

Derrygreenagh Power Project Environmental Impact Assessment Report

Chapter 11: Noise and Vibration

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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 the baseline conditions, potential impacts and an assessment of the significance of effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development and Overall Project with respect to noise and vibration.
- 11.1.2 This chapter describes the methods and guidance used to assess the effects in 11.2 and 11.3; the baseline conditions currently existing at the Site and surrounding area in 11.4; the predicted impacts in 11.5 and the mitigation measures required to prevent, reduce, or offset any significant adverse effects are discussed in 11.6; the likely residual effects after these measures have been adopted are discussed in 11.7 followed by a cumulative assessment in 11.8.
- 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 and Overall Project are presented in Chapter 5: The Proposed Development and Overall Project of this EIAR.
- 11.1.4 Volume II Appendix 11A contains an introduction to acoustic glossary terminology of terms relevant to this chapter.
- 11.1.5 Volume II Appendix 11B contains a map of the site, receptor and baseline monitoring locations along with details of the existing environment as each monitoring location. For convenience a larger version of the map can be found in Figure 11.1.
- 11.1.6 Volume II Appendix 11C contains details about the baseline monitoring equipment, the measured levels and associated time history plots.
- 11.1.7 Volume II Appendix 11B contains detailed information about the acoustic modelling details used to predict levels for the construction and operational phases of the Proposed Development.

Statement of Authority

- 11.1.8 The baseline survey was undertaken by NVM Ltd (NVM.ie) Ciaran Mythen, Noel Carr, and Adam Lyons of NVM Limited. All named operatives have a BSc in Acoustics or in an environmental protection or management capacity and have undertaken Institute of Acoustics training.
- 11.1.9 This EIAR Chapter assessment was:
- Prepared By: Alex Southern – BSc (Hons) MSc PhD MIOA;
 - Technical Review By: Chris Skinner – MSci MA MIOA
- 11.1.10 Refer to Volume II Appendix 1B for further details about the authors.

11.2 Methodology

Introduction

11.2.1 This section details the approach for evaluating noise and vibration impacts associated with the Proposed Development and Overall Project. It defines the study area in relation to noise-sensitive receptors and describes the assessment process for the construction, operational, and decommissioning phases. The methodology is explained which includes setting noise and vibration criteria based on applicable standards, conducting baseline surveys, predicting potential effects, and identifying mitigation measures. Assessment scope and exclusions are defined as well as assessment criteria for each phase of the Proposed Developments lifecycle. This is followed by statements covering the main limitations and assumptions made in the assessment.

Study Area

11.2.2 The study area for the assessment of on-site construction, operational and decommissioning phase noise and vibration is defined as an area extending from the Site of the Proposed Development and Overall Project up to and including the closest noise sensitive receptor locations. It follows that if noise generating activities can demonstrate compliance at the closest sensitive receptors (for distances see 11.4.2), then compliance will be achieved at more distant receptors. A map showing closest sensitive receptors in relation to the Proposed Development and Overall Project can be found in Figure 11.1. Receptors were identified from satellite imagery.

Impact Assessment Methodology

11.2.3 The general assessment methodology is summarised in these six bullets:

- Review of the most applicable standards and guidelines to set acceptable noise and vibration criteria for the construction, operational and decommissioning phases of the Proposed Development and Overall Project
- Characterise the receiving environment of the Proposed Development through baseline noise surveys at chosen NSLs surrounding the Power Plant Area and Electricity Grid Connection
- Undertake predictive calculations to assess the potential effects associated with the construction, operational and decommissioning phases of the Proposed Development and Overall Project
- Establish if mitigation measures are required and specify mitigation measures to reduce, where necessary, the identified potential impacts relating to noise and vibration from the Proposed Development and Overall Project
- Describe the significance of the residual noise and vibration effects associated with the Proposed Development and Overall Project following the incorporation of mitigation measures
- Perform a cumulative impact assessment including contribution from all three of the major Project parts.

Assessment Scope

11.2.4 The significant noise effects arising from the Proposed Development and Overall Project have been considered across sections 11.5 Predicted Impacts, 11.6 Mitigation and Enhancement Measures and 11.7 Residual Effect under the following scenarios:

- Power Plant Area:
 - Construction Phase
 - Site Noise
 - Noise from Construction Traffic on Existing Roads
 - Operational Phase
 - Site Noise
 - Decommissioning Phase
- Electricity Grid Connection:
 - Construction Phase
 - Site Noise
 - Noise from Overhead Line and Underground Cable Installation
 - Noise from Construction Traffic on Existing Roads
 - Operational Phase
 - Site Noise
 - Decommissioning Phase
- Gas Corridor Connection:
 - Construction Phase
 - Site Noise
 - Noise from Construction Traffic on Existing Roads
 - Operational Phase
 - Site Noise
 - Decommissioning Phase

11.2.5 Potential effects in all scenarios have been considered quantitatively. Potential effects arising during decommissioning phase are not expected to be any worse than those predicted for the construction phase, this is a conservative assumption.

11.2.6 Exclusions to the assessment scope are addressed below.

11.2.7 The assessment criteria and methodologies adopted for each phase are then also discussed in turn below.

Assessment Scope Exclusions

11.2.8 The effects of elements scoped out of the assessment are considered Not Significant or better in line with the terminology set out in the EPA 2022 Guidelines discussed in Table 11.1. The following subsection provide justification for excluding these elements from the assessment.

Vibration – Construction Phase

- 11.2.9 During the construction phase, no vibration impacts are expected due to the intervening distances between the Power Plant Area/Electricity Grid Connection and sensitive receptors. All identified sensitive receptors in the vicinity of the Power Plant Area and Electricity Grid Connection are at least 340m from the 400kV substation area and at least 1.2km to the Power Plant Area or any location where vibration generating activities, such as piling, are likely to 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, meaning that construction activities do not produce large enough vibrations to warrant concern beyond this range. In addition, the construction vibration assessment methodology adopted in Highways England document 'Design Manual for Roads and Bridges LA 111 Noise and vibration' (LA 111) for assessing road schemes, recommends that a maximum study area of 100m is normally sufficient.
- 11.2.10 The effects of vibration relating to the Power Plant Area and Electricity Grid Connection construction are therefore considered **Not Significant** and a further detailed assessment is scoped out.
- 11.2.11 As stated in the Limitation and Assumptions section below, the precise route of pipeline is not yet determined. Therefore, in relation to the potential vibration from the Gas Corridor Connection construction occurring in the vicinity of sensitive receptors - a vibration assessment is scoped out. This is on the basis that the planned route will either be at least 100m from residential receptors or exceedances of the limits in BS 5228-1:2009 will be avoided, controlled, and managed at sensitive receptors through plant selection, programming and communication where appropriate.
- 11.2.12 On this basis the effects of construction vibration from the installation of the Gas Corridor Connection are considered **Not Significant** and a further detailed assessment is scoped out.

Vibration – Operational Phase

- 11.2.13 During the operational phase, no plant that would generate vibration levels that would be of a level that can be perceived, cause disturbance or damage at the site boundary or sensitive receptors is proposed. Therefore, further assessment of operational vibration has been scoped out of the assessment and is therefore considered **Not Significant**.

Electricity Grid Connection – Line Cable Interface Compound (Operational)

- 11.2.14 The operational equipment related to the transfer of the power cabling does not generate sound levels at sensitive receptors that would be considered as disturbing if audible at all. The nearest sensitive receptor is 750m from the compound. This equipment has therefore been scoped out of the operational noise assessment and its effects are considered **Not Significant**.

Electricity Grid Connection – 220 kV Overhead Line (Operational)

- 11.2.15 Noise sensitive receptors are more than 200m from the 220 kV overhead line. On this basis it is considered that generated sound levels at sensitive receptors would not be considered as disturbing if audible at all. This equipment has therefore been scoped out of the operational noise assessment and any effects are considered **Not Significant**.

Electricity Grid Connection – 220 kV Underground Cable (Operational)

- 11.2.16 Once installed there is no daily operational noise associated with the underground cable sections. This equipment has therefore been scoped out of the operational noise assessment and its effects are considered **Not Significant**.

Roads - Operational Phase (Standard Operations)

- 11.2.17 During the operational stage, the Power Plant Area will fire primarily on natural gas to generate power. Natural gas will be piped to the Site from the main high pressure gas line BGE/77 (through the Gas Connection Corridor).
- 11.2.18 Therefore, as fuel will not arrive by road as standard, traffic numbers related to the Power Plant Area will be small compared to the base Annual Average Weekday Traffic 18-hour two-way flow of ~2500 vehicles (17% HGV) on the R400, the road between the M6 motorway and site entrance. The noise impact of operational phase traffic has been scoped out of this assessment due to the small daily traffic flow generation.
- 11.2.19 The Electricity Grid Connection only generate 1-2 staff trips intermittently and the Gas pipeline connection will require only 1 transit van visiting the Above Ground Installation (AGI) once a month.
- 11.2.20 A detailed assessment of adverse traffic impacts associated with the operational phase of Electricity Grid Connection and Gas Corridor Connection has been scoped out on the basis that the daily traffic generated will be small compared to other traffic movements occurring in the area.
- 11.2.21 It is commonly understood that in order for a just noticeable change in sound level to be perceived the sound energy needs to be doubled, this can be equated to doubling of the road traffic flows. The number of additional vehicles on the road will increase by a small margin during the operational phase but it is not expected to approach a doubling of the existing traffic flows over the annual average weekday.
- 11.2.22 On the basis of the above, increases in road traffic noise levels in relation the operational phase, the noise impact of operational phase traffic has been scoped out of this assessment for the Power Plant Area, Electricity Grid Connection and Gas Connection Corridor - any effects are therefore considered **Not Significant**.

Roads - Operational Phase (Emergency Operations)

- 11.2.23 The Power Plant Area also has the functionality to fire on locally stored backup or secondary fuel. Delivery of back up fuel will be by road via HGVs as required for top up purposes of the backup supply.
- 11.2.24 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.
- 11.2.25 During emergency scenarios, up to 36 vehicles per day have been consented to arrive to the site for fuel deliveries, as stated in 14.5.51. However, these are not expected to be a regular occurrence and consist of fewer daily trips than assessed within the construction assessment (discussed further below in Section 11.5).
- 11.2.26 The noise impact of operational phase traffic during an emergency event has been scoped out of this assessment due to the relatively small daily traffic flow generation and infrequent nature of such emergency events.

Maintenance Operations

- 11.2.27 Routine maintenance operations for the Power Plant Area, Electricity Grid Connection and the Gas Connection Corridor elements 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 for maintaining the continuity of the process. Any non-routine maintenance and repair operations will be undertaken as and when they arise.

- 11.2.28 Maintenance activities at the Power Plant Area are not expected to produce noise and vibration emissions any worse than noise emissions associated with normal operations and have therefore not been assessed in further detail.
- 11.2.29 Maintenance activities relating to the Electricity Grid Connection and Gas Pipeline Corridor are expected to be short term tasks in a given area and therefore have limited capacity to cause noise disturbance at sensitive receptors and are not assessed in further detail. The effects of maintenance operations are considered **Not Significant** at all sensitive receptors.

Determination of the Baseline Environment

- 11.2.30 The baseline acoustic environment has been established via several long-term unattended surveys conducted within and around the Site relating to the Power Plant Area, and Electricity Grid Connection (see Section 11.4). The Gas Connection Corridor was not subject to baseline surveys specifically, see Limitations and Assumptions section below. Also see Volume II Appendix 11B for photographs and descriptions of the prevailing acoustic environment and perceived soundscape.

Describing Potential Effects

- 11.2.31 The terminology used in this chapter to describe potential effects from noise generating activities in the construction/decommissioning and operational phases is aligned with the Environmental Protection Agency (EPA) ‘*Guidelines on the Information to be contained in Environmental Impacts Assessment Reports*’ (2022) (referred to as the ‘EPA Guidelines’). See Section 11.3 for more information on relevant Guidance.
- 11.2.32 Effects are described under various headings, including Quality, Significance, Extent and Context, Magnitude, Probability, Duration and Frequency. Of relevance are the definitions of significance and duration and frequency, which are given in Table 11.1 and Table 11.2.

Table 11.1 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.

Table 11.2 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

Construction Phase

Noise from Construction Site Activities

11.2.33 There is no published statutory Irish guidance relating to permissible noise limits for construction noise, however local authorities normally limit the construction hours to minimise adverse impacts. Construction noise predictions have been undertaken using the methodology outlined in BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites. Noise.’ (BS5228-1) based on assumptions on the number and type of plant required for the noisiest phase of the works – the noisiest phase is established in section. This method is commonly selected for this purpose in the Republic of Ireland and is referenced in relation to construction in the ‘Other Guidance’ section within document ‘Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)’ (EPA, 2016). In the preface subsection ‘Applicability of this Document’ within NG4 it states:

“All off-site transportation activities and construction related issues are typically covered in other guidance documents and best practice standards (see Section 11).”

11.2.34 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).

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

11.2.36 The criteria presented in this document given in Table 11.1 and Table 11.2, relate to construction noise levels at the façade of residential properties.

Table 11.3 Maximum permissible noise levels at the façade of dwellings during construction according to the NRA Guidelines

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.

11.2.37 Potential construction noise impacts can also be assessed using BS 5228-1.

11.2.38 The ‘ABC’ method (detailed in BS 5228-1 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 and Overall Project is determined by rounding the ambient noise levels to the nearest 5dB and then comparing this level to the Category A, B and C values given in BS 5228-1, detailed in Table 11.2.

Table 11.4 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

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 3dB 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 5dB) are less than these values.

(b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.

(c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.

(d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.

11.2.39 For the purposes of this assessment, it is proposed the criteria given in both the NRA Guidelines and BS 5228-1 are considered. Where the criteria differ, the more stringent of the two will be adopted.

11.2.40 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 relevant local planning authority will be contacted in advance to agree any additional controls.

- 11.2.41 The criteria in BS 5228-1 are more stringent in the stated typical construction hours and are therefore adopted as the construction assessment criteria for this assessment.

Noise from Construction Traffic on Existing Roads

- 11.2.42 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. The CRTN methodology does not cover very low traffic flows (below 1,000 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.
- 11.2.43 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 is used to determine a change in road traffic noise levels. 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 important however, given that it is the change in traffic noise level that is relevant.
- 11.2.44 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 Rev 2 Noise and Vibration, Design Manual for Roads and Bridges, May 2020, *Highways England, UK*. These criteria are given in terms of change in traffic noise level and are presented in Table 11.3.

Table 11.5 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

- 11.2.45 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

- 11.2.46 To calculate operational noise levels at nearby receptors, information on the proposed Power Plant Area, Electrical Grid Connection and Gas Connection Corridor has been used to create a 3D model of the operational site using the CadnaA sound modelling software package.
- 11.2.47 Full details of the operational noise modelling procedure are given in Appendix 11D (refer to EIAR Volume II) and details the sound sources, types, dimensions, and model parameters used to predict sound pressure levels at receptors.

- 11.2.48 The Power Plant Area (within the Proposed Development) will be required to operate under an Industrial Emissions (IE) Licence which is subject of an application to the EPA per activity class 2.1 of the First Schedule of the EPA Act as amended. This EIAR will support the IE licence application.
- 11.2.49 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."*
- 11.2.50 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."*
- 11.2.51 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'.
- 11.2.52 A 'Quiet Area' is a location relatively free from anthropogenic sound sources according to NG4 Section 4 Step 1. To be in a 'Quiet Area' the Proposed Development must be:
- 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.
- 11.2.53 Quiet Area designation does not apply to the Proposed Development and Overall Project locations at least due to nearby roads (including the M6 motorway and N52) and the existing local industrial activities in the area.
- 11.2.54 A receptor is considered to be in an 'Area of Low Background Noise' if noise levels monitored at the location that meet all of the following criteria, NG4 Section 4 Step 3:
- Average Daytime Background Noise Level ≤ 40 dB LAF90, and;
 - Average Evening Background Noise Level ≤ 35 dB LAF90, and;
 - Average Night-time Background Noise Level ≤ 30 dB L_{AF90}.
- 11.2.55 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 11.6 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	45dB	40dB	35dB
All other Areas	55dB	50dB	45dB

Decommissioning Phase

- 11.2.56 Effects arising from the process of decommissioning of the Power Plant Area are considered to be the same as the construction phase on a highly precautionary basis (i.e., the Decommissioning Phase is likely to take place over a much shorter time period than the Construction Phase, and activities which may give rise to significant noise and vibration effects, such as piling, will not be carried out during decommissioning). Therefore, where this assessment refers to potential construction effects, these are also representative of predicted decommissioning effects – this is a conservative approach.
- 11.2.57 The Electricity Grid Connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (ESBN and EirGrid for electricity) as part of the national grid electricity. Upon decommissioning of the Power Plant Area, the 220kV substation and 400kV substation and associated transmission infrastructure will remain in-situ and form part of the national grid infrastructure. A decommissioning phase has not been considered in relation to the EGC.
- 11.2.58 The Gas Connection Corridor will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks. At the end of its design life, it is expected that the Gas Connection Corridor may have residual life remaining, and the operational life may be extended if appropriate and/or the asset refurbished and retained as part of the national transmission network. The gas pipeline will therefore not be decommissioned, and a decommissioning phase has not been considered in relation to the GCC.

Limitations and General Assumptions

General

- 11.2.59 Due to the large extent of the proposed project and the relatively flat characteristics of the landscape. Acoustic modelling predictions undertaken for this assessment have assumed flat ground. This is viewed as a conservative assumption as introducing height and natural undulations to the topography model can break line of sight between sound source and receptor and have the effect of reducing predicted sound levels at sensitive receptors.

Power Plant Area

- 11.2.60 The type, quantity, and usage of the provided construction plant for the Power Plant Area list against named activities is assumed a worst-case representation when combined for the purpose of the assessment. Therefore, while the procured list of construction plant may differ in practice, the outcome of this assessment will not be changed.

Electricity Grid Connection

11.2.61 The construction plant and activities for the 220 kV and 400 kV substation areas are no higher than the total sound power level associated plant to be used for the construction of the Power Plant Area.

Gas Corridor Connection

11.2.62 The specific route of the pipeline within gas connection corridor is currently unknown, see Figure 11.1 for the corridor's extents.

11.2.63 A construction vibration assessment has been scoped out as it is assumed that the planned pipeline route will either be at least 100m from residential receptors or exceedances of the limits in BS 5228-1:2009 will be avoided, controlled, and managed at sensitive receptors through plant selection, programming and communication where appropriate.

11.2.64 A specific baseline survey has not been carried out for the assessment of the Gas Corridor Connection, however levels from the baseline survey that was undertaken are expected to be representative.

11.3 Legislation, Policy Framework and Guidance

Legislation

11.3.1 *The Environmental Noise Regulations, 2006 (S.I. No. 140 of 2006)*: These regulations transpose the European Directive 2002/49/EC, commonly referred to as the Environmental Noise Directive (END). The directive aims to define a common approach intended to avoid, prevent, or reduce on a prioritized basis the harmful effects of exposure to environmental noise. The END primarily deals with noise from the following major sources:

- Major roads
- Major railways
- Major airports
- Agglomerations (urban areas with a population exceeding a certain threshold)

11.3.2 However, industrial noise is only relevant in the following manner:

- In larger urban areas, or "agglomerations" as defined by the directive, the noise from industrial activities can be considered when making strategic noise maps and action plans.
- If industrial noise is a significant source of noise pollution in an agglomeration, it would need to be assessed and managed in line with the directive's requirements.

11.3.3 The Proposed Development is not within a qualifying agglomeration - a population in excess of 100,000 persons and a population density such that the Member State considers it to be an urbanized area.

11.3.4 *EU Directive 2014/52/EU* is an amendment to Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The Directive requires that public and private projects that are likely to have significant effects on the environment be made subject to an assessment prior to development consent being given.

11.3.5 *Environmental Protection Agency Act, 1992*: This act established the Environmental Protection Agency (EPA) in Ireland. It covers a wide range of environmental concerns, including noise, which is among the environmental factors the EPA is required to consider.

Policy

11.3.6 The Offaly County Development Plan 2021-2027 and Westmeath County Development Plan 2021-2027, prepared in accordance with the provisions of the Planning and Development Act 2000 (as amended), set out a range of proposed policy objectives for development up to 2027 (Offaly County Council, 2021 and Westmeath County Council, 2021). The plans incorporate the mandatory objectives listed in the Act, including conservation and protection of the environment and promotion of compliance with environmental standard.

Guidance

EPA Guidelines 2022

11.3.7 The EPA Guidelines (EPA, 2022) were published to provide guidance on EU Directive 2011/92/EU as amended by 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.

Guidance Note for Noise (NG4)

- 11.3.8 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).

British Standard 5228:2009+A1:2014

- 11.3.9 BS 5228-1 ‘Code of practice for noise and vibration control on construction and open sites – Noise’ provides a ‘best practice’ guide for noise control and includes sound power level (L_w) data for individual plant as well as a calculation method for noise from construction activities.

- 11.3.10 BS 5228-2 ‘Code of practice for noise and vibration control on construction and open sites – Vibration’ provides a ‘best practice’ guide for construction vibration control.

British Standard 4142:2014 + A1:2019

- 11.3.11 BS 4142 ‘Methods for rating and assessing industrial and commercial sound’ can be used for assessing the effect of noise of an industrial nature, including mechanical services plant noise. The method compares the difference between ‘rating level’ of the industrial sound, with the ‘background sound level’ at the receptor position.

ISO 9613-2:1996

- 11.3.12 ISO 9613-2:1996 ‘Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation’ specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

Calculation of Road Traffic Noise

- 11.3.13 Department for Transport (DfT)/ Welsh Office Memorandum ‘Calculation of Road Traffic Noise’ (CRTN) describes procedures for traffic noise calculation and measurement and is suitable for environmental assessments of schemes where road traffic noise may have an effect.

Design Manual for Road and Bridges (2020)

- 11.3.14 The National Highways ‘Design Manual for Road and Bridges LA 111 (Revision 2) Noise and Vibration’ (DMRB) guidance on the appropriate approach to be taken when assessing the noise and vibration effects arising from all road projects, including new construction, improvements, and maintenance. The guidance is also useful for assessing changes in traffic noise levels because of non-road projects such as this.

World Health Organization

- 11.3.15 The World Health Organization’s (WHO) ‘Environmental Noise Guidelines for the European Region’ provides recommendations to protect human health from noise from transportation, wind turbines and leisure. These guidelines do not cover industrial noise, however, recommend that ‘Guidelines for Community Noise’ (Ref. 7-18) should remain valid.

- 11.3.16 This recommends external daytime and evening environmental noise limits, and internal night- time limits to avoid sleep disturbance.

- 11.3.17 The WHO ‘Night Noise Guidelines for Europe’ (Ref. 7-19) recommend updated guidelines on night-time noise limits to avoid sleep disturbance.

Noise Advisory Council Method 1978

- 11.3.18 'A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq} ', Report by a Working Party for the Technical Sub-Committee of the Council, describes a method for predicting road traffic noise levels appropriate for low flows compared to CRTN.

11.4 Baseline Environmental Conditions and Constraints

11.4.1 The NSR Noise Sensitive Receptors (NSRs) likely to be most exposed to the noise emissions from the Proposed Development and Overall Project have been identified and are shown on Figure 11.1.

- NSR1 (53.325176, -7.243542) Coole
- NSR2 (53.328533, -7.250672) Coole
- NSR3 (53.334351, -7.247513) Togher
- NSR4 (53.34256, -7.24835) Barrysbrook
- NSR5 (53.383595, -7.242782) Knockdrin
- NSR6 (53.38702, -7.237075) Knockdrin
- NSR7 (53.404312, -7.280541) Farthingstown

11.4.2 The seven receptors are all residential and represent the relevant closest receptor positions to the Proposed Development identified from satellite imagery. The closest receptors to the Power Plant Area are NSR5 and NSR6 both approximately 1.1km south. The closest receptor to the 400 kV Substation is NSR1 which is approximately 350m south-west of the shortest path to the red line boundary.

11.4.3 NSR1 to NSR7 represent the properties closest to the various components of the Proposed Development and therefore are exposed to the highest noise levels. It is assumed that if compliant levels are achieved at these locations, compliant levels will be achieved at all other receptor positions. This is a reasonable assumption as observed sound pressures level reduce as the distance from the sound source increases in open outdoor conditions like those surrounding the Proposed Development.

Baseline Monitoring Overview

11.4.4 A baseline sound level survey was carried out at eight monitoring locations (M1-M8 located to the north-west, west, south-west and north-east) between 20 April 2023 and 11 May 2023 to determine existing ambient noise levels in the area pertaining to the Proposed Development. The monitoring locations used are shown on Figure 11.1 and are representative of the NSRs either directly in the instances where they are in the same location or by proxy where a similar nearby alternative location has been used. M1 represents NSR1, M2 represents NSR2 and so on whereas M8 does not relate to specific sensitive receptor and was situated within the Power Plant Area.

11.4.5 Photographs and descriptions of the monitoring locations are available on Volume II Appendix 11B, while further details of the baseline survey, including levels and instrumentation is provided in Appendix 11C.

11.4.6 Acoustic measurements were undertaken with reference to ISO 1996-2:2007: Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels as referenced within NG4.

11.4.7 Assessments are carried out for each NSR location, whereas the monitoring location, are in the general area of the corresponding NSR depending on access, safety, and security consideration for placing the unattended monitoring equipment. The monitored sound levels at the monitoring locations are considered to be representative of those that would be experienced at the NSRs themselves.

11.4.8 Road traffic noise, bird song, vegetation and occasional agricultural sound sources are common sound and activities across all areas.

Power Plant Area

- 11.4.9 Baseline monitoring locations relevant to the Power Plant Area are M5, M6 and M7. These are located ~1.2km, ~1.1km and ~1.6km from the Power Plant Area and are representative of the closest noise sensitive receptors NSR5, NSR6 and NSR7.

Electricity Grid Connection

- 11.4.10 Baseline monitoring location M1 to M7 are relevant to the Electricity Grid Connection. Specifically monitoring locations:
- M1 to M3 are closest to the 400kV substation;
 - M4 is closest to the overhead line cable interface compound; and
 - M5 to M7 are closest to the 220kV substation.

Gas Corridor Connection

- 11.4.11 Baseline monitoring was not conducted for the assessment of the Gas Corridor Connection specifically as explained in 11.3 Limitations and Assumptions. However, some of the monitoring locations for the Power Plant Area and Electricity Grid Connection can provide an indication of the prevailing sound pressure levels within most of the Gas Corridor Connection.
- 11.4.12 Baseline monitoring conducted at M7 is within the Gas Connection Corridor area and is situated approximately 350m south of the M6 Motorway.
- 11.4.13 Baseline monitoring was also conducted at M8 within the planned Power Plant Area. This is close to the edge of the pipeline buffer area however it is also 2.3km south of the M6 Motorway which dissects the Gas Connection Corridor. M8 can be used to represent other rural receptors within pipeline area that are a similar distance north of the motorway. As there is a much greater concentration of residential properties around Rochfortbridge, which is ~1.4km north of the M6 Motorway, it is likely that background levels there are higher than at M8 due to the presence of a greater number of residential properties. Using background sound levels that are lower than those at the sensitive receptors being assessed is a conservative approach when comparing absolute levels.

Baseline Monitoring – Summary of Sound Measured Levels

- 11.4.14 A summary of the sound levels over the duration of the baseline monitoring survey are presented in the following Table 11.7. Coordinates and more detailed day, evening, and night breakdown for each 24- hour period monitored as well as figures of sound level time histories for each monitoring location are provided in Appendix 11C.

Table 11.7 Baseline Monitoring Sound Level Summary

MONITORING LOCATION	DAY			EVENING			NIGHT		
	L _{Aeq,T}	L _{Amax}	L _{A90,T}	L _{Aeq,T}	L _{Amax}	L _{A90,T}	L _{Aeq,T}	L _{Amax}	L _{A90,T}
M1	59	99	40	57	97	34	57	99	27
M2	57	100	43	60	104	35	57	101	27
M3	50	87	37	49	79	33	49	93	33
M4	51	95	38	55	92	31	45	90	24
M5	54	88	44	52	90	37	51	90	32
M6	48	82	37	48	80	33	46	80	25
M7	58	88	52	59	84	50	53	79	42
M8	49	90	39	46	71	33	42	75	30

11.4.15 While specific activities are not immediately discernible from the background sound level data, it is known that Yellow River Windfarm was under construction, quarries to the west and east) of the Power Plant Area were operational and as well as the Rhode Power Station to the east of the electricity grid connection during the baseline monitoring periods. These activities may be contributing to the monitored baseline sound levels at some locations. However, even with these potential contributions at some monitoring locations (M1, M4, M6 and M8), the criteria for a Low Background Noise Area, explained in section 11.2, is still met. This is discussed further in relation to sensitive receptors from paragraphs 11.5.25 and 11.5.58.

11.5 Predicted Impacts

Do Nothing Scenario

11.5.1 In the absence of the Proposed Development and Overall Project, the existing acoustic environment is expected to remain largely unaffected and unchanged, despite potential for change from other planned developments in the area. The area is rural in nature but with noise contributions from the roads and other industrial operators and energy/renewable energy projects, like quarries, Yellow River Windfarm and the Rhode Power Station in proximity to the Proposed Development and Overall Project.

11.5.2 If the Proposed Development were not to proceed, environmental monitoring and site management would continue, as required under the conditions of the IPC Licence (P0501-01).

Impact Assessment for Power Plant Area

Construction Phase

Site Noise

11.5.3 Based on the criteria in Table 11.1 and Table 11.2, and the measured baseline noise levels in Appendix 11C (refer to EIAR Volume II), the weekday daytime and Saturday morning construction noise criteria for all seven sensitive receptors is 65dB $L_{Aeq,T}$ (façade).

11.5.4 The proposed construction programme is detailed in Table 5.6 of Chapter 5: Proposed Development of this EIAR.

11.5.5 The Applicant and Engineering Design Team have provided a list of construction equipment, sound power levels and daily percentage on-time for each stage of the work. This information can be found in Volume II Appendix 11D but is summarised in the following.

11.5.6 Power Plant (OCGT, CCGT, Secondary Fuel Storage, Unloading Facility and Subsidiary items of plant/equipment) Construction Stages are listed below:

- Demolition;
- Site Clearance;
- Piling and Foundation Works;
- Building and General Site Activities;
- Fit Out; and
- Landscaping.

11.5.7 Derrygreenagh Above Ground Infrastructure (AGI) Compound Construction Stages:

- Preparing access to and from right of way inc. hedge removal;
- Site Fencing;
- Pre and post construction land drainage;
- Topsoil strip;
- Preparing Right of Way; and
- Construction.

11.5.8 To assess the construction noise levels associated with the Power Plant Area, the loudest stages of construction for the Power Plant Area have been combined to

represent a conservative worst-case scenario in terms of potential construction noise levels.

- 11.5.9 If construction noise levels during this worst-case scenario are demonstrated to be compliant with the nominated criteria, it follows that construction noise levels will be compliant during all other stages of the construction programme.
- 11.5.10 Sound power levels associated with the various plant and processes to be employed during the noisiest phase of the works have been provided by the Applicant and Engineering Design Team and have been estimated using the data in BS 5228-1.
- 11.5.11 The daily percentage on-times for all construction plant used for the Power Plant Area is 60%.
- 11.5.12 The daily percentage on-times for all construction plant used for the AGI construction is 91%.
- 11.5.13 Accounting for on-times, the combined levels used in the assessment are presented in Table 11.8 for each stage. A breakdown of the typical construction plant and equipment used for each stage can be found in Appendix 11D.

Table 11.8 Sound Power Levels for each Stage of Work for the Power Plant Area

	STAGE OF WORK	SOUND POWER (L_w dBA)
POWER PLANT	Demolition	126
	Site Clearance	122
	Piling and Foundation Works	125
	Building and General Site Activities	123
	Fit Out	121
	Landscaping	101
AGI COMPOUND	Preparing access to and from right of way inc. hedge removal	111
	Site Fencing	111
	Pre and post construction land drainage	117
	Topsoil strip	120
	Preparing Right of Way	116
	Construction	120

- 11.5.14 The preparatory “Demolition” stage at the Power Plant Area and “Construction” stage at the AGI Compound, represent the two stages that, if they occur at the same time, would result in the highest cumulative sound power levels under the following condition which is:
 - That all equipment listed in those stages is active for their quoted on-time with respect to either a 12 hour or 6 hour day depending on whether it is occurring on a weekday day-time or Saturday morning.
- 11.5.15 The construction sound power level used to assess the Power Plant Area is therefore 127dB L_{wA} determined by the logarithmic addition of the sound power levels of these two stages (126 + 120).
- 11.5.16 Construction noise predictions were undertaken using the methodology outlined in BS 8233-1. The predicted facade construction noise levels during normal working hours at each receptor location are provided in Table 11.9. The sound power level has been

assigned to an area source at a height of 3m and covering the main work area as worst-case assumption. These predicted noise levels include a +3dB façade correction.

Table 11.9 Predicted Construction Noise Levels – façade

RECEPTOR	PREDICTED DAY-TIME CONSTRUCTION NOISE LEVEL (L _{Aeq,12hr} dB)
NSR5	59
NSR6	58
NSR7	57

11.5.17 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 in Table 11.4.

11.5.18 No significant adverse impact is therefore expected at residential receptor positions with regards to construction phase noise levels generated by on-site activities. With reference to EPA Guidelines and Table 11.5 and 11.6, the effects of the Power Plant Area construction would be defined as **Not Significant, Negative and Short-Term**.

Noise from Construction Traffic on Existing Roads

11.5.19 The following public roads (excluding the M6 Motorway) would be used by the construction traffic, as identified in Chapter 14: Traffic of this EIAR, see Figure 11.2 for a map of the seven relevant links, considered in the construction noise assessment.

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

11.5.21 Calculations have been carried out in accordance with the BNL methodology presented in CRTN.

11.5.22 The traffic flow data used for input to the road traffic noise calculations is provided in Table 11.10(a) by the project traffic consultant. The development traffic considers the combined total construction trips for the power plant area, electric grid connection and gas connection corridor. It should be noted that the peak overall traffic occurs at a different time as the peak HGV traffic and so both scenarios have been assessed. The resulting Basic Noise Level (BNL) calculations for each link are presented in Table 11.10(b) along with predicted change in noise level.

Table 11.10(a) Predicted Road Traffic Flows in the year of construction 2025.

Peak HGV Assessment - March - May 2025									
Link	2025 Base			Development Traffic			2025 + Development Traffic		
	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%
Link 1	5300	346	6.5%	0	0	0.0%	5300	346	6.5%
Link 2	4155	245	5.9%	0	0	0.0%	4155	245	5.9%
Link 3	2767	212	7.7%	0	0	0.0%	2767	212	7.7%
Link 4	2664	472	17.7%	544	414	76.1%	3208	886	27.6%
Link 5	2661	473	17.8%	253	152	60.1%	2914	625	21.5%
Link 6	4081	362	8.9%	87.6	30	34.2%	4169	392	9.4%
Link 7	2082	97	4.7%	84	30	35.7%	2166	127	5.9%
Peak combined total traffic - Dec 2025 - Feb 2026 (baseline year 2025 used)									
Link	2025 Base			Development Traffic			2025 + Development Traffic		
	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%
Link 1	5300	346	6.5%	0	0	0.0%	5300	346	6.5%
Link 2	4155	245	5.9%	90	33	36.7%	4245	278	6.5%
Link 3	2767	212	7.7%	90	33	36.7%	2857	245	8.6%
Link 4	2664	472	17.7%	708	380	53.7%	3372	852	25.3%
Link 5	2661	473	17.8%	393	222	56.5%	3054	695	22.8%
Link 6	4081	362	8.9%	236	125	53.0%	4317	487	11.3%
Link 7	2082	97	4.7%	211	125	59.2%	2293	222	9.7%

Table 11.10(b) Predicted road traffic noise levels, predicted change and resulting magnitude of impact.

Peak HGV Assessment - March - May 2025				
Link	2025 Base BNL (dB)	2025 + Development Traffic BNL (dB)	Predicted Change (dB)	Magnitude of Impact
Link 1	61.5	61.5	0	No Change
Link 2	60.5	60.5	0	No Change
Link 3	58.6	58.6	0	No Change
Link 4	58.5	59.5	1.0	Minor
Link 5	58.4	58.9	0.5	Negligible
Link 6	60.4	60.5	0.1	No Change
Link 7	57.0	57.2	0.2	No Change
Peak combined total traffic - Dec 2025 - Feb 2026 (baseline year 2025 used)				
Link	2025 Base BNL (dB)	2025 + Development Traffic BNL (dB)	Predicted Change (dB)	Magnitude of Impact
Link 1	61.5	61.5	0.0	No Change
Link 2	60.5	60.6	0.1	Negligible
Link 3	58.6	58.7	0.2	Negligible
Link 4	58.5	59.7	1.2	Minor
Link 5	58.4	59.2	0.7	Negligible
Link 6	60.4	60.7	0.3	Negligible
Link 7	57.0	57.6	0.6	Negligible

11.5.23 Through comparison of Table 11.3 and Table 11.10(b), it can be seen that a minor impact or better is predicted on all links in both scenarios. Note that a change of 3dB is considered just noticeable in everyday listening conditions. The BNL is the predicted level 10m from the road link, meaning the absolute levels will be lower overall for receptors further away. While the predicted change will remain the same for more distant receptors, the contribution of other sound sources in the area will be more prevalent, this contextual factor has the effect of reducing the final magnitude of impact for more distance receptors. Considering change in level at 10m is therefore a conservative approach.

11.5.24 No worse than minor impact (not significant) on existing road traffic noise levels is expected during the construction phase at residential receptor positions. With reference to EPA Guidelines and Table 11.5 and 11.6, the effect of the Power Plant Area construction vehicles utilising local roads would be defined as **Imperceptible, Negative Short-Term, and Reversible**.

Operational Phase

Site Noise

11.5.25 The assessment criteria associated with each NSR is determined from the baseline sound level monitoring survey data presented in Table 11.7.

11.5.26 Based on the NG4 methodology and the baseline noise levels, the assessment criteria for operational noise emissions have been determined from NG4 and are presented in Table 11.11 below. See Figure 11.1 for NSR and monitoring locations.

Table 11.11 Typical Operational NG4 Limit Values for Noise from Licensed Sites – 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)
NSR5	M5	55	50	45
NSR6	M6	45	40	35
NSR7	M7	55	50	45

11.5.27 Monitoring location M5 and M7 are not compliant with the qualification criteria in NG4 for Low Background Noise Area, reproduced in paragraph 11.2.47. This means NSR5 and NSR7 are assessed against the All-Other Areas criteria outlined in Table 11.4 above.

11.5.28 Monitoring location M6 is compliant with the qualification criteria in NG4 for Low Background Noise Area, reproduced in paragraph 11.2.47. This means NSR6 is assessed against the Low Background Noise Area criteria in Table 11.4 in this application.

11.5.29 The Power Plant Area of the Proposed Development will comprise the following main operational phase components (refer to Chapter 5 of this EIAR for full details):

- Combined Cycle Gas Turbine Unit (CCGT) Plant;
- Open Cycle Gas Turbine (OCGT) Plant;
- Secondary Fuel Storage and Unloading Facility;
- Subsidiary items of plant/equipment;
- Gas Connection AGI Compound; and

- Associated buildings and infrastructure.

11.5.30 A full description of the Proposed Development Power Plant Area is provided in EIAR Chapter 5: The Proposed Development and Overall Project.

11.5.31 The Proposed Development Power Plant Area will have the ability to operate 24 hours a day, seven days a week. It is noted, however, that whilst the Power Plant Area has the potential to operate in this manner, in reality, it is expected to only operate at full generating capacity during for a limited number of hours per year, running on less than full generating capacity for the majority of the year, in line with grid network capacity demands.

11.5.32 Design details have been provided by the Applicant and Engineering Design Team which is based on information from equipment supplier data, industry practice and design specifications to present a robust operational assessment of the Power Plant Area operational plant.

11.5.33 The operational plant noise levels used in the assessment are presented in Table 11.12. They have been provided by the Applicant.

Table 11.12 Operational Plant Sound Power Levels.

PLANT		SOUND POWER LEVEL (L_{WA} dB) PER ITEM
1 x CCGT		
S1	Turbine and steam turbine halls	94
S2	Air inlet filters	94
S3	HRSB buildings	97
S4	HRSB Stack Body	91
S4	HRSB Stack Top	92
S5	Electrical building	83
S6	Feedwater pump building	80
S7	Generator transformers	92
S8	Workshop and stores	80
S9	Demineralised water treatment plant, fire pumps and lab	80
S10	Wastewater treatment plant	80
S11	Gas Compressor Fin Fan Coolers	94
S12	Gas Compressors	80
S13	Electrical, control room and admin building	74
S14	Closed circuit cooling water Fin Fan Coolers	80
S15	ACC Inlet	103
S16	ACC Outlet	104
2 x OCGT		
S17	OCGT Fin Fans	94
S18	Stack base	100
S19	Stack outlet	95
S20	Main Transformer (with 5m high blast wall on north, south and east sides)	106
S21	Auxiliary transformer	102

S22	Skid gas enclosure (internal)	106
	Turbine enclosure (internal)	105
	Generator (internal)	107
	Diffuser (internal)	105
S23	Air intake inlet (external)	112
	Air intake body (external)	114

- 11.5.34 Sound sources have been located as labelled with ID in Appendix 11D.
- 11.5.35 Note that sound sources related to the AGI compound are not included in the list of operational sound sources above. This is because operational noise from the AGI would typically be confined to limited scheduled maintenance works or occasional venting of small volumes of gas.
- 11.5.36 A representative sound pressure level for the venting has been provided by the project team as being 75dBA at 5m, the closest NSRs (NSR5 and NSR6) are ~1.2km away and as the venting would not occur continuously an on-time correction should be included. Based on a conservative on-time of 1.6% (1 min in an hour) the predicted specific sound level at the nearest receptor would be approximately 8 dBA. As this is well below the existing background sound level the venting sound impact during maintenance activity would be considered **Negative, Imperceptible, and Momentary**.
- 11.5.37 In the 3D model definition sound sources have been represented as either point sources or as area sources “wrapped” around the box/enclosure of a building. The sound power level for a particular building has been spread evenly over its sides and roof. Building and structures (without additional mitigation) have been assumed to provide minimal sound absorption of 1 dB. The Power Plant Area has been modelled with a hard ground assumption within the redline boundary and soft ground otherwise to best represent the surrounding peatland/agricultural land. More acoustic modelling details can be found in Volume II Appendix 11D.
- 11.5.38 In the case of S20 Main Transformer it is modelled with a 5m high blast wall on three sides, north, south and east. If a quieter transformer can be procured, then this may negate the acoustic requirement for the blast wall on three sides.
- 11.5.39 In the case of S22, the two OCGT buildings, the four internal sound sources indicated in Table 11.12 have been assumed to be within a building enclosure that is constructed with single 0.8mm sheet steel cladding with insertion loss values given in Table 11.13. This is a minimum acoustic performance assumption made for the purpose of the assessment. Alternative constructions providing an improved overall reduction would also be acceptable from an acoustic standpoint.

Table 11.13 Insertion Loss Provided by 0.8mm Sheet Steel Cladding.

	OCTAVE FREQUENCY BAND								
	31.5	63	125	250	500	1000	2000	4000	8000
0.8mm steel cladding insertion loss	9	9	12	16	21	26	32	37	9

- 11.5.40 Table 11.14 provides external sound power level of all internal OCGT building (S22) sound sources accounting for reverberation within the building, on the basis of painted concrete floor, steel walls and steel roof interior with the specification provided.

Table 11.14 Combined Sound Power Level of Internal Source plus Reverberation and External Air Intake Equipment on each OCGT Building (S22).

	OCTAVE FREQUENCY BAND									L _{WA}
	31.5	63	125	250	500	1000	2000	4000	8000	
L _w of Internal sources + reverb. on external building surfaces	112	114	101	97	94	86	79	69	58	95
L _w of Air Intake external to building	128	130	120	112	110	111	110	105	101	116

11.5.41 To calculate operational noise levels at nearby receptors, the 3D CadnaA noise modelling software package has been used and setup with an even ground assumption as this represents the area well but is also conservative. This is discussed in 11.2 Limitations and Assumptions.

11.5.42 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 and/or design out these characteristics at the detailed design phase so that no acoustic character corrections are required when assessed at the NSR.

11.5.43 A summary of the results is provided in Table 11.15 and illustrated in Figure 11.3

Table 11.15 Predicted Operational Noise Levels at Receptors – free-field.

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVEL (L _{Aeq,T} dB)	DAY / EVE NIGHT NOISE CRITERION L _{Aeq,T} dB	COMPLIANT DAY, EVENING & NIGHT ?
NSR5 – GF	42	55 / 50	Yes
NSR5 – FF	43	45	Yes
NSR6 – GF	41	45 / 40	No (in Evening)
NSR6 – FF	42	35	No
NSR7 – GF	33	55 / 50	Yes
NSR7 – FF	34	45	Yes

11.5.44 A comparison of Table 11.11 and Table 11.15 indicates that additional mitigation is required as the unmitigated scenario is not compliant with the evening or night-time limits at NSR6. NSR6 is compliant in the day-time.

11.5.45 Predicted levels at NSR5 and NSR7 are compliant in the day, evening, and night-time periods.

11.5.46 Without any mitigation intervention the impact of the Power Plant Area at NSR6 is **Negative, Significant, Permanent, and Reversible** in the evening and night-time.

11.5.47 At all other receptors and at NSR6 in the day-time, without any mitigation intervention, the impact is described as **Negative, Not Significant, Permanent, and Reversible**.

11.5.48 Mitigation is discussed in section 11.6 for the Power Plant Area to address the exceedance at NSR6.

Decommissioning Phase

11.5.49 Effects arising from the process of decommissioning of the Power Plant Area are expected to be no worse than those arising from the construction process. This is because similar processes will be employed, except for piling activities, concrete pours, etc. which are not required. The decommissioning phase is also anticipated to take place over a much shorter duration than the construction phase. However, on a highly precautionary basis, impacts and effects associated with the construction phase are assumed to be the same for the decommissioning phase.

11.5.50 The decommissioning phase has therefore not been considered separately in this chapter. Where this assessment refers to potential construction effects, these can be considered a robust conservative representation of predicted decommissioning effects.

Impact Assessment for Electricity Grid Connection

Construction Phase

Site Noise

11.5.51 Based on the criteria in Table 11.1 and Table 11.2, and the measured baseline noise levels in Appendix 11C (refer to EIAR Volume II), the weekday daytime and Saturday morning construction noise criteria for all the identified closest receptors is BS 5228-1 Category A 65dB $L_{Aeq,T}$ (façade).

11.5.52 The construction activity of the Power Plant Area was previously assessed using a sound power level of 127dB L_{WA} in section 11.5. As the construction of Electricity Grid Connection including the 220kV and 400kV substations would each be a considerably smaller undertaking, using the same 127dB L_{WA} for each substation construction area is considered an adequate worst-case scenario to determine compliant levels at nearby sensitive receptors.

11.5.53 Construction noise predictions were undertaken using the methodology outlined in BS 5228-1. The construction activity at the 220kV and 400kV substations was represented by an area source at 3m height covering the substation areas with assigned sound power level of 127dB L_{WA} . The predicted facade construction noise levels during normal working hours at each receptor locations are provided in Table 11.16. These predicted noise levels include a +3dB façade correction.

Table 11.16 Predicted Construction Noise Levels for Electricity Grid Connection – façade.

RECEPTOR	PREDICTED DAY-TIME CONSTRUCTION NOISE LEVEL ($L_{Aeq,12hr}$ dB)
NSR1	63
NSR2	60
NSR3	60
NSR4	52
NSR5	59
NSR6	58
NSR7	57

11.5.54 It can be seen from Table 16 that predicted construction noise levels for the estimated noisiest period of construction are no greater than the weekday daytime and Saturday morning assessment criteria given in Table 11.2 for Category A.

Overhead Line and Underground Cable Installation and Transition Location

11.5.55 As outlined previously, core construction hours are in the daytime and given:

- A BS 5228-1 Category A Threshold value of 65 dB $L_{Aeq,T}$ before potentially Significant effects occur
- The duration of the cable infrastructure installation from the perspective of a single resident; and
- The significant intervening distance from the OHL/underground cable to any NSR.

11.5.56 It is considered that the Threshold value will not be exceeded at any given NSR and that implementation of BAT would sufficiently control and minimise noise levels.

Noise from Construction Traffic on Existing Roads

11.5.57 See paragraph 11.5.22 and Table 10(a) and Table 10(b) for the construction traffic noise assessment that includes contributions from the Power Plant Area, Electricity Grid Connection and Gas Connection Corridor.

Operational Phase

Site Noise

11.5.58 The assessment criteria associated with each NSR in relation to the Electricity Grid Connection is determined from the baseline sound level monitoring survey data presented in Table 11.7.

11.5.59 Based on the NG4 methodology and the baseline noise levels, the assessment criteria for operational noise emissions have been determined from NG4 and are presented in Table 11.17 below. See Figure 11.1 for NSR and monitoring locations.

Table 11.17 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)
NSR1	M1	45	40	35
NSR2	M2	55	50	45
NSR3	M3	55	50	45
NSR4	M4	45	40	35
NSR5	M5	55	50	45
NSR6	M6	45	40	35
NSR7	M7	55	50	45

11.5.60 Monitoring locations M2, M3, M5 and M7 are not compliant with the qualification criteria in NG4 for Low Background Noise Area, reproduced in paragraph 11.2.47. This means NSR2, NSR3, NSR5 and NSR7 are assessed against the All Other Areas criteria in Table 11.4 in this application.

11.5.61 Monitoring locations M1, M4 and M6 are compliant with the qualification criteria in NG4 for Low Background Noise Area, reproduced in paragraph 11.2.47. This means NSR1, NSR4 and NSR6 are assessed against the Low Background Noise Area criteria in Table 11.4 in this application.

11.5.62 The noise generating sound sources associated with the Electricity Grid Connection Areas of the Proposed Development will comprise the following (refer to Chapter 5 of this EIAR for full details including none noise generating components):

- 220kV GIS Electrical Substation Building;
- Hybrid double circuit 220kV transmission OHL and Underground Cable connection (UGC) facilitated by line-cable interface compound to the 400kV Substation; and
- 2 x 400kV Transformer (with 11m high blast wall on 3 sides).

11.5.63 The OHL and UGC are scoped out of the operational noise assessment as explained in section 11.2 Assessment Scope Exclusions.

11.5.64 The Electricity Grid Connection will have the ability to operate 24 hours a day, seven days a week and therefore as the night-time period is the most stringent, compliance with the night-time criteria inherently means compliance with day and evening criteria.

Table 11.18 Operational Noise Criteria – free-field.

PLANT		SOUND POWER LEVEL (L _{WA} dB) PER ITEM
Substation Areas		
S24	220kV GIS Electrical Substation Building	77
S25	400kV Transformer (with 11m high blast wall on 3 sides)	88
S26	400kV Transformer (with 11m high blast wall on 3 sides)	88

11.5.65 Table 11.19 presents the predicted sound levels from the combination of the 220kV and 400kV substation operations.

Table 11.19 Predicted Substation (220kV and 400kV) Operational Noise Levels – freefield.

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVEL (L _{Aeq,T} dB)	PREDICTED OPERATIONAL NOISE LEVEL (L _{Aeq,T} dB)
	Ground Floor	First Floor
NSR1	17	17
NSR2	20	22
NSR3	20	22
NSR4	10	10
NSR5	6	6
NSR6	5	5
NSR7	3	3

11.5.66 It can be observed from Table 11.19 that the contribution of the two substations combined is well below the night-time assessment criteria of 35dB L_{Aeq,8hr}.

11.5.67 Therefore, no significant adverse impact is expected at residential receptor positions generated by substation operations. With reference to the EPA Guidelines and Table 11.5 and 11.6, the effects of Electrical Grid Connection Substation Area operations would be defined as **Negative, Imperceptible, Permanent, and Reversible**.

Decommissioning Phase

11.5.68 The Electricity Grid Connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (ESBNI and EirGrid for electricity) as part of the national grid electricity. Upon decommissioning of the Power Plant Area, the 220 kV substation and 400 kV substation and associated transmission infrastructure will remain in situ and form part of the national grid infrastructure. Decommissioning is therefore not envisaged for the Electricity Grid Connection.

Impact Assessment for Gas Corridor Connection

11.5.69 There are number of noise sensitive properties located within the Gas Connection Corridor, the receptors are located along the R400, L1127 road and clustered around Rochfortbridge. The route of the Gas Connection Corridor can be found in Figure 11.1. The acoustic environment varies over the corridor area mainly as a result of the change in proximity to major road transportation routes. The south of the route crosses the M6 motorway and north of the route stops just before crossing the N52.

11.5.70 As discussed in Section 11.4, the baseline surveys can be used to provide an understanding of how road traffic sound levels from the M6 motorway affects, or not, the prevailing ambient sound levels at a range of distances. Specifically, this means that the baseline survey can be used to establish representative baseline sound levels for NSR's within the Gas Connection Corridor including NSR7.

Construction Phase

Site Noise

11.5.71 There is the potential for noise effects to occur from construction works associated with the proposed scheme.

11.5.72 However, the 'worst case' scenarios, where the construction works will be closest to the noise sensitive properties are not known since the precise route of the Gas Connection Corridor is still to be determined.

11.5.73 Due to the linear nature of the pipeline construction, the duration of the activity from the perspective of a single sensitive receptor is expected to be short in nature, such that is considered much shorter than Temporary in duration according EPA Guidelines.

11.5.74 It is the responsibility of the nominated contractor to specify the construction plant and methodology to be employed. However, to present a robust assessment suitable library plant and activities which are typical for these construction works, and 'worst-case' levels have been compiled from empirical sources and presented in Table 11.20 below.

Table 11.20 Sound Pressure Levels for Typical Construction Plant and Activities associated with Gas Pipeline installation.

PLANT/ACTIVITY	dB L _{Aeq,T} @ 10m
Haulage lorries	70
30 tonne Excavator	87
D6 dozer	86
Wheeled dozer	80
2 dump trucks (combined)	81
Pumping/dewatering	81
Demolition (rock breaking – only if required)	90
Compacting fill (vibrating roller)	78
Directional drilling/augering (HDD)	75-80

These values have been reproduced from Kilroot Pipeline Environmental Statement – Volume 1 June 2020

11.5.75 The predicted noise levels from combined activities were determined at a range of distances for each work phase activity of the gas pipeline installation. The results are presented in Table 11.21 below.

Table 11.21 Predicted Sound Pressure Levels for Typical Construction Activities associated with Gas Pipeline installation at a range of distances.

	Sound pressure level (dB L _{Aeq,T}) at range of distances (metres)							
	10m	15 m	30 m	50 m	100m	160m	200m	300m
Site clearance and preparation of working width	87	83	77	73	67	63	61	57
Topsoil stripping	89	85	79	75	69	65	63	59
Route excavation and preparation	85	81	75	71	65	61	59	55
Landscaping	85	81	75	71	65	61	59	55
HGV movements	85	81	75	71	65	61	59	55
<i>These activities and levels @10m have been reproduced from Kilroot Pipeline Environmental Statement – Volume 1 June 2020. Levels for 15m to 300m have been calculated and are therefore predicted levels.</i>								

11.5.76 During the core construction hours in the daytime and Saturday morning it can be observed that the baseline survey data ranges between 48 to 59 dB L_{Aeq,12hr} and it is therefore likely that construction activity at the NSRs within Gas Corridor Connection should also be assessed against the BS 5228-1 Category A criteria of 65 dB L_{Aeq,12hr}. This is on the basis that the sound character and acoustic environment within the Gas Corridor Connection area is likely to be very similar to that represented by the baseline survey. Further to this, it was previously explained in paragraph 11.4.11 that M7 and M8 are relevant representative baseline for the Gas Connection Corridor.

11.5.77 As exceedances of the Category A Threshold Values are predicted to be possible depending on the proximity of a given NSR to the constructions works it is therefore appropriate to implement mitigation measures to reduce the impact at the ‘worst case’ properties during pipeline installation.

11.5.78 However, it is important to note that this ‘worst case’ impact will be limited in duration and for the majority of the works the distance to the noise sensitive properties will be more than 160m. For works beyond this distance, the predicted construction sound levels are below the threshold for Category A and hence the impact for the majority of the works would not be considered as significant.

11.5.79 No significant adverse impact is therefore expected at residential receptor positions with regards to construction phase noise levels generated by pipeline installation activities provided that suitable good practice mitigation measures are implemented as outlined in section 11.6, and minimal works take place within 160m of sensitive receptors. With reference to the EPA Guidelines and Table 11.5 and 11.6, the effects of Pipeline Installation construction would be defined as **Negative, Not Significant and Temporary**.

Noise from Construction Traffic on Existing Roads

- 11.5.80 See paragraph 11.5.22 and Table 10(a) and Table 10(b) for the construction traffic noise assessment that includes contributions from the Power Plant Area, Electricity Grid Connection and Gas Connection Corridor.

*Operational Phase***Site Noise**

- 11.5.81 The gas connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks.
- 11.5.82 When operational, the Gas Connection Corridor element will operate 24 hours a day, seven days a week, with occasional offline periods for maintenance. Telemetry will be used to interface with the GNI central control room to reduce the need for attended personnel inspection.
- 11.5.83 It is not proposed that the gas connection corridor or AGI on the high-pressure line will be attended by personnel although periodic inspections and maintenance activities will be undertaken in the order of one transit van visit to the AGI per month.
- 11.5.84 The potential traffic impacts associated with the operational phase have been determined to be negligible and terms of the EPA Guidelines the effect of the Gas Pipeline Corridor during operation would be classed as **Imperceptible, Permanent** but **Reversible**

Decommissioning Phase

- 11.5.85 The gas connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks. At the end of its design life, it is expected that the Gas Connection Corridor may have residual life remaining, and the operational life may be extended if appropriate and/or the asset refurbished and retained as part of the national transmission network. Decommissioning of the Gas Connection Corridor is therefore not envisaged.

11.6 Mitigation and Enhancement Measures

Power Plant Area

Construction Phase

- 11.6.1 A Significant adverse effect is not predicted during the construction phase of the Power Plant Area. This is on the basis that BS-5228-1 Category A Threshold Value of 65 dB $L_{Aeq,T}$ Threshold Value is not predicted to be exceeded.
- 11.6.2 Nonetheless, to keep noise and vibration levels to a minimum, the following general mitigation will be implemented during construction:
- Good community relations will 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 will be adhered to, i.e., 0700 hours - 1900 hours weekdays and 0800 hours - 1300 hours Saturdays, with no working on Sundays or Bank Holidays (including site deliveries) unless agreed with the local planning authority;
 - Any activities that are required to be undertaken outside of standard construction hours will be discussed with the relevant authorities in advance;
 - 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 will be located away from receptor locations wherever possible;
 - The appointed Contractor for the construction phase will be provided with electrical power which minimises the requirement for diesel generators at the Site;
 - Diesel generators, if and when required, will be enclosed in sound proofed containers to minimise the potential for noise impacts
 - All plant used on site will be regularly maintained, paying attention to the integrity of silencers and acoustic enclosures;
 - Compressors will be of the "sound reduced" models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
 - All noise generating construction plant will be shut down when not in use;
 - The loading and unloading of materials will take place away from residential properties, ideally in locations which are acoustically screened from nearby NSRs;
 - 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 will 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 will 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 will 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.

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

Operational Phase

11.6.4 A commitment is made to adopt the NG4 operational noise limits detailed in this assessment as requirements within the final design, including the need to address distinctive acoustic characteristics of tonality and impulsivity and application of best available techniques (BAT) at detailed design stage as per the requirements of NG4 for licensed operations.

11.6.5 The Power Plant Area will be operated in compliance with the conditions of an Industrial Emissions (IE) Licence including all conditions related to control of noise emissions attributable to on-site activities.

11.6.6 Application of BAT could be, but is not limited to, the selection of equipment that is a quieter alternative, uses quiet modes or can be readily fitted with acoustic interventions such as silencers, mufflers or attenuators all to reduce the sound emissions.

11.6.7 A commitment is also made to:

- Undertake annual compliance noise level monitoring with the nominated NG4 criteria for each NSR, i.e., in-line with the license conditions for the site as agreed under IE Licence; and
- Periodic maintenance of the Plant to manufacturer specification and implementation of an energy management strategy (EMS) to keep the operational Plant compliant.

11.6.8 As discussed in the previous section (Section 11.5), noise emissions from the Power Plant Area exceeds the nominated criteria at NSR6 in the evening and night-time periods.

11.6.9 An analysis has been carried out to determine an effective noise mitigation strategy that can be incorporated into the Power Plant Area design.

11.6.10 The proposed reductions are detailed in Table 11.22 and are listed in order of dominance at the nearest sensitive receptor.

Table 11.22 Operational Plant Sound Power Levels.

PLANT		SOUND POWER LEVEL (L _{WA} dB)	REDUCTION REQUIRED (L _{WA} dB)	RESULTANT SOUND POWER LEVEL (L _{WA} dB)
S22	Air Intake Body (OCGT)	114	15	99
S22	Air Intake Inlet (OCGT)	112	13	99
S18	OCGT Stack Base	100	0	100
S15	ACC Outlet	104	0	104
S16	ACC Inlet	103	0	103
S3	HRSB Building	97	0	97
S22	OCGT Building 1	95*	0	95*
S22	OCGT Building 2	95*	0	95*

* This is the combined L_{WA} for all sound sources marked as internal to the OCGT building and includes a correction for interior reverberation and the reduction of sound level from inside to outside subject to passing through 0.8mm steel cladding.

11.6.11 Acoustic interventions are most effective when they address the most dominant sound sources at the receptor. It is apparent from the Air-intake equipment is the most dominant as it is one of the closest sources to the sensitive receptors and has the highest sound power levels.

Decommissioning Phase

11.6.12 The impact assessment has already established that effects arising from the process of decommissioning of the Power Plant Area are likely to be of a similar or lesser nature and duration to those arising from the construction process.

11.6.13 Where this assessment refers to potential construction effects, these can be considered a robust representation of predicted decommissioning effects. This is considered a conservative approach.

11.6.14 Therefore, the general mitigation in the form of good practice presented in section 11.6.1 is also applicable to the Power Plant Area decommissioning phase.

11.6.15 Decommissioning will be carried out in compliance with Closure, Remediation and Aftercare Management (CRAMP) under IE Licence. The CRAMP will be agreed with the Agency under the IE Licence application or conditions of the IE Licence and regularly updated under Licence conditions in advance of closure of the Power Plant Area.

Electricity Grid Connection

Construction Phase

11.6.16 No significant adverse effects are predicted during the construction phase of the Electricity Grid Connection and near the 220kV or 400kV substations or the transmission infrastructure. 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 listed in Section 11.6 Power Plant Area – Construction Phase are implemented.

Operational Phase

11.6.17 The electricity grid connection will be managed by the transmission asset operators (TAO) and transmission system operators (TSO) (ESBN and EirGrid for electricity) as part of the national grid electricity.

- 11.6.18 The infrastructure will be maintained to manufacturer specification, and this will help reduce noise nuisance that may develop over time.
- 11.6.19 The operational noise assessment in section 11.5.25 did not identify any significant adverse effects due to the operation of the 220 kV and 400 kV substation or at the transition from underground to overhead cable.
- 11.6.20 Therefore, additional mitigation is not anticipated to be required for the operation of the Electricity Grid Connection.

Decommissioning Phase

- 11.6.21 Decommissioning of the Electricity Grid Connection is not envisaged as it will be managed by ESBN and once it is operational and will become an important part of the Republic of Ireland's national grid infrastructure. Therefore, mitigation measures are not relevant as this scenario is not anticipated to occur.

Gas Corridor Connection

Construction Phase

- 11.6.22 No significant adverse effects are predicted during the construction phase of the Gas Connection Corridor nonetheless, to ensure noise and vibration levels are kept to a minimum and to reduce the risk of cumulative impacts, it is recommended that construction works are restricted to weekdays and Saturday morning works only and the mitigation measures listed section 11.6 under Power Plant Area are adopted where practical.

Operational Phase

- 11.6.23 The gas connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks.
- 11.6.24 The infrastructure will be maintained to manufacturer specification, and this will help reduce noise nuisance that may develop over time.
- 11.6.25 The operational noise assessment in section 11.5.25 did not identify any significant adverse effects due to the operation of the Gas Connection Corridor and therefore, additional mitigation is not anticipated to be required for the operation of same.

Decommissioning Phase

- 11.6.26 Decommissioning of the Gas Connection Corridor is not envisaged as it will be managed by Gas Networks Ireland (GNI) and will become an important part of the Republic of Ireland's gas network infrastructure. Therefore, mitigation measures are not relevant as this scenario is not anticipated to occur.

11.7 Residual Effect

Power Plant Area

Power Plant Area - Construction Phase

11.7.1 The 3D noise model has been updated to include the above mitigation measures in Section 11.6. A noise map is presented in Figure 11.4 of this EIAR showing predicted noise contours across and in the vicinity of the Site. A summary of the results is given in Table 11.23 and includes ground floor and first floor results.

Table 11.23 Predicted Operational Noise Levels at PPA - free-field – Mitigated

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVEL (L _{Aeq,T} dB)	DAY / EVE NIGHT NOISE CRITERION L _{Aeq,T} dB	COMPLIANT DAY, EVENING & NIGHT
NSR5 – GF	34	55 / 50	Yes
NSR5 – FF	35	45	Yes
NSR6 – GF	34	45 / 40	Yes
NSR6 – FF	35	35	Yes
NSR7 – GF	30	55 / 50	Yes
NSR7 – FF	30	45	Yes

Note: FF is First Floor (4m) and GF is Ground Floor (1.5m)

11.7.2 A comparison of Table 11.11 and Table 11.23 indicates that, with mitigation, noise levels from the Power Plant Area comply with the relevant criteria.

11.7.3 No significant adverse impact is therefore expected at residential receptor positions with regards to operational phase noise levels generated by on-site activities in the Power Plant Area. The residual impact summarises the significance of effect post mitigation.

11.7.4 Predicted construction noise levels for the estimated noisiest period of construction are below the weekday daytime and Saturday morning assessment criteria.

11.7.5 In addition, the use of construction noise mitigation measures including the adoption of BAT will help control levels. Hence, the residual effects of noise from construction works are assessed to be not significant.

11.7.6 Prior to commencement of works, the CEMP will be updated by the selected contractor and facilitate demonstration of compliance with the relevant noise and vibration guidance documents. Works will not commence until Offaly County Council are satisfied that the proposed works and mitigation measures will reduce the impact to within acceptable noise and vibration levels.

11.7.7 On the basis that following implementation of mitigation measures the predicted noise levels at all NSRs are below the relevant assessment the BS 5228-1 Category A criteria during the construction of the Power Plant Area. The residual noise effects of construction phase of the Power Plant Area are determined to be **Not Significant, Negative, and Short-Term.**

11.7.8 Construction phase traffic on local roads is addressed below.

Power Plant Area - Operational Phase

11.7.9 The residual operational noise levels have been calculated with the incorporation of the recommended mitigation measures detailed above as set out in Table 11.23.

11.7.10 On the basis that the proposed mitigation measures are implemented, the predicted sound levels at all NSRs are below the relevant assessment criteria in the day, evening and night-time periods as shown in Table 11.23. Hence, the residual noise effects of construction traffic noise are determined to be **Negative, Not Significant, Permanent and Reversible**.

Power Plant Area - Decommissioning Phase

11.7.11 As Decommissioning works are temporary in nature and as a conservative approach no worse than the construction phase. The residual noise effects of the decommissioning phase of the Power Plant Area are determined to be **Negative, Not Significant and Short Term**

Electricity Grid Connection

Electricity Grid Connection - Construction Phase

11.7.12 Predicted construction noise levels for the estimated noisiest period of construction are below the weekday daytime and Saturday morning assessment criteria.

11.7.13 In addition, the use of construction noise mitigation measures including the adoption of BAT will help control levels. Hence, the residual effects of noise from construction works are assessed to be not significant.

11.7.14 Prior to commencement of works, the CEMP will be updated by the selected contractor and facilitate demonstration of compliance with the relevant noise and vibration guidance documents. Works will not commence until the relevant Local Authorities are satisfied that the proposed works and mitigation measures will reduce the impact to within acceptable noise and vibration levels.

11.7.15 On the basis that following implementation of mitigation measures the predicted noise levels at all NSRs are below the relevant assessment the BS 5228-1 Category A criteria during the construction of the Electricity Grid Connection. The residual noise effects of the construction phase are determined to be **Negative, Not Significant and Short-Term**

11.7.16 Construction phase traffic on local roads is addressed below.

Electricity Grid Connection - Operational Phase

11.7.17 Predicted operational noise levels have been presented in Table 11.19 relating to the Electricity Grid Connection. The levels were shown to be compliant with the relevant operational assessment criteria.

11.7.18 Therefore, it was identified that specific noise mitigation measures would not be required as part of the Electricity Grid Connection operation.

11.7.19 As the predicted residual operational noise levels are below the relevant criteria at all the selected receptors. The residual effects of noise from the operation of the Electricity Grid Connection are assessed to be **Negative, Not Significant, Permanent and Reversible**.

Electricity Grid Connection - Decommissioning Phase

11.7.20 As Decommissioning works are not planned for Electricity Grid Connection infrastructure assessed in this chapter, there will be no residual noise effects to consider.

Gas Corridor Connection

Gas Connection Corridor - Construction Phase

11.7.21 During the construction phase it is expected that noise levels in the surrounding environment to works will increase temporarily and this may be noticeable in outdoor areas at some properties but will generally be controlled to within the guideline Threshold

Values in BS5228-1. In any instances where the proximity of planned construction activity may cause an exceedance of the Threshold Value, the good practice mitigation measures described in this chapter in 11.6.2 will be used to keep construction noise levels to a minimum.

11.7.22 The residual effects of noise from the operation of the Gas Corridor Connection construction phase are determined to be **Negative, Not Significant** and **Short-Term**.

11.7.23 Construction phase traffic on local roads is addressed below.

Gas Connection Corridor - Operational Phase

11.7.24 The Gas Connection Corridor will not produce noise emission under normal operational conditions and therefore it is considered that there are no residual noise effects. The operational noise effects will be **Imperceptible**.

Gas Connection Corridor - Decommissioning Phase

11.7.25 As Decommissioning works are not planned for the Gas Connection Corridor infrastructure assessed in this chapter, there will be no residual noise effects to consider.

Residual Noise Effects relating Construction Traffic – PPA, EGC and GCC

11.7.26 On the basis that changes in road traffic sound level are limited to minor adverse with reference Table 11.3. The residual noise effects of construction phase of the Proposed Development and Project are determined to be **Negative, Imperceptible** and **Short-Term**.

11.8 Cumulative Effects

Cumulative Effects between the Various Elements of the Proposed Development and Overall Project

- 11.8.1 There is potential for cumulative effects between the elements of the Proposed Development and Overall Project.
- 11.8.2 This impact assessment has considered all elements of the Proposed Development and Overall Project, including elements which are not subject to this planning permission, during the construction, operation, and decommissioning phases. A thorough impact assessment has therefore been carried out throughout this chapter to examine the impacts that the various elements of the Overall Project will have on noise levels at sensitive receptors and the acoustic environment. These are considered in combination in this section.

Construction Phase

- 11.8.3 As a worst-case scenario, the assessment assumes a cumulative assessment that assumes that Power Plant Area construction, Electricity Grid Connection including the 220kV and 400kV substation are all undertaking the noisiest stage of construction simultaneously at each area.
- 11.8.4 The Gas Connection Corridor construction noise level contribution is considered negligible at these receptors on the basis of the distance from the corridor to the NSR. This is with exception of NSR7 which is within the Gas Connection Corridor approximately 250m from the centre line. As the installation of the pipeline is only likely to be in the vicinity of NSR7, and indeed other NSR within corridor, for a limited duration the resulting Gas Connection Corridor cumulative effects are considered to be negligible compared to the total duration of the construction works.

Table 11.24 Cumulative Predicted Construction Noise Levels – façade.

RECEPTOR	PREDICTED DAY-TIME CONSTRUCTION NOISE LEVEL ($L_{Aeq,12hr}$ dB)
NSR1	63
NSR2	60
NSR3	60
NSR4	52
NSR5	60
NSR6	59
NSR7	57

- 11.8.5 It can be seen from Table 11.25 that cumulative predicted construction noise levels for the estimated noisiest period of construction at each area do not exceed the weekday daytime and Saturday morning assessment criteria of 65dB $L_{Aeq,12hr}$.

Operational Phase

- 11.8.6 The operation of the Proposed Development and Overall Project, namely the Power Plant Area operation, Electricity Grid Connection including the 220kV and 400kV substation operations and the Gas Corridor Connection have all been assessed cumulatively assuming they operate simultaneously.

Table 11.25 Predicted Cumulative Operational Noise Levels for Power Plant, 220kV and 400kV Substations – façade.

RECEPTOR	PREDICTED OPERATIONAL NOISE LEVELS (L _{Aeq,12hr} dB)	
	Ground Floor	First Floor
NSR1	19	19
NSR2	21	23
NSR3	21	23
NSR4	18	19
NSR5	35	36
NSR6	34	35
NSR7	31	31

- 11.8.7 No cumulative operational phase noise effects have been identified as predicted levels are below NG4 criteria in the day, evening and night-time periods defined in NG4.
- 11.8.8 NSR5 is the closest noise sensitive receptor to the Power Plant Area but meets the assessment criteria limit in the night-time period of 35 dB L_{Aeq,8hr}. NSR6 is slightly further away and is 1dB below the criteria. Application 23277 is closest development to NSR5 and NSR6 and involves the movement of soil and stone by road, but is understood not to be operational during the night-time. Therefore, exceedance of the NG4 assessment criteria is unlikely because the day-time and evening thresholds are less stringent.

Decommissioning Phase

- 11.8.9 A cumulative impact assessment of the decommissioning phase applies only to the Power Plant Area as the Electricity Grid Connection Substations and Gas Corridor connection will not be decommissioned as they will form part of the national infrastructure.
- 11.8.10 The decommissioning phase of Power Plant Area has been considered equivalent or no worse than the construction phase throughout this assessment. Therefore, it is again anticipated that the cumulative impact during the decommissioning phase is no worse than the cumulative impact during the construction phase. It is, however, recommended to consider any other construction/decommissioning planned in the area closer to the time.

Cumulative In-Combination Effects

- 11.8.11 A search of consented projects (i.e., one that has received full or outline planning permission) in the locality of the Proposed Development and Overall Project was undertaken using publicly available data from the MyPlan.ie ‘National Planning Application’ database, An Bord Pleanála (ABP) database and County Council’s Planning Portals.
- 11.8.12 A desktop planning history search for the last five years and within 1km of the Proposed Development and Overall Project was undertaken using these resources to assess historical and current land use. Other developments beyond 1km will generate negligible noise contribution at sensitive receptors considered in this chapter due to the combination of the reduction of sound levels over distance and the masking provided by the prevailing background noise levels. A full list of planning applications assessed in this chapter was obtained from the planning search is presented in Chapter 4 and a shortlist of closest and relevant planning applications is provided in Table 11.26.

Table 11.26 Other Developments.

PLANNING APPLICATION	PLANNING AUTHORITY	SUMMARY DETAILS	ADDRESS/APPLICANT	STATUS
22247	Westmeath CC	Development and construction of a logistics warehouse at the site of the former site compound for the M6 Motorway project, a site of 2.99 Hectares.	Dumper Depot Ltd, Farthingstown, Rochfortbridge	Granted 21/02/2023
2260051	Westmeath CC	Phased extraction of sand and gravel (wet working) over an area of c. 51.3 hectares with processing that includes crushing and washing. The proposed extraction operational period is for 15 years plus 2 years to complete restoration (total duration sought 17 years). Access to the site will be via an existing agricultural entrance, upgraded to provide a new splayed entrance priority junction onto the R400.	Kilsaran Concrete Unlimited Company - Farthingstown Townland, Mongagh Bridge, Rochfortbridge	RFI 24/02/2023
23277	Offaly CC	To import soil and stone (ewc class 17 05 04) not exceeding 25,000 tons over a period of 2 yrs for the purpose of raising existing ground levels not exceeding 1.2m in height, installation of new drainage over 2.4ha with restoration to agricultural use on completion. permission is also sought for the temporary installation of a suitable wheel wash at the entrance and all ancillary site works. the development will require a waste facility permit	Knockdrin and Derrygreenagh Townlands, Rhode, Co. Offaly - Tony McCabe	Decision Due Date 07/08/2023
19176	Offaly CC	Erection of a guyed wind monitoring mast, with instruments, 100m in height, for a period of six years	Bord na Mona Powergen Ltd - Derrygreenagh, Rhode	Granted 11/06/2019

11.8.13 A high-level review of all planning applications in Chapter 4, including the shortlist above for those in closest proximity to the R400 has confirmed that no cumulative construction or operational noise impacts are anticipated. This conclusion is explained in the following subsections.

Construction

11.8.14 Regarding the consideration of the contribution of other developments in the area specifically those listed in Chapter 4 it is useful to consider how much additional construction noise contribution would be required at each NSR to exceed the assessment criteria of 65dB $L_{Aeq,12hr}$.

11.8.15 A doubling of the construction activity would lead to a 3dB increase in predicted cumulative levels in Table 11.25. If this was to occur, predicted levels at NSR2 to NSR7 would still be compliant with the 65dB $L_{Aeq,12hr}$ limit. As none of the listed developments are of a similar scale to the Proposed Development and Overall project and/or of similar proximity to these NSRs then cumulative impacts during the construction phase are considered negligible at these receptors.

11.8.16 NSR1 would have the potential to exceed the 65dB $L_{Aeq,12hr}$ assessment criteria if construction activity was doubled, however it is worth noting that NSR1 is located in

proximity to the 400 kV substation and that the closest development in the list of other developments is more than 2km from NSR1 NSR2 and NSR3, suggesting that realising a combination of overlapping construction activities that cumulatively exceeds the 65dB $L_{Aeq,12hr}$ is highly unlikely in practice.

11.8.17 Any cumulative adverse effect is therefore considered **Imperceptible to Not Significant** 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 other developments.

Cumulative Construction Traffic Assessment – Proposed Development in combination with other Developments

11.8.18 The following public roads (excluding the M6 Motorway) will be used by the construction traffic, as identified in Chapter 14: Traffic of this EIAR, see Figure 11.2 for a map of the seven relevant links, considered in this cumulative construction noise assessment.

11.8.19 Calculations have again been carried out in accordance with the BNL methodology presented in CRTN.

11.8.20 The traffic flow data used for input to the road traffic noise calculations is provided in Table 11.26 by the project traffic consultant.

11.8.21 The development traffic considers the combined total construction trips for the Power Plant Area, Electric Grid Connection and Gas Connection Corridor.

11.8.22 The cumulative trips consider the predicted contribution from other developments.

11.8.23 It should be noted that the peak overall traffic occurs at a different time to the peak HGV traffic and so both scenarios have been assessed.

Table 11.27 Road Traffic Noise Change due to Construction - Cumulative.

Cumulative Peak HGV Assessment - March - May 2025						
Link	2025 Base			2025 + Development Traffic + Cumulative		
	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%
Link 1	5300	346	6.5%	5300	346	6.5%
Link 2	4155	245	5.9%	4155	245	5.9%
Link 3	2767	212	7.7%	2767	212	7.7%
Link 4	2664	472	17.7%	3540	1190	33.6%
Link 5	2661	473	17.8%	3068	779	25.4%
Link 6	4081	362	8.9%	4169	392	9.4%
Link 7	2082	97	4.7%	2166	127	5.9%
Cumulative Peak combined total traffic - Dec 2025 - Feb 2026 (baseline year 2025 used)						
Link	2025 Base			2025 + Development Traffic + Cumulative		
	AAWT	No.HGVs	HGV%	AAWT	No.HGVs	HGV%
Link 1	5300	346	6.5%	5300	346	6.5%
Link 2	4155	245	5.9%	4245	278	6.5%
Link 3	2767	212	7.7%	2857	245	8.6%
Link 4	2664	472	17.7%	3704	1156	31.2%
Link 5	2661	473	17.8%	3208	849	26.5%
Link 6	4081	362	8.9%	4317	487	11.3%
Link 7	2082	97	4.7%	2293	222	9.7%

11.8.24 The resulting Basic Noise Level (BNL) calculations for each scenario and link are presented in Table 11.27 along with predicted change in noise level.

Table 11.27 Road Traffic Noise Change due to Construction 2025 - Cumulative.

Cumulative Peak HGV Assessment - March - May 2025				
Link	2025 Base BNL (dB)	2025 + Development Traffic BNL (dB)	Predicted Change (dB)	Magnitude of Impact
Link 1	63.6	63.6	0	No Change
Link 2	62.5	62.5	0	No Change
Link 3	60.6	60.6	0	No Change
Link 4	61.4	61.9	0.5	Negligible
Link 5	60.9	61.2	0.3	Negligible
Link 6	62.5	62.5	0.0	No Change
Link 7	59.3	59.3	0.0	No Change
Cumulative Peak combined total traffic - Dec 2025 - Feb 2026 (baseline year 2025 used)				
Link	2025 Base BNL (dB)	2025 + Development Traffic BNL (dB)	Predicted Change (dB)	Magnitude of Impact
Link 1	61.5	61.5	0	No Change
Link 2	60.6	60.6	0	No Change
Link 3	58.7	58.7	0	No Change
Link 4	59.7	60.1	0.5	Negligible
Link 5	59.2	59.4	0.3	Negligible
Link 6	60.7	60.7	0.0	No Change
Link 7	57.6	57.6	0.0	No Change

11.8.25 Through comparison of Table 11.5 and Table 11.27, it can be seen that a negligible effect is predicted on Link 4 and Link 5 in both scenarios. All other links will not be impacted and remain “No Change”.

11.8.26 Adding the traffic from the other developments has not changed magnitude of impact outcome although the predicted change has increased slightly by 0.4 dB at Link 4 and Link 5, see Table 11.10b.

11.8.27 Consequently, no significant cumulative adverse effect is therefore expected at residential receptor positions with regards to construction phase traffic noise levels generated by combination of the proposed development and other development traffic flows on existing roads. The changes are considered **Imperceptible, Negative, and Short-Term.**

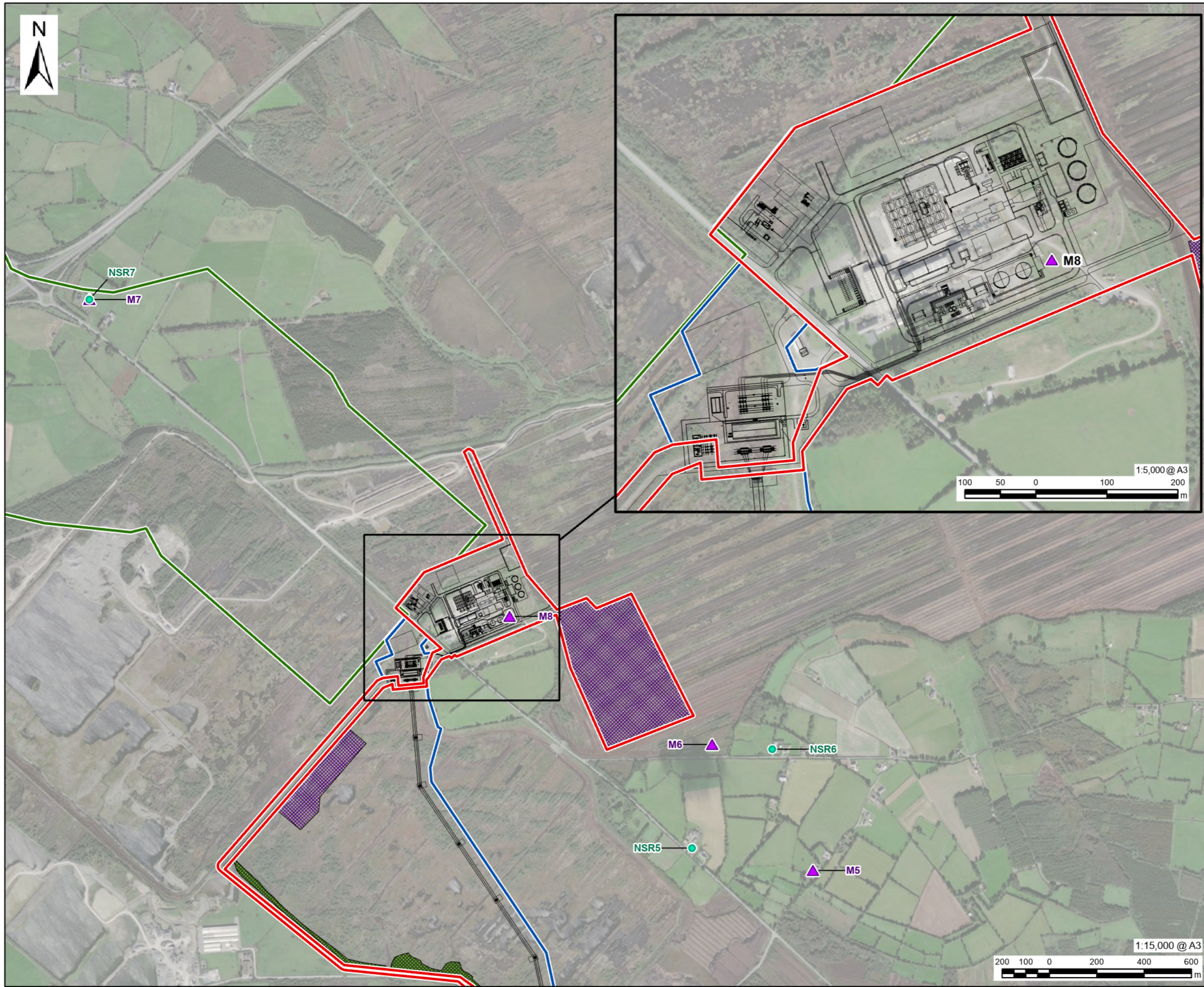
Operational

11.8.28 In order for the predicted noise levels at NSRs to exceed the relevant NG4 criteria when combined with other developments, it is necessary for those developments to operate with a time averaged noise level at the NSR that, over the relevant reference period Day, Evening and Night, is comparable to that of the Proposed Development and Overall Project.

- 11.8.29 Cumulative levels in the Day and Evening periods are not a concern because predicted levels from the Proposed Development and Overall Project are at least 10dB lower than the limits in the day and 5dB lower in the Evening. The means to exceed these limits cumulatively, the contribution from other developments would need to be significantly greater than those predicted from the Proposed Development and Overall Project alone. None of the developments identified above individually or in combination would be expected to produce noise emissions of this magnitude at the receptors closest to the Proposed Development and Overall Project and therefore cumulative impact in the Day and Evening can be excluded.
- 11.8.30 During the night-time, the most likely receptor to be affected is NSR6. Predicted operational sound levels from the Proposed Development and Overall Project are already at the relevant limit of 35 dB $L_{Aeq,8hr}$ at that location.
- 11.8.31 A high-level review of the distances, operational times and nature of the other developments listed in Table 11.24 has been undertaken. It confirms that these activities are neither significant or likely to generate noise in the night-time of sufficient level in the vicinity of NSR6. At other receptors, the predicted levels from the Proposed Development and Overall Project are lower than the limit values, see Table 11.27. Operations at the other developments identified above are either not expected to be continuous during the night-time or are not likely to operate at all at night. On this basis the cumulative impacts can also be excluded all NSRs in the night-time period as well.
- 11.8.32 Any cumulative adverse effect is therefore considered **Negative though Not Significant** at residential receptor positions with regards to operational phase noise levels generated by the Proposed Development and Overall Project on-site activities and potential concurrent operational activities related to the operation of other developments.

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. Noise*'.
- BSI Group (2014) BS 5228-2:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites. Vibration*'.
- 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 (NG4)*'.
- 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}* '.



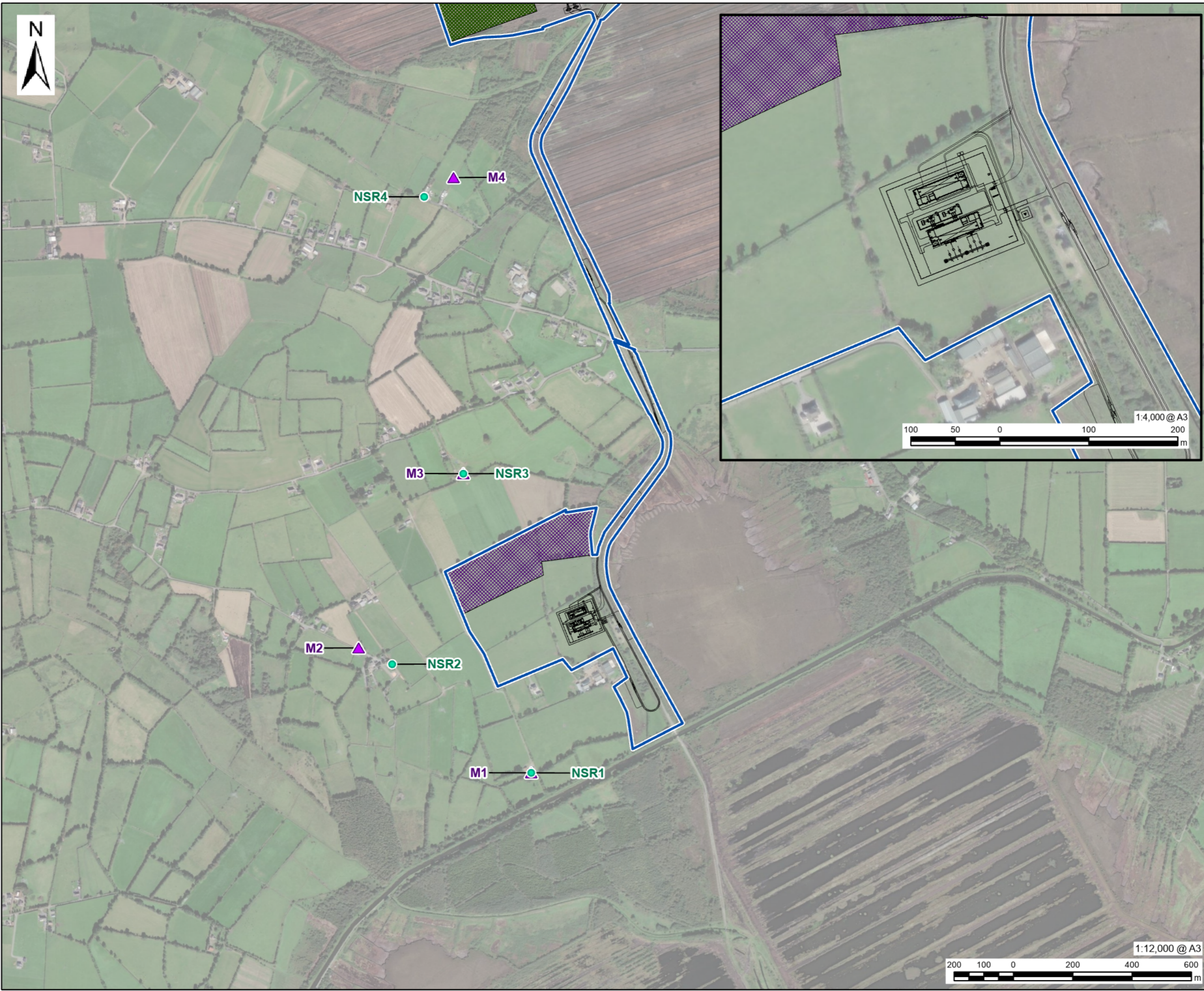
LEGEND

	Power Plant Area Boundary
	Electricity Grid Connection Boundary
	Gas Connection Corridor Boundary
Project Elements	
	Project Layout
	Tree Replanting Area
	Peat Deposition Area
Noise Constraints	
	Noise Sensitive Receptors
	Noise Monitoring Stations

NOTES
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ISSUE PURPOSE
FOR ISSUE
PROJECT NUMBER
60699676
FIGURE TITLE
Power Plant Area and 220kV
Substation, Nearby Receptors and
Monitoring Locations
FIGURE NUMBER
Figure 11.1a

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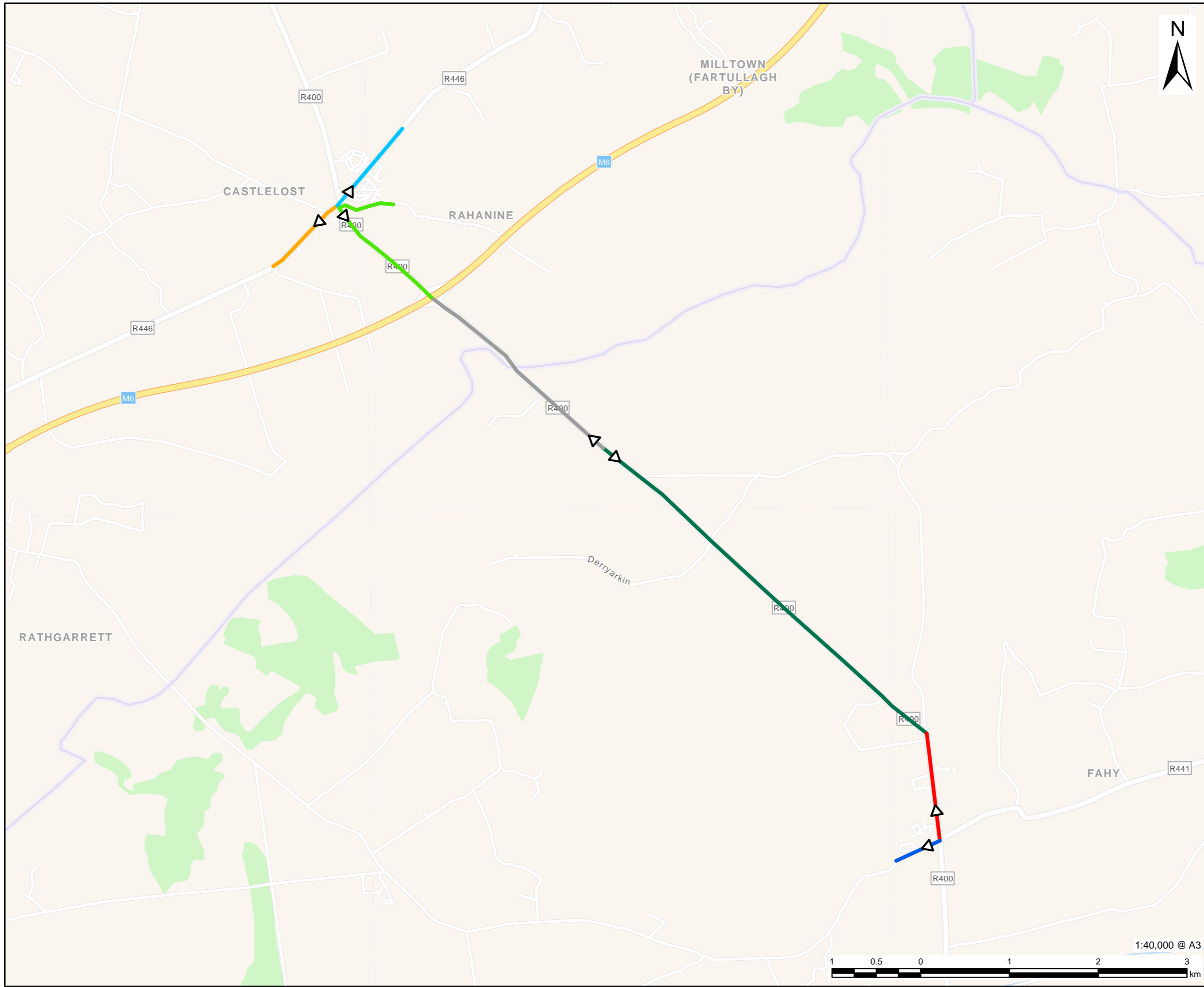
- LEGEND**
- Electricity Grid Connection Boundary
 - Project Layout
 - Tree Replanting Area
 - Peat Deposition Area
 - Noise Constraints**
 - Noise Sensitive Receptors
 - ▲ Noise Monitoring Stations









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ISSUE PURPOSE
FOR ISSUE
PROJECT NUMBER
60699676
FIGURE TITLE
440kV Substation, Nearby Receptors and Monitoring Locations

FIGURE NUMBER
Figure 11.1b

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-  Turning Traffic Counter
-  Link 1: R446 (N)
-  Link 2: R446 (S)
-  Link 3: Rahine
-  Link 4: R400 Rochfortbridge
-  Link 5: R400 Derryiron
-  Link 6: R400 Rhode
-  Link 7: Marian Terrace

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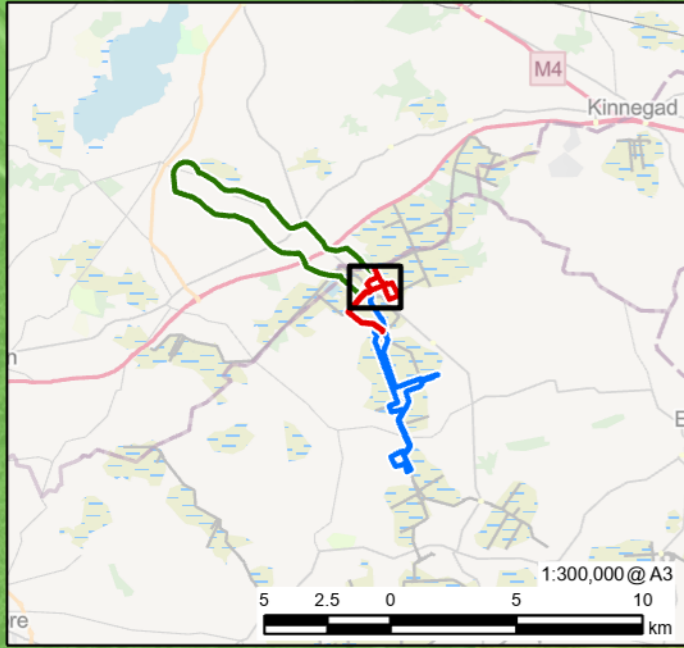
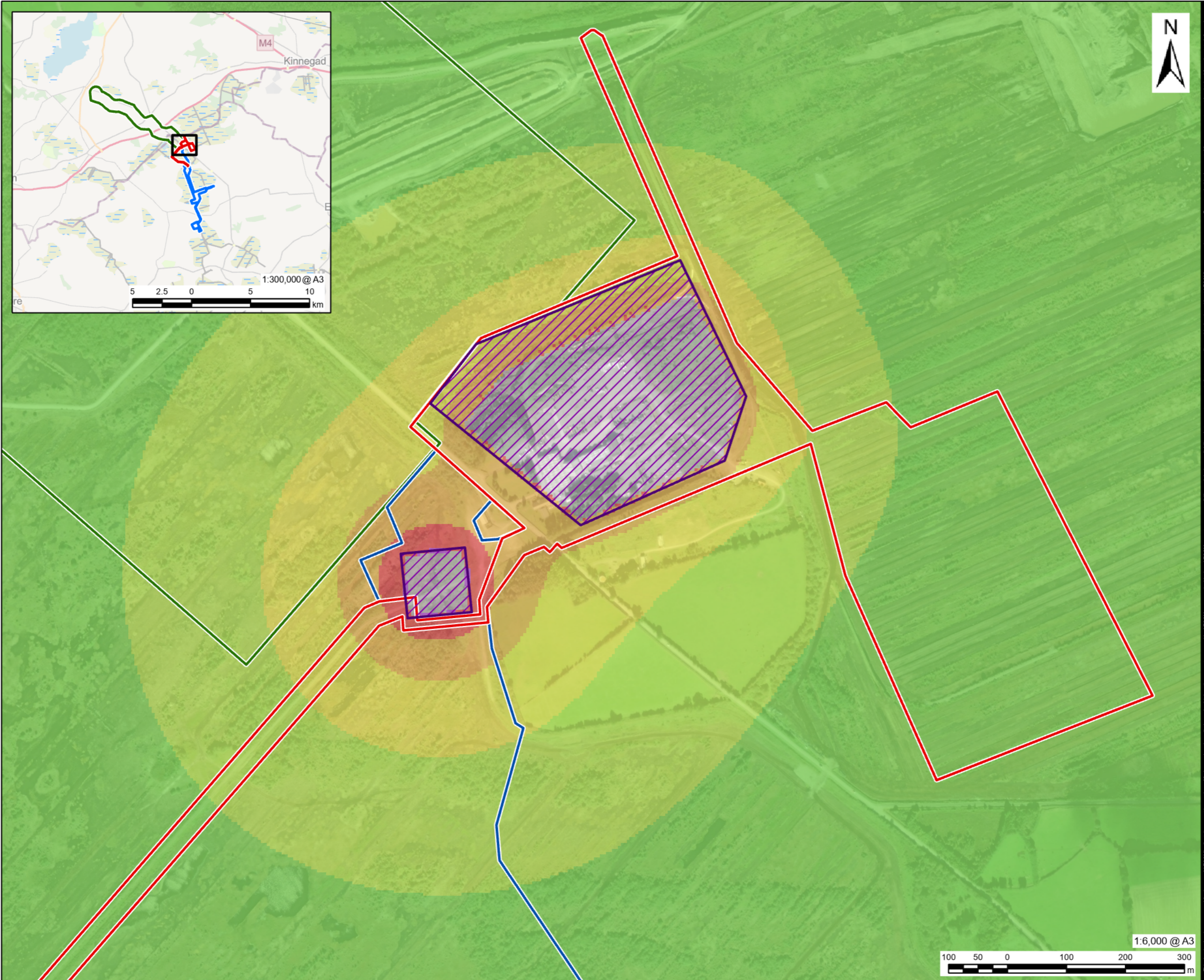
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Construction Road Links

Figure 11.2

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LEGEND

	Power Plant Area Boundary
	Electricity Grid Connection Boundary
	Gas Connection Corridor Boundary
	Peat Deposition Area
<i>Noise Source</i>	
	Construction Area Source

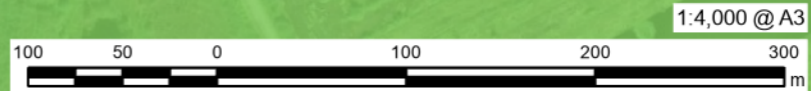
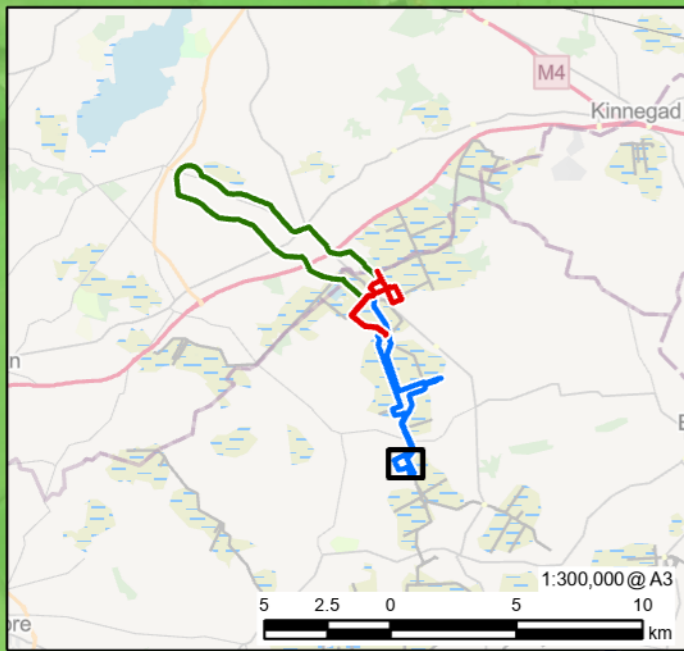
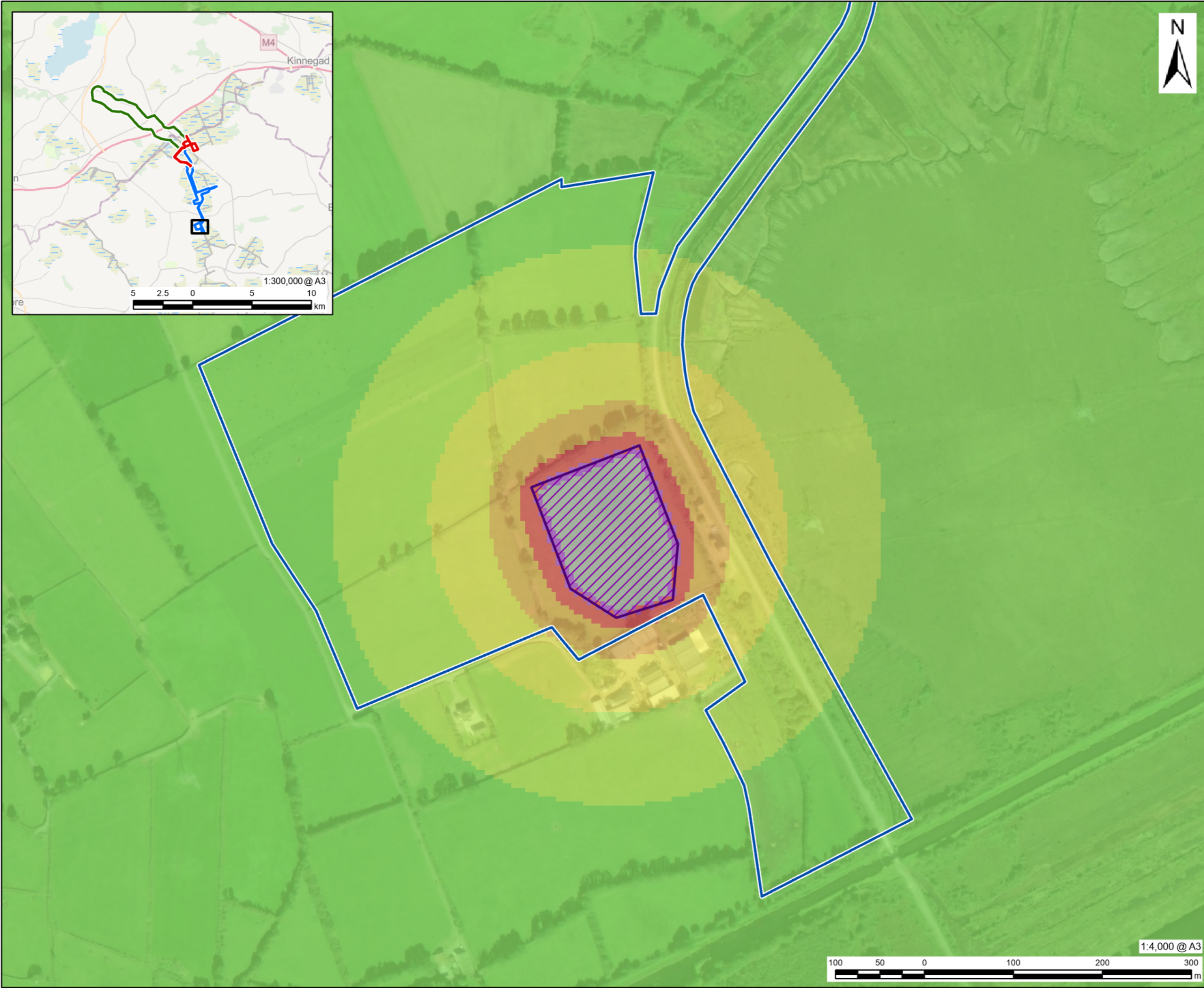
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ISSUE PURPOSE
FOR ISSUE
PROJECT NUMBER
60699676
FIGURE TITLE
Predicted Construction Noise Levels from Power Plant Area and 220kV Substation Construction

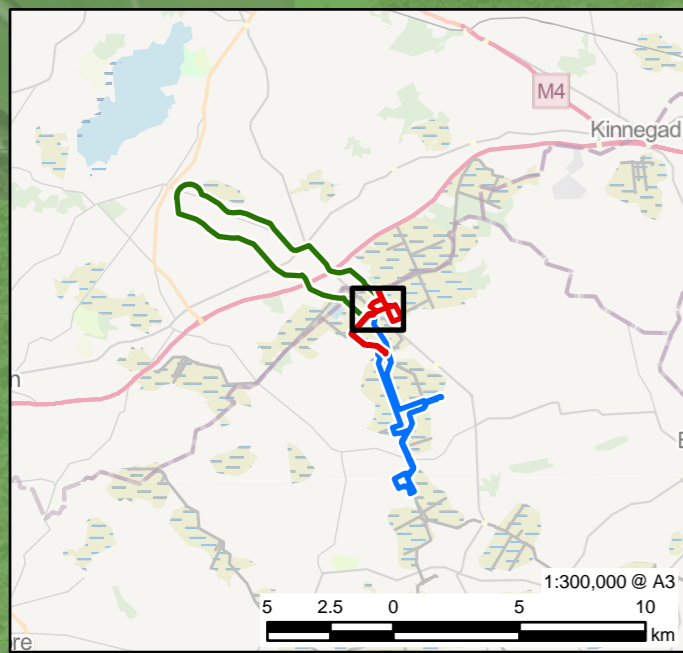
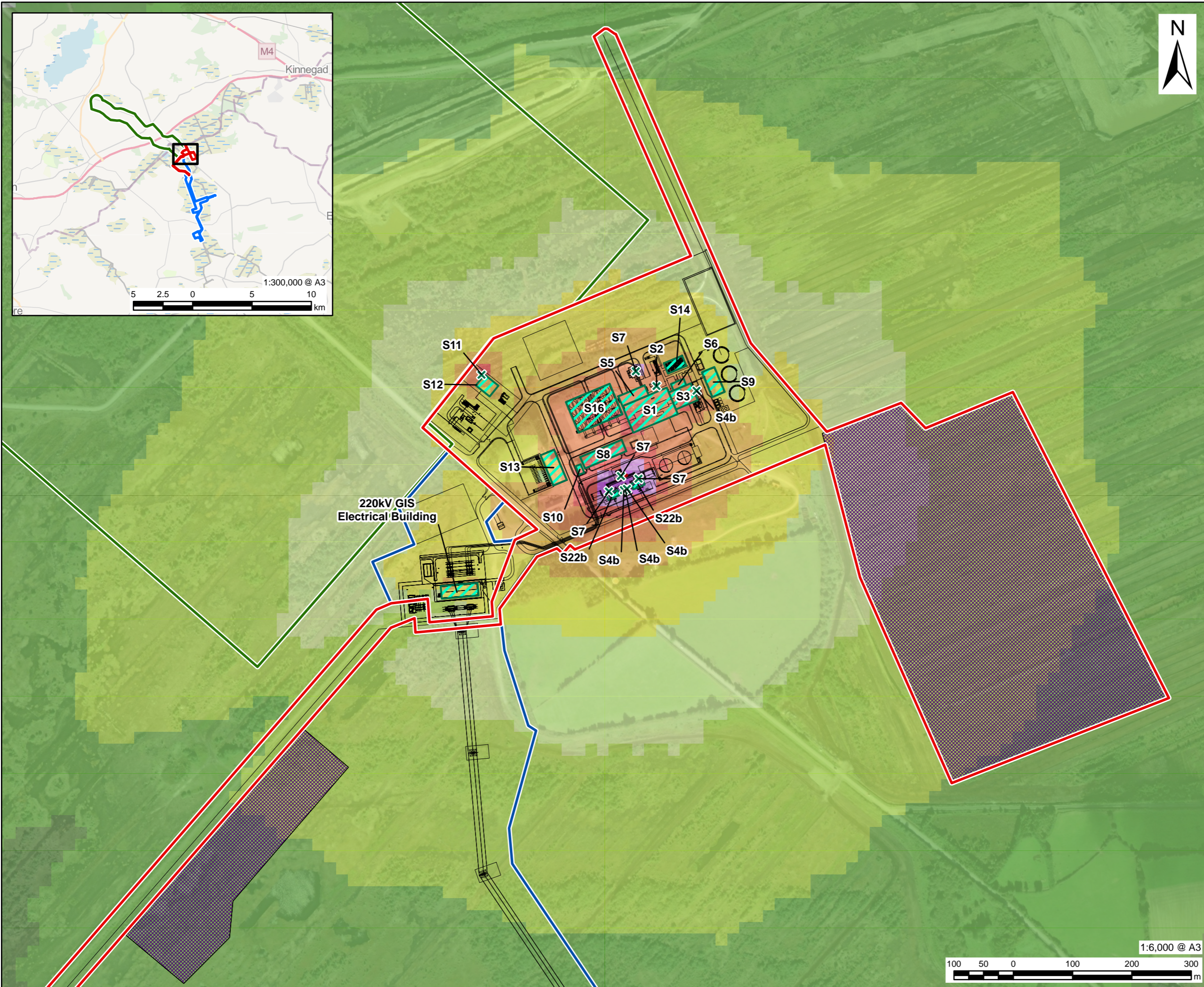
FIGURE NUMBER
Figure 11.3a



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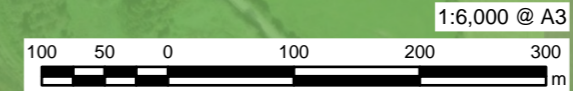
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- LEGEND**
- Power Plant Area Boundary
 - Electricity Grid Connection Boundary
 - Gas Connection Corridor Boundary
- Project Elements*
- Project Layout
 - Peat Deposition Area
- Noise Sources*
- ✕ Point Source
 - Blast Wall
 - Plant Area Source
- Predicted Operational Noise Level (dB)*
- <math>< 35.0</math>

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ISSUE PURPOSE
FOR ISSUE
PROJECT NUMBER
60699676
FIGURE TITLE
Predicted Operational Noise Levels from Power Plant Area and 220kV Substation (post-mitigation)
FIGURE NUMBER
Figure 11.4a



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LEGEND

	Electricity Grid Connection Boundary
Noise Sources	
	Point Source
	Blast Wall
Project Elements	
	Project Layout
	Peat Deposition Area
Predicted Operational Noise Level (dB)	
	<math>< 35.0</math>

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ISSUE PURPOSE
FOR ISSUE
PROJECT NUMBER
60699676
FIGURE TITLE
Predicted Operational Noise Levels from 400kV Substation Construction (post-mitigation)
FIGURE NUMBER
Figure 11.4b

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