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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 Unlimited Company (also referenced as Kilsaran or Kilsaran Concrete). It primarily addresses potential noise related impacts from the proposed new sand and gravel extraction operations at Naul townland, Ford-de-Fine, Co. Meath.

10.2 The development provides for:

- Extraction and processing on site, to include washing (with associated closed recycled washing plant and lagoon system), screening and crushing plant; storage; stockpiling and haulage of sand and gravel to service the existing readymix concrete plant operated by Kilsaran on the eastern side of the R108 regional road and permitted under P. Ref. 80/572 & 22/153 (ABP-314881-22);
- The total extraction proposal extends to an area of c. 6.2 hectares and will be worked (extracted and restored) on a phased basis for a period of 11 years plus 1 year to complete final restoration works (total duration of 12 years);
- Phased stripping and storage of topsoil and overburden materials for reuse in the restoration works. Restoration of the site will be to a beneficial agricultural after-use;
- Access to the site will be through the existing agricultural enterprise site entrance onto the R108 regional road with upgrade of same to consist of setting-back of the existing boundary wall to the north of the site access, and provision for the upgrade of the existing internal access track and sections of a new access track which will include a new weighbridge; and
- All associated site ancillary works within an overall application area of c. 14.9 hectares.

10.3 Further information on the site infrastructure, operations, environmental management systems, and controls at the proposed sand and gravel pit site is provided in chapter 2 of this EIAR.

10.4 The proposed development annual extraction rate will be c. 120,000 tonnes of sand and gravel per year. Based on 249 working days, together with an average payload of 27 tonne, this will result in an average of 18 loaded aggregates haulage vehicles over the working day.

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 pit 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 An operational vibration assessment has not been undertaken as previous SLR experience and that of the applicant in operating other sand and gravel pits to date indicates that little or no vibration arises from activities of this nature and, as such, no vibration assessment is required.

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 EIAR chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:

- methodology used to assess potential noise 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;
- a summary of any residual impacts; and
- monitoring proposals.

Consultations / Consultees

10.9 In preparing the previous planning application (P. Ref. AA191263), a pre-planning consultation meeting was held between officials of Meath County Council and the applicant on the 2nd August 2019 at the offices of the Planning Authority. As the site is adjacent to the Meath-Dublin border, pre-planning consultation was also carried out with Fingal County Council at the time.

10.10 Although this planning application is for development broadly covering the same development as applied for previously under P. Ref. AA191263, owing to the lapse in time between planning applications, a further formal pre-planning meeting was held with Meath County Council Planning Department via MS Teams on the 30th May 2024.

10.11 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 impacts of the proposed development.

Contributors / Author(s)

10.12 SLR Consulting Ireland undertook the impact assessment presented in this chapter on behalf of Kilsaran. The lead consultant for the study was Aldona Binchy MSc. (Eng) PIEMA (Environmental Engineering) and Conor Hughes MSc. Energy Science. Baseline noise monitoring was carried out by BHP Laboratories.

Limitations / Difficulties Encountered

10.13 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

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

10.15 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.

Planning Policy and Development Control

National Planning Framework – Project Ireland 2040

10.16 The National Planning Framework 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 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 minerals will continue to be enabled where this is compatible with protection of the environments.

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

10.18 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.

10.19 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."

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

Local Planning Policy - Meath County Development Plan 2021-2027

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

- **INF OBJ 71** *"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 73** *"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

10.22 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.

10.23 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 (UK)

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

10.25 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.

10.26 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 70dB LAeq,1hr for temporary operations.

EPA Publication

10.27 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).*

Noise Impact

10.28 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 Minerals).

10.29 The magnitude of operational noise upon residential receptors has been detailed in **Table 10-1**.

Table 10-1
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

Noise Effect

10.30 Generic noise effects are detailed below. These 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";

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

- 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".

Significance of Effect

10.31 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 10-2**.

Table 10-2
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 10-3**.

Table 10-3
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

10.32 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 Limits

10.33 The planning application site is currently a greenfield site.

10.34 Condition No. 3of the planning permission ABP-314881-22 (P. Ref. 22/153) in relation to, inter alia the provision of a concrete reclaimer unit at the existing Kilsaran concrete batching plant states:

"The noise levels generated during the operation of the developed site shall not exceed 55 dB(A) Leq, one hour when measured at the nearest occupied house. When measuring the specific noise, the time shall be any one-hour period during which the sound emission from the site is at its maximum level"

RECEIVING ENVIRONMENT

Study Area

10.35 The proposed sand and gravel pit is located in the townland of Naul, County Meath approximately 750m northwest of Naul village on the northern side of the Delvin River. The Delvin River provides the county boundary between Meath and Dublin, with the village of Naul located within Dublin (Fingal administrative area) and the planning application site located in County Meath.

10.36 The R108 regional road passes to the east of the application site and runs from Dublin city centre to Drogheda, passing through Santry, Ballyboughal and Naul. The R122 passes to the south of the application site and runs from Balbriggan to the east, through Naul before turning south and meeting up with the R108 at St Margaret's to the west of Dublin airport.

10.37 Access to the national road network is via the local road network on the R122 regional road which provides access to both the M1 and M2 motorways.

10.38 The lands surrounding and within the existing landholding comprise farm fields. The application site is not subject to any statutory or non-statutory nature conservation designations. Dwellings in the vicinity of application site are generally located along the local road network, both as isolated farmhouse structures or houses in clusters. The nearest dwellings to the landholding site boundary are identified on **Figure 10-1.**

Baseline Study Methodology

10.39 Environmental noise surveys were carried out to capture typical background noise levels at the noise-sensitive receptors closest to the application site. The methodology of the surveys and the results are set out below.

10.40 The baseline 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.

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

- LAeq,T is the A-weighted equivalent continuous noise level over the measurement period, and effectively represents an "average" value.
- LA90,T is the A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.
- LA10,T is the A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe traffic noise.

10.42 The baseline noise surveys were undertaken by BHP Laboratories and SLR Consulting. The weather conditions were favourable, with no winds (<2m/s), no cloud cover and temperatures above 5°C.

Noise measurements were undertaken over 1 hr period during the daytime (07:00 to 19:00). The monitoring periods chosen are considered to give representative daytime noise levels at the proposed site boundaries.

10.43 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).

10.44 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.

Sources of Information

10.45 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

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

- N1 at the receptors located to the western side of the proposed sand & gravel extraction area;
- N2 at the receptors located along the R122 to the south of the proposed sand & gravel extraction area;
- N3 at the receptors located along the R108 to the southeast of the of the proposed sand & gravel extraction area and south of the existing concrete batching facility in Naul village;
- N4 at the receptors located along the R108 to the northwest of the proposed sand & gravel extraction area and north of the existing concrete batching facility.
- N5 at the receptors located to the northeast of the sand and gravel extraction area;
- N6 at the receptors located to the southeast of the existing concrete batching facility .

10.47 Noise monitoring results for the baseline survey are provided in **Table 10-4**; summary of the average LAeq values and the respective noise sensitive receptors represented by the monitoring locations are provided in **Table 10-5**.

10.48 The following observations are made in respect of the baseline noise monitoring undertaken around the application site:

- Measured baseline noise levels at monitoring point N1 were mainly dominated by natural noises, traffic noise audible in the distance;
- Measured baseline noise levels at N2 were mainly dominated by traffic noise;
- Measured baseline noise levels at N3 were mainly dominated by natural noises, traffic noise audible in the distance;
- Measured baseline noise levels at N4 were mainly dominated by traffic noise;

- Measured baseline noise levels at N5 were mainly dominated by natural noises, traffic noise audible in the distance; and
- Measured baseline noise levels at N6 were mainly dominated by traffic noise.

Table 10-4
Summary of Measured Noise Levels, Free Field dB

Date	Time	Location	$L_{Aeq,T}$(dB)	$L_{A10,T}$(dB)	$L_{A90,T}$(dB)
26/04/23	11:42-12:42	N1	59.0	62.0	46.0
22/05/23	09:57-10:57	N1	51.0	53.0	43.0
26/04/23	11:47-12:47	N2	58.0	60.0	35.0
22/05/23	10:03-11:03	N2	53.0	56.0	37.0
26/04/23	11:52-12:52	N3	50.0	52.0	47.0
22/05/23	10:08-11:08	N3	52.0	54.0	46.0
26/04/23	12:58-13:58	N4	59.0	62.0	41.0
22/05/23	11:14-12:14	N4	57.0	60.0	42.0
26/04/23	13:04-14:04	N5	50.0	53.0	37.0
22/05/23	11:19-12:19	N5	51.0	54.0	35.0
01/06/22	11:23-11:38	N6	70.0	75.0	43.0
01/06/22	11:39-11:54	N6	68.0	73.0	41.0
01/06/22	11:55-12.10	N6	69.0	74.0	42.0
01/06/22	12:12-12:27	N6	68.0	73.0	40.0

Table 10-5
Summary of Measured Noise Levels, Free Field dB (Average Values)

Location	Receptors effected	Period	L_{Aeq}
N1	R37 to R46	Daytime	56
N2	R32 to R36	Daytime	56
N3	R24 to R31 & R47	Daytime	51
N4	R1 to R14	Daytime	58
N5	R48	Daytime	50
N6	R15 to R23	Daytime	68

10.49 **Table 10-5** provides detail of the closest receptors affected by the noise emissions from the activities around at the application site in relation to the noise monitoring locations.

Sensitive Receptors

Human Receptors

10.50 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 (refer to **Figure 10-1**).

10.51 There are c. 47 sensitive receptors identified within the 500m study area of the application site boundary. A summary of the closest sensitive receptors in each direction surrounding the planning application area and their respective proximity to the nearest noise generating activity within the site is presented in **Table 10-6** below. R48, at c.635m north is included as a representative sensitive receptor to the north of the extract area.

Table 10-6

Noise Sensitive Receptors within 500m of the Redline Application Boundary & Concrete Batching Facility

This colour = within 500m			**Approximate Distance (m) from Receptor to:** (Refer to Figure 10-1)					
Reference	**Receptor**	**Sensitivity**	**Site Boundary** / Red line application area	S & G **Stripping Magenta Dashed** Line	S & G **Extraction Magenta Dashed** Line	S & G **Central Processing Area Magenta Cross-Hatched** Area	**Entrance Upgrade** (Temporary Works)	**Concrete Reclaimer**
R1	Residential	Medium	460 (N)	850	850	915	470	580
R2	Residential	Medium	425 (N)	815	815	885	430	540
R3	Residential	Medium	290 (N)	835	835	925	300	405
R4	Residential	Medium	260 (N)	730	730	820	270	380
R5	Residential	Medium	170 (N)	720	720	815	180	285
R6	Residential	Medium	130 (N)	765	765	895	140	250
R7	Residential	Medium	130 (N)	690	690	810	140	235
R8	Residential	Medium	85 (N)	665	665	800	95	210
R9	Residential	Medium	50 (N)	655	655	810	60	175
R10	Residential	Medium	90 (N)	740	740	885	100	190
R11	Residential	Medium	40 (N)	620	620	790	50	160
R12	Residential	Medium	5 (W)	710	710	890	30	100
R13	Residential	Medium	40 (W)	700	700	890	55	100
R14	Residential	Medium	50 (W)	715	715	910	100	100
R15	Residential	Medium	305 (SE)	1145	1145	1345	480	375
R16	Residential	Medium	200 (SE)	1045	1045	1240	370	265
R17	Residential	Medium	250 (SE)	1050	1050	1255	425	325
R18	Residential	Medium	205 (SE)	990	990	1200	370	275
R19	Residential	Medium	190 (SE)	945	945	1155	350	255

This colour = within 500m			Approximate Distance (m) from Receptor to: (Refer to Figure 10-1)					
Reference	**Receptor**	**Sensitivity**	**Site Boundary** / Red line application area	S & G **Stripping** Magenta **Dashed** Line	S & G **Extraction** Magenta **Dashed** Line	S & G **Central Processing Area** Magenta **Cross-Hatched** Area	**Entrance Upgrade** (Temporary Works)	**Concrete Reclaimer**
R20	Residential	Medium	185 (S)	910	910	1120	340	245
R21	Residential	Medium	235 (S)	855	855	1075	350	285
R22	Residential	Medium	245 (S)	815	815	1040	200	295
R23	Residential *(Housing Development c. 80 residences)*	Medium	225 (SE)	1000	1000	1215	380	295
R24	Residential	Medium	335 (S)	730	730	965	385	335
R25	Amenity (GAA Pitch)	Medium	280 (S)	615	615	850	285	250
R26	Educational (Montessori / Pre-school)	Medium	215 (S)	650	650	875	255	230
R27	Residential *(Housing Development c. 11 residences)*	Medium	120 (S)	650	650	865	150	140
R28	Residential	Medium	80 (S)	510	510	715	160	200
R29	Residential	Medium	210 (S)	540	540	760	290	300
R30	Residential	Medium	210 (S)	445	445	675	320	340
R31	Residential	Medium	290 (S)	435	435	675	475	500
R32	Residential	Medium	465 (S)	530	530	740	1000	1000
R33	Residential	Medium	395 (S)	430	430	635	1000	1040
R34	Residential	Medium	425 (S)	480	480	680	1050	1080
R35	Residential	Medium	435 (S)	500	500	705	1080	1110
R36	Residential	Medium	455 (S)	530	530	740	1120	1150
R37	Residential	Medium	505 (SW)	520	520	720	1480	1530
R38	Residential	Medium	250 (W)	255	255	430	1260	1320
R39	Residential	Medium	220 (W)	250	250	400	1240	1300
R40	Residential	Medium	240 (W)	260	260	375	1260	1330
R41	Residential	Medium	295 (W)	335	335	430	1310	1380
R42	Residential	Medium	320 (W)	365	365	430	1320	1390

This colour = within 500m			Approximate Distance (m) from Receptor to: (Refer to Figure 10-1)					
Reference	**Receptor**	**Sensitivity**	**Site Boundary** / Red line application area	S & G **Stripping Magenta Dashed** Line	S & G **Extraction Magenta Dashed** Line	S & G **Central Processing Area Magenta Cross-Hatched** Area	**Entrance Upgrade** (Temporary Works)	**Concrete Reclaimer**
R43	Residential	Medium	320 (W)	295	295	410	1310	1390
R44	Residential	Medium	365 (W)	375	375	505	1420	1500
R45	Residential	Medium	445 (NW)	470	470	640	1510	1600
R46	Residential	Medium	315 (SW)	400	400	600	1240	1340
R47	Residential	Medium	195 (S)	585	585	810	260	275
R48	Residential	Medium	635 (N)	690	690	805	870	990

Ecological Receptors

10.52 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).

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

IMPACT ASSESSMENT

Methodology

Soils Stripping and Sand Extraction

10.54 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 LAr, 1hr noise predictions at each receptor location are based on the prediction protocol for fixed plant contained within ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation'.

10.55 The noise assessment methodology used was based on BS5228: Part 1 (2009) + A1:2014 "Code of Practice for Noise and Vibration Control on Construction and Open Sites''.

10.56 For the purposes of this impact assessment, no reduction has been adopted for noise screening around the application site for the soil stripping, topsoil and overburden mounds construction and pit restoration.

10.57 A reduction of -10dB(A) has been adopted for full noise screening during the sand and gravel extraction period by existing hedges and constructed perimeter topsoil and overburden mounds around the application site. In all likelihood, the actual reduction will be greater and further noise attenuation will be provided by the sand and gravel pit faces.

10.58 On the basis of EPA (2006) Guidance on Quarries and Ancillary Activities and DoEHLG (2004) Guidelines for Planning Authorities noise limit, applied to the nearest noise-sensitive receptors, an

absolute limit of 55dB LAeq,1hr during the daytime (07:00 to 18:00 hours) have been adopted for the normal daytime operations. The limit of 70dB LAeq, 1hr for periods of up to eight weeks in any working year at the noise-sensitive receptors have been adopted for the temporary site set up activities of temporary works with long term environmental benefits.

10.59 For the purposes of this assessment, it is assumed that all of the noise sources are active for 100% of the time, at the distances stated during the working hours of the development and the attenuation distance to the selected receptors is calculated from the operational plant area.

10.60 On this basis, it is considered that the noise impact assessment presented herein is conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in **Appendix 10-B**.

10.61 The noise sources listed in **Table 10-7** have been considered in the noise assessment for the proposed sand and gravel operations:

Table 10-7
Noise Sources at the Proposed Sand and Gravel Pit

Plant	Octave Band Sound Pressure Levels @ 10m, Hz								LAeq@10m
	63	125	250	500	1k	2k	4k	8k	
Excavator	75	84	78	74	70	68	64	61	77
Mobile Screener	93	86	79	78	75	71	69	62	81
Loading Shovel	84	88	81	74	74	71	66	65	80
HGV	85	74	78	73	73	74	67	63	79

10.62 The plant and equipment used at the sand and gravel pit will not generate impulsive or tonal noise; no penalty was added to the predicted operational $L_{Ar,\ 1hr}$ noise level for presence of tonal or impulsive elements or prediction of resultant noise level at each receptor.

Entrance Works

10.63 The existing ready-mix concrete plant and associated activities were operational and captured during the baseline monitoring. The entrance works focusses on the impacts of the short-term construction activities at the entrance and noise associated with these short-term activities once completed will cease and the noise levels will go back to existing ambient levels recorded around the site and Naul village.

10.64 To determine the noise impact from construction works, SLR Consulting Ireland carried out a noise prediction assessment, whereby the levels of noise were calculated at the nearest noise sensitive receptors (residences).

10.65 Noise levels at the residences arising from site activities at Naul have been calculated using the methodology set out in British Standard 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1: Noise (BS5228).

10.66 For the purposes of this assessment, it is assumed that all of the noise sources are active for 100% of the time, at the distances stated during the working hours of the site and that the attenuation distance to the selected receptors.

10.67 The EPA (2006) Environmental Management Guidelines for Quarries and Ancillary Activities and the DoEHLG (2004) Guidelines for Planning Authorities both recommend a noise emission limit, applied to the nearest noise-sensitive receptors, of 55dB $L_{Aeq, 1hr}$ during daytime working hours (defined as 07:00 to 18:00 hours). A limit of 70dB $L_{Aeq, 1hr}$ is permitted for periods of up to eight weeks in any working year at nearby noise sensitive receptors to facilitate ant necessary construction or temporary site works.

10.68 The following noise sources have been considered in the noise assessment for the entrance works within the planning application area:

- Loading Shovel/ Excavator.

10.69 On this basis, it is considered that the noise impact assessment presented herein is conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in **Appendix 10-B.**

Operation of the Concrete Reclaimer Unit and the Concrete Plant

10.70 To determine the noise impact from production activities at the existing concrete batching facility, SLR Consulting Ireland carried out a noise prediction assessment, whereby the levels of noise were calculated at the nearest noise sensitive receptors (residences).

10.71 Noise levels at the residences arising from site activities at Naul have been calculated using the methodology set out in British Standard 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1: Noise (BS5228).

10.72 For the purposes of this assessment, it is assumed that:

- exiting concrete ready-mix plant is active for 100% of the time;
- concrete reclaimer unit will be in operation for 50% of the time (as it only operates to reclaim returned concrete which doesn't occur 100% of the time);
- at the distances stated during the working hours of the site and that the attenuation distance to the selected receptors.

10.73 A noise reduction of -5dB(A) has been adopted for partial noise screening by perimeter screening banks and fences around the existing concrete batching facility, further noise reduction of -22 dB(A) (BS 8233: 1999) has been assumed for full noise screening of ready-mix concrete plant afforded by the external cladding.

10.74 The EPA (2006) Environmental Management Guidelines for Quarries and Ancillary Activities and the DoEHLG (2004) Guidelines for Planning Authorities both recommend a noise emission limit, applied to the nearest noise-sensitive receptors, of 55dB LAeq, 1hr during daytime working hours (defined as 07:00 to 18:00 hours).

10.75 The following noise sources have been considered in the noise assessment for the concrete production activities within the existing concrete batching facility:

- Concrete reclaimer unit;
- Loading shovel;
- Concrete ready-mix plant.

10.76 On this basis, it is considered that the noise impact assessment presented herein is conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in **Appendix 10-B**.

Table 10-8
Noise Sources at Concrete Batching Facility

Plant	L_{Aeq}@10m
Loading Shovel/ Excavator	76
Concrete Reclaimer Unit	75
Concrete Ready-mix Plant	80

10.77 The plant and equipment used at the site will not generate impulsive or tonal noise; no penalty was added to the predicted operational $L_{Ar, 1hr}$ noise level for presence of tonal or impulsive elements or prediction of resultant noise level at each receptor.

Impact Assessment

10.78 The noise prediction / 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**.

Soil Stripping, Top Soil and Overburden Mounds Construction, Pit Restoration

10.79 The following noise sources have been considered in the noise assessment for the temporary operations:

- Excavator;
- HGV (Heavy Duty Vehicle).

10.80 For the purposes of the noise assessment, it is assumed that an excavator will be used continuously to carry out the earthworks, with as one HDV also present on-site at all time.

Table 10-9
Soil Stripping, Top Soil and Overburden Mounds Construction & Pit Restoration Noise Levels

Receptor	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)*	Difference
R01	Daytime	70.0	46	-24
R02	Daytime	70.0	46	-24
R03	Daytime	70.0	46	-24
R04	Daytime	70.0	47	-23
R05	Daytime	70.0	47	-23
R06	Daytime	70.0	46	-24
R07	Daytime	70.0	47	-23
R08	Daytime	70.0	48	-22
R09	Daytime	70.0	48	-22
R10	Daytime	70.0	47	-23
R11	Daytime	70.0	48	-22
R12	Daytime	70.0	47	-23

Receptor	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)*	Difference
R13	Daytime	70.0	47	-23
R14	Daytime	70.0	47	-23
R15	Daytime	70.0	43	-27
R16	Daytime	70.0	44	-26
R17	Daytime	70.0	44	-26
R18	Daytime	70.0	44	-26
R19	Daytime	70.0	45	-25
R20	Daytime	70.0	45	-25
R21	Daytime	70.0	45	-25
R22	Daytime	70.0	46	-24
R23	Daytime	70.0	44	-26
R24	Daytime	70.0	47	-23
R25	Daytime	70.0	48	-22
R26	Daytime	70.0	48	-22
R27	Daytime	70.0	48	-22
R28	Daytime	70.0	50	-20
R29	Daytime	70.0	49	-21
R30	Daytime	70.0	51	-19
R31	Daytime	70.0	51	-19
R32	Daytime	70.0	50	-20
R33	Daytime	70.0	51	-19
R34	Daytime	70.0	50	-20
R35	Daytime	70.0	50	-20
R36	Daytime	70.0	50	-20
R37	Daytime	70.0	50	-20
R38	Daytime	70.0	56	-14
R39	Daytime	70.0	56	-14
R40	Daytime	70.0	56	-14
R41	Daytime	70.0	54	-16
R42	Daytime	70.0	53	-17
R43	Daytime	70.0	55	-15
R44	Daytime	70.0	53	-17
R45	Daytime	70.0	51	-19
R46	Daytime	70.0	52	-18
R47	Daytime	70.0	49	-21
R48	Daytime	70.0	47	-23

10.81 It can be seen from the figures in **Table 10-9** that the noise criterion limits (70dB(A)) for temporary stripping, banks construction activities and pit restoration are met at all the noise sensitive locations.

Sand and Gravel Extraction

10.82 The following noise sources have been considered in the noise assessment for the sand and gravel extraction operations:

- Processing Plant (crushing, washing and screening);
- Loading Shovel.

10.83 For the purposes of the noise assessment, it is assumed that processing plant and the front loader will be used continuously on-site at all time during working hours. It is therefore considered that the noise assessment presented herein is very conservative and represents a worst-case scenario.

10.84 A noise prediction assessment was undertaken to calculate the level of noise arising from the proposed activities at the nearest sensitive receptors, shown on **Figure 10-1**. Detailed noise assessment calculations are provided in **Appendix 10-B**.

10.85 The operational LAr, 1hr noise prediction for each receptor location is presented in **Table 10-10** below. The table also shows the comparison between the predicted operational LAr, 1hr noise level and the noise limit at each receptor during each time-period.

Table 10-10
Sand and Gravel Extraction Operational Noise Levels

Receptor	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)*	Difference
R01	Daytime	55	38	-17
R02	Daytime	55	38	-17
R03	Daytime	55	38	-17
R04	Daytime	55	39	-16
R05	Daytime	55	39	-16
R06	Daytime	55	38	-17
R07	Daytime	55	39	-16
R08	Daytime	55	39	-16
R09	Daytime	55	39	-16
R10	Daytime	55	38	-17
R11	Daytime	55	40	-15
R12	Daytime	55	39	-16
R13	Daytime	55	39	-16
R14	Daytime	55	38	-17
R15	Daytime	55	35	-20
R16	Daytime	55	35	-20
R17	Daytime	55	35	-20
R18	Daytime	55	36	-19
R19	Daytime	55	36	-19

Receptor	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)*	Difference
R20	Daytime	55	36	-19
R21	Daytime	55	37	-18
R22	Daytime	55	37	-18
R23	Daytime	55	36	-19
R24	Daytime	55	38	-17
R25	Daytime	55	39	-16
R26	Daytime	55	39	-16
R27	Daytime	55	39	-16
R28	Daytime	55	41	-14
R29	Daytime	55	40	-15
R30	Daytime	55	42	-13
R31	Daytime	55	42	-13
R32	Daytime	55	41	-14
R33	Daytime	55	42	-13
R34	Daytime	55	41	-14
R35	Daytime	55	41	-14
R36	Daytime	55	41	-14
R37	Daytime	55	41	-14
R38	Daytime	55	46	-9
R39	Daytime	55	47	-8
R40	Daytime	55	47	-8
R41	Daytime	55	45	-10
R42	Daytime	55	45	-10
R43	Daytime	55	46	-9
R44	Daytime	55	44	-11
R45	Daytime	55	42	-13
R46	Daytime	55	43	-12
R47	Daytime	55	40	-15
R48	Daytime	55	39	-16

*Operational Noise Level = Predicted Noise Level without a 5dB penalty

10.86 It can be seen from the above figures that the daytime noise criterion limits arising specifically from site operations at the sensitive receptors are comfortably met at all noise sensitive locations during site operations.

10.87 To identify the potential impact of continuous (full-time) site activities, activity at the proposed pit development, predicted specific LAeq, 1hr dB(A) noise levels have been logarithmically added to existing ambient noise levels at the sensitive receptors. The cumulative levels have been compared to the existing ambient noise levels at each of the site corners for each time-period. The cumulative assessment is shown in **Table 10-11** below.

Table 10-11
Sand and Gravel Extraction Cumulative Operational Noise Levels

Receptor	Period	Existing Baseline $L_{Aeq,T}$ dB(A)	Operational $L_{Ar,\ 1hr}$ dB(A)*	Cumulative $L_{Aeq,\ T}$ dB(A)*	Difference	Short term Impact	Long term Impact
R01	Daytime	58	38	58	0	Negligible	Negligible
R02	Daytime	58	38	58	0	Negligible	Negligible
R03	Daytime	58	38	58	0	Negligible	Negligible
R04	Daytime	58	39	58	0	Negligible	Negligible
R05	Daytime	58	39	58	0	Negligible	Negligible
R06	Daytime	58	38	58	0	Negligible	Negligible
R07	Daytime	58	39	58	0	Negligible	Negligible
R08	Daytime	58	39	58	0	Negligible	Negligible
R09	Daytime	58	39	58	0	Negligible	Negligible
R10	Daytime	58	38	58	0	Negligible	Negligible
R11	Daytime	58	40	58	0	Negligible	Negligible
R12	Daytime	58	39	58	0	Negligible	Negligible
R13	Daytime	58	39	58	0	Negligible	Negligible
R14	Daytime	58	38	58	0	Negligible	Negligible
R15	Daytime	68	35	68	0	Negligible	Negligible
R16	Daytime	68	35	68	0	Negligible	Negligible
R17	Daytime	68	35	68	0	Negligible	Negligible
R18	Daytime	68	36	68	0	Negligible	Negligible
R19	Daytime	68	36	68	0	Negligible	Negligible
R20	Daytime	68	36	68	0	Negligible	Negligible
R21	Daytime	68	37	68	0	Negligible	Negligible
R22	Daytime	68	37	68	0	Negligible	Negligible
R23	Daytime	68	36	68	0	Negligible	Negligible
R24	Daytime	51	38	51	0	Negligible	Negligible
R25	Daytime	51	39	51	0	Negligible	Negligible
R26	Daytime	51	39	51	0	Negligible	Negligible
R27	Daytime	51	39	51	0	Negligible	Negligible
R28	Daytime	51	41	51	0	Negligible	Negligible
R29	Daytime	51	40	51	0	Negligible	Negligible
R30	Daytime	51	42	52	1	Minor	Negligible
R31	Daytime	51	42	52	1	Minor	Negligible
R32	Daytime	56	41	56	0	Negligible	Negligible
R33	Daytime	56	42	56	0	Negligible	Negligible
R34	Daytime	56	41	56	0	Negligible	Negligible
R35	Daytime	56	41	56	0	Negligible	Negligible

Receptor	Period	Existing Baseline $L_{Aeq,T}$ dB(A)	Operational $L_{Ar,\ 1hr}$ dB(A)*	Cumulative $L_{Aeq,\ T}$ dB(A)*	Difference	Short term Impact	Long term Impact
R36	Daytime	56	41	56	0	Negligible	Negligible
R37	Daytime	56	41	56	0	Negligible	Negligible
R38	Daytime	56	46	56	0	Negligible	Negligible
R39	Daytime	56	47	56	0	Negligible	Negligible
R40	Daytime	56	47	56	0	Negligible	Negligible
R41	Daytime	56	45	56	0	Negligible	Negligible
R42	Daytime	56	45	56	0	Negligible	Negligible
R43	Daytime	56	46	56	0	Negligible	Negligible
R44	Daytime	56	44	56	0	Negligible	Negligible
R45	Daytime	56	42	56	0	Negligible	Negligible
R46	Daytime	56	43	56	0	Negligible	Negligible
R47	Daytime	51	40	51	0	Negligible	Negligible
R48	Daytime	50	39	50	0	Negligible	Negligible

10.88 With reference to the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative long-term noise impact from the proposed development is determined to be NEGLIGIBLE at all Receptors.

10.89 With reference to the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative short-term noise impact from the proposed development is determined to be MINOR at Receptors R30 and R31 and NEGLIGIBLE at all other receptors.

10.90 In view of the above findings, it is considered that mitigation measures to reduce the noise impacts of plant associated with the planned development are necessary for short term activities at R30 and R31.

Entrance Improvement Works

10.91 The noise prediction / 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.**

10.92 The operational LAr, 1hr noise prediction for each receptor location is presented in **Table 10-12** below. **Table 10-12** also shows the comparison between the predicted operational LAr, 1hr noise level and the prescribed noise limit.

Table 10-12
Operational Noise Levels from Entrance Improvement Works

Receptors	Period	Noise Limit $L_{Aeq,\ 1hr}$ dB(A)	Operational $L_{Aeq,\ 1hr}$ dB(A)	Difference
R01	Daytime	70	46	-24
R02	Daytime	70	46	-24
R03	Daytime	70	49	-21

Receptors	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)	Difference
R04	Daytime	70	50	-20
R05	Daytime	70	54	-16
R06	Daytime	70	56	-14
R07	Daytime	70	56	-14
R08	Daytime	70	59	-11
R09	Daytime	70	63	-7
R10	Daytime	70	59	-11
R11	Daytime	70	65	-5
R12	Daytime	70	69	-1
R13	Daytime	70	64	-6
R14	Daytime	70	59	-11
R15	Daytime	70	45	-25
R16	Daytime	70	48	-22
R17	Daytime	70	46	-24
R18	Daytime	70	48	-22
R19	Daytime	70	48	-22
R20	Daytime	70	48	-22
R21	Daytime	70	48	-22
R22	Daytime	70	53	-17
R23	Daytime	70	47	-23
R24	Daytime	70	47	-23
R25	Daytime	70	50	-20
R26	Daytime	70	51	-19
R27	Daytime	70	55	-15
R28	Daytime	70	55	-15
R29	Daytime	70	50	-20
R30	Daytime	70	49	-21
R31	Daytime	70	45	-25
R32	Daytime	70	39	-31
R33	Daytime	70	39	-31
R34	Daytime	70	39	-31
R35	Daytime	70	38	-32
R36	Daytime	70	38	-32
R37	Daytime	70	36	-34
R38	Daytime	70	37	-33
R39	Daytime	70	37	-33
R40	Daytime	70	37	-33

Receptors	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)	Difference
R41	Daytime	70	37	-33
R42	Daytime	70	37	-33
R43	Daytime	70	37	-33
R44	Daytime	70	36	-34
R45	Daytime	70	35	-35
R46	Daytime	70	37	-33
R47	Daytime	70	51	-19
R48	Daytime	70	40	-30

10.93 It can be seen from the above figures that the noise criterion limits arising specifically from site construction activities at the sensitive receptors are met at all noise sensitive locations during construction phase. The entrance improvement works will be temporary in nature.

10.94 In view of the above findings, it is considered that additional mitigation measures to reduce the noise impacts of the proposed activities are not necessary. However, a number of additional mitigation measures shall be applied through best practice construction techniques.

Operation of Concrete Batching Plant

10.95 The noise prediction / 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.**

10.96 The operational LAr, 1hr noise prediction for each receptor location is presented in **Table 10-13** below. **Table 10-13** also shows the comparison between the predicted operational LAr, 1hr noise level and the prescribed noise limit.

Table 10-13
Operational Noise Levels from Concrete Batching Facility (Reclaimer Unit / Concrete Plant)

Receptors	Period	Noise Limit $L_{Aeq, 1hr}$ dB(A)	Operational $L_{Aeq, 1hr}$ dB(A)	Difference
R01	Daytime	55	40	-15
R02	Daytime	55	45	-10
R03	Daytime	55	46	-9
R04	Daytime	55	46	-9
R05	Daytime	55	48	-7
R06	Daytime	55	48	-7
R07	Daytime	55	49	-6
R08	Daytime	55	49	-6
R09	Daytime	55	51	-4
R10	Daytime	55	50	-5
R11	Daytime	55	51	-4
R12	Daytime	55	55	0

R13	Daytime	55	55	0
R14	Daytime	55	55	0
R15	Daytime	55	46	-9
R16	Daytime	55	48	-7
R17	Daytime	55	47	-8
R18	Daytime	55	48	-7
R19	Daytime	55	48	-7
R20	Daytime	55	48	-7
R21	Daytime	55	48	-7
R22	Daytime	55	47	-8
R23	Daytime	55	47	-8
R24	Daytime	55	47	-8
R25	Daytime	55	48	-7
R26	Daytime	55	49	-6
R27	Daytime	55	52	-3
R28	Daytime	55	50	-5
R29	Daytime	55	47	-8
R30	Daytime	55	47	-8
R31	Daytime	55	45	-10
R32	Daytime	55	44	-11
R33	Daytime	55	44	-11
R34	Daytime	55	43	-12
R35	Daytime	55	43	-12
R36	Daytime	55	43	-12
R37	Daytime	55	43	-12
R38	Daytime	55	43	-12
R39	Daytime	55	43	-12
R40	Daytime	55	43	-12
R41	Daytime	55	43	-12
R42	Daytime	55	43	-12
R43	Daytime	55	43	-12
R44	Daytime	55	43	-12
R45	Daytime	55	43	-12
R46	Daytime	55	44	-11
R47	Daytime	55	48	-7
R48	Daytime	55	44	-11

10.97 It can be seen from the above figures that the noise criterion limits arising specifically from concrete batching operations at the sensitive receptors are met at all noise sensitive locations during its operations.

10.98 To identify the potential impact of ongoing, continuous site activities, predicted specific $L_{Aeq, 1hr}$ dB(A) 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 10-14**.

Table 10-14
Cumulative Operational Noise Levels Concrete Batching Facility (Reclaimer Unit / Concrete Plant)

Receptor	Period	Existing Baseline $L_{aeq,T}$ Db(A)	Operational $L_{ar, 1hr}$ Db(A)*	Cumulative $L_{aeq, T}$ Db(A)*	Difference	Short Term Impact	Long Term Impact
R01	Daytime	58	40	58	0	Negligible	Negligible
R02	Daytime	58	45	58	0	Negligible	Negligible
R03	Daytime	58	46	58	0	Negligible	Negligible
R04	Daytime	58	46	58	0	Negligible	Negligible
R05	Daytime	58	48	58	0	Negligible	Negligible
R06	Daytime	58	48	58	0	Negligible	Negligible
R07	Daytime	58	49	58	0	Negligible	Negligible
R08	Daytime	58	49	59	1	Minor	Negligible
R09	Daytime	58	51	59	1	Minor	Negligible
R10	Daytime	58	50	59	1	Minor	Negligible
R11	Daytime	58	51	59	1	Minor	Negligible
R12	Daytime	58	55	60	2	Minor	Negligible
R13	Daytime	58	55	60	2	Minor	Negligible
R14	Daytime	58	55	60	2	Minor	Negligible
R15	Daytime	68	46	68	0	Negligible	Negligible
R16	Daytime	68	48	68	0	Negligible	Negligible
R17	Daytime	68	47	68	0	Negligible	Negligible
R18	Daytime	68	48	68	0	Negligible	Negligible
R19	Daytime	68	48	68	0	Negligible	Negligible
R20	Daytime	68	48	68	0	Negligible	Negligible
R21	Daytime	68	48	68	0	Negligible	Negligible
R22	Daytime	68	47	68	0	Negligible	Negligible
R23	Daytime	68	47	68	0	Negligible	Negligible
R24	Daytime	51	47	52	1	Minor	Negligible
R25	Daytime	51	48	53	2	Minor	Negligible
R26	Daytime	51	49	53	2	Minor	Negligible
R27	Daytime	51	52	55	4	Moderate	Minor
R28	Daytime	51	50	53	2	Minor	Negligible
R29	Daytime	51	47	53	2	Minor	Negligible
R30	Daytime	51	47	52	1	Minor	Negligible

Receptor	Period	Existing Baseline $L_{aeq,T}$ Db(A)	Operational $L_{ar,\ 1hr}$ Db(A)*	Cumulative $L_{aeq,\ T}$ Db(A)*	Difference	Short Term Impact	Long Term Impact
R31	Daytime	51	45	52	1	Minor	Negligible
R32	Daytime	56	44	56	0	Negligible	Negligible
R33	Daytime	56	44	56	0	Negligible	Negligible
R34	Daytime	56	43	56	0	Negligible	Negligible
R35	Daytime	56	43	56	0	Negligible	Negligible
R36	Daytime	56	43	56	0	Negligible	Negligible
R37	Daytime	56	43	56	0	Negligible	Negligible
R38	Daytime	56	43	56	0	Negligible	Negligible
R39	Daytime	56	43	56	0	Negligible	Negligible
R40	Daytime	56	43	56	0	Negligible	Negligible
R41	Daytime	56	43	56	0	Negligible	Negligible
R42	Daytime	56	43	56	0	Negligible	Negligible
R43	Daytime	56	43	56	0	Negligible	Negligible
R44	Daytime	56	43	56	0	Negligible	Negligible
R45	Daytime	56	43	56	0	Negligible	Negligible
R46	Daytime	56	44	56	0	Negligible	Negligible
R47	Daytime	51	48	53	2	Minor	Negligible
R48	Daytime	50	44	51	1	Minor	Negligible

10.99 With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA), the cumulative long-term noise impact at all receptors, is determined to be NEGLIGIBLE with the exception of R27 being minor in a worst-case scenario.

10.100 With reference to the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative short-term noise impact is determined to be MODERATE at receptor R27; MINOR at receptors R8-R14, R24-R26, R28-R31, R47-R48 and NEGLIGIBLE at all other receptors.

10.101 In view of the above findings, it is considered that additional mitigation measures to reduce the noise impacts of the proposed activities shall be applied.

Ecological Receptors

10.102 Ecological receptors of concern are those areas designated under EU Habitats Directive (92/43/EEC).

10.103 The application site is not subject to any statutory nature conservation designation.

10.104 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 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 Naul and any Natura 2000 site(s) beyond this distance.

10.105 At a distance greater than 2km, and in the absence of any potential source-pathway-receptor link, it is considered that no Natura 2000 sites would be affected by any direct loss of habitat or impacted upon by the effects of noise.

10.106 There are no Natura 200 Sites within or directly adjacent to the Site. The nearest Natura 2000 site is the River Nanny Estuary and Shoreline Special Protection Area (SPA) 004158 ca. 8.2 km north - east of the Site at the closest point when measured in a straight line. The Site is not connected via ecological features such as hedgerows or treelines or surface water pathways to any Natura 2000 site. Natura 2000 sites can be considered to be sufficiently distant from and unconnected to the proposed sand and gravel pit to not be affected by the potential impacts and resultant effects.

10.107 There are no nationally important Natural Heritage Areas (NHA) located within a 10km zone of influence of the Site. There are four proposed Natural Heritage Areas (pNHA) located within a 10 km zone of influence for the project. The nearest pNHAs is Bog of the Ring pNHA (001204) located approximately 3.3km east of the Site. All sites are considered too far from the site to be impacted by dust associated with the application site.

Traffic

10.108 The criterion for assessment of "affected roads" contained within the latest DMRB guidance focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic. Affected roads are defined as those that meet any of the following criteria:

- is the project likely to cause change in the baseline noise levels of 1dB $LA_{10,18hr}$ in the do-minimum year compared to do-something opening year;
- is the project likely to cause change in the baseline noise levels of 3 dB $LA_{10,18hr}$ in the do–something future year compared to do-minimum opening year;
- does the project involve construction of new road links within 600m of noise sensitive receptors;
- would there be a reasonable stakeholder's expectation that an assessment is undertaken.

10.109 The proposed development annual extraction rate will be ca. 120,000 tonnes of sand and gravel per year. Based on 249 working days per year[2], together with an average payload of 27 tonne, this will result in an average of 18 loaded aggregates haulage vehicles over the working day between the sand and gravel pit and the existing concrete batching plant.

10.110 The proposed sand and gravel extraction from the application site will negate the need to haul these materials from their existing source destinations at Annagor and Ballynamona sites.

10.111 In view of the above, it is considered that the extent of any change and the likely impact of the proposed development can be deemed 'negligible' in terms of traffic and that no further assessment is necessary.

Unplanned Events (i.e. Accidents)

10.112 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 by Kilsaran. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during sand and gravel extraction activities.

[2] Refer to EIAR Chapter 14 Traffic: Section 14.51 for operational days rationale

10.113 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.

10.114 Considering the method of sand and gravel extraction activities there is no need to use any warning sirens or warning sounds in relation to unplanned events.

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

- equipment malfunction;
- vehicle collision.

10.116 The noise impact of any unplanned events, are considered to be negligible, as they have no potential to increase noise levels at sensitive receptors.

Cumulative Impacts

10.117 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.

10.118 There is an existing permitted concrete batching facility with all aggregates delivered to the facility from other sites carried in HGVs and/or articulated trucks which travel through existing roads and junctions within the Naul village.

10.119 Aggregate extraction at the proposed sand and gravel pit will reduce the number of the HGVs and/or articulated trucks which will travel through the village as the haulage of aggregates from other sites operated by Kilsaran can be eliminated. This can be deemed as a positive impact on the sensitive receptors.

10.120 Local existing and planned developments were reviewed as part of this assessment. The review shows a permitted C&D facility (P. Ref. 180893) adjacent to the existing concrete batching facility, subject to a grant of licence by the EPA. As the operation is now functional and a waste licence has been granted by the EPA, it can be considered that the project is accounted for within the baseline assessments undertaken.

10.121 Similarly, the existing permitted and operational batching plant (P. Ref. 80/572) is part of the background noise levels, so the cumulative effect of these operations are also accounted for within the baseline assessments undertaken.

10.122 This assessment shows that the proposed development will not result in a significant increase in the existing ambient noise levels in the vicinity of the application area. The cumulative effects of both developments if not mitigated, could possibly lead to occasional increases in nuisance noise.

'Do-nothing Scenario'

10.123 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.

10.124 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

10.125 The potential impact of noise 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'.

MITIGATION MEASURES

10.126 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.

10.127 Notwithstanding the findings of the impact assessment presented above, which determined that the proposed activities at Naul will have negligible to minor long-term noise impact, and in line with practice, the following best practice measures will be implemented wherever practicable at the proposed site to minimise the potential noise impact of on-site activities:

10.128 **Screening:-**

- Top soil and overburden storage mounds will be erected to act as acoustic barriers between the closest residences and site operations along the site boundary;
- existing perimeter hedge planting will be retained.

10.129 **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.

10.130 **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 pit will be prohibited from leaving their engines running and there should be no unnecessary revving of engines.

10.131 Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can bring about a reduction of 5dB(A) or more in ambient noise levels.

RESIDUAL IMPACT ASSESSMENT

10.132 The worst-case scenario noise assessment has shown that in accordance with the scale in the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA) the cumulative noise impact from plant associated with the development reduces to Negligible at all receptors with the implementation of the proposed mitigation measures.

10.133 **Table 10-15** summarises the impacts, mitigation measures and residual impact for operational plant noise at each of the noise sensitive receptor considered.

Table 10-15
Operational Noise Summary Table Proposed Sand Gravel Pit

Receptors	Impact Without Mitigation Measures			Mitigation	Reduction In Noise From Mitigation $L_{aeq, 1hr}$ Db(A)	Increase In Operational Noise $L_{aeq, 1hr}$db(A)	Residual Short-Term Impact	Residual Long-Term Impact
	Increase In Operational Noise $L_{aeq, 1hr}$ Db(A)	Short Term	Long Term					
R01	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R02	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R03	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R04	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R05	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R06	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R07	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R08	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R09	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R10	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R11	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R12	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R13	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R14	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R15	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R16	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R17	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R18	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R19	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R20	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R21	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible

Receptors	Increase In Operational Noise $L_{aeq, 1hr}$ Db(A)	Impact Without Mitigation Measures		Mitigation	Reduction In Noise From Mitigation $L_{aeq, 1hr}$ Db(A)	Increase In Operational Noise $L_{aeq, 1hr}$db(A)	Residual Short-Term Impact	Residual Long-Term Impact
		Short Term	Long Term					
R22	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R23	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R24	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R25	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R26	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R27	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R28	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R29	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R30	+1	Minor	Negligible	Short term Required	-5	0	Negligible	Negligible
R31	+1	Minor	Negligible	Short term Required	-5	0	Negligible	Negligible
R32	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R33	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R34	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R35	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R36	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R37	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R38	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R39	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R40	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R41	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R42	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R43	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R44	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R45	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R46	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R47	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R48	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible

MONITORING

10.134 Noise monitoring shall 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 the Meath County Council on a regular basis for review and record purposes.

FIGURES

Figure 10-1
Receptors and Noise Monitoring Locations

NOTES

1. Extract from Ordnance Survey Discovery Series Map No. 43

2. Ordnance Survey Ireland Licence No. CYAL50381397 (c) Tailte Éireann - Surveying

LEGEND

- LAND INTEREST AREA c.25 HECTARES (c.61.8 ACRES)
- APPLICATION AREA c.14.9 HECTARES (c.36.8 ACRES)
- EXISTING KILSARAN BATCHING PLANT P.REFS. 80/572 & 22/153 (ABP-314881-22)
- PROPOSED SAND AND GRAVEL PIT OPERATIONAL SITE AREA
- 500M & 1KM OFF-SET BOUNDARY TO APPLICATION SITE AREA (RED LINE) & EXISTING CONCRETE PLANT (CYAN AREA)
- RESIDENCE / RECEPTOR LOCATIONS
- NAUL VILLAGE
- PROPOSED EXTRACTION AREA c.6.2 HECTARES (c.15.3 ACRES)
- PROPOSED PROCESSING AREA (ON PIT FLOOR)
- BASELINE NOISE MONITORING LOCATIONS

N

0 100 200 300 400m 600 800 1000

Metres 1:10,000

Kilsaran
ideas taking shape

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KILSARAN CONCRETE UNLIMITED COMPANY

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

SAND & GRAVEL DEVELOPMENT
AT NAUL TOWNLAND, CO. MEATH

NOISE MONITORING LOCATIONS

FIGURE 10-1

Scale	Date
1:10,000 @ A3	OCTOBER 2024

00036.064988.Naul.EIAR-Fig10-1.Noise Monitoring R2.dwg

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, Banks Construction and Pit Restoration

Activity	Receptor	Activity LAeq (dB) at 10m Distance		Reflection dB(A)	Screening dB(A)	Activity Distance (m)		Noise Attenuated with Distance dB(A)		Activity LAeq (dB)		Operational Noise Levels dB(A)
		Excavator	HGV			Excavator	HGV	Excavator	HGV	Excavator	HGV	
Soils Stripping, Berms Construction and Restoration	R 1	77	79	3	0	850	850	-39	-39	41	43	46
	R 2	77	79	3	0	815	815	-38	-38	42	44	46
	R 3	77	79	3	0	835	835	-38	-38	42	44	46
	R 4	77	79	3	0	730	730	-37	-37	43	45	47
	R 5	77	79	3	0	720	720	-37	-37	43	45	47
	R 6	77	79	3	0	765	765	-38	-38	42	44	46
	R 7	77	79	3	0	690	690	-37	-37	43	45	47
	R 8	77	79	3	0	665	665	-36	-36	44	46	48
	R 9	77	79	3	0	655	655	-36	-36	44	46	48
	R 10	77	79	3	0	740	740	-37	-37	43	45	47
	R 11	77	79	3	0	620	620	-36	-36	44	46	48
	R 12	77	79	3	0	710	710	-37	-37	43	45	47
	R 13	77	79	3	0	700	700	-37	-37	43	45	47
	R 14	77	79	3	0	715	715	-37	-37	43	45	47
	R 15	77	79	3	0	1145	1145	-41	-41	39	41	43
	R 16	77	79	3	0	1045	1045	-40	-40	40	42	44
	R 17	77	79	3	0	1050	1050	-40	-40	40	42	44
	R 18	77	79	3	0	990	990	-40	-40	40	42	44
	R 19	77	79	3	0	945	945	-40	-40	40	42	45
	R 20	77	79	3	0	910	910	-39	-39	41	43	45
	R21	77	79	3	0	855	855	-39	-39	41	43	45
	R22	77	79	3	0	815	815	-38	-38	42	44	46
	R23	77	79	3	0	1000	1000	-40	-40	40	42	44
	R24	77	79	3	0	730	730	-37	-37	43	45	47
	R25	77	79	3	0	615	615	-36	-36	44	46	48

	R26	77	79	3	0	650	650	-36	-36	44	46	48
	R27	77	79	3	0	650	650	-36	-36	44	46	48
	R28	77	79	3	0	510	510	-34	-34	46	48	50
	R29	77	79	3	0	540	540	-35	-35	45	47	49
	R30	77	79	3	0	445	445	-33	-33	47	49	51
	R31	77	79	3	0	435	435	-33	-33	47	49	51
	R32	77	79	3	0	530	530	-34	-34	46	48	50
	R33	77	79	3	0	430	430	-33	-33	47	49	51
	R34	77	79	3	0	480	480	-34	-34	46	48	50
	R35	77	79	3	0	500	500	-34	-34	46	48	50
	R36	77	79	3	0	530	530	-34	-34	46	48	50
	R37	77	79	3	0	520	520	-34	-34	46	48	50
	R38	77	79	3	0	255	255	-28	-28	52	54	56
	R39	77	79	3	0	250	250	-28	-28	52	54	56
	R40	77	79	3	0	260	260	-28	-28	52	54	56
	R41	77	79	3	0	335	335	-31	-31	49	51	54
	R42	77	79	3	0	365	365	-31	-31	49	51	53
	R43	77	79	3	0	295	295	-29	-29	51	53	55
	R44	77	79	3	0	375	375	-31	-31	49	51	53
	R45	77	79	3	0	470	470	-33	-33	47	49	51
	R46	77	79	3	0	400	400	-32	-32	48	50	52
	R47	77	79	3	0	585	585	-35	-35	45	47	49
	R48	77	79	3	0	690	690	-37	-37	43	45	47

Sand & Gravel Extraction/ Processing

Activity	Receptor	Activity LAeq (dB) at 10m Distance		Reflection	Screening	Activity Distance (m)		Noise Attenuated with Distance dB(A)		Activity LAeq (dB)		Operational Noise Levels dB(A)
		Front Loader	Processing Plant	dB(A)	dB(A)	Front Loader	Processing Plant	Front Loader	Processing Plant	Front Loader	Processing Plant	
Sand Extraction and Processing	**R 1**	80	81	3	-10	850	915	-39	-39	34	35	38
	R 2	80	81	3	-10	815	885	-38	-39	35	35	38
	R 3	80	81	3	-10	835	925	-38	-39	35	35	38
	R 4	80	81	3	-10	730	820	-37	-38	36	36	39
	R 5	80	81	3	-10	720	815	-37	-38	36	36	39
	R 6	80	81	3	-10	765	895	-38	-39	35	35	38
	R 7	80	81	3	-10	690	810	-37	-38	36	36	39
	R 8	80	81	3	-10	665	800	-36	-38	37	36	39
	R 9	80	81	3	-10	655	810	-36	-38	37	36	39
	R 10	80	81	3	-10	740	885	-37	-39	36	35	38
	R 11	80	81	3	-10	620	790	-36	-38	37	36	40
	R 12	80	81	3	-10	710	890	-37	-39	36	35	39
	R 13	80	81	3	-10	700	890	-37	-39	36	35	39
	R 14	80	81	3	-10	715	910	-37	-39	36	35	38
	R 15	80	81	3	-10	1145	1345	-41	-43	32	31	35
	R 16	80	81	3	-10	1045	1240	-40	-42	33	32	35
	R 17	80	81	3	-10	1050	1255	-40	-42	33	32	35
	R 18	80	81	3	-10	990	1200	-40	-42	33	32	36
	R 19	80	81	3	-10	945	1155	-40	-41	33	33	36
	R 20	80	81	3	-10	910	1120	-39	-41	34	33	36
	R21	80	81	3	-10	855	1075	-39	-41	34	33	37
	R22	80	81	3	-10	815	1040	-38	-40	35	34	37
	R23	80	81	3	-10	1000	1215	-40	-42	33	32	36
	R24	80	81	3	-10	730	965	-37	-40	36	34	38

	R25	80	81	3	-10	615	850	-36	-39	37	35	39
	R26	80	81	3	-10	650	875	-36	-39	37	35	39
	R27	80	81	3	-10	650	865	-36	-39	37	35	39
	R28	80	81	3	-10	510	715	-34	-37	39	37	41
	R29	80	81	3	-10	540	760	-35	-38	38	36	40
	R30	80	81	3	-10	445	675	-33	-37	40	37	42
	R31	80	81	3	-10	435	675	-33	-37	40	37	42
	R32	80	81	3	-10	530	740	-34	-37	39	37	41
	R33	80	81	3	-10	430	635	-33	-36	40	38	42
	R34	80	81	3	-10	480	680	-34	-37	39	37	41
	R35	80	81	3	-10	500	705	-34	-37	39	37	41
	R36	80	81	3	-10	530	740	-34	-37	39	37	41
	R37	80	81	3	-10	520	720	-34	-37	39	37	41
	R38	80	81	3	-10	255	430	-28	-33	45	41	46
	R39	80	81	3	-10	250	400	-28	-32	45	42	47
	R40	80	81	3	-10	260	375	-28	-31	45	43	47
	R41	80	81	3	-10	335	430	-31	-33	42	41	45
	R42	80	81	3	-10	365	430	-31	-33	42	41	45
	R43	80	81	3	-10	295	410	-29	-32	44	42	46
	R44	80	81	3	-10	375	505	-31	-34	42	40	44
	R45	80	81	3	-10	470	640	-33	-36	40	38	42
	R46	80	81	3	-10	400	600	-32	-36	41	38	43
	R47	80	81	3	-10	585	810	-35	-38	38	36	40
	R48	80	81	3	-10	690	805	-37	-38	36	36	39

Entrance Works

Activity	Receptor	Activity LAeq (dB) at 10m Distance Loading Shovel/Excavator	Reflection dB(A)	Screening dB(A)	Activity Distance (m)	Noise Attenuated with Distance dB(A)	Excavator	Operational Noise Levels dB(A)
Entrance Works and Construction of Aggregate Bays	**R 1**	76	3	0	470	-33	46	46
	R 2	76	3	0	430	-33	46	46
	R 3	76	3	0	300	-30	49	49
	R 4	76	3	0	270	-29	50	50
	R 5	76	3	0	180	-25	54	54
	R 6	76	3	0	140	-23	56	56
	R 7	76	3	0	140	-23	56	56
	R 8	76	3	0	95	-20	59	59
	R 9	76	3	0	60	-16	63	63
	R 10	76	3	0	100	-20	59	59
	R 11	76	3	0	50	-14	65	65
	R 12	76	3	0	30	-10	69	69
	R 13	76	3	0	55	-15	64	64
	R 14	76	3	0	100	-20	59	59
	R 15	76	3	0	480	-34	45	45
	R 16	76	3	0	370	-31	48	48
	R 17	76	3	0	425	-33	46	46
	R 18	76	3	0	370	-31	48	48
	R 19	76	3	0	350	-31	48	48
	R 20	76	3	0	340	-31	48	48
	R21	76	3	0	350	-31	48	48
	R22	76	3	0	200	-26	53	53
	R23	76	3	0	380	-32	47	47

	R24	76	3	0	385	-32	47	47
	R25	76	3	0	285	-29	50	50
	R26	76	3	0	255	-28	51	51
	R27	76	3	0	150	-24	55	55
	R28	76	3	0	160	-24	55	55
	R29	76	3	0	290	-29	50	50
	R30	76	3	0	320	-30	49	49
	R31	76	3	0	475	-34	45	45
	R32	76	3	0	1000	-40	39	39
	R33	76	3	0	1000	-40	39	39
	R34	76	3	0	1050	-40	39	39
	R35	76	3	0	1080	-41	38	38
	R36	76	3	0	1120	-41	38	38
	R37	76	3	0	1480	-43	36	36
	R38	76	3	0	1260	-42	37	37
	R39	76	3	0	1240	-42	37	37
	R40	76	3	0	1260	-42	37	37
	R41	76	3	0	1310	-42	37	37
	R42	76	3	0	1320	-42	37	37
	R43	76	3	0	1310	-42	37	37
	R44	76	3	0	1420	-43	36	36
	R45	76	3	0	1510	-44	35	35
	R46	76	3	0	1240	-42	37	37
	R47	76	3	0	260	-28	51	51
	R48	76	3	0	870	-39	40	40

Operation of Concrete Batching Facility (Reclaimer Unit / Concrete Plant)

Activity	Receptor	Activity LAeq (dB) at 10m Distance	Activity LAeq (dB) at 10m Distance	Activity LAeq (dB) at 10m Distance	Reflection dB(A)	Screening dB(A)	Cladding dB(A)	50% Duration Activity Correction	Activity Distance (m)	Noise Attenuated with Distance dB(A)	Reclaimer Unit	Concrete Plant	Loading Shovel	Operational Noise Levels dB(A)
		Reclaimer Unit	Concrete Plant	Loading Shovel										
Operation of Concrete Reclaims Unit and the Concrete Plant	**R 1**	75	80	75	3	-5	-22	-3	580	-35	35	26	38	40
	R 2	75	80	75	3	-5	-22	-3	540	-35	35	43	38	45
	R 3	75	80	75	3	-5	-22	-3	405	-32	38	43	41	46
	R 4	75	80	75	3	-5	-22	-3	380	-32	38	43	41	46
	R 5	75	80	75	3	-5	-22	-3	285	-29	41	43	44	48
	R 6	75	80	75	3	-5	-22	-3	250	-28	42	43	45	48
	R 7	75	80	75	3	-5	-22	-3	235	-27	43	43	46	49
	R 8	75	80	75	3	-5	-22	-3	210	-26	44	43	47	49
	R 9	75	80	75	3	-5	-22	-3	175	-25	45	43	48	51
	R 10	75	80	75	3	-5	-22	-3	190	-26	44	43	47	50
	R 11	75	80	75	3	-5	-22	-3	160	-24	46	43	49	51
	R 12	75	80	75	3	-5	-22	-3	100	-20	50	43	53	55
	R 13	75	80	75	3	-5	-22	-3	100	-20	50	43	53	55
	R 14	75	80	75	3	-5	-22	-3	100	-20	50	43	53	55
	R 15	75	80	75	3	-5	-22	-3	375	-31	39	43	42	46
	R 16	75	80	75	3	-5	-22	-3	265	-28	42	43	45	48
	R 17	75	80	75	3	-5	-22	-3	325	-30	40	43	43	47
	R 18	75	80	75	3	-5	-22	-3	275	-29	41	43	44	48
	R 19	75	80	75	3	-5	-22	-3	255	-28	42	43	45	48
	R 20	75	80	75	3	-5	-22	-3	245	-28	42	43	45	48
	R 21	75	80	75	3	-5	-22	-3	285	-29	41	43	44	48
	R 22	75	80	75	3	-5	-22	-3	295	-29	41	43	44	47

R 23	75	80	75	3	-5	-22	-3	295	-29	41	43	44	47
R 24	75	80	75	3	-5	-22	-3	335	-31	39	43	42	47
R 25	75	80	75	3	-5	-22	-3	250	-28	42	43	45	48
R 26	75	80	75	3	-5	-22	-3	230	-27	43	43	46	49
R 27	75	80	75	3	-5	-22	-3	140	-23	47	43	50	52
R 28	75	80	75	3	-5	-22	-3	200	-26	44	43	47	50
R 29	75	80	75	3	-5	-22	-3	300	-30	40	43	43	47
R 30	75	80	75	3	-5	-22	-3	340	-31	39	43	42	47
R 31	75	80	75	3	-5	-22	-3	500	-34	36	43	39	45
R 32	75	80	75	3	-5	-22	-3	1000	-40	30	43	33	44
R 33	75	80	75	3	-5	-22	-3	1040	-40	30	43	33	44
R 34	75	80	75	3	-5	-22	-3	1080	-41	29	43	32	43
R 35	75	80	75	3	-5	-22	-3	1110	-41	29	43	32	43
R 36	75	80	75	3	-5	-22	-3	1150	-41	29	43	32	43
R 37	75	80	75	3	-5	-22	-3	1530	-44	26	43	29	43
R 38	75	80	75	3	-5	-22	-3	1320	-42	28	43	31	43
R 39	75	80	75	3	-5	-22	-3	1300	-42	28	43	31	43
R 40	75	80	75	3	-5	-22	-3	1330	-42	28	43	31	43
R 41	75	80	75	3	-5	-22	-3	1380	-43	27	43	30	43
R 42	75	80	75	3	-5	-22	-3	1390	-43	27	43	30	43
R 43	75	80	75	3	-5	-22	-3	1390	-43	27	43	30	43
R 44	75	80	75	3	-5	-22	-3	1500	-44	26	43	29	43
R 45	75	80	75	3	-5	-22	-3	1600	-44	26	43	29	43
R 46	75	80	75	3	-5	-22	-3	1340	-43	27	44	30	44
R 47	75	80	75	3	-5	-22	-3	275	-29	41	45	44	48
R 48	75	80	75	3	-5	-22	-3	990	-40	30	43	33	44