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11.0 NOISE AND VIBRATION

11.1 Introduction

- 11.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of the likely significant environmental effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development with respect to noise and vibration.
- 11.1.2 This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the Site and surrounding area; the measures required to prevent, reduce, or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.
- 11.1.3 A full description of the existing site and conditions is presented in Chapter 4: Existing Site and Conditions of this EIAR, while details of the proposed development are presented in Chapter 5: The Proposed Development of this EIAR.

11.2 Methodology

- 11.2.1 During the construction phase, no vibration impacts are expected due to the intervening distances between the works and sensitive receptors. All identified receptors in the vicinity of the Proposed Development are 260m or greater from any location where vibration generating activities, such as piling, may occur. This conclusion is based on the guidance provided in *BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites'* (BS 5228), which provides piling vibration prediction methodologies up to a maximum of 110m. In addition, the construction vibration assessment methodology adopted in Highways England document '*Design Manual for Roads and Bridges LA 111 Noise and vibration*' (LA 111¹), for assessing road schemes, which recommends a maximum study area of 100m is normally sufficient. On this basis construction phase vibration impacts are scoped out of the assessment presented in this EIAR.
- 11.2.2 During the operational phase, no plant that would generate significant vibration levels is proposed. The primary rotating equipment within the generator set will be balanced to a high degree and constantly monitored to identify maintenance issues to allow for any rectification. Therefore, further assessment of operational vibration has been scoped out of the assessment. This is a common approach which is mirrored in other planning applications for similar developments (e.g. VPI Immingham² and the Proposed Gas Fired Power Station at Lumcloon, Cloghan, Co. Offaly³).
- 11.2.3 The noise impact of operational phase traffic has been scoped out of this assessment due to the small daily traffic flow generation. The rationale is given below.

¹ <https://www.standardsforhighways.co.uk/dmrb/search/cc8cfcf7-c235-4052-8d32-d5398796b364>

² <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010097/EN010097-000012-IMHM%20-%20Scoping%20Report.pdf> accessed 15.02.22

³ https://epawebapp.epa.ie/licences/lic_eDMS/090151b2803d0efc.pdf accessed 15.02.22

- 11.2.4 During the operational stage, the Proposed Development plant will fire primarily on natural gas to generate power. Natural gas is currently piped to the Site (through an existing underground pipe) and there will be no operational vehicle movements associated with the facility in this respect.
- 11.2.5 The plant also has the functionality to fire on locally stored backup fuel (distillate or Hydrotreated Vegetable Oil (HVO)). Delivery of back up fuel will be by road via HGVs as required for top up purposes of the backup supply. Operation using backup fuel is only expected to occur during an emergency scenario (such as loss of natural gas transmission pipeline pressure when there is a high demand for power) and during compliance tests.
- 11.2.6 Routine maintenance operations will be scheduled to take place during the daytime hours and will only extend into the night-time and/ or weekends should this prove necessary to maintaining the continuity of the process. Any non-routine maintenance and repair operations will be undertaken as and when they arise as is the case with the existing Tynagh Power Station operations.
- 11.2.7 Therefore, it is expected that on average there will be 5-10 daily vehicle movements (or less) associated with the operational development which will predominately be staff cars and light goods vehicles LGV's.
- 11.2.8 During emergency scenarios, up to 60 vehicles could arrive to the Site each day for distillate fuel deliveries. However, these are not expected to be a regular occurrence and generate fewer daily trips than was assessed within the construction assessment (discussed further below in Section 11.5). Therefore, no further assessment has been undertaken.
- 11.2.9 On the basis of the above, the noise impact of operational phase traffic has been scoped out of this assessment due to the small daily traffic flow generation.
- 11.2.10 The likelihood of significant noise effects arising from the Proposed Development have been considered under the following scenarios:
- Short-term noise impacts arising during the construction and decommissioning phases of the Proposed Development; and
 - Long-term noise impacts arising during the operational phase of the Proposed Development.
- 11.2.11 Potential effects in both scenarios have been considered quantitatively.
- 11.2.12 The methodologies adopted for each scenario are discussed in turn below.

Construction Phase

Noise from Construction Site Activities

- 11.2.13 Construction noise predictions have been undertaken using the methodology outlined in *ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'* (ISO 9613-2) based on assumptions on the number and type of plant required for the noisiest phase of the works.
- 11.2.14 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).

11.2.15 It is acknowledged the limits presented relate to construction works for road schemes, however it is considered reasonable and pragmatic to assume that noise sensitive receptors are likely to be equally sensitive to construction noise from other project types.

11.2.16 The criteria presented in this document are given in Table 11.1, they relate to construction noise levels at the façade of residential properties.

Table 11.1 Maximum permissible noise levels at the façade of dwellings during construction

PERIOD	L _{Aeq,1hr} dB	L _{AMax,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.		

11.2.17 Potential construction noise impacts can also be assessed using BS 5228.

11.2.18 The ‘ABC’ method (detailed in BS 5228 Section E.3.2) can be used to develop criteria for the onset of potentially significant effects. Using this method, the construction noise threshold for the Proposed Development is 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 BS 5228, detailed in Table 11.2.

Table 11.2: BS 5228 ABC Categories

ASSESSMENT CATEGORY AND THRESHOLD VALUE PERIOD	THRESHOLD VALUE L _{Aeq,T} dB – FACADE		
	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) and Saturdays (07:00 – 13:00)	65	70	75
<p>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.</p> <p>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.</p> <p>NOTE 3: Applies to residential receptors only.</p>			

ASSESSMENT CATEGORY AND THRESHOLD VALUE PERIOD	THRESHOLD VALUE $L_{Aeq,T}$ dB – FACADE		
	CATEGORY A (a)	CATEGORY B (b)	CATEGORY C (c)
(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.			

11.2.19 For the purposes of this assessment, it is proposed the criteria given in both the NRA Guidelines and BS 5228 are considered. Where the criteria differ, the more stringent of the two will be adopted.

11.2.20 Typical hours of construction for the construction phase are expected to be 0700 hours to 1900 hours Monday to Friday and 0700 hours to 1300 hours on Saturdays. It is anticipated that some of the proposed construction works, in particular concrete pours, may require 24-hour construction to meet engineering requirements, and hence may take place outside these normal working hours. If on-site works are to be conducted outside normal working hours, the local planning authority will be contacted in advance to agree any additional controls.

Noise from Construction Traffic on Existing Roads

11.2.21 The potential increase in traffic 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.

11.2.22 The CRTN methodology does not cover very low traffic flows (below 1000 18 hour Annual Average Weekday Traffic (AAWT)). 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.

11.2.23 The CRTN or NAC method has been used to calculate the ‘Basic Noise Level’ (BNL) i.e. the traffic noise level at 10m from the kerb, taking into account of the flow, percentage HGV and speed. The BNL is calculated for scenarios with and without the construction works and the change due to the construction works determined. The different methodologies predict different metrics; CRTN predictions are based on $L_{A10,18hr}$ results whereas the NAC predictions are based on $L_{Aeq,16hr}$ results. This difference is not significant however, given that it is the change in traffic noise level that is relevant.

11.2.24 No specific Republic of Ireland 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 criteria based on those provided in LA 111. These criteria are given in terms of change in traffic noise level and are presented in Table 11.3.

Table 11.3: Magnitude of Impact – Construction Phase Traffic

INCREASE IN BNL ($L_{A10,18hr}$ OR $L_{Aeq,16hr}$ dB)	MAGNITUDE OF IMPACT
Less than 1.0	Negligible
Greater than or equal to 1.0 and less than 3.0	Minor
Greater than or equal to 3.0 and less than 5.0	Moderate
Greater than or equal to 5.0	Major

11.2.25 As set out in LA 111 construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months.

Operational Phase Site Noise

11.2.26 To calculate operational noise levels at nearby receptors, information on the proposed plant has been used in conjunction with topographical survey and OSi map data (2D data and 3D data) for the Site and surrounding area to create a 3D model of the operational site using the CadnaA sound modelling software package.

11.2.27 Full details of the operational noise modelling procedure are given in Appendix 11B (refer to EIAR Volume II).

11.2.28 The Proposed Development would be operated under an EPA Industrial Emissions Licence which would be the subject of an application in due course.

11.2.29 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 refers to Best Available Techniques (BAT) 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.”

11.2.30 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.”

11.2.31 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’.

11.2.32 A ‘Quiet Area’ is a location relatively free from anthropogenic sound sources. This does not apply to the Proposed Development location due to nearby roads and the existing Tynagh Power Station.

11.2.33 An ‘Area of Low Background Noise’ is a location that meets all of the following criteria:

- Average Daytime Background Noise Level ≤ 40 dB L_{AF90} , and;
- Average Evening Background Noise Level ≤ 35 dB L_{AF90} , and;
- Average Night-time Background Noise Level ≤ 30 dB L_{AF90} .

11.2.34 The criteria presented in NG4 are detailed in Table 11.4. The daytime and evening criteria are based on a rated noise level ($L_{Ar,T}$) which is equal to the $L_{Aeq,T}$ with the addition of adjustments for the tonal character and/or impulsiveness of the sound, if required. During the night-time period NG4 states that no tonal or impulsive noise from the facility should be clearly audible or measurable at any noise sensitive receptor and therefore a penalty is not applied.

Table 11.4: Recommended Noise Limit Criteria – free-field

SCENARIO	DAYTIME NOISE CRITERION $L_{Ar,T}$ dB (0700 TO 1900 HOURS)	EVENING NOISE CRITERION $L_{Ar,T}$ dB (1900 TO 2300 HOURS)	NIGHT-TIME NOISE CRITERION $L_{Aeq,T}$ dB (2300 TO 0700 HOURS)
Areas of Low Background Noise	45 dB	40 dB	35 dB
All other Areas	55 dB	50 dB	45 dB

Decommissioning Phase

11.2.35 Effects arising from the process of decommissioning of the Proposed Development are of a similar or lesser nature and duration to those arising from the construction process and therefore have not been considered separately in this chapter. Where this assessment refers to potential construction effects, these are also representative of predicted decommissioning effects.

11.3 Regulatory and Policy Framework

11.3.1 The Environmental Protection Agency (EPA) document ‘*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*’ (EPA, 2022) were published to give effect to EU Directive 2014/52/EU in the Republic of Ireland and replace draft Guidelines introduced in 2017. The Guidelines identify the recommended approach to be followed when preparing an EIAR and this EIAR has been prepared, having regard to the recommended methodology in the Guidelines.

11.3.2 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 and frequency, which are given in Table 11.5 and Table 11.6

Table 11.5: 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

Table 11.6: Description of Duration and Frequency 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

11.4 Baseline Environmental Conditions and Constraints

- 11.4.1 The sensitive receptors likely to be most exposed to the noise emissions from the Proposed Development have been identified and are shown on Figure 11.1 (refer to EIAR Volume III). These receptors are all residential in nature and are the closest receptor positions to the Proposed Development.
- 11.4.2 Where multiple receptor positions are near to each other, a single 'worst case' position has been identified and used. In the case of 'Receptor 2', two locations have been used as the worst case (i.e. loudest) location can change depending on the scenario under assessment. The loudest of the two locations is always reported.
- 11.4.3 Receptors R1 to R5 represent the properties closest to the Site and therefore are likely to be exposed to the highest noise levels from the Proposed Development. It follows that if compliant levels are achieved at these locations, compliant levels will be achieved at all other receptor positions.
- 11.4.4 In November 2021, a planning application and EIAR were submitted to GCC for a separate development project, a 299MW OCGT plant on the western portion of the existing Tynagh Power Station site. Submitted Development Ref: 21/2192 proposes to demolish the existing Tynagh Power Station site workshop, administration building and car park, relocate these items to the brownfield lands to the immediate north of the Tynagh Power Station facility and develop a separate OCGT plant on the western part of the Power Station Site. Submitted Development Ref: 21/2192 is currently awaiting determination by An Bord Pleanála (PL 07.313538) following a Third Party appeal against Galway County Council's decision to grant permission. Subject to planning approval being obtained for the Submitted Development Ref: 21/2192, the Applicant intends to build out and operate both Submitted Development Ref: 21/2192 and the Tynagh North OCGT.
- 11.4.5 The Submitted Development Ref: 21/2192 may be in operation before the commencement of operation of the Proposed Development. If the proposed OCGT development (relating to planning application 212192) goes ahead, noise from the plant will form part of the future baseline. However, a conservative approach has been adopted and the operational noise criteria for the Proposed Development have been based on the existing baseline noise levels.

Baseline Monitoring

- 11.4.6 A baseline survey was carried out at four locations (M1-M4 located to the north-west, west, south-west and north-east) on the 01 and 02 July 2021 to determine existing ambient noise levels around the Site. The monitoring locations used are shown on Figure 11.1. The results are presented in Appendix 11A, EIAR Volume II.
- 11.4.7 The operator of the existing Tynagh Power Station facility was consulted and confirmed that the plant was operational during the survey. It is also understood that Sperrin Galvanisers, west of the existing power station, were operating. Road traffic noise was noted as dominant at M1 to the north-west; the existing power station was not perceptible whilst on site. Road traffic noise and industrial noise were noted at M2 to the west during the day and night, including metal clanging at night which was likely to be from Sperrin Galvanisers. Noise from regular agricultural vehicles was noted at M3 to the south-west and M4 to the north-east, and the existing power station was perceptible during the day and night at both M3 and M4.

- 11.4.8 The baseline monitoring survey indicates that locations M1, M3 and M4 are likely to meet the criteria for an 'Area of Low Background Noise' in terms of the operational noise impact assessment. The 'All Other Areas' criteria is likely to apply to Location M2.

Protected structures

- 11.4.9 The nearest protected structures are Castletown bridge (RPS 3651) and a thatched cottage (RPS 3648) which are identified and described in EIAR Chapter 8: Cultural Heritage. Castletown Bridge (RPS 3651) is located 2.1km to the north of the Site on a busy road and the thatched house (RPS 3648) is located 400 to the south-west of the Site. Due to the distance from the Proposed Development, no significant construction or operational vibration impacts are expected on the historic assets.
- 11.4.10 Castletown Bridge (RPS 3651) is now closed to traffic as the new bridge to the immediate west carries the main carriageway. Construction and operational traffic will not pass directly over Castletown Bridge so noise (and traffic vibration) and the physical presence of traffic will not affect the ability to understand this asset. In conclusion, Castletown Bridge (RPS 3651) is located approximately 10m from the current bridge and will not be impacted by major vibrations from passing HGV traffic.
- 11.4.11 The thatched house (RPS 3648) is largely screened by the existing earthen bund which will also mitigate any potential impacts from construction noise. Additionally, construction and operational traffic will not pass this asset. Therefore, no significant construction or operation noise impacts are expected to occur on this asset.
- 11.4.12 Neither receptor is considered further in the assessment below.

11.5 Predicted Impacts from the Proposed Development

Do Nothing Scenario

- 11.5.1 In the absence of the Proposed Development, the existing acoustic environment is expected to remain unaffected. The area is broadly rural in nature but with noise contributions from the existing Tynagh Power Station and other industrial operators present in proximity to the Site.

Construction Phase

- 11.5.2 Based on the criteria in Table 11.1 and Table 11.2, and the measured baseline noise levels in Appendix 11A (refer to EIAR Volume II), the weekday daytime and Saturday morning construction noise criteria for all the identified closest receptors is 65 dB $L_{Aeq,T}$ (façade).
- 11.5.3 The proposed construction programme is detailed in Table 11.7.

Table 11.7: Outline Construction Programme

PHASE	PERIOD	DURATION
Site Surveys	Month 1 to Month 5	5
Design Update	Month 1 to Month 8	8
Civils and Equipment Delivery	Month 6 to Month 14	9

Installation of Mechanical Plant	Month 12 to Month 18	7
Testing and Commissioning	Month 18 to Month 22	5

- 11.5.4 The Applicant and Engineering Design Team anticipate that the noisiest period of construction activity will be during months 8 and 9, when piling and other civil engineering works are taking place. If construction noise levels during this period are demonstrated to be compliant with the nominated criteria, it follows that construction noise levels will be compliant at all other times.
- 11.5.5 Sound power levels associated with the various plant and processes to be employed during the noisiest phase of the works have been estimated using the data in BS 5228. The levels used in the assessment are presented in Table 11.8.

Table 11.8 Mechanical Plant Sound Power Levels

PLANT	BS5228 TABLE/ SOURCE	SOUND POWER LEVEL (L _{WA} dB)	NUMBER OF ITEMS
Excavators	C.2.2	105	2
Dump trucks	C.2.33	109	3
Mobile Elevating Work Platforms (MEWPs)	C.4.62	94	2
Forklift trucks	C.2.35	99	1
Concrete pumps	C.3.25	106	2
Piling rigs	C.3.1	117	2
Compressors	C.3.19	103	3
Generators	C.4 average of rows 76-84	94	2
Pumps	C.11.1	109	2

- 11.5.6 As a robust estimate, it has been assumed that all plant will work continuously and simultaneously throughout the working day. This will result in an overestimation of average noise levels at receptor positions but is considered a conservative approach.
- 11.5.7 Construction noise predictions were undertaken using the methodology outlined in ISO 9613-2. The predicted facade construction noise levels during normal working hours at each receptor location are provided in Table 11.9 and illustrated in Figure 11.2 of this EIAR (refer to EIAR Volume III). The predicted noise levels include a +3 dB façade correction.

Table 11.9: Predicted Construction Noise Levels – façade

RECEPTOR	PREDICTED CONSTRUCTION NOISE LEVEL ($L_{Aeq,T}$ dB)
R1	46
R2	46
R3	39
R4	44
R5	48

11.5.8 It can be seen from Table 11.9 that predicted construction noise levels for the estimated noisiest period of construction are below the weekday daytime and Saturday morning assessment criteria.

11.5.9 No significant adverse effect is therefore expected at residential receptor positions with regards to construction phase noise levels generated by on-site activities.

Noise from Construction Traffic on Existing Roads

11.5.10 The following public roads would be used by the construction traffic, as identified in Chapter 14: Traffic of this EIAR:

- LP4310 Gurtymadden (note – some public documents refer to this road as Gortymadden) to Tynagh Road; and
- N65 east and west of LP4310.

11.5.11 Chapter 14: Traffic, of this EIAR, includes further information on traffic to be generated by the construction works.

11.5.12 Calculations have been carried out in accordance with the BNL methodology presented in CRTN for the N65, and in accordance with the NAC methodology for the LP4310. The NAC methodology is used where traffic flows are very low and outside the bounds of the CRTN methodology.

11.5.13 The results of the calculations are presented in Table 11.10.

Table 11.10: Road Traffic Noise Change due to Construction 2024

ACCESS ROUTE FOR CONSTRUCTION TRAFFIC	BASELINE BNL	CONSTRUCTION PHASE BNL	CHANGE (dB(A))
LP4310	57.6 dB $L_{Aeq,16hr}$	59.1 dB $L_{Aeq,16hr}$	+1.5
N65 west	68.3 dB $L_{A10,18hr}$	68.7 dB $L_{A10,18hr}$	+0.4
N65 east	68.1 dB $L_{A10,18hr}$	68.5 dB $L_{A10,18hr}$	+0.4

11.5.14 Through comparison of Table 11.9 and Table 11.10, it can be seen that a negligible impact is predicted on the N65 and a minor impact is predicted on LP4310 Gurtymadden to Tynagh Road.

11.5.15 No significant adverse effect is therefore expected at residential receptor positions with regards to construction phase traffic noise levels generated by additional traffic flows on existing roads.

Operational Phase

Operational Phase Site Noise

11.5.16 Based on the NG4 methodology and the baseline noise levels, the assessment criteria for operational noise emissions have been calculated and are presented in Table 11.11 below. Receptor locations are shown on Figure 11.1 (refer to EIAR Volume III).

Table 11.11: Operational Noise Criteria – free-field

RECEPTOR POSITION	ASSOCIATED MEASUREMENT LOCATION	DAYTIME NOISE CRITERION $L_{Ar,T}$ dB (07:00 TO 19:00 HOURS)	EVENING NOISE CRITERION $L_{Ar,T}$ dB (19:00 TO 23:00 HOURS)	NIGHT-TIME NOISE CRITERION $L_{Aeq,T}$ dB (23:00 TO 07:00 HOURS)
R1	M1	45	40	35
R2	M2	55	50	45
R3	M3	45	40	35
R4	M4	45	40	35
R5	M2	55	50	45

11.5.17 The Proposed Development will comprise the following main components:

- Open Cycle Gas Turbine (OCGT) unit, 40m emissions stack and balance of plant;
- Acoustic barriers;
- Secondary fuel storage and unloading facility;
- Distillate fuel gantry;
- Water Storage Tanks; and
- Surface Water Drainage system.

11.5.18 A full description of the Proposed Development is provided in EIAR Chapter 5: The Proposed Development.

11.5.19 The Proposed Development is a peaking plant that will have the ability to operate 24 hours a day, seven days a week. It is noted, however, that whilst the Proposed Development has the potential to operate in this manner, in reality it is expected to only operate during peak periods for a limited number of hours per year.

11.5.20 Design details have been sourced from equipment suppliers and this library of supplied data, based on industry information and design specifications, has been used to present a robust assessment of the Proposed Development.

11.5.21 An assessment based on this approach is industry standard and considered sufficient to demonstrate and assess the Proposed Development. The noise levels and design approach presented will be adopted as design limits at the plant procurement stage.

11.5.22 The noise levels used in the assessment are presented in Table 11.12

Table 11.12: Operational Plant Sound Power Levels

PLANT	NUMBER OF ITEMS	SOUND POWER LEVEL (L _{WA} dB) PER ITEM
Gas Turbine Enclosure	1	107
Gas Turbine Basic Module	1	106
Gas Turbine Generator	1	107
Filter House	1	105
Diffusor	1	118
Stack Outlet	1	109
Stack Base (including outlet duct and silencer casing)	1	120
LV Transformer	1	100
Fin Fan Cooler	1	105

11.5.23 To calculate operational noise levels at nearby receptors, the above information has been used in conjunction with topographical survey and OSi map data to create a 3D model of the operational site and surrounding area using the CadnaA noise modelling software package.

11.5.24 NG4 states that during the daytime and evening corrections should be applied to sound sources with distinctive acoustic characteristics (e.g., tonality, impulsivity etc.). During the night-time period, NG4 states that no tonal or impulsive noise from the facility should be clearly audible or measurable at any noise sensitive receptor. Therefore, a commitment has been made to either specify items which do not present distinctive acoustic characteristics or to apply suitable mitigation at the detailed design phase so that no acoustic character corrections are required within the assessment.

11.5.25 A summary of the results is provided in Table 11.13 and illustrated in Figure 11.3 (refer to EIAR Volume III).

Table 11.13: Predicted Operational Noise Levels at Receptors – free-field

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVEL (L _{Aeq,T} dB)
R1	49
R2	49

R3	45
R4	48
R5	51

11.5.26 A comparison of Table 11.11 and Table 11.13 indicates that, without additional mitigation, noise emissions from the Proposed Development would not comply with the relevant criteria. Mitigation measures are detailed below in Section 11.6.

Decommissioning Phase

11.5.27 Effects arising from the process of decommissioning of the Proposed Development are likely to be of a similar or lesser nature and duration to those arising from the construction process. This is because similar processes will be employed, except for piling activities which are not required.

11.5.28 The decommissioning phase has therefore not been considered separately in this chapter.

11.5.29 Where this assessment refers to potential construction effects, these can be considered a robust representation of predicted decommissioning effects.

11.6 Mitigation and Enhancement Measures

Construction Phase

11.6.1 No significant adverse effects are predicted during the construction phase of the Proposed Development. Nonetheless, to ensure noise and vibration levels are kept to a minimum and to reduce the risk of cumulative impacts, it is recommended that measures including the following are adopted during the construction phase:

- Good community relations shall be established and maintained throughout the construction process to keep residents informed on progress and the measures put in place to minimise noise impacts;
- Standard construction working hours should be adhered to i.e. 0700 hours - 1900 hours weekdays and 0700 hours - 1300 hours Saturdays, with no working on Sundays or Bank Holidays (including site deliveries) unless agreed with the local planning authority;
- Selection of quiet and low vibration equipment and methodologies in accordance with the principles of 'best practicable means';
- Fixed and semi-fixed ancillary plant such as generators, compressors and pumps shall be located away from receptor locations wherever possible;
- The Engineering and Construction (E&C) Contractor will be provided with electrical power which minimises the requirement for diesel generators at the Site;
- All plant used on site 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 from nearby noise sensitive receptors;
- 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; and
- 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.

11.6.2 Proposed noise and vibration mitigation measures are incorporated into the Outline Construction Environmental Management Plan (oCEMP) (EIAR Volume II Appendix 5A), which will form the basis of the final CEMP. The CEMP will be implemented by the E&C contractor, who is yet to be appointed.

Operational Phase

11.6.3 As discussed in the previous section (Section 11.5), noise emissions from the Proposed Development would, without design mitigation, exceed the nominated criteria at all receptor locations.

11.6.4 An investigation has been carried out to determine noise mitigation measures that can be incorporated into the Proposed Development design. These investigations included consultation with equipment suppliers to ensure the measures and reductions presented are technically achievable.

11.6.5 The proposed reductions are detailed in Table 11.14

Table 11.14: Operational Plant Sound Power Levels

PLANT	SOUND POWER LEVEL (L _{WA} dB)	REDUCTION REQUIRED (L _{WA} dB)	RESULTANT SOUND POWER LEVEL (L _{WA} dB)
Gas Turbine Enclosure	107	0	107
Gas Turbine Basic Module	106	3	103

Gas Turbine Generator	107	8	99
Filter House	105	6	99
Diffuser	118	21	97
Stack Outlet	109	14	95
Stack Base (including outlet duct and silencer casing)	120	7	112
LV Transformer	100	0	100
Fin Fan Cooler	105	0	105

11.6.6 In addition to the above measures, a 7.0m high acoustic barrier around the fin fan cooler, a 8.0m high acoustic barrier around the transformers, and a 10.0m high barrier around the generator, turbine, diffuser and stack base, have been incorporated into the design. The barriers are shown in Chapter 5: The Proposed Development Figures (refer to EIA Volume III).

11.6.7 The 3D noise model has been rerun including the above mitigation measures (i.e. including the sound power level reductions and acoustic barriers). A noise map is presented in Figure 11.4 of this EIA (refer to EIA Volume III) showing predicted noise contours across and in the vicinity of the Site. A summary of the results is given in Table 11.15.

Table 11.15: Predicted Operational Noise Levels - free-field – Mitigated

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVEL ($L_{Aeq,T}$ dB)
R1	35
R2	37
R3	33
R4	34
R5	38

11.6.8 A comparison of Table 11.11 and Table 11.15 indicates that, with mitigation, noise levels from the Proposed Development comply with the relevant criteria.

11.7 Residual Effect

Construction Phase

- 11.7.1 Predicted construction noise levels for the estimated noisiest period of construction are below the weekday daytime and Saturday morning assessment criteria.
- 11.7.2 In addition, the use of construction noise and vibration mitigation measures including the adoption of 'best practicable means' will ensure that the construction noise and vibration levels are controlled to the lowest levels practicable. Hence, the residual effects of noise from construction works are assessed to be not significant.
- 11.7.3 The residual effects of construction traffic noise are assessed to be not significant.
- 11.7.4 The effects of construction noise and vibration, and construction traffic noise will be temporary, normally only occurring on weekdays and Saturdays.

Operational Phase

- 11.7.5 The residual operational noise levels have been calculated with the incorporation of the recommended mitigation measures detailed above as set out in Table 11.15.
- 11.7.6 The predicted residual operational noise levels are at or below the relevant criteria at all the selected receptors. The residual effects of noise from the operation of the Proposed Development are assessed to be not significant.

11.8 Cumulative Effects

- 11.8.1 A desktop planning history search was undertaken for the Proposed Development using the An Bord Pleanála Online Planning System and the Galway County Council (GCC) Online Planning System to assess potential cumulative effects. Planning applications submitted and/ or approved within the last 5 years ago and within 1 km of the Site are the only applications considered. The results are given in Table 11.16 below.

Table 11.16: Other Developments

PLANNING APPLICATION	DATE SUBMITTED	SUMMARY DETAILS	ADDRESS/ APPLICANT	STATUS
212192	24/11/2021	For the construction of an OCGT plant (299 MW) and associated infrastructure and buildings, to the west of the existing Tynagh Power Station site.	EP Energy Developments Ltd	Approved by GCC (April 2022). Currently under appeal to An Bord Pleanála (ABP-313538-22)
201972	18/12/2020	For the construction of a Dwelling House, Domestic garage, Treatment Unit, Percolation area and all associated site services. Gross floor space of proposed works: 270m ² .	S. Loughrey & N. Briscoe C/o OPC Design & Planning	Granted with conditions on 07/06/2021

PLANNING APPLICATION	DATE SUBMITTED	SUMMARY DETAILS	ADDRESS/APPLICANT	STATUS
19633	26/04/2019	To extend workshop and to complete all associated site works. Permission is also sought to erect acoustic fencing along a section of the existing site boundary. The site is located within the confines of a Major Accident Site under the Seveso Directive. Gross floor space of proposed works: 600 m ²	Sperrin Galvanisers (IRE) Ltd. Derryfrench	Granted (Conditional) 29/07/2019
18221	26/02/2018	To extend workshop and complete all associated site works. Permission is also sought to erect acoustic fencing along a section of the existing site boundary. Gross floor space of proposed works 600 m ² . The proposed site is located at Derryfrench, Tynagh, Co. Galway and is within the confines of a Major Accident Site as determined by the Seveso Directive.	Sperrin Galvanisers (IRE) Ltd. Derryfrench	Granted (Conditional) 20/04/2018

Source: Galway County Council Online Planning System and An Bord Pleanála Online Planning System – dated 25 January 2023

Construction Phase

- 11.8.2 Some limited (approximately 3 months) overlap with the EP Energy Developments Ltd Submitted Development Ref: 21/2192 project for the construction of an OGCT plant at the existing Tynagh Power Station site is anticipated. This planning application has been granted permission (subject to conditions) however it is currently subject to an appeal which has not yet been determined.
- 11.8.3 Subject to planning approval being obtained for the Submitted Development Ref: 21/2192, the Applicant intends to build out and operate both Submitted Development Ref: 21/2192 and the Tynagh North OCGT. The current construction programmes for each development indicate that the noisiest phase of the works at each site would not overlap. However, a worst case approach has been adopted assuming the noisiest phase of both construction works occur at the same time. The cumulative predicted facade construction noise levels during normal working hours at each receptor location are provided in Table 11.17.

Table 11.17: Cumulative Predicted Construction Noise Levels – façade

RECEPTOR	PREDICTED CONSTRUCTION NOISE LEVEL ($L_{Aeq,T}$ dB)
R1	57
R2	63
R3	55
R4	50
R5	60

- 11.8.4 It can be seen from Table 11.17 that cumulative predicted construction noise levels for the estimated noisiest period of construction for both developments are below the weekday daytime and Saturday morning assessment criteria of 65 dB $L_{Aeq,T}$.
- 11.8.5 No significant cumulative adverse effect is therefore expected at residential receptor positions with regards to construction phase noise levels generated by the Proposed Development on-site activities and potential concurrent construction activities related to construction of the Submitted Development Ref: 21/2192.
- 11.8.6 The results of the cumulative construction traffic calculations are presented in Table 11.18

Table 11.18: Road Traffic Noise Change due to Construction 2024 - Cumulative

ACCESS ROUTE FOR CONSTRUCTION TRAFFIC	BASELINE BNL	CUMULATIVE CONSTRUCTION PHASE BNL	CHANGE (dB)
LP4310	57.6 dB $L_{Aeq,16hr}$	59.2 dB $L_{Aeq,16hr}$	+1.6 dB
N65 west	68.3 dB $L_{A10,18hr}$	68.8 dB $L_{A10,18hr}$	+0.5 dB
N65 east	68.1 dB $L_{A10,18hr}$	68.6 dB $L_{A10,18hr}$	+0.5 dB

- 11.8.7 Through comparison of Table 11.5 and Table 11.18, it can be seen that a negligible impact is predicted on the N65 and a minor impact is predicted on LP4310 Gurty Madden to Tynagh Road.
- 11.8.8 No significant cumulative adverse effect is therefore expected at residential receptor positions with regards to construction phase traffic noise levels generated by additional traffic flows on existing roads.

Operational Phase

- 11.8.9 The operation of the Proposed Development is expected to coincide, at times, with the operation of the workshop associated with planning applications 18221 and 19633. Sperrin Galvanisers are understood to have been operating during the baseline survey, therefore any noise from their existing operations is included in the measured baseline levels. As set out in Section 11.4, industrial noise, likely to include some noise from

Sperrin Galvanisers, was noted at location M2. Planning application 19633 states that if the application is approved it “*will further reduce any perception of noise emissions and loss of residential amenity locally*”. Therefore, no cumulative operational impact with the Proposed Development is anticipated.

- 11.8.10 Due to the nature of the Submitted Development Ref: 21/2192 it is likely to operate at the same time as the Proposed Development during the evening and daytime, but not at night. The evening and daytime operational noise criteria are 5 dB and 10 dB higher than the night-time criteria respectively. Therefore, as both plants are designed to meet the night-time criteria the cumulative impact of both plants operating at the same time would not exceed the evening and daytime criteria. Submitted Development Ref: 21/2192 has been granted permission (subject to conditions) however it is currently subject to an appeal which has not yet been determined. Subject to planning approval being obtained for the Submitted Development Ref: 21/2192, the Applicant intends to build out and operate both Submitted Development Ref: 21/2192 and the Tynagh North OCGT. The likelihood of simultaneous night-time operation is insignificant, however should there be a requirement to operate the Submitted Development Ref: 21/2192 and Tynagh North simultaneously during night-time periods, the operator will apply additional mitigation/technical design modifications to one or both of the developments to ensure the cumulative noise impact does not exceed the noise criteria set out in Table 11.11.
- 11.8.11 No cumulative operational phase noise effects have been identified.

11.9 References

- BSI Group (2014) BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites'
- Department of Transport Welsh Office (1988) Calculation of Road Traffic Noise
- Environmental Protection Agency (2016) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Highways England (2020) Design Manual for Roads and Bridges LA 111 Noise and vibration
- International Organization for Standardization (1996) ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'
- National Roads Authority (2004) Guidelines for the Treatment of Noise and Vibration in National Road Schemes
- Noise Advisory Council (1978) A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}