10%	436	64	15%	8%	60%
L1031 (W)	2025	335	25	7%	339	25	7%	1%	0%
	2030	359	28	8%	362	28	8%	1%	0%
	2040	378	32	8%	381	32	8%	1%	0%
L10317	2025	50	10	20%	86	34	40%	72%	240%
	2030	53	11	21%	89	35	39%	68%	218%
	2040	57	12	21%	93	36	39%	63%	200%

- 10.127 The projected traffic volumes for the L1031 indicate that HGV volumes will increase by approximately 60% to 77% for eastbound traffic. In the context of the overall traffic volumes, variation in Annual Average Daily Traffic Volumes will be closer to 8 or 9%. The resultant increase in overall road traffic noise levels would be expected to be less than 1 dB at all receptors adjacent the road.
- 10.128 In respect of additional road traffic noise on the L10317, the traffic predictions suggest that relative increase in road traffic will be high for both HGV specific and overall annual daily traffic volumes. Due to the existing low road traffic volumes on this road and the proximity of receptors to the road, it is more appropriate to consider an estimate of the potential noise generated during peak hours.
- 10.129 The noise level associated with a discrete noise event, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The Sound Exposure Level can be used to calculate the contribution of a series of events to the overall noise level in a given period based on the following formula:

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 20\log_{10}(r_1/r_2) \text{ dB}$$

where

- $L_{Aeq,T}$ is the equivalent continuous sound level over the time period T (in seconds);
- L_{AX} is the “A-weighted” Sound Exposure Level of the event considered (dB);
- N is the number of events over the course of time period T;
- r_1 is the distance at which the L_{AX} value has been measured; and,
- r_2 is the distance to the assessment location.
- 10.130 Typical Sound Exposure Level values for heavy goods vehicle (HGV) travelling at low speeds (i.e. 15 to 45 kmph) would be of the order of 82 dB L_{AX} at 5 metres from the vehicle. For light vehicles travelling at similar speeds, the value would be of the order 67 dB L_{AX} at 5 metres from the vehicle. These figures are based on a series of controlled measurements completed on vehicles in good repair travelling on a well surfaced tarmac road.
- 10.131 It is understood that peak hourly movements for the development would be approximately 4 no. heavy goods vehicles. It is expected that staff and other LGV movement would occur earlier and later than the expected peak for HGV for the site. During other periods, up to 2 no. HGV movements would be expected per hour.
- 10.132 Based on the proximity of the nearest noise sensitive locations to the L10317 (R2 at 4 metres and R3 at 8 metres from the road), the predicted road traffic noise level arising from peak hour HGV would be of the order of 48 to 54 dB $L_{Aeq,1hr}$ at noise sensitive receptors R2 and R3. This would reduce to approximately 45 to 51 dB $L_{Aeq,1hr}$ during other periods where only two hourly movements occur.
- 10.133 Based on the prevailing noise levels at these locations (49 dB $L_{Aeq,1hr}$ as measured at N2), the potential cumulative noise level from peak hourly HGV site vehicle movements would result in an overall cumulative noise level of 55 and 52 dB $L_{Aeq,1hr}$ at R2 and R3 respectively. During other periods, the cumulative noise level would reduce to 53 and 51 dB $L_{Aeq,1hr}$ at R2 and R3 respectively.
- 10.134 In terms of potential impact, making reference to the impact assessment rating presented in **Table 10-5**, peak hourly HGV movements at receptors R2 and R3 would be considered as minor to moderate in the long term. During non-peak hours, the long-term impact would be considered as negligible to minor.
- 10.135 Additional mitigation measures will be required to reduce potential impact of noise on these receptors, suitable mitigation measures have been outlined in Section 10.159 to 10.161.

Cumulative Impacts

- 10.136 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.
- 10.137 A planning search undertaken to determine if there were any other planned developments in the vicinity of the application site did not identify any other potentially significant source of noise or ground-borne vibration, either approved or planned within 2 km of the application site. As a result, no potential for significant cumulative impacts has been identified. The cumulative impact of the proposed development on local noise and vibration levels is therefore assessed as insignificant.
- 10.138 To identify the potential impact of ongoing, continuous site activities, the predicted specific noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels at each of the

noise sensitive locations for each time-period. The cumulative assessment is presented in **Table 10-15**.

Table 10-15 Cumulative Operational Noise Levels

Receptor	Proxy Baseline Survey Location	Sound Pressure Level ($L_{Aeq,T}$ dB RE 2×10^{-5} Pa)			Difference	IEMA Long Term Impact Rating
		Existing Noise Levels	Maximum Operational Noise Level	Cumulative		
R1	N1	44	61	61	+ 17	Major
R2	N2	49	54	55	+ 6	Moderate
R3	N2	49	53	55	+ 6	Moderate
R4	N2	49	45	51	+ 2	Negligible
R5	N2	49	54	55	+ 6	Moderate
R6	N2	49	53	54	+ 5	Moderate
R7	N2	49	52	54	+ 5	Moderate
R8	N4	58	50	59	+ 1	Negligible
R9	N4	58	49	58	-	Negligible
R10	N1	44	52	52	+ 8	Moderate
R11	N1	44	43	47	+ 3	Minor
R12	N1	44	43	47	+ 3	Minor
R13	N1	44	43	47	+ 3	Minor
R14	N1	44	42	46	+ 2	Negligible
R15	N3	58	51	59	+ 1	Negligible
R16	N3	58	50	59	+ 1	Negligible
R17	N3	58	50	59	+ 1	Negligible
R18	N3	58	49	59	+ 1	Negligible
R19	N3	58	49	58	-	Negligible
R20	N3	58	49	58	-	Negligible

- 10.139 With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA) and based on the prevailing noise levels measured during the baseline noise survey, the potential worst case cumulative medium-term noise impact from the proposed development would be considered as negligible to minor for the majority of receptors located in close proximity to the site.
- 10.140 It is noted that potentially major impacts would arise at receptor R1 during the latter stages of the extraction period. This would be expected to arise due to Phase 3 extraction works only. During Phase 1 and 2 extraction periods, the relative change in noise levels would give rise to slight to moderate impacts during worst case periods.
- 10.141 In a limited number of instances, the relative change in noise levels under worst case operational conditions suggests that moderate medium-term impacts may arise at receptors R2, R3, R5, R6, R7 and R10.

- 10.142 It is important to note that the predicted values represent worst case operational noise levels. In addition, the predicted operational noise levels at all locations fall below the adopted EPA Guideline Values at all locations. For the majority of the operational period, the predicted noise levels and resultant relative increase in noise levels is expected to be lower than that presented in **Table 10-15**.

Mitigation

- 10.143 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.

Acoustic Screening at Boundary

- 10.144 Screening berms will be constructed on the boundary of the site at specific locations using soils stripped from the Phase 1 extraction area. The screening berms will be c. 2 m in height and will be located along the northern boundary of Phase 3 adjacent to residence R1, and along the eastern boundary of Phase 2 adjacent to residences R2/R3.
- 10.145 In addition to the screening berms, proprietary fencing adjacent to residences R1 to the north and R2/R3 to the east will be installed.
- 10.146 Screening berms and acoustic barriers comprise a key mitigation measure for both the construction and operational phases of the development. The berms and barriers will be inspected on a regular basis and maintained as necessary.

Construction Phase

- 10.147 The impact assessment has indicated that worst case construction noise levels will fall within the adopted criterion.
- 10.148 Notwithstanding, it will be a requirement for the operator to employ and implement best practice construction noise and vibration management techniques throughout the construction phase in order to further reduce the noise and vibration impact to nearby noise sensitive receptors.

Construction Noise and Vibration Management Plan

- 10.149 Prior to commencement of works, the applicant and their appointed contractor will compile and submit to Laois County Council a suitable Construction Noise and Vibration Management Plan (NVMP). The plan shall:
- Outline management processes and mitigation measures to be utilised to remove or reduce significant noise impacts from the construction works;
 - Define noise and vibration monitoring and reporting;
 - Include method statements for each phase of the works including associated specific measures to minimise noise and vibration in so far as is reasonably practicable for the specific works covered by each plan and a detailed appraisal of the resultant construction noise and vibration generated.
- 10.150 The contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works.

- 10.151 The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.
- 10.152 BS5228-1:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Noise* and BS5228-2:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Vibration* is the best practice standard for management of noise and vibration on construction sites.
- 10.153 The standards include guidance on several aspects of construction site mitigation measures, including, but not limited to:
- Selection of quiet and or low vibration emitting plant;
 - Control of noise sources;
 - Screening;
 - Hours of work;
 - Liaison with the public; and
 - Monitoring.

Operational Phase

Mechanical Plant

- 10.154 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.
- 10.155 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.

Vehicle Movement within Site Boundary

- 10.156 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.
- 10.157 Vehicles waiting within the site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines.
- 10.158 Care will be taken when unloading vehicles to reduce or minimise potential noise disturbance to residents.

Vehicle Movements on Public Roads

- 10.159 Trucks owned and operated by the applicant will be required to adhere to a 30 kmph speed limit on the L10317 to ensure road traffic noise impacts on the nearest receptors R2 and R3 are minimised.
- 10.160 All trucks owned and operated by the applicant will be kept and maintained in good working order.
- 10.161 Any deliveries to the site will be programmed to arrive during daytime hours only.

Monitoring

- 10.162 It will be necessary that the operator complete an annual compliance noise survey to establish operational noise emissions from the site.

- 10.163 The survey shall be completed by a Competent Person in accordance with the EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4).
- 10.164 The survey shall be completed using a Class 1 Sound Level meter.

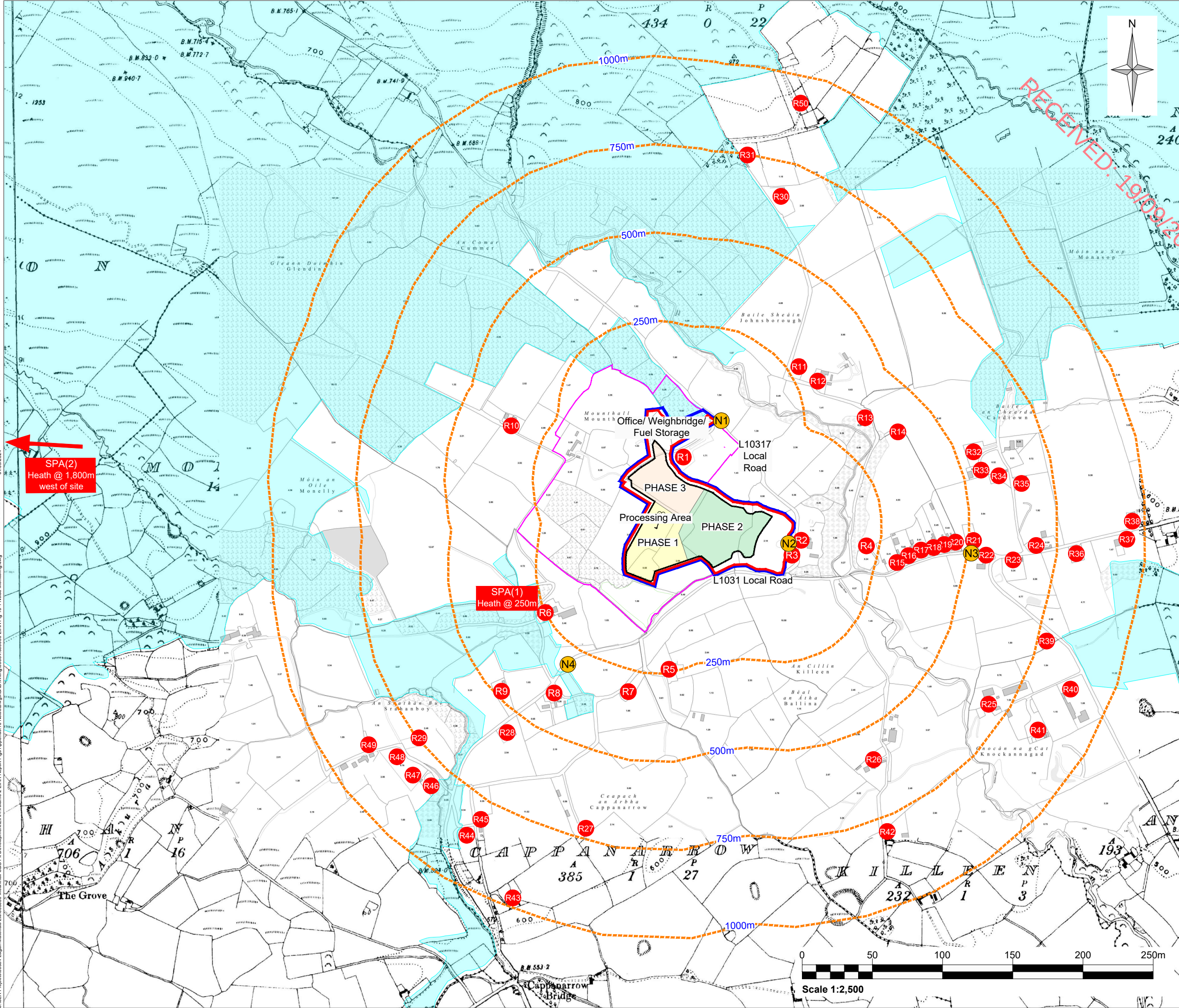
Residual Impact Assessment

- 10.165 During the construction stage, under a worst-case scenario for noise generation, there is potential for moderate to significant temporary negative impacts.
- 10.166 The adoption and implementation of best practice Construction Noise Management practices should ensure residual impacts are minimised to the extent that construction noise should give rise to slight negative temporary impacts for the most part and moderate brief impacts on limited occasions.
- 10.167 During the operational phase, onsite activity arising from general extraction and aggregate processing has the potential to give rise to slight to moderate medium term noise impacts. For receptor R1 (landowner residence), it is possible that major short-term impacts could occur towards the latter end of the extraction period.
- 10.168 The adoption and implementation of operational phase mitigation measures is expected to ensure that noise impacts are limited to slight medium-term for the most part and moderate temporary towards the latter end of the extraction period.

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Figures

Figure 10-1 Noise Monitoring Locations & Receptors



Notes:

- Extract from Ordnance Survey 5,000 scale mapping - sheet numbers 3880, 3881, 3937, 3938 and 6" Raster Mapping - sheet numbers LS010, LS011, OY040

Legend:

- Landowner Boundary (c.32.1 Hectares)
Third party landowner's land interest
- Planning Application Area (c.12.2 Hectares)
- Applicants Land Interest Area (c.12.4 Hectares)
under lease agreement from landowner
- Proposed S&G Extraction Area (c.8 Hectares)
- Special Protection Area (SPA)
Sieve Bloom SPA
- Distance Off-Sets from Planning Application Boundary
250m, 500m, 750m and 1km
- Residential Property Locations
Residences numbered within 1km of Application Boundary
- Baseline NOISE Monitoring Locations
N1 - N4

Rev	Amendments	Date	By	Chk	Auth
 SLR CONSULTING IRELAND 7 DUNDUM BUSINESS PARK, WINDY ARBOUR, DUBLIN, IRELAND, D14 N2Y7 www.slrconsulting.com					
Client Breedon Ireland					
Project Sand and Gravel Pit Development at Mounthall, Camross, Co. Laois					
Figure Title Baseline Noise Monitoring Locations (and Receptors within 1km)					
Scale 1:2,500 @ A3		SLR Project No. 00584.065036			
Designed SMcD	Drawn SMcD	Checked RM	Authorised RM		
Date 01/24	Date 01/24	Date 09/24	Date 09/24		
Figure Number Figure 10-1					Rev. R1

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Appendices

Appendix 10-A Glossary of Terms

Glossary of Terminology

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. 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 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10 A-1 Noise Levels Commonly Found in the Environment

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

Acoustic Terminology

Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
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 (2×10^{-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.
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fast time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
L_{Aeq}	is defined as the notional steady sound level which, over a stated period, 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} 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_{Aeq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level	($L_r = L_{Aeq,T}$) Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p_0). The reference value for sound pressure is 20 μ Pa. Defined as:

$$L_p = 20 \log \left(\frac{p}{p_0} \right)$$