Shannon Technology and Energy Park (STEP) Power Plant

Environmental Impact Assessment Report - Volume 2

Chapter 09 Airborne Noise and Groundborne Vibration

Shannon LNG Limited

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Delivering a better world

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9. Airborne Noise and Groundborne Vibration

9.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the potential noise and vibration impacts associated with the Proposed Development.

Noise and vibration emissions can potentially occur during the construction, operational and decommissioning phases of the Proposed Development.

Potential noise and vibration sources during the construction phase comprise mobile plant and construction processes such as earthworks which can give rise to elevated sound and vibration levels.

Potential noise sources during the operational phase comprise plant and equipment associated with the operation of the power plant and Above Ground Installation (AGI). No significant groundborne vibration sources are identified during the operational phase.

The Site is located in the townlands of Kilcolgan Lower and Ralappane, between Tarbert and Ballylongford, Co. Kerry. The application Site boundary ('red line') encloses an area of approximately 41 hectares (ha) and is entirely owned by the Applicant.

Full details on the background, Site history and the Proposed Development is provided in **Chapter 02** (Description of the Proposed Development) and also the Planning Statement submitted with this planning application.

9.2 Competent Expert

The assessment has been carried out under the supervision of Chris Skinner. Chris Skinner has over 20 years' experience in acoustics consultancy and holds a MSci / MA Physics from the University of Cambridge. He is a full corporate member of the Institute of Acoustics.

He has significant experience in modelling noise from a range of industrial facilities, including power generation plant. Chris works with a wide range of clients, from industrial site operators and developers to local authorities and provides expert technical advice to government departments on noise and nuisance.

Chris has strong experience in developing large complex acoustic models and undertaking predictions and has worked with many clients to use such models to understand noise impacts from industrial sites, design mitigation and provide acoustic design advice for site developments.

9.3 Methodology

9.3.1 Study Area

The study area for onsite construction and operational noise and vibration is defined as an area extending from the Site up to and including the nearest sensitive receptor locations as shown in **Figure F9.1**, Volume 3. If compliant levels of noise and vibration are predicted at the nearest sensitive receptor locations, it follows that compliant levels will be achieved at all other locations.

The study area for offsite traffic noise is the same as identified in the transport assessment, detailed in **Chapter 11** (Traffic and Transport).

9.3.2 Determination of the Baseline Environment

The baseline acoustic environment has been determined via several long-term surveys conducted in and around the Site. These surveys are discussed in **Section 9.4**.

9.3.3 Describing Potential Effects

The Environmental Protection Agency (EPA) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) are Guidelines written to facilitate the implementation of Directive 2011/92/EU as amended by EU Directive 2014/52/EU in Ireland together, the 'EIA Directive'. This chapter covers the assessment and description of the likely significant environmental effects.

Effects are described under various headings, including Quality, Significance, Extent and Context, Probability, Duration and Frequency. Of relevance are the definitions of significance and duration, which are given in **Table 9.1** and **Table 9.2**.

Table 9.1: Description of Significance of Effects

Aspect	Description
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Source: EPA 2022

Table 9.2: Description of Duration of Effects

Aspect	Description
Momentary	Effects lasting from seconds to minutes.
Brief	Effects lasting less than a day.
Temporary	Effects lasting less than a year.
Short-Term	Effects lasting from one to seven years.
Medium-Term	Effects lasting from seven to 15 years.
Long Term	Effects lasting from 15 to 60 years.
Permanent	Effects lasting over 60 years.
Reversible	Effects that can be undone, e.g. through remediation or restoration.
Frequency	How often the effect will occur.

Source: EPA 2022

9.3.4 Significance of Effects Construction Phase

9.3.4.1 Introduction

To determine potential temporary noise and vibration impacts during the construction phase of the Proposed Development, the following matters have been considered:

- Noise and vibration caused by construction site activities.
- Noise and vibration caused by increases in traffic on existing roads.

9.3.4.2 Criteria – Noise from Onsite Construction Activities

Transport Infrastructure Ireland (TII; formerly the National Roads Authority) is the only government body in Ireland to publish construction noise limits, which are presented in the document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004) ("NRA Guidelines").

It is acknowledged the limits presented relate to construction works for road schemes, however it is assumed that noise sensitive receptors are likely to be equally sensitive to construction noise from other project types. The criteria presented in this chapter are shown in **Table 9.3**.

Table 9.3: Maximum Permissible Noise Levels at the Façade of Dwellings During Construction

Period	$L_{Aeq,1hr}$ dB	$L_{p(max)\ slow}$ dB
Monday to Friday – 07:00 to 19:00	70	80
Monday to Friday – 19:00 to 22:00	60[1]	65[1]
Saturday – 08:00 to 16:30	65	75
Sundays and Bank Holidays – 08:00 to 16:30	60[1]	65[1]

[1] Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority

Source: Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004)

Potential construction noise impacts can also be assessed using BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (BS5228).

The 'ABC' method (detailed in BS5228 Section E.3.2) has been used to develop criteria. Using this method, the construction noise limit for the Proposed Development are determined by rounding the ambient noise levels to the nearest 5 dB and then comparing this level to the Category A, B and C values given in BS5228, detailed in **Table 9.4**.

Table 9.4: BS5228 Construction Noise Criteria

Assessment category and threshold value period	Threshold Value L_{Aeq},T dB		
	Category A (a)	Category B (b)	Category C (c)
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends (d)	55	60	65
Daytime (07:00 - 19:00) & Saturdays (07:00 - 13:00)	65	70	75

NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.
NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.
NOTE 3: Applies to residential receptors only.

(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
(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.
(c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.
(d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.

For the purposes of this assessment, the criteria given in both the NRA Guidelines and BS5228 will be considered. Where the criteria differ, the more stringent of the two will be adopted.

9.3.4.3 Criteria – Vibration from Onsite Construction Activities

There are two types of construction vibration criteria: those dealing with human perception and those dealing with structural damage to buildings. Both criterion types are considered relevant to the Proposed Development.

Table B.1 in BS5228 presents vibration criteria with regards human perception. These are presented in **Table 9.5** with descriptions of likely reactions.

Table 9.5: BS5228 Vibration Criteria - Human Perception

Peak Particle Velocity (PPV)	Description
>= 10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.
>1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
>0.3 mm/s	Vibration might be just perceptible in residential environments.
>0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.

Table 2 of the NRA guidelines provide construction vibration criteria identified to ensure there is no potential for vibration damage during construction. These criteria are presented in **Table 9.6.**

Table 9.6: NRA Guidelines Vibration Criteria – Structural Damage

Allowable vibration velocity (peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	**10 to 50 Hz**	**50 to 100Hz (and above)**
8 mm/s	12.5 mm/s	20 mm/s

9.3.4.4 Criteria – Blasting

It is expected that blasting would be required during the initial construction phases to excavate some of the rock, which cannot be removed by rock breaking equipment mounted on tracked excavators. Full details of the blasting process and methodology are given in **Chapter 02** (Description of the Proposed Development).

With regard blasting operations BS5228 states:

> *Whenever blasting is carried out, energy is transmitted from the blast site in the form of airborne pressure waves. These pressure waves comprise energy over a wide range of frequencies, some of which are higher than 20 Hz and therefore perceptible as sound, whereas the majority are below 20 Hz and hence inaudible but can be sensed as concussion. It is the combination of the sound and concussion that is known as air overpressure.*

With regard air overpressure criteria, BS5228 goes on to state:

> *As the airborne pressure waves pass any single point the pressure of the air rises rapidly to a value above atmospheric pressure, falls to below atmospheric pressure, then returns to normal pressure after a series of oscillations. The maximum value above atmospheric pressure is known as peak air overpressure and is measured in pressure terms and generally expressed in linear decibels (dB lin) (see I.4).*
>
> *Routine blasting can regularly generate air overpressure levels at adjacent premises of around 120 dB (lin). This level corresponds to an excess air pressure which is equivalent to that of a steady wind velocity of 5 m·s−1 (Beaufort force 3, gentle breeze) and is likely to be above the threshold of perception.*
>
> *Windows are generally the weakest parts of a structure and research by the United States Bureau of Mines [65] has shown that a poorly mounted window that is prestressed might crack at 150 dB (lin), with most windows cracking at around 170 dB (lin), whereas structural damage would not be expected at levels below 180 dB (lin).*

Criteria for vibration caused by blasting activities are presented in BS6472-2:2008 Guide to evaluation of human exposure to vibration in buildings, Part 2: Blast Induced Vibration (BSI Group, 2008) (BS6472). These criteria are presented in **Table 9.7**.

Table 9.7: BS6472 Vibration Criteria - Blasting

Place	Time	Satisfactory Magnitude[A] PPV (mm/s)
Residential	Day[D]	6.0 to 10.0[C]
	Night[D]	2.0
	Other Times[D]	4.5
Offices[B]	Any Time	14.0
Workshops[B]	Any Time	14.0

NOTE 1 This table recommends magnitudes of vibration below which the probability of adverse comment is low (noise caused by any structural vibration is not considered).
NOTE 2 Doubling the suggested vibration magnitudes could result in adverse comment and this will increase significantly if the magnitudes are quadrupled.
NOTE 3 For more than three occurrences of vibrations per day see the further multiplication factor in 5.2.

A) The satisfactory magnitudes are the same for the working day and the rest of the day unless stated otherwise.
B) Critical working areas where delicate tasks impose more stringent criteria than human comfort are outside the scope of this standard.
C) Within residential properties people exhibit a wide variation of tolerance to vibration. Specific values are dependent upon social and cultural factors, psychological attitudes and the expected degree of intrusion. In practice the lower satisfactory magnitude should be used with the higher magnitude being justified on a case-by-case basis.
D) For the purpose of blasting, daytime is considered to be 08h00 to 18h00 Monday to Friday and 08h00 to 13h00 Saturday. Routine blasting would not normally be considered on Sundays or Public Holidays. Other times cover the period outside of the working day but exclude night-time, which is defined as 23h00 to 07h00.

9.3.4.5 Criteria – Noise from Increased Traffic Flows on Existing Roads during the Construction Period

The potential increase in noise levels resulting from changes to road traffic flows during the construction period have been determined in accordance with the NRA Guidelines which refer to the Calculation of Road Traffic Noise (CRTN) methodology.

The CRTN methodology is not accurate for very low traffic flows (below 1000 AAWT,18hr). Where flows of this magnitude are predicted, the Noise Advisory Council (NAC) prediction method detailed in the document 'A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}' has been used.

No specific Irish guidance containing criteria for noise impacts from construction traffic has been published.

The impact of construction phase traffic has therefore been assessed in accordance with the short-term criteria provided in the Highways England Design Manual for Roads and Bridges LA111 Noise and vibration document (2020). These criteria are given in terms of change in noise level and are presented in **Table 9.8**.

Table 9.8: Magnitude of Impact – Construction Phase Traffic

Change in Sound Level ($L_{A10,18hr}$ dB)	Magnitude of Impact (Short Term)
0	No Change
0.1 to 0.9	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
5+	Major

Source: Design Manual for Roads and Bridges LA111 Noise and vibration (Highways England, 2020)

9.3.4.6 Construction Phase – Special Area of Conservation (SAC) and Other Ecological Receptors

The impact of construction phase noise and vibration emissions on the habitats and species of the SAC and other ecological receptor positions are discussed in **Chapter 07B** (Terrestrial Ecology).

9.3.5 Significance of Effects Operational Phase

9.3.5.1 Introduction

To determine the potential noise and vibration impacts during the operational phase, the following matters have been considered:

- Sound and vibration caused by site operations.
- Sound and vibration caused by increases in traffic on existing roads.

9.3.5.2 Criteria – Operational Phase Noise Emissions

The Proposed Development will be licensed by the EPA under an Industrial Emissions (IE) licence.

Guidance on permissible noise emission limits for licensed facilities is contained in the document Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA, 2016) (NG4). NG4 refers to Best Available Techniques as a form of noise mitigation which is defined in Section 7 of the Protection of the Environment Act (2003) as:

> *'The most effective and advanced stage in the development of an activity and its methods of operation, which indicate the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed to prevent or eliminate or, where that is not practicable, generally to reduce an emission and its impact on the environment as a whole.'*

NG4 states that:

> *' All reasonably practicable measures should be adopted at licensed facilities to minimise the noise impact of the activity, and BAT should be used in the selection and implementation of appropriate noise mitigation measures and controls.'*
>
> *NG4 also provides criteria for use in noise assessments which vary depending on whether the location of the development is in a 'Quiet Area' or an 'Area of Low Background Noise'.*
>
> *A 'Quiet Area' is defined as a location that meets the following criteria:*
>
> *At least 3 km from urban areas with a population >1,000 people;*
>
> *At least 10 km from any urban areas with a population >5,000 people;*
>
> *At least 15 km from any urban areas with a population >10,000 people;*
>
> *At least 3 km from any local industry;*
>
> *At least 10 km from any major industry centre;*
>
> *At least 5 km from any National Primary Route, and;*
>
> *At least 7.5 km from any Motorway or Dual Carriageway.*
>
> *An 'Area of Low Background Noise' is a location that meets the following criteria:*
>
> *Average Daytime Background Noise Level ≤40dB L_{AF90},*
>
> *Average Evening Background Noise Level ≤35dB L_{AF90}, and;*
>
> *Average Night-time Background Noise Level ≤30dB L_{AF90}.*

The criteria presented in NG4 are detailed in **Table 9.9**.

Table 9.9: Recommended Noise Limit Criteria

Scenario	Daytime Noise Criterion dB $L_{ar,T}$ (07:00 to 19:00 hours)	Evening Noise Criterion dB $L_{ar,T}$ (19:00 to 23:00 hours)	Night-time Noise Criterion dB $L_{ar,T}$ (23:00 to 07:00 hours)
Quiet Area	Noise from the licensed site to be at least 10 dB below the average daytime background noise level measured during the baseline survey.	Noise from the licensed site to be at least 10 dB below the average evening background noise level measured during the baseline survey.	Noise from the licensed site to be at least 10 dB below the average night-time background noise level measured during the baseline survey.
Areas of Low Background Noise	45 dB	40 dB	35 dB
All other Areas	55 dB	50 dB	45 dB

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

The criteria are given in terms of a Rated Noise Level ($L_{ar,T}$) which is defined in NG4 as:

> *The Rated Noise Level, equal to the LAeq during a specified time interval (T), plus specified adjustments for tonal character and / or impulsiveness of the sound.*

The method for applying adjustments for tonal and / or impulsive characteristics are described in NG4 and have been considered in this assessment.

The location of the Proposed Development does not meet the definition of a 'Quiet Area' due to its proximity to the N69 road to the east and the Money Point Power Station to the north. However, the results of the baseline survey indicate that the site could be considered an 'Area of Low Background Noise' (this is discussed further below). Therefore, the criteria detailed for Areas of Low Background Noise' have been adopted for this assessment.

The acoustic character of this rural area may change in the future due to the area being zoned for marine-related industry as part of the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary which is supported by Kerry County Council (Kerry Co. Co.) as identified in the Kerry County Development Plan 2022-2028 (Kerry CDP 2022-2028). So, while the more stringent 'area of low background noise' criteria have been adopted in this assessment, it may be appropriate to review these criteria in due course.

9.3.5.3 Criteria – Noise from Increased Traffic Flows on Existing Roads during the Operational Phase

The potential increase in noise levels resulting from changes to road traffic flows during the operational phase have been determined in accordance with the NRA Guidelines which refer to the CRTN methodology.

The CRTN methodology is not accurate for very low traffic flows (below 1000 AAWT,18hr). Where flows of this magnitude are predicted, the NAC prediction method detailed in the document A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq} has been used.

The only Irish guidance which discusses criteria for road traffic noise is the NRA guidelines, which identifies a criterion of 60 dB L_{den}.

This guidance is identified as applicable to new road schemes only. However, it may be considered applicable to this scheme given the absence of other guidance and the fact that the impact of increased road traffic noise from existing roads may be considered subjectively similar to road traffic noise from a new road link.

The impact of operational phase traffic can also be assessed in accordance with the short-term and long-term criteria provided in the Highways England Design Manual for Roads and Bridges LA111 Noise and vibration document (2020). This document does not cover Ireland; however, it has historically been used to assess this aspect.

LA111 presents criteria in terms of the change in noise level in the short-term (year of opening) and long term (typically 15 years after opening) The criteria are given in **Table 9.10** and **Table 9.11**.

Table 9.10: Magnitude of Impact – Operational Phase Traffic – Short-Term

Change in Sound Level ($L_{A10,18hr}$ dB)	Magnitude of Impact (Short-Term)
-0	No Change
0.1 to 0.9	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
5+	Major

Source: Design Manual for Roads and Bridges LA111 Noise and vibration (Highways England, 2020)

Table 9.11: Magnitude of Impact – Operational Phase Traffic – Long-Term

Change in Sound Level ($L_{A10,18hr}$ dB)	Magnitude of Impact (Long-Term)
-0	No Change
<3.0	Negligible
3.0 to 4.9	Minor
5.0 to 9.9	Moderate
10+	Major

Source: Design Manual for Roads and Bridges LA111 Noise and vibration (Highways England, 2020)

The assessment refers to both sets of criteria.

9.3.5.4 Operational Phase SAC and other Ecological Receptors

The impacts of operational phase noise emissions on the SAC and other ecological receptors are discussed in **Chapter 07B** (Terrestrial Ecology).

9.3.6 Limitations and Assumptions

The following limitations and assumptions apply to the assessment:

- The sound levels measured during the acoustic survey are representative of the baseline acoustic environment generally.
- Prior to construction start, a commercial tendering process will be held to supply the Power Plant. The tendering process will result in a contract for a particular model of power plant. Therefore, the precise size, configuration, performance, and layout of the equipment will be finalized following the

award of the contract. For the purposes of this planning application and EIAR, consideration of environmental impacts is on the basis of the largest anticipated size of Power Plant envisaged while accommodating equipment from the handful of major equipment suppliers capable of providing this type of generation equipment.

- The calculated sound levels presented in the report have been established using CadnaA 3D sound modelling software which adopts the calculation methodologies detailed in ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation, BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites and the Department of Transport Welsh Office document Calculation of Road Traffic Noise. The assessment is therefore subject to the assumptions and limitations detailed within these standards.

9.4 Baseline Environment

9.4.1 Baseline Measurements

Three long-term acoustic surveys were carried out in and around the Site to determine baseline levels: between 14th and 18th February 2020, between 20th and 28th October 2020 and between 27th November and 11th December 2020. All surveys were conducted in accordance with BS 7445-1:2003 Description and measurement of environmental noise Guide to quantities and procedures.

The three surveys were conducted to ensure sufficient data was collected during weather conditions suitable for measurement. The measurement locations used during the surveys are shown in **Figure F9.1**, Volume 3.

The existing acoustic environment is rural in nature. Sound sources identified included birdsong, farm animals and weather induced sound (e.g. the wind 'rustling' vegetation). Some intermittent road traffic sound was present, mainly from the L1010 road.

The results of the long-term measurement surveys, excluding measurements affected by adverse weather[1] are given in **Table 9.12**.

Table 9.12: Measured Baseline Levels

Date	Period	$L_{Aeq,T}$ (dB)	$L_{A90,15min}$ (modal) (dB)
04.02.20	Day	-	-
	Evening	32	23
	Night	30	23
05.02.20	Day	36	29
	Evening	31	22
	Night	25	23
20.10.20	Day	-	-
	Evening	-	-

[1] Defined as windspeeds greater than 5 m/s and/or precipitation. Weather data obtained from: https://www.met.ie/climate/available-data/historical-data. Data for Shannon airport was used as this was the most representative location where hourly data was available. Only results where acceptable weather was present for the full period (i.e. day, evening or night) are presented and used in the assessment.

Date	Period	$L_{Aeq,T}$ (dB)	$L_{A90,15min}$ (modal) (dB)
	Night	42	34
21.10.20	Day	-	-
	Evening	44	41
	Night	43	40
22.10.20	Day	49	39
	Evening	-	-
	Night	-	-
27.11.20	Day	-	-
	Evening	33	29
	Night	41	38
28.11.20	Day	42	38
	Evening	40	36
	Night	36	29
29.11.20	Day	42	28
	Evening	27	21
	Night	43	35
30.11.20	Day	56	51
	Evening	43	43
	Night	-	-
01.12.20	Day	47	35
	Evening	52	45
	Night	-	-
02.12.20	Day	68	46
	Evening	-	-
	Night	-	-
03.12.20	Day	-	-
	Evening	37	34
	Night	-	-
06.12.20	Day	45	33
	Evening	37	35
	Night	41	39
07.12.20	Day	37	27
	Evening	42	34
	Night	-	-
08.12.20	Day	-	-
	Evening	48	41
	Night	32	30

In addition to the long-term survey, concurrent short term attended measurements were taken at three locations in proximity to nearby sensitive receptor positions during the February 2020 survey. The measurement locations are also shown in **Figure F9.1**, Volume 3. The results of the measurements are presented in **Table 9.13**.

Table 9.13: Short-Term Attended Measurements

Location	Date	Period	Time	$L_{Aeq,T}$ (dB)	$L_{A90,15min}$ (dB) (Range)
ST1	04.02.20	Day	1500-1600	57	28 – 31
	04.02.20	Night-time	2300-2330	46	24-25
ST2	04.02.20	Day	1500-1600	57	26 – 30
	04.02.20	Night-time	2345-0015	46	24-25
ST3	05.02.20	Day	1015-1115	59	37-38
	05.02.20	Night-time	0040-0110	28	23

It can be seen from a comparison of the long-term and short-term data that average sound levels ($L_{Aeq,T}$) are generally higher in proximity to the receptor positions than at the long-term monitoring location. This is likely due to the receptors being closer to the L1010 road than the long-term monitoring location. Background sound levels ($L_{A90,T}$) are similar to or slightly lower than the background levels measured at the long-term monitoring location.

This baseline data is only used to derive the relevant criteria to be used for assessing. In **Section 9.7.5.1** it is noted that the most stringent criteria possible was selected. *i.e.* any change in baseline conditions could not result in a more onerous criteria.

9.4.2 Existing Receptors

The location of the nearest noise sensitive receptor locations to the Site are shown in **Figure F9.1**, Volume 3.

9.5 Characteristics of the Proposed Development

Sound and vibration emissions from the proposed development will occur in three distinct phases: construction, operation and decommissioning.

The construction phase is expected to last approximately 32-months. During this period sound and vibration levels are expected to vary depending on the work being carried out.

Sound levels will be highest during the initial enabling phase whilst louder activities such as earthworks take place. As the construction phase develops, sound levels are expected to reduce as less noisy works (plant installation, internal works within structures) take over.

Vibration levels are expected to be highest during blasting operations, however these will be carefully managed. No more than one blast is envisaged to occur in any given day and associated noise and vibration levels will be transient and very short lived.

Sound levels during the operational phase will be caused principally by mechanical plant such as the open cycle gas turbines. Intermittent sound from movement and operation of vehicles is also expected. Noise emissions during the operational phase will be subject to stringent limits, particularly during the

night-time. Sound emissions are expected to be low level and present no distinctive characteristics such as tonality or impulsiveness. If these characteristics do occur, more stringent limits will apply.

As outlined in **Chapter 02** (Description of the Proposed Development), in the event of decommissioning, measures would be undertaken by the Applicant to ensure that there would be no significant, negative environmental effects during the decommissioning phase. Examples of the measures that will be implemented are outlined in Section 2.10, **Chapter 02**. As a result, additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase.

9.6 Embedded Mitigation

The Proposed Development includes topographical changes, specifically a reduction in ground heights such that power plant (and associated noise sources) are recessed into the existing terrain. This reduction in ground height means that noise sensitive receptors in the vicinity of the Proposed Development will be acoustically shielded from noise emissions associated with the Proposed Development and, as such, subject to lower noise levels than they would be otherwise.

9.7 Assessment of Impact and Effect

9.7.1 Construction Phase – Site Operations

By comparison of the measured baseline levels presented in **Table 9.12** and **Table 9.13** and the threshold values presented in **Table 9.4** the Site is classified as 'Category A' with regard the ABC criteria presented in BS5228.

Category A BS5228 criteria are more stringent than the NRA guideline limits presented in **Table 9.3** and therefore have been adopted for this assessment.

Details of the proposed construction programme are based upon information provided by an experienced power plant construction contractor for a similar and comparable scheme. The proposed construction programme was also checked by Black & Veatch who are also a global engineering, procurement, consulting and construction company specializing in infrastructure development. The construction working hours will take place between the hours of 07:30 to 18:00 (Monday to Friday) and 08:00 to 14:00 (Saturday). No works will take place on Sundays or Bank Holidays.

Therefore, only the daytime and weekend noise limits apply. If construction works are required to take place outside of these times, this will be agreed in advance with the prior agreement of Kerry Co. Co., and subject to communication with the local community.

The criteria adopted for the assessment are presented in **Table 9.14**. The criteria apply at one metre from the façade of sensitive receptor positions.

Table 9.14: Construction Noise Criteria

Period	Time	Criteria
Monday to Friday	07:30 – 18:00	65 dB $L_{Aeq,10.5hr}$[1]
Saturday	08:00 – 13:00	65 dB $L_{Aeq,5hr}$[1]
Saturday	13:00 – 14:00	55 dB $L_{Aeq,1hr}$[1]

1. Criteria time periods chosen to align with working hours

The construction programme is understood to last approximately 32 months, comprising four sections as detailed in **Table 9.15**. The dates presented are understood to be indicative at this stage.

Table 9.15: Construction Programme

Area	Start Onsite	Completion
Enabling, Earthworks & Site Preparation	January 2026	October 2026
220 kV and medium voltage (10 / 20 kV) connections[2]	August 2026	September 2027
CCGT - 2 Blocks	October 2026	June 2028
CCGT - 1 Block	March 2027	August 2028

Two scenarios have been considered, both of which are expected to take place during the 'Enabling, Earthworks and Site Preparation' period:

Two scenarios have been considered:

- 'Peak 1' around June / July 2026 when site clearance, enabling works and heavy civil engineering operations related to the Power Plant are expected to occur concurrently.
- 'Peak 2' around May 2026 - September 2027 when CSA, mechanical and electrical works are to be carried out.

These peaks represent the worst case (*i.e.* highest) construction phase noise emissions. Noise levels at all other times will be lower.

In addition to the above, the Site will be served by light vehicle movement and lorry movements. It has been assumed that a total of 105 No. vehicles per hour will be travelling in and out of the construction Site and a total of nine (9 no.) lorries per hour will be travelling in and out of the Site. Noise from these vehicle movements have been factored into the noise model.

Sound power levels for each plant item present have subsequently been assigned from archive data presented in BS5228. The plant and associated sound levels for Peak One are presented in **Table 9.16** The plant and associated sound levels for Peak Two are presented in **Table 9.17.**

Peak One construction activities take place in two distinct areas; the main construction Site (around the footprint of the Proposed Development) and the associated access road. The percentage on time for equipment used at both locations concurrently are presented separately. Peak Two construction activities only take place within the main construction Site. Therefore, no distinction is required.

[2] While the 220 kV and medium voltage (10 / 20 kV) connections are outside the Proposed Development, number and traffic from their construction is included in this EIAR. This includes the associated onsite Eirgrid 220 kV and ESBN 20 kV substations.

Table 9.16: 'Peak 1' Plant and Associated Sound Pressure Levels – Main Construction and Access Road

Plant Item	No.	% on time	% on time for associated road works	BS5228 reference	Octave Band Sound Pressure Levels (dB)								$L_{Aeq,T}$ 10m dBA	L_w dB(A)
					63	125	250	500	1k	2k	4k	8k		
45T Tracked Excavator w breaker	2	100	25	C.9.6	95	93	89	89	86	82	76	74	91	119
30T Tracked Excavator	2	100	30	C.2.16	72	71	74	73	69	66	63	58	75	103
30T Tracked Excavator w breaker	5	100	20	C.9.11	91	89	85	89	87	87	84	80	93	121
90T Semi Mobile Crusher	1	100	30	C.9.14	91	91	88	87	85	83	78	68	90	118
30T Dump Trucks	8	100	30	C.2.31	86	79	79	79	79	84	69	60	87	115
D8 (36T) Dozer	2	100	30	C.6.30	79	87	79	78	82	80	73	66	86	114
D9 (50T) Dozer	1	100	30	C.6.28	80	84	76	77	79	81	69	59	85	113
16T Rollers	2	100	40	C.2.38	80	75	77	72	67	62	54	46	73	101
50T Loading Shovel	1	100	40	C.9.8	89	87	84	82	81	81	72	65	86	114
Road Grader (&Tipper)	1	100	30	C.6.31	88	87	83	79	84	78	74	65	86	114
Teleporter (Diesel)	1	100	-	C.2.35	85	79	69	67	64	62	56	47	71	99
14T Track Machine	1	100	-	C.2.25	77	65	67	67	63	61	57	47	69	97
80T Mobile Crane	1	100	-	C.5.37	85	73	67	71	72	69	63	56	76	104
9T Site Dumper	1	100	-	C.4.4	82	76	75	74	68	68	64	55	76	104
26T Fuel Tanker	1	100	-	C.4.16	75	70	67	67	69	66	60	53	72	100
Concrete Truck	1	100	-	C.4.28	79	80	73	72	69	68	59	53	75	103
Poker Vibrator	1	100	-	C.4.33	82	80	80	73	69	72	70	65	78	106
MEWP - Boom (Diesel)	1	100	-	C.4.57	78	76	62	63	60	59	58	49	67	95
Con Saw	2	100	-	C.4.70	72	89	81	80	80	82	86	85	91	119
Generator (Diesel)	1	100	-	C.4.82	64	61	59	53	49	47	42	35	56	84
Generator (Diesel)	3	100	-	C.4.85	69	69	67	60	59	60	56	53	66	94
Water Pump	1	100	-	C.4.88	70	65	66	64	64	63	56	46	68	96
3T Track machine w Breaker	1	100	-	C.5.2	79	75	73	74	77	77	75	70	83	111

Plant Item	No.	% on time	% on time for associated road works	BS5228 reference	Octave Band Sound Pressure Levels (dB)								$L_{Aeq,T}$ 10m dBA	L_w dB(A)
					63	125	250	500	1k	2k	4k	8k		
Kango Hammer	2	100	-	C.5.3	82	75	73	68	63	67	80	69	82	110
3T Roller	1	100	-	C.5.27	85	70	62	62	61	59	53	45	67	95
Whacker Plate	1	100	-	C.5.29	76	78	74	77	77	77	73	70	82	110
Skilsaw	2	100	-	C.4.72	69	75	77	74	71	70	74	69	79	107
Drills	4	100	-	C.2.44	67	80	74	72	72	72	68	61	77	105

Table 9.17: 'Peak 2' Plant and Associated Sound Pressure Levels

Plant Item	No.	% on time	BS5228 ref	Octave Band Sound Pressure Levels (dB)								$L_{Aeq,T}$ 10m dBA	L_w dB(A)
				63	125	250	500	1k	2k	4k	8k		
Teleporter Diesel	6	100	C.4.54	79	73	66	65	78	66	54	47	79	107
Teleporter 360	2	100	C.4.54	79	73	66	65	78	66	54	47	79	107
Consaws	6	100	C.4.70	72	89	81	80	80	82	86	85	91	119
Poker Vibrators	6	100	C.4.33	82	80	80	73	69	72	70	65	78	106
Skilsaws	6	100	C.4.72	69	75	77	74	71	70	74	69	79	107
Concrete Trucks	10	100	C.4.28	79	80	73	72	69	68	59	53	75	103
Concrete Pumps	2	100	C.4.24	69	64	64	66	63	59	53	47	67	95
20T Tracked Excavator	4	100	C.10.2	82	75	72	73	71	70	66	58	76	104
14T Tracked Excavator	2	100	C.6.12	84	74	71	71	68	66	61	55	74	102
5T Tracked Excavator	4	100	C.4.67	87	79	76	70	68	64	57	48	74	102
3T Tracked Excavator	2	100	C.4.68	71	71	66	59	59	58	54	48	65	93
9T Site Dumpers	6	100	C.4.4	82	76	75	74	68	68	64	55	76	104
100T Mobile Crane	6	100	C.4.39	87	82	78	74	71	67	60	52	77	105
MEWP Booms	16	100	C.4.57	78	76	62	63	60	59	58	49	67	95
MEWP Scissor Lifts (Diesel)	8	100	C.4.59	80	77	74	74	74	71	65	63	78	106
Kango Hammers	6	100	C.5.6	90	79	75	78	78	83	91	92	95	123
Impact Guns	6	100	C.4.69	75	74	75	72	74	75	80	80	85	113
8kVA Generator Diesel	6	100	C.4.85	69	69	67	60	59	60	56	53	66	94
Water Pumps	2	100	C.4.88	70	65	66	64	64	63	56	46	68	96
Hilti Nail Guns	4	100	C.4.95	63	65	65	66	65	69	64	61	73	101

To determine the impact of construction noise on existing receptors in the area, a 3D sound model was constructed using CadnaA 2023 acoustic modelling software. The inputs to the model are as follows:

- Topographical information for the Site and surrounds from Ordnance Survey Ireland.
- Vector mapping data from Ordnance Survey Ireland.
- Site location and layout drawing provided by Black and Veatch.
- Plant sound power data as provided for the similar and comparable.

The following assumptions were made:

- Construction noise sources were input at a height 1.5 m from the existing ground level (ignoring the potential acoustic screening provided by proposed topographical changes).
- Construction noise sources input as a spatially averaged area source extending over the construction Site.
- Ground absorption is assumed to be 'acoustically soft' as defined in BS5228. Water, the Proposed Development footprint, and roads are assumed to be acoustically hard / reflective.
- It is likely that a number of the Peak 2 sources would be used internally or in locations screened from nearby receptors by newly constructed structures. For robustness, no attenuation provided by this screening has been included in the predictions.

Full details of the sound modelling and associated noise maps are given in **Appendix A9.2,** Volume 4 and **Figures F9.2** through to **F9.4**, Volume 3. The results of the construction noise emission predictions are summarised in **Table 9.18**.

Table 9.18: Calculated Construction Noise Levels – Daytime

Receptor Position	Calculated Peak 1 Sound Pressure Level ($L_{Aeq,T}$)	Calculated Peak 2 Sound Pressure Level ($L_{Aeq,T}$)	Criteria	Below Criteria?
R1	60	57	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	N
R2	56	52	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	Y
R3	64	58	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	N
R4	61	59	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	N
R5	57	58	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	N
R6	51	50	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y
			55 dB $L_{Aeq,1hr\ Sat\ 1300\text{-}1400}$	Y
R7	56	55	65 dB $L_{Aeq,10.5hr\ Mon\text{-}Fri}$	Y
			65 dB $L_{Aeq,5hr\ Sat\ 0800\text{-}1300}$	Y

Receptor Position	Calculated Peak 1 Sound Pressure Level ($L_{Aeq,T}$)	Calculated Peak 2 Sound Pressure Level ($L_{Aeq,T}$)	Criteria	Below Criteria?
			55 dB $L_{Aeq,1hr\ Sat\ 1300-1400}$	Y

It can be seen the above that construction sound levels are below the criteria at all identified receptors during all periods, except for Saturdays where there is a predicted exceedance between 13:00 and 14:00. Exceedances during this period will be avoided through the careful scheduling of works.

Based on the above, before mitigation, a **Negative, Not Significant, Short-Term** effect is expected as a result of construction phase sound levels generated by onsite activities.

9.7.2 Construction Phase – Vibration

Vibration-generating equipment associated with the construction phase are the 16T Vibratory rollers used during Peak 1; none of the other plant items proposed for use are expected to generate significant levels of groundborne vibration.

The rollers are understood to only operate at a distance of 80 m or greater from nearby receptor positions. At distances of greater than 80 m, no adverse impact it expected to occur due to the attenuation of vibration levels with distance.

It is not envisaged that any other of the proposed construction activities are likely to generate vibration levels, with the exception of blasting activities which are discussed separately in **Section 9.7.3.2**.

Based on the above, a **Negative, Imperceptible, Short-Term** effect is expected as a result of construction phase vibration.

9.7.3 Construction Phase – Blasting

9.7.3.1 Noise and Air Overpressure

It is expected that blasting would be required to excavate rock which cannot be removed by equipment mounted on tracked excavators. It is understood that only single blasts will take place and only during the enabling phase.

With regards the prediction of air overpressure, BS6472 states:

> *Accurate prediction of air overpressure is almost impossible due to the variable effects of the prevailing weather conditions and the large distances often involved.*
> *Control of air overpressure should always be by its minimization at source through appropriate blast design.*

Without mitigation, is it likely that noise and air overpressure will give rise to a **Negative, Significant, Momentary** effect.

9.7.3.2 Vibration

It is expected that blasting would be required to excavate some of the rock, which cannot be removed by rock breaking equipment mounted on tracked excavators.

Without mitigation, blasting induced vibration has the potential to give rise to **Negative, Significant, Momentary** effects.

9.7.4 Construction Phase – Traffic on Existing Roads

The traffic flows on the surrounding road network with and without construction traffic are presented in **Table 9.19.**

Table 9.19: Construction Phase Traffic

Link Number	Link Name	2027 without Construction Traffic		2027 with Construction Traffic	
		AAWT,18hr	% HGV	AAWT,18hr	% HGV
1	L1010 Ballylongford	875	4.1%	875	4.1%
2	L1010 (to Tarbert)	2052	3.8%	3,482	9.2%
3	N67 towards ferry	1977	8.7%	2,043	8.7%
4	Bridewell Street	5499	5.6%	6,863	7.9%
5	N69 (to Limerick)	5221	6.6%	6,230	8.4%
6	N69 (to Listowel)	4959	6.2%	5,314	6.9%
7	R551	2533	4.1%	2,533	4.1%

Calculations have been carried out in accordance with the Basic Noise Level methodology presented in CRTN to determine the change in road traffic noise levels resulting from these changes in flows.

The CRTN methodology is not accurate for very low traffic flows (below 1000 AAWT,18hr). Where flows of this magnitude are predicted, the Noise Advisory Council method has been used.

The results of these calculations alongside the associated magnitude of impact are presented in **Table 9.20**.

Table 9.20: Change in Road Traffic Noise Level Resulting from Construction Traffic

Link	Change in Noise Level	Magnitude of Impact
1	0.0	No Change
2	3.9	Moderate
3	0.2	Negligible
4	1.5	Minor
5	1.1	Minor
6	0.4	Negligible
7	0.0	No Change

It can be seen from the above that minor, negligible or no-change increase is expected on the majority link during the construction phase, except for Link 2 (L1010 road – Site entrance to Tarbert) where a moderate increase is predicted.

This impact is limited to the relatively small number of noise sensitive properties located along this stretch of existing road.

The following contextual factors should be borne in mind when considering this impact:

- The absolute noise levels from Link 2 with and without construction traffic are low. Noise levels from this road, inclusive of construction traffic, are expected to be in the vicinity of 57 dB

$L_{Aeq,16hr}$ at 10 m from the roadside. This is not a particularly high noise level and therefore the impact of the change in noise level may be less than indicated.

- It is understood that Link 2 would be resurfaced prior to the commencement of the Proposed Development. This may assist in reducing noise levels (e.g. by removing potholes, roughness etc.). However, it is not possible to quantify this change.

Based on the above noise from construction traffic on existing roads will give rise to a **Negative, Significant, Short-Term** effect, but this will only occur in a limited area for a limited duration**.**

9.7.5 Operational Phase – Site Operations

9.7.5.1 Criteria

The assessment evaluates potential adverse impact from sound emissions using criteria derived from existing baseline noise levels ($L_{A90,T}$) around the Site as they exist currently.

Analysis of the measured baseline levels presented in **Table 9.12** and **Table 9.13** indicate there is variance in prevailing background sound levels; some survey periods indicate the Site would be classed as an area of low background noise (As defined in NG4), whereas other periods indicate otherwise.

Furthermore, it is possible that the acoustic character of the area may change in the future due to the area being zoned for marine-related industry as part of the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary which is supported by Kerry Co. Co. as identified in the Kerry CDP 2022-2028.

To assess the impact of the Proposed Development with regard to operational noise, the more stringent 'area of low background noise' criteria have been adopted. The adopted criteria are presented in **Table 9.21**.

Table 9.21: Operational Phase Noise Criteria

Location	Daytime Noise Criterion dB $L_{ar,T}$ (0700 to 1900 hours)	Evening Noise Criterion dB $L_{ar,T}$ (1900 to 2300 hours)	Night-time Noise Criterion dB $L_{ar,T}$ (2300 to 0700 hours)
Areas of Low Background Noise	45 dB	40 dB	35 dB

Site operations are of a 24/7 nature therefore the most stringent noise criterion of 35 dB $L_{ar,T}$ for the night-time at the nearest sensitive receptor location has been adopted. Compliance with this night-time criterion will therefore ensure compliance with the higher criteria for daytime and evening periods.

For the purposes of the noise assessment, the Proposed Development is considered in two parts:

- Power Plant.
- Above Ground Installation (AGI).

These are discussed in turn below.

9.7.5.2 Power Plant

Prior to construction start, a commercial tendering process will be held to supply the Power Plant. The tendering process will result in a contract for a particular model of power plant. Therefore, the precise size, configuration, performance, and layout of the equipment will be finalized following the award of

the contract, however this will not affect the design of the buildings or emissions as described in this EIAR.

Indicative details of the noise generating mechanical plant associated with the Power Plant have been provided by the Applicant and the Project Engineers (Black and Veatch). They are detailed in **Table 9.22**.

Table 9.22: Power Plant Sound Levels

Plant	QTY	SPL/L_w	Sound Pressure / Power Levels dB(A)									
			31.5	63	125	250	500	1K	2K	4K	8K	Total
Air Intake Filter House	6	L_w	77	91	96	97	91	89	86	94	88	**102**
GT Enclosure Vent Outlet Fans	6	L_w	65	78	91	98	102	100	95	87	78	**106**
GT Enclosure Vent Outlet	6	L_w	64	57	55	55	51	44	38	31	18	**66**
Generator 2-p 50 Hz	6	L_w	-	65	100	106	107	106	103	100	90	**112**
Generator Cooling Inlet (air cooled)	6	L_w	70	82	90	94	99	98	99	96	88	**105**
Generator Cooling Outlet (air cooled)	6	L_w	66	75	91	83	86	85	88	84	78	**95**
Exhaust Duct	6	L_w	81	91	98	91	86	83	86	85	87	**100**
Oil Mist Outlet	9	L_w	45	59	68	72	78	79	72	64	56	**83**
Stack Outlet	6	L_w	83	89	105	106	109	116	110	99	79	**118**
HRSG Total (Duct + Body)	6	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Steam Turbine	3	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Air Cooled Condenser Fans (12 fans per unit)	3	SPL at 100 metres	20	34	41	42	46	45	38	33	24	**50**
ST Gland Steam Condenser	3	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Duct Burner Skid	6	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
CT GSU Transformer	3	SPL at 2 metre	-	37	67	51	57	60	56	56	52	**70**
BESS Step Up transformer	1	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
CT Auxiliary Transformer	6	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Boiler feed pumps & motors	12	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 92**
LP Recirculation Pumps	6	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Closed Cycle Cooling Water Pumps	6	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Closed Cycle Cooling Water Fin-Fan Coolers (24 per unit)	3	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Steam Jet Air Ejectors units	3	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**

Plant	QTY	SPL/L_w	Sound Pressure / Power Levels dB(A)									
			31.5	63	125	250	500	1K	2K	4K	8K	Total
Vacuum Pumps	3	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Condensate Pumps	9	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Aux Boiler Components	1	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Aux Boiler Stack Discharge	1	L_w	-	-	-	-	-	-	-	-	-	**110**
Other pumps, valves, blowers, etc.	--	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**
Sewage Treatment Package	1[1]	SPL at 1 metre	-	-	-	-	-	-	-	-	-	**≤ 85**

1. Does not include standby units present.

A number of the plant items listed above are to be housed within the proposed turbine halls which are to be constructed from ~100 mm vertical profiled modular steel cladding. This cladding is assumed to be similar to the Kingspan KS1000RW cladding panels and will be lined with 18 mm cement board (or similar) if / where required to reduce noise emissions. This will be determined via prediction once details of the specific plant items to be installed are known.

The facade sound insulation performance used for the assessment is detailed in **Table 9.23**.

Table 9.23: Sound Insulation Performance of Turbine Hall Facades

Source	R,w (dB)								
	63	125	250	500	1K	2K	4K	8K	Total (dB Rw)
Facade Sound Insulation	22	26	30	33	29	32	47	-	**32**

The locations of these plant items are indicated on drawing reference 198291-1GSU-G2001 and 198291-1GSU-G2002, submitted with this application.

In addition, there are noise sources which would operate intermittently. These intermittent sources are:

- Firewater Pumps: 85 dB $L_{Aeq,T}$ at 1 metre.
- Firewater Jockey Pumps: 85 dB $L_{Aeq,T}$ at 1 metre.

These sources only operate during emergency conditions and for testing. The pumps will be tested once a day for approximately 30 minutes. This will only occur during the daytime. They have not been included in the assessment.

9.7.5.3 Above Ground Installation

It is understood that noise generating plant associated with the Above Ground Installation (AGI) comprises the following:

- Package Boiler Units.
- Gas Fired Generator.

- Pressure Regulating Stream.

9.7.5.4 Assessment

To determine the potential noise impact of the Proposed Development on the noise sensitive receptor locations identified, all of the noise sources identified above were input into the 3D sound model discussed in **Section 9.7**. Details of the sound modelling methodology is given in **Appendix A9.2**, Volume 4 with noise maps given in **Figures F9.2** through **F9.5**, Volume 3.

The following modelling approaches were adopted:

- Ground absorption is assumed to be 'acoustically soft' as defined in *ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors - Part 2: General method of calculation*. Areas of water, the Proposed Development footprint and roads assumed to be acoustically hard / reflective.
- As a conservative approach, it is assumed that all sound sources identified as not exceeding a given sound pressure / power level would emit a level equal to the defined limit.
- Where spectral data was not available for certain sources, the sound power / pressure level has been input in the 500 Hz band.
- It is assumed that sound pressure levels within the turbine hall would not exceed 85 dB $L_{Aeq,T}$ at the internal perimeter (*i.e.* incident on the inner face of the façade walls). It was confirmed with Black and Veatch that this limit would be adopted at the detailed design stage and, if this limit proves unachievable in certain areas, the façade walls of the turbine halls could be acoustically upgraded (above the levels presented in **Table 9.23**) such that the external emissions remain the same.
- Where sound pressure level input data has been provided for external sources of small dimension (condensate pumps, vacuum pumps, steam jet air injectors, closed cycle cooling water pumps, oil mist outlet and control valves), the sound power levels have been calculated assuming hemispherical propagation over a reflective plane. The same approach has been applied to the various exhausts and intake / discharge points associated with the Proposed Development. These sources have been input as point sources within the 3D model.
- Where sound pressure level input data has been provided for larger external sound sources (e.g. Transformers), sound power levels have been calculated in accordance with the methodology detailed in *BS EN ISO 3746:2010 Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane* (ISO 3746:2010). It is assumed that the sound pressure level provided is representative of all measurement positions. These sources have been input as area sources within the 3D model.
- Sound sources within the AGI are to be designed to not exceed a cumulative level of 45 dB $L_{Aeq,T}$ at the boundary. Sound sources from this area of the Proposed Development were input as an area source at a height of two metres set one metre in from the boundary of the AGI and calibrated within the model to result in a sound level of 45 dB $L_{Aeq,T}$ at the boundary.

Section 5 of NG4 details the assessment of noise sources with tonal or impulsive elements and the appropriate penalties / corrections to apply where sources present these characteristics. In this instance, it is assumed that all sources can be designed such that they do not present tonal or impulsive characteristics at the location of nearby receptor positions. Therefore, no corrections have been applied. This has been discussed with Black and Veatch and it was confirmed this was a reasonable assumption.

The 3D sound model was used to calculate operational phase sound pressure levels at the various receptor locations identified. Calculations were carried out in with the Power Plant operational. The results of the modelling calculations are presented in **Table 9.24**.

Table 9.24: Operational Sound Levels - Unmitigated

Receptor	Criterion ($L_{Ar,T}$)	Predicted Level ($L_{Ar,T}$)	Compliant? (Y/ N)
R1	35 dB	59	N
R2	35 dB	53	N
R3	35 dB	54	N
R4	35 dB	53	N
R5	35 dB	53	N
R6	35 dB	50	N
R7	35 dB	46	N

Without mitigation, site operations will give rise to a **Negative, Significant, Long-Term** effect.

9.7.6 Operational Phase – Traffic on Existing Roads

The traffic flows on the surrounding road network with and without construction traffic are presented in **Table 9.25**.

Table 9.25: Operational Phase Traffic Flows

Link No	Link Name	2028 Without Development		2028 With Development		2043 With Development	
		AAWT,18hr	% HGV	AAWT,18hr	% HGV	AAWT,18hr	% HGV
1	L1010 Ballylongford	885	4.1%	885	4.1%	903	4.1%
2	L1010 (to Tarbert)	2075	3.8%	2,190	3.9%	2,233	3.9%
3	N67 towards ferry	1999	8.7%	2,004	8.7%	2,046	8.7%
4	Bridewell Street	5560	5.6%	5,670	5.6%	5,784	5.6%
5	N69 (to Limerick)	5279	6.6%	5,360	6.6%	5,469	6.6%
6	N69 (to Listowel)	5014	6.2%	5,043	6.2%	5,146	6.2%
7	R551	2561	4.1%	2,561	4.1%	2,613	4.1%

Calculations have been carried out in accordance with the Basic Noise Level methodology presented in CRTN to determine the change in road traffic noise levels resulting from changes in flows. The results of these calculations alongside the associated magnitude of impact are presented in **Table 9.26.**

Table 9.26: Change in Road Traffic Noise Level Resulting from Operational Traffic

Link	Short Term Change in Noise Level	Short Term Magnitude of Impact	Long Term Change in Noise Level	Long Term Magnitude of Impact
1	0.0 dB	No Change	0.1 dB	Negligible
2	0.3 dB	Negligible	0.4 dB	Negligible
3	0.0 dB	No Change	0.1 dB	Negligible
4	0.1 dB	Negligible	0.2 dB	Negligible
5	0.1 dB	Negligible	0.1 dB	Negligible
6	0.0 dB	No Change	0.1 dB	Negligible
7	0.0 dB	No Change	0.1 dB	Negligible

It can be seen from the above that all increases in road traffic noise during the operational phase are **Negligible**.

Without mitigation, noise from operational phase traffic on the existing road network to give rise to **Negative, Not Significant, Long-Term** effect.

9.8 Mitigation and Monitoring Measures

9.8.1 Construction Phase

9.8.1.1 Construction Phase – Site Operations and Vibration

The assessment of construction noise and vibration detailed above indicates no adverse effects. Nonetheless, to ensure sound and vibration levels are kept to a minimum and to reduce the risk of cumulative impacts, it is recommended that the following measures are adopted during the construction phase:

- Good community relations shall be established and maintained throughout the construction process. This shall include informing residents on progress and ensuring measures are put in place to minimise noise and vibration impacts.
- Fixed and semi-fixed ancillary plant such as generators, compressors and pumps shall be located away from sensitive receptors wherever possible.
- All plant used onsite shall be regularly maintained, paying attention to the integrity of silencers and acoustic enclosures.
- All noise generating construction plant shall be shut down when not in use.
- The loading and unloading of materials shall take place away from residential properties, ideally in locations which are acoustically screened.
- Materials shall be handled with care and placed rather than dropped where possible. Drop heights of materials from lorries and other plant shall be kept to a minimum.
- Modern plant shall be selected which complies with the latest European Commission noise emission requirements. Electrical plant items (as opposed to diesel powered plant items) shall be used wherever practicable. All major compressors shall be low noise models fitted with

properly lined and sealed acoustic covers. All ancillary pneumatic percussive tools would be fitted with mufflers or silencers of the type recommended by the manufacturers.

- Site operations and vehicle routes shall be organised to minimise the need for reversing movements, and to take advantage of any natural acoustic screening present in the surrounding topography.
- No employees, subcontractors and persons employed on the site shall cause unnecessary noise from their activities e.g. excessive 'revving' of vehicle engines, music from radios, shouting and general behaviour etc. All staff inductions at the site shall include information on minimising noise and reminding them to be considerate of the nearby residents.
- As far as practicable, noisier activities shall be planned to take place during periods of the day which are generally considered to be less noise sensitive i.e. not particularly early or late in the day.
- Measures shall be put in place to ensure that employees know that minimisation of noise will be important at the Site.
- Blasting vibration limits will be achieved by limiting the Maximum Instantaneous Charge (MIC) based on the results of trial blasts carried out in accordance with the procedure detailed in BS6472. It is noted there may be blasting charge limits imposed as a result of the underwater acoustic assessment. If these limits differ, the more stringent limit of the two will be adopted.

In addition to the above measures, a regime of noise and vibration monitoring will be undertaken during the construction phase to determine compliance with the nominated criteria and to provide a feedback mechanism so that corrective action can be taken in the event of exceedances.

Approximately three to four long-term noise monitoring stations and one to two long-term vibration monitors will be set up on the Site boundary. The exact location of these stations will be determined at detailed design and will be chosen to best represent noise and / or vibration emissions in the direction of nearby receptor positions. Monitoring will continue throughout the entire construction phase, as committed to in the Construction Environmental Management Plan (CEMP).

Long-term noise monitoring stations will be equipped with an SMS and / or email alert system so that site staff can be informed of potential exceedances. The results of the monitoring will be recorded and reported to relevant stakeholders in an appropriate manner and frequency, to be agreed at detailed design. Any noise complaints received during the construction phase will be investigated thoroughly. The results of the investigation, including measured noise and vibration levels at the time of the complaint, onsite activities and any corrective action taken, will also be reported to relevant stakeholders.

With mitigation, construction noise from on-site activities will give rise to a **Negative, Not Significant, Short-Term** effect.

9.8.1.2 Construction Phase - Blasting

Regarding **Section 9.7.3.1**, to mimimise the impact of air overpressure and blasting it is recommended that:

- Blasting is carried out in accordance with the principles set out in bs 5607:2017 code of practice for the safe use of explosives in the construction industry.
- Ensuring appropriate burden to avoid over or under confinement of the charge.
- Accurate setting out and drilling.
- Appropriate charging.
- Appropriate stemming with appropriate material such as sized gravel or stone chippings.
- Using delay detonation to ensure smaller maximum instantaneous charges (mics).
- Using decked charges and in-hole delays.
- Blast monitoring to enable adjustment of subsequent charges.
- Designing each blast to maximize its efficiency and reduce the transmission of vibration.
- Avoiding the use of exposed detonating cord on the surface in order to minimise air overpressure – if detonating cord is to be used in those cases where down-the-hole initiation techniques are not possible, it should be covered with a reasonable thickness of selected overburden.
- A protocol for community relations with regards blasting is adopted such that prior warning of blasting operations is given to members of the public.

Provided the above measures are adopted during the blasting stage of the construction phase, the impact of air overpressure would be minimised as far as practicable.

With regards blasting induced vibration, **Table 9.7** details appropriate criteria. It is understood that no more than one blast per day are envisaged (a prerequisite for the **Table 9.7** criteria to apply).

The blasting vibration limits will be achieved by limiting the Maximum Instantaneous Charge (MIC) used in the blasting process. To determine the MIC for the Site, a number of trial blasts will be carried out such that a site-specific scaled distance graph can be developed. Using this graph, the MIC limit required to achieve the **Table 9.7** criteria can be determined in accordance with the procedure detailed in BS6472.

With mitigation, blasting induced noise, air overpressure and vibration will give rise to a **Negative, Not Significant, Momentary** effect.

9.8.1.3 Construction Phase – Traffic on Existing Roads

There are no practicable mitigation measures possible to address noise from construction traffic on existing roads.

Therefore, the effect of noise from construction traffic on existing roads will remain the same *i.e.* a **Negative, Significant, Short-Term** effect. However, this will only occur in a limited area for a limited duration.

9.8.2 Operational Phase

9.8.2.1 Assessment

In response to the results of the unmitigated noise emissions predictions, a discussion with the wider design team was held and identified the following mitigation requirements.

Table 9.27: Proposed Noise Mitigation Measures

Plant Item	Reduction Required	Form of Mitigation
Air Intake Filter House	13 dB	Silencers
Stack Outlet	35 dB	Silencers / attenuators
CT GSU Transformer	10 dB	Re-specification to a quieter model. An acoustic barrier around the units may also be required.
Closed Cycle Cooling Water Pumps	10 dB	Re-specification to a quieter model.
Closed Cycle Cooling Water Fin-Fan Coolers (24 per unit)	8 dB	Re-specification to larger units allowing the fans to run at lower speeds. An acoustic barrier around the units may also be required.
Aux Boiler Stack Discharge	25 dB	Re-specification to a quieter model and inclusion of an attenuator.
Sewage Treatment Package	5 dB	Re-specification to a quieter model.

The above requirements were discussed and confirmed as technically achievable with Black and Veatch.

It is not clear at this stage whether acoustic barriers and / or enclosures would be required to mitigate noise emissions. To retain flexibility, a seven-metre-high barrier around the Closed Cycle Cooling Water Fin-Fan Coolers and a six-metre-high barrier around the CT GSU Transformer have been included in the 3D sound model and associated planning drawings. Whether these barriers are required and their specific dimensions will be confirmed at the detailed design stage.

The 3D sound model was used to calculate operational phase sound pressure levels at the various receptor positions including the mitigation measures identified in **Table 9.27**. The results of these calculations are presented in **Table 9.28.**

Table 9.28: Operational Sound Levels – Mitigated – Residential Receptors

Receptor	Criterion ($L_{Ar,T}$)	Predicted Level ($L_{Ar,T}$)	Compliant? (Y / N)
R1	35 dB	37	N
R2	35 dB	32	Y
R3	35 dB	31	Y
R4	35 dB	30	Y
R5	35 dB	33	Y
R6	35 dB	27	Y
R7	35 dB	26	Y

It can be seen from **Table 9.28** that, including the mitigation measured detailed in **Table 9.27**, operational phase noise emissions comply with the most stringent criteria at all residential receptor positions, with the exception of a 2 dB exceedance at receptor R1 during the night-time.

However, there are various contextual factors which indicate that this exceedance may not give rise to a significant impact. They are:

- The predicted sound levels are readily compliant with the NG4 daytime and evening criteria at all receptor locations. The predicted levels also comply with the night-time criteria at all other receptors apart from R1.
- A 2 dB exceedance is relatively small. It is often considered difficult to detect a change in sound level of less than 3 dB outside of laboratory conditions. Therefore, the levels predicted at R1 are likely to be subjectively no different from compliant levels.
- A sound level of 37 dB $L_{Ar,T}$ is relatively low, identified in NG4 as comparable to the ambient levels you would expect in an empty bedroom or in a rural setting with no wind.
- As discussed in **Chapter 02** (Description of the Proposed Development) and **Chapter 15** (Climate), the Power Plant will not operate 24/7. Therefore, sound emissions will not be constantly present.
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings defines acceptable internal levels within bedrooms as being 30 dB $L_{Aeq,T}$ during the night-time. It also states that a façade with an open window will provide approximately 15 dB of sound attenuation. On this basis, sound levels from the Proposed Development within the bedrooms of R1 will be 22 dB $L_{Ar,T}$ with windows open and even lower with windows shut.
- With windows shut it is highly likely that sound from the Proposed Development will be inaudible within bedrooms at R1. With windows open sound levels from the Proposed Development will be 8 dB below the BS8233 criterion. It is noted that the BS8233 criterion is applicable to anonymous sources only, however it is used in this context for reference.
- The criteria used are derived from sound level measurements taken in accordance with the weather condition requirements detailed in NG4 (*i.e.* low wind speeds and no rain). However, weather conditions during the survey periods indicate that these weather conditions are not typical for the area. Significantly higher ambient sound levels were measured during periods of wind and/ or rain. If sound levels during periods of wind and rain were factored into baseline levels, a different category of NG4 criteria would apply and the predicted levels would be readily compliant.
- There is indication that the acoustic character of the area may change due to surrounding area being zoned for marine-related industry as part of the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary which is supported by Kerry Co. Co. as identified in the Kerry CDP 2022-2028. If this were to happen, the criteria adopted for the assessment may need further consideration.
- NG4 makes significant reference to the application of Best Available Techniques (BAT). Significant work has been undertaken to reduce noise emissions from the Proposed Development. The mitigation measures and attenuation levels detailed in **Table 9.27** and, in some cases, are at the

limit of what is achievable with current technology. The noise mitigation strategy as currently proposed is considered to be an application of BAT.

- Prior to construction start, a commercial tendering process will be held to supply the Power Plant. The tendering process will result in a contract for a particular model of power plant. Therefore, the precise size, configuration, performance, and layout of the equipment will be finalized following the award of the contract, however this will not affect the design of the buildings or emissions as described in this EIAR. The assessment assumes the largest anticipated size of Power Plant. It is therefore possible that sound levels from the Proposed Development, once specified in detail, will be quieter than indicated in this assessment.

9.8.2.2 Monitoring Regime

Furthermore, compliance with the nominated criteria will be confirmed via long term noise monitoring.

Long-term monitoring will be undertaken for a period of at least 12 months from the commencement of site operations and again following any subsequent substantive change in site operations. After 12 months the need for long-term monitoring will be reviewed with the relevant authority. Indicative monitoring locations are shown in **Figure F9.1**, Volume 3, but may change as more detailed information becomes available.

In addition to the above, short-term attended noise measurements will be taken at or near to the receptor locations identified in this chapter. Measurements will be taken and reported in accordance with the guidance provided in NG4. Short-term measurements will take place at the commencement of site operations and again following any subsequent substantive change in site operations. They will then be repeated no less than once a year. As a minimum, measurements will comprise a 30-minute measurement at each location during the daytime, evening and nighttime (as defined in NG4).

If exceedances of the predicted levels are identified by either the long-term or short-term monitoring, the causes will be thoroughly investigated, and corrective action will be taken.

The Proposed Development will be licensed by the EPA under an Industrial Emissions (IE) licence, the terms and conditions of which are anticipated to be requiring a noise monitoring protocol to be adopted.

With mitigation, operational phase noise emissions will give rise to a **Negative, Not Significant, Long-Term** effect.

9.8.2.3 Operational Phase – Traffic on Existing Roads

Without mitigation, noise from operational phase traffic on the existing road network to give rise to **Negative**, **Not Significant, Long-Term** effect**.** Therefore, no mitigation is required.

9.9 Cumulative Impacts

The developments considered regarding cumulative impacts are listed in **Appendix A1,2, Volume 4.**

Developments within a 5 km radius of the Site are listed below, alongside commentary relating to potential cumulative noise and / or vibration effects. Developments further than 5 km from the Site are not discussed as the intervening distance between the Site and these developments is considered sufficient to mitigate any potential cumulative effects. Planning applications on site are discussed separately below. Similarly, developments which were consented more 5 years ago have also not been

discussed as they are considered to form part of the baseline conditions under which the Proposed Development is considered.

Table 9.29: Developments Considered for Cumulative Impacts

Kerry Co. Co. / ABP Ref. No.	Location	Received Date	Decision Date	Decision	Description	Airborne Noise and Groundborne Vibration Context
18878	Kilpaddoge, Tarbert, Co. Kerry	10.09.2018	23.09.2019	Granted	For a 10-year permission to construct a battery energy storage system (bess) facility on a total site area of up to 0.6 hectares that will provide grid balancing services to the Irish electrical grid. Third Party Appeal to Appeal to ABP (305739-19). ABP granted permission.	This development is located over 3.5 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
19115	Kilpaddoge, Tarbert, Co. Kerry	12.02.2019	07.02.2020	Granted	For a 10-year permission for a grid stabilisation facility comprising of: the construction up to 4 no. rotating stabilisers, 5 no. battery storage containers, 1 no. control room, 2 transformers and ancillary equipment within a site area of approx. 1.46 hectares.	This development is located over 2 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
21549	Kilpaddoge, Tarbert, Co Kerry	25.05.2021	20.08.2021	Granted	Amendment to the above permission.	None.
304807-19	Townlands of Aghanagran Middle, Aghanagran Lower, Ballyline West, Tullahennell South, Ballylongford, Co. Kerry	02.07.2019	06.01.2020	Granted	Construction of a Windfarm consisting of up to 6 Wind Turbines. Previously refused by Kerry County Council (19381).	This development is located over 4 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
VA03.307798	Townland of Carrowdotia South, Co. Clare and Kilpaddoge, Co. Kerry.	30.07.2020	04.06.2021	Granted	Installation of 400 kV electricity transmission cables, extension to the existing Kilpaddoge Electrical Substation and associated works, between the existing Moneypoint 400 kV Electrical Substation in the townland of Carrowdoita South County Clare and existing Kilpaddoge 220/110 kV Electrical Substation in the townland of Kilpaddoge County Kerry. The development includes work in the foreshore.	This development is located over 2 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
308643-20	Meelcon, Carhoona, Farranawana, Tarbert, Doonard upper and lower, Kilpaddoge, Ballyline West, Ballymacasy, Lislaughtin,	11.11.2020	21.06.2021	Granted	Amendment to previous granted permission (304807-19) which related to change in connection grid route for wind farm. Previously refused by Kerry County Council (20/438).	None.

Kerry Co. Co. / ABP Ref. No.	Location	Received Date	Decision Date	Decision	Description	Airborne Noise and Groundborne Vibration Context
	Glamcullare south, Gurteenavallig, Co Kerry					
20850	Kilpaddoge, Tarbert, Co. Kerry	18.09.2020	12.11.2020	Granted	For changes to the previously permitted peaker power plant development (planning ref. 13/138). It is proposed to change the energy source for the charging of the battery energy storage system (BESS) containers from diesel to charging off the national grid and to change the permitted layout for electrical equipment.	None.
23350	Tarbert 220 kV substation, Tarbert Generating Station, Tarbert Island (Townland), Co Kerry	31.03.2023	17.01.2024	Granted	Removal of existing cable joint, bay within Tarbert Generating Station, 220kv switchgear within the existing Tarbert substation compound and associated 220 kV cabling; two no. new lengths of 220 kV underground cabling measuring approximately 340 m each, running between two no. new underground cable joint base in Tarbert Generating Station and the connection point at Tarbert substation; new 220 kV switchgear bay within the existing Tarbert substation compound comprising associated electrical equipment, including cable sealing ends, insulators, over head conductors, surge arrestors, lightning masts and lighting poles.	This development is located over 3.5 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
EE08.315838	Tarbert Power Station, Tarbert, in the townland of Tarbert Island, Co. Kerry	17.02.2023	14.04.2023	Decision of the Minister to approve the proposed development under Section 7 subsection (1)(c) of the Development (Emergency Electricity Generation) Act 2022	The installation and operation of temporary emergency electricity generating plant, to a limit of 500 hours per annum, at the existing Tarbert Power Station.	This development is located over 3.5 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.

Kerry Co. Co. / ABP Ref. No.	Location	Received Date	Decision Date	Decision	Description	Airborne Noise and Groundborne Vibration Context
PA08.318 540	Tarbert Power Station, Tarbert Island, Tarbert, Co. Kerry	28.11.2023	Decision due 05.06.2024	Awaiting	10-year planning permission for the proposed Open Cycle Gas Turbine (OCGT) power plant fuelled by Hydrotreated Vegetable Oil (HVO) and associated site works.	This development is located over 3.5 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
19746	Moneypoint Generating Station, Carrowdotia North, Kilimer Co. Clare.	26.09.2019	20.11.2019	Granted	10-year planning permission for a synchronous condenser and supporting items of plant, with the largest building being c.962 sq.m. and standing c.15 m high.	This development is located over 2 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
20318	Moneypoint Generating Station, Carrowdotia North and Carrowdotia South, Kilimer, Co. Clare.	20.05.2020	16.07.2020	Granted	10-year planning permission for a synchronous condenser, supporting items of plant, with the largest building being c.420 sq.m. and standing c.15m high. Permission also sought to continue the use of the existing underground cable grid connection. This application represents a relocation within Moneypoint of a similar application permitted by Clare County Council under Reg. Ref. P19/746.	This development is located over 2 km from the Proposed Development. Due to the attenuation in noise / vibration levels provided by the intervening distance, no cumulative impact is expected to occur.
2332	Moneypoint Generating Station, Carrowdotia & Carrowdotia South, Kilimer, Co Clare (Eircode V15 R963).	23.01.2023	18.04.2023	Granted	Land based site Investigation (SI) works comprising of boreholes and trial pits across the site.	None.
PA03.319 080	Moneypoint Generating Station, Moneypoint, Co. Clare.	12.02.2024		Awaiting	Proposed transition and conversion of the existing 900 MW electricity generating station from coal to heavy fuel oil and associated ancillary development at Moneypoint Generating Station.	None.

9.9.1 Other Developments at or Near the Site

Developments on or related to the Site which are listed in **Table 9.30**.

Table 9.30: Planning Applications on Site

Planning Reference	Location	Received Date	Decision Date	Decision	Description
02/2292	Reenturk, Tarbert, Co. Kerry	11.09.2002	20.01.2003	Granted	Demolish all existing dwelling houses, outhouses, derelict buildings
PL08.GA0003	townlands of Ralappane, Carhoonakineely, Carhoonakilla, Cockhill, etc.	14.8.2008	17.2.2009	Granted	Permission approved for a gas pipeline to connect Shannon LNG Terminal to the existing natural gas network at Leahy's Co. Limerick.
PL08. DA0003	townlands of Ralappane, Carhoonakineely, Carhoonakilla, Cockhill, etc.	1.8.2008	17.2.2009	Make acquisition order without amendments	Application for an acquisition order for the Shannon LNG Terminal at Tarbert, Co. Kerry to the Bord Gáis Eireann Network at Foynes, County Limerick.

In addition to the table above, the following anticipated developments / applications have been considered:

- **SLNG Gas Pipeline** - Planning permission exists for the development of a 26 km Natural Gas Pipeline which will facilitate connection from the Site to the GNI transmission network at Leahy's, located to the west of Foynes, Co. Limerick. The application was accompanied by an Environmental Impact Statement (EIS). A revised assessment and an updated EIAR of the permitted pipeline will be included within the required future application to CRU for consent under Section 39A of the Gas Act 1976 (as amended).
- **SLNG Strategic Gas Reserve Facility** - The location of the Proposed Development is the subject of a SID pre-application for a Proposed Shannon Technology and Energy Park (STEP) Strategic Gas Reserve Facility (APB-319245-24) comprising of a floating storage and regasification unit (FSRU), jetty and access trestle, onshore receiving facilities, and all ancillary works. A pre-application was submitted to An Bord Pleanála (ABP) on 8th March 2024, and a request for a pre-application consultation meeting is pending from the Board.
- **Data Centre Campus** - As part of the Masterplan for the Site, a Data Centre Campus is to be constructed to the west of the Proposed Development. This will be subject to its own EIAR and planning application.
- **High Voltage 220 kV and Medium Voltage (10 / 20 kV) Power Transmission Networks** - An application to connect to the national electrical transmission network via a 220 kV high voltage connection was submitted to EirGrid in September 2020. Shannon LNG executed a 600 MW 220 kV grid connection agreement with EirGrid for the Power Plant on 14th April 2023. The precise connection details are being developed at this time and cannot be confirmed yet. The current proposal is that the connection point will be the ESBN / EirGrid Kilpaddoge 220 kV substation which is located approximately 5 km east of the Site with connection provided via a 220 kV cable(s) under the L1010 road. If the 220 kV grid connection is not available

medium voltage (10 / 20 kV) grid connection will be used as a backup power supply. However, the connection is subject to a connection agreement with ESBN and will be considered under a separate planning application. The medium voltage (10 / 20 kV) and 220 kV power connections will be constructed in parallel with the Proposed Development but will be subject to separate planning design and planning applications. Further details on the proposed 220 kV and medium voltage power transmission networks can be found in **Section 2.3.12.1** of **Chapter 02** (Description of the Proposed Development).

- **L1010 Road Works** - Kerry Co. Co. are undertaking a widening scheme of the L1010 road which is to be completed prior to the start of the main construction elements but may overlap with the enabling works.

9.9.1.1 Summary – Potential Cumulative Impacts from Developments at or Near the Site

There is the potential for noise and / or vibration levels from the Proposed Development and the other developments to combine and result in elevated levels during both the construction and operational phases.

However, this is not expected to occur for the following reasons:

- The Gas Pipeline, Data Centre Campus and Grid Connection will be subject to their own impact assessments, meaning that noise and vibration emissions will be considered in combination with the Proposed Development. Any potential impacts can be identified and mitigated at this stage.
- All current and future applications at the development Site are on behalf of the same Applicant. A commitment has been made to ensure that noise and vibration emissions from all developments are considered cumulatively such that construction and / or operational noise emissions do not combine in such a way that relevant noise limits are breached.
- Works associated with the L1010 road widening will not overlap with the main noise generating processes involved in the construction phase of the Proposed Development, as the L1010 road will be built prior to the main elements of the Power Plant. Therefore, no cumulative impact is expected with regards construction noise and / or vibration. The road widening will not generate additional noise once complete, so no cumulative impact during the operational phase is expected either.

9.10 Do Nothing Scenario

If the Proposed Development were not to go ahead, the temporary and long-term noise and / or vibration sources would not be introduced into the area.

However, Under the Kerry County Development Plan 2022-2028[3], the Site is zoned as a Strategic Development Location (SDL). This SDL is recognised in the Development Plan for its potential as an Energy Hub and for industrial development at a regional and national level.

It is therefore possible that, in the absence of the Proposed Development, a different industrial development could be forthcoming which could contain its own array of noise and / or vibration sources.

[3] Available at: https://cdp.kerrycoco.ie/

Nonetheless, any other development proposed in this location would be subject to the same noise and vibration criteria and therefore, its emissions and impact on existing receptors would need to be addressed in a similar manner to those described above.

Alternatively, no development could be forthcoming and as a result the existing acoustic environment (as quantified during the baseline survey and described above) would be expected to continue with little change.

9.11 Residual Impacts and Effects

Post mitigation, the only residual impacts are those arising from changes in traffic flows on existing roads during the construction phase as detailed in **Table 9.20** which are **Negative, Not Significant and Short Term.** All effects in other areas of assessment, post mitigation, are considered either **Not Significant** or **Imperceptible**. A summary of pre and post mitigation effects is given in **Table 9.31**.

9.12 Decommissioning

As outlined in **Chapter 02** (Description of the Proposed Development), in the event of decommissioning, measures would be undertaken by the Applicant to ensure that there would be no significant, negative environmental effects during the decommissioning phase. Examples of the measures that would be implemented are outlined in Section 2.9, **Chapter 02** (Description of the Proposed Development). As a result, additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase.

9.13 Summary

The Proposed Development has been assessed with regard to the following areas:

- Short-term impacts during the construction phase, including:
    - noise and vibration generated by onsite construction activities;
    - noise, vibration and air overpressure generated by blasting activities; and
    - noise generated by changes to traffic flows on existing roads.
- Long-term impacts during the operational phase, including:
    - noise generated by the proposed development once complete; and
    - noise generated by changes to traffic flows on existing roads.

Subject to the adoption of the mitigation measures detailed in this chapter, **Not Significant** impacts are predicted in any of these areas, with the exception of one likely **Moderate Short-Term** impact with regard to increased traffic flows during the construction phase on the L1010 road between the Site entrance and Tarbert.

A regime of noise and vibration monitoring will be undertaken during the construction phase to determine compliance with the nominated criteria and provide a feedback mechanism so that corrective action can be taken in the event of exceedances.

Approximately three to four long-term noise monitoring stations and one to two long-term vibration monitors will be set up on the construction Site boundary. The exact location of these stations will be determined at detailed design and will be chosen to best represent noise and / or vibration emissions

in the direction of nearby receptor positions. Monitoring will continue throughout the entire construction phase.

Long-term noise monitoring stations will be equipped with an SMS and / or email alert system so that site staff can be informed of potential exceedances. The results of the monitoring will be recorded and reported to relevant stakeholders in an appropriate manner and frequency, to be agreed at detailed design. Any noise complaints received during the construction phase will be investigated thoroughly by the Applicant and the appointed Contractor. The results of the investigation, including measured noise and vibration levels at the time of the complaint, onsite activities and any corrective action taken, will also be reported to relevant stakeholders.

Long-term monitoring will be undertaken for a period of at least 12 months from the commencement of site operations and again following any subsequent substantive change in site operations. After 12 months the need for long-term monitoring will be reviewed with the relevant authority. Indicative monitoring locations are shown in **Figure F9.1,** Volume 3 but may change as more detailed information becomes available.

In addition to the above, short-term attended noise measurements will be taken at or near to the receptor locations identified in this chapter. Measurements will be taken and reported in accordance with the guidance provided in NG4. Short-term measurements will take place at the commencement of site operations and again following any subsequent substantive change in site operations. They will then be repeated no less than once a year. As a minimum, measurements will comprise a 30-minute measurement at each location during the daytime, evening and nighttime (as defined in NG4).

If exceedances of the predicted levels are identified by either the long-term or short-term monitoring, the causes will be thoroughly investigated, and corrective action will be taken.

Table 9.31: Summary

Proposed Development Phase	Aspect / Impact Assessed	Existing Environment / Receptor Sensitivity	Effect / Magnitude	Significance (Prior to Mitigation)	Mitigation and Monitoring Measures (the Proposed Development design embedded environmental controls and all mitigation and monitoring measures detailed herein are included in the CEMP)	Residual Impact Significance
Construction	Construction Noise	Sensitive	Negative	Not Significant	Scheduling of works such that noisy activities do not occur between 1300- and 1400 on Saturdays, and to comply with noise limits and criteria set out in this chapter during weekdays. Fixed and semi-fixed ancillary plant will be located away from sensitive receptors wherever possible. All plant shall be regularly maintained and shut down when not in use. Approximately three to four long term noise monitoring stations and one to two long term vibration monitors will be set up on the construction site boundary.	**Not Significant**
	Construction Vibration	Sensitive	Neutral	Imperceptible	None required. See below for mitigation measures associated with blasting.	**Imperceptible**
	Construction Traffic Noise on Existing Roads	Sensitive	Negative	Significant	Construction traffic from this and other concurrent development will be coordinated to minimise traffic and site noise impacts where possible.	**Significant**
	Blasting Induced Noise / Air Overpressure	Sensitive	Negative	Significant	Process management and community liaison including a dedicated Public Liaison Officer. A protocol for community relations with regards to blasting will be adopted such that prior warning of blasting operations is given to members of the public. All noise complaints will be logged and followed up in a prompt fashion by the Liaison Officer. Only single blasts will take place in each event and monitoring will be in place as described in this chapter.	**Not Significant**
	Blasting Induced Vibration	Sensitive	Negative	Significant	Limiting of Maximum Instantaneous Charge (MIC).	**Not Significant**
Operational	Operational Noise	Sensitive	Negative	Significant	Various forms of mitigation (inc. silencers, plant selection, relocation, barriers enclosures) as detailed in the relevant chapter. Long term monitoring will be undertaken for a period of at least 12 months from the commencement of site operations and again following any subsequent substantive change in site operations. After 12 months the need for long term monitoring will be reviewed with the relevant authority. Indicative monitoring locations are provided in **Figure F9.1**, Volume 3. In addition to the above, short-term attended noise measurements will be taken at or near to the receptor locations identified in Chapter 09 at the commencement of site operations and again following any subsequent substantive change in site operations.	**Not Significant**

Proposed Development Phase	Aspect / Impact Assessed	Existing Environment / Receptor Sensitivity	Effect / Magnitude	Significance (Prior to Mitigation)	Mitigation and Monitoring Measures (the Proposed Development design embedded environmental controls and all mitigation and monitoring measures detailed herein are included in the CEMP)	Residual Impact Significance
					The Proposed Development will comply with the conditions of the Industrial Emissions licence, which will be required to operate the Site.	
	Operational Traffic Noise on Existing Roads	Sensitive	Negative	Not Significant	Best practice measures will be adhered to during operation, including avoiding vehicle idling and adhering to speed limits on internal roads.	**Not Significant**

9.14 References

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