

11. NOISE AND VIBRATION

11.1 Introduction

11.1.1 Background & Objectives

This chapter of the rEIAR assesses the potential for any likely significant effects of noise and vibration arising from peat extraction and ancillary activities at Lemanaghan Bog in County Offaly (hereafter “the Application Site”), during the Peat Extraction Phase, the Current Phase and the Remedial Phase (as described in Chapter 4 Description of the Development). The Application Site is the subject of this substitute consent application to An Coimisiún Pleanála, in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended).

Noise impact assessments have been prepared for the Peat Extraction Phase, the Current Phase, and the Remedial Phase of the Project at the nearest Noise Sensitive Locations (NSLs) to the Application Site. To inform this assessment, background noise levels have been measured at several locations, representative of the nearest NSLs in the vicinity of the Application Site, to assess the potential impacts associated with the peat extraction and ancillary activities at the Application Site.

Chapter 4 of this rEIAR provides a full description of the Project. The activities at the Application Site operate under an Integrated Pollution Control (IPC) licence from the Environmental Protection Agency (EPA) (Reg. P0500-01; hereafter the “IPC Licence”) which sets noise emission limits. NSLs in this context are any occupied dwelling, house, hostel, health building or place of worship and may include areas of particular scenic quality or special recreational amenity importance. In this instance all of the NSLs are dwellings.

It is important to note that in the case of environmental noise generally, once a noise-generating activity has ceased, any associated environmental noise effects will dissipate, leaving no residual effect or impact.

11.1.2 Statement of Authority

This chapter of the rEIAR has been prepared by the following staff of AWN Consulting Ltd:

Mike Simms

Mike Simms (Principal Acoustic Consultant) holds a BE and MEngSc in Mechanical Engineering and is a member of the Institute of Acoustics (MIOA) and of the Institution of Engineering and Technology (MIEI). Mike has worked in the field of acoustics for over 20 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, wind energy, industrial, commercial and residential.

Dermot Blunnie

Dermot Blunnie (Associate) holds a BEng (Hons) in Sound Engineering, MSc in Applied Acoustics and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He has been working in the field of acoustics since 2008 and is a member of the Institute of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA). He has extensive knowledge and experience in relation to commissioning noise monitoring and impact assessment of wind farms as well as a detailed knowledge of acoustic standards and proprietary noise modelling software packages. He has commissioned noise surveys and completed noise impact assessments for numerous wind farm projects within Ireland.

Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Section 2.4 of Chapter 2 Background of the rEIAR. No responses pertaining to noise and vibration have been received to date.

Fundamentals of Acoustics

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. To take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

The audible range of sounds expressed in terms of SPL is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3 dB.

The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. The 'A-weighting' system defined in the international standard, BS ISO 226:2003 Acoustics. Normal Equal-loudness Level Contours has been found to provide the best correlations with human response to perceived loudness. SPLs measured using 'A-weighting' are expressed in terms of dB(A).

An indication of the level of some common sounds on the dB(A) scale is presented in Figure 11-1. For a glossary of terms used in this chapter please refer to Appendix 11-1.

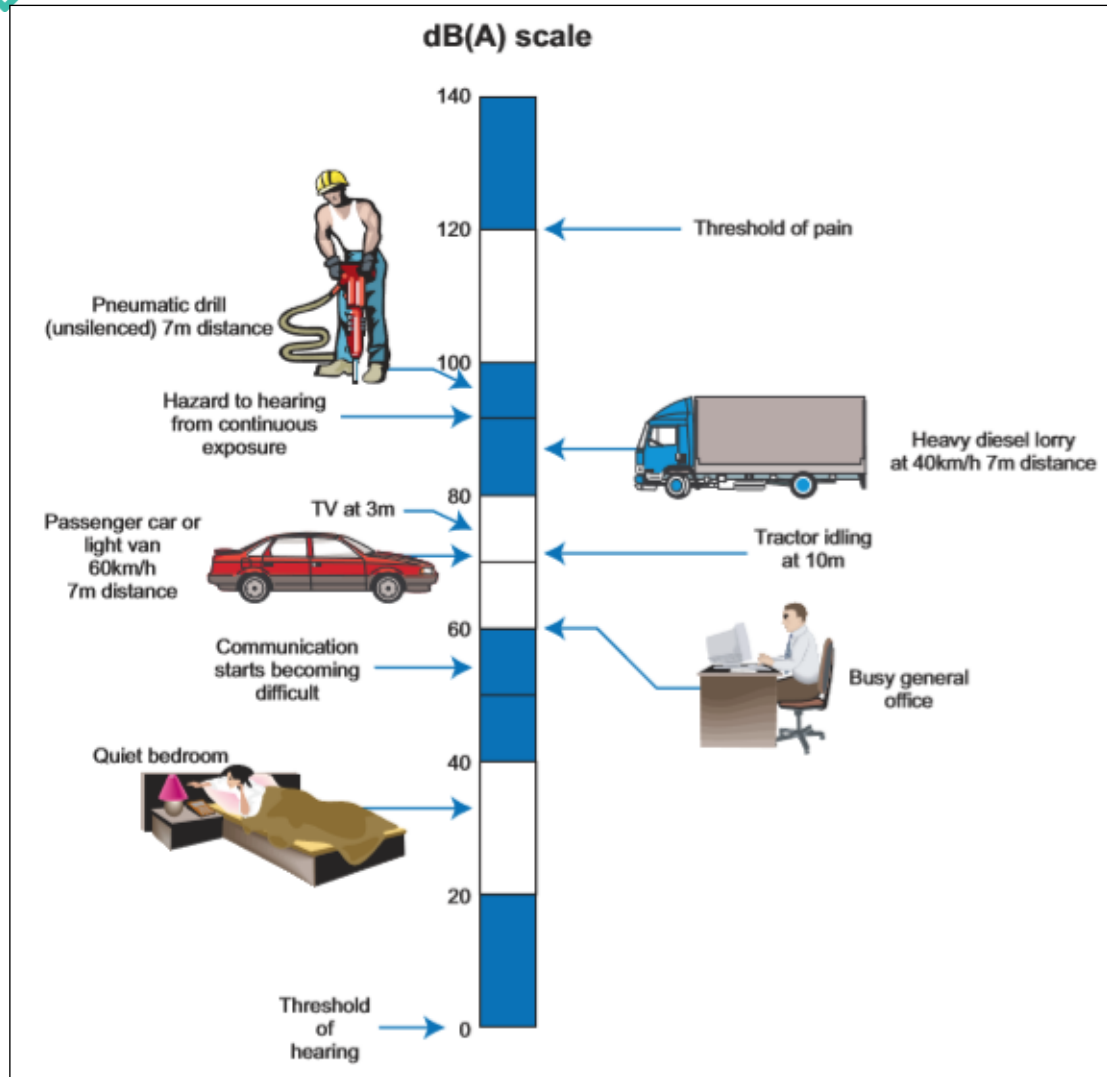


Figure 11-1 The level of typical common sounds on the dB(A) scale (NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004)

11.3

Assessment Methodology

The assessment of impacts has been undertaken with reference to the most appropriate guidance documents relating to noise and vibration for the peat extraction and ancillary activities, which are set out within the relevant sections of this chapter.

In addition to the specific guidance documents outlined below, the EPA 2022 Environmental Impact Assessment Report (EIAR) guidelines listed in Chapter 1 Introduction were considered and consulted for the purposes of preparing this rEIAR chapter.

The methodology adopted for this noise and vibration impact assessment is summarised as follows:

- Review of appropriate guidance to identify appropriate noise and vibration criteria for the Peat Extraction Phase, the Current Phase and Remedial Phases;
- Characterise the receiving environment through baseline noise surveys at various NSLs surrounding the Application Site;
- Undertake predictive calculations to assess the potential impacts associated with the Project Phases and related activities at NSLs;
- Evaluate the potential noise and vibration impacts and effects; and,

- Describe the significance of the residual noise and vibration effects associated with the peat extraction and ancillary activities at the Application Site.

11.3.1 EPA Description of Effects

The significance of effects of peat extraction and ancillary activities shall be described in accordance with the EPA guidance document *2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*. Details of the methodology for describing the significant of the effects are provided in Chapter 1.

The effects associated with the peat extraction and ancillary activities are described with respect to the EPA guidance in the relevant sections of this chapter.

11.3.2 Guidance Documents and Assessment Criteria

The following sections review best practice guidance that are considered appropriate to developments such as peat extraction within the Application Site. Although peat extraction at the Application Site took place between the years 1960 to 2020 with drainage commencing in 1950, the approach here is to assess the impacts of peat extraction and ancillary activities at the Application Site from 1988 onwards, using the current applicable IPC Licence Reg No P0500-01 which was granted by the EPA in May 2000, when noise limits for the activities at the Application Site first came into place. The IPC Licence was amended on 27th February 2025. If it can be shown that the peat extraction and ancillary activities meet the noise criteria defined in the IPC Licence, then it can be concluded that the Application Site operated and is operating without significant noise impact.

11.3.2.1 Noise

As discussed above in Section 11.3.2, the peat extraction and ancillary activities at the Application Site are governed by the IPC Licence which imposes noise limits on the onsite activities.

As activity on site was, is and will be carried out within the period defined as Daytime in the IPC Licence, i.e. 08:00 hrs to 22:00 hrs. As stated in Condition 8.1 of the IPC licence, the relevant noise level limit is 55dB L_{Aeq,30min} at NSLs. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the Application Site for that period.

11.3.2.2 Vibration

Reference is made to BS 6472-1:2008 (BSI 2008) which provides the following Vibration Dose Value (VDV) ranges as in Table 11-1 which result in various probabilities of adverse comment (i.e. complaints) resulting from exposure to vibration within residential buildings. An adverse comment is an unfavourable human reaction or response.

Table 11-1 BS 6472 Table 10.5: VDV ($m/s^{1.75}$) above which various degree of adverse comment may be expected in residential buildings

Building Type	Low probability of adverse ⁽¹⁾	Adverse comment possible	Adverse comment probable ⁽²⁾
Residential building – Day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building – Night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Note 1) Below these ranges adverse comment is not expected. Note 2) Above these ranges adverse comment is very likely.

11.3.2.3 Additional Traffic on Public Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the Project made use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that arose because of vehicular movements associated with the Project. That said, movement of milled peat from the bogs during the Peat Extraction Phase would have been exclusively by internal private Bord na Móna railway so there were no HGV traffic movements of peat during that period. During the Current Phase a majority of the peat was removed via railway with some minor volumes of peat removed via HGV in 2023 and 2024. No peat has been transported from the Application Site since 2024.

In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 11-2, taken from UK Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020), offers guidance as to the likely degree of impact associated with any long-term change in traffic noise level.

Table 11-2 Significance in Change of Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact	EPA Significance of Effect
0	Inaudible	Negligible	Imperceptible
0.1 – 2.9	Barely Perceptible		Not Significant
3 – 4.9	Perceptible	Minor	Not Significant to Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Slight to Moderate
10+	Doubling of loudness and above	Major	Significant to Very significant

The guidance outlined in Table 11-2 will be used to assess the increases in traffic levels on public roads that arose from activities at the Application Site and comment on the likely long-term impacts during the Peat Extraction Phase, Current Phase and Remedial Phase.

11.3.3 Background Noise Assessment

Reference is made to the background noise survey undertaken at the Application Site as part of the environmental noise assessment for the proposed Lemanaghan Wind Farm to determine baseline noise levels in the receiving environment. The relevant details are discussed in the following sections. As detailed in Section 4.11.1 in Chapter 4 of this rEIAR, Lemanaghan Designated Activity Company (DAC), a joint venture between SSE Renewables and Bord na Móna, (i.e. the Applicant for the proposed Lemanaghan Wind Farm) are proposing a wind energy development consisting of 15 turbines with an overall blade to tip height of 220m.¹ This application will be made directly to An Coimisiún Pleanála as ‘Strategic Infrastructure Development’ (SID).

¹ <https://www.lemanaghanwindfarm.ie/>

11.3.3.1 Choice of Measurement Locations

Noise monitoring at NSLs was not undertaken during the Peat Extraction Phase. However, noise monitoring was undertaken as part of the proposed Lemanaghan Wind Farm Environmental Noise Assessment. The representative background noise levels taken at NSLs around the Application Site are used to ascertain typical background noise levels during the Peat Extraction Phase. Coordinates for the noise monitoring locations are detailed in Table 11-3 and illustrated in Figure 11-2.

Table 11-3 Measurement Location Coordinates

Location	Coordinates – Irish Transverse Mercator (ITM)	
	X (ITM)	Y (ITM)
1	614,214	728,744
2	613,215	727,095
3	616,409	727,553
4	616,883	730,153
5	618,788	729,628
6	617,302	727,197
7	613,662	726,078
8	614,814	729,539

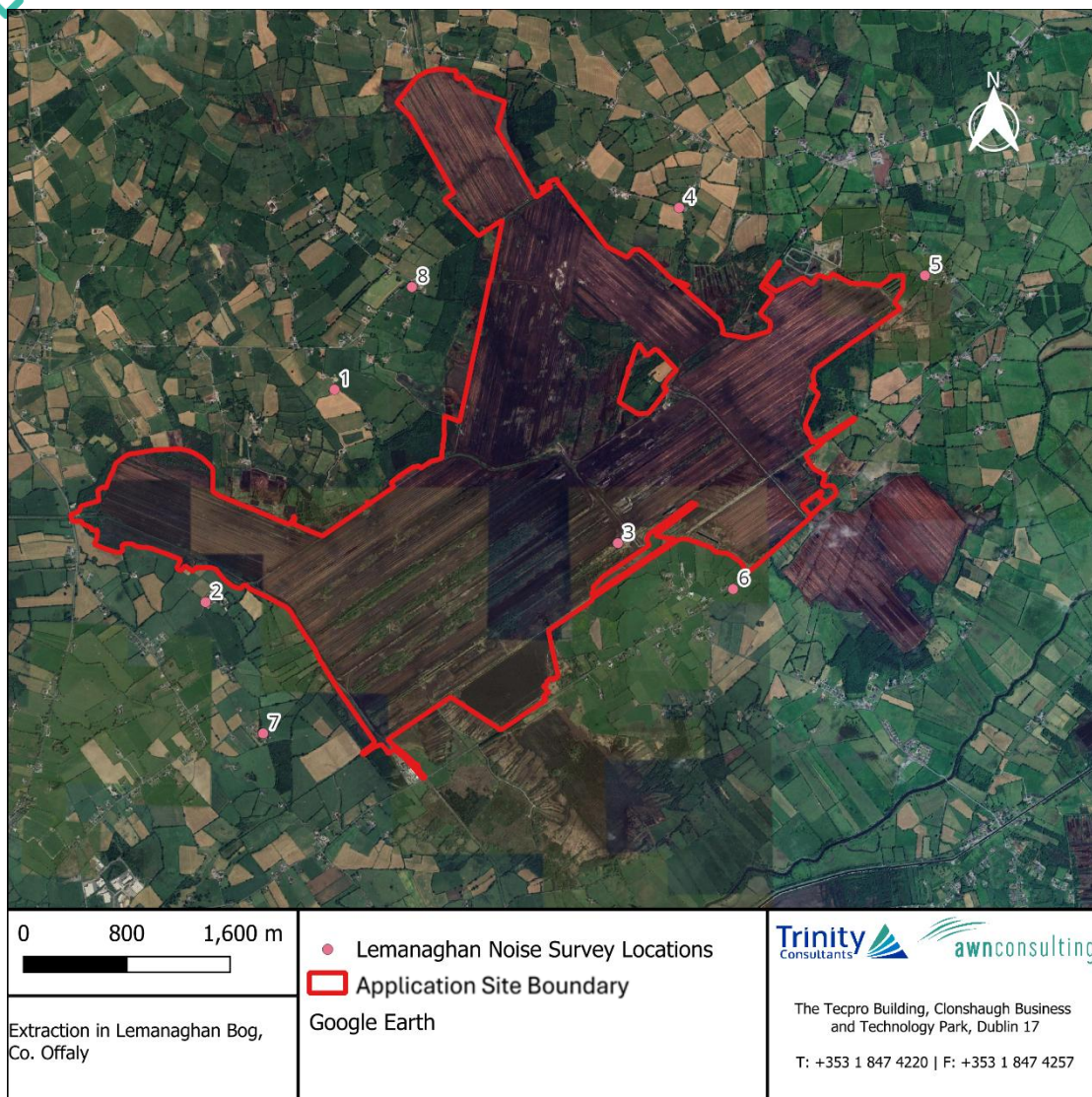


Figure 11-2 Indicative measurement locations

Significant noise sources in this area were noted to be distant traffic movements, activity in and around the residences and wind generated noise from local foliage and other typical anthropogenic sources typically found in such rural settings. The noise monitoring was undertaken during the Current Phase when peat stockpile removal was underway; therefore, the machinery listed in Section 11.5.2 was present and operating at the Application Site during the monitoring period.

11.3.3.2 Measurement Periods

Noise measurements were conducted at each of the monitoring locations over the periods outlined in Table 11-4.

Table 11-4 Measurement Periods

Location	Start Date	End Date
1	1 Sept 2021	15 Oct 2021
2	1 Sept 2021	15 Oct 2021
3 ²	1 Sept 2021	24 Nov 2021
4	15 Oct 2021	24 Nov 2021
5	27 Sept 2021	5 Nov 2021
6	1 Sept 2021	14 Oct 2021
7	15 Oct 2021	22 Nov 2021
8	15 Oct 2021	23 Nov 2021

A variety of wind speed and weather conditions were encountered over the survey periods in question. As discussed below, the data collected during the survey in support of the proposed Lemanaghan Wind Farm planning application was filtered to remove windy periods for the Peat Extraction Phase, Current Phase and Remedial Phase noise impact assessment.

11.3.3.3 Personnel and Instrumentation

AWN Consulting installed and removed the noise monitors at all locations. Battery checks and meter calibrations were carried out part-way through the survey periods. Table 11-5 details the instrumentation used at the various monitoring locations.

Table 11-5 Instrumentation Details

Location	Equipment	Serial Number
1	Rion NL42	186670
2	Rion NL42	564808
3	Rion NL42	386771
4	Rion NL42	564808
5	Rion NL42	386771
6	Rion NL42	998411
7	Rion NL42	998411
8	Rion NL42	186670

Before and after the survey the measurement apparatus was check calibrated using a sound level calibrator where appropriate. Instruments were calibrated on each interim visit and any drift noted. All

² Equipment was removed by third party between 8 September and 5 November 2021

calibration drifts were less than ± 0.4 dB. Relevant calibration certificates are presented in Appendix 11-2.

Rainfall was monitored and logged using a Texas Instruments TR-525 console and a data logger that was installed on-site for the duration of the surveys. This allows for the identification of periods of rainfall, which allows for the removal of sample periods affected by rainfall from the noise monitoring data sets in line with best practice when calculating the prevailing background noise levels.

11.3.3.4 Procedure

Measurements were conducted at the eight locations over the survey periods outlined in Table 11-4. Data samples for all measurements (noise, rainfall and wind) were logged continuously at 10-minute interval periods for the duration of the survey. Daytime baseline levels were established by removing measured data when the wind speeds were typically above 5 m/s, and by also removing noise levels measured during wet conditions.

11.3.4 Noise Calculations

British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise is appropriate for open sites such as the Application Site. The standard contains a calculation method for noise propagation from machinery across different types of ground can take account of screening and the ‘on-time’ of different items, to calculate a $L_{Aeq,T}$ at a NSL which can be compared to the adopted operational noise criterion.

11.4 Establishing the 1988 Baseline Conditions

By 1988, peat extraction and ancillary activities were well established at the Application Site. The Application Site was drained, milled peat extraction was underway, and railway infrastructure was in place. As noise measurements are not available from the baseline year, 1988, the results of the recent noise survey undertaken to support the proposed Lemanaghan Wind Farm environmental noise assessment are presented here. Measured noise levels, filtered in accordance with the procedure in Section 11.3.3.4 are presented in Table 11-6.

Table 11-6 Measured Noise Levels

Location	Period	L_{Aeq}	L_{A90}
1	Day	52	29
	Evening	52	23
	Night	32	18
2	Day	52	33
	Evening	45	28
	Night	34	20
3	Day	39	29
	Evening	35	25
	Night	38	27

Location	Period	L _{Aeq}	L _{A90}
4	Day	43	29
	Evening	32	23
	Night	33	21
5	Day	47	33
	Evening	34	26
	Night	33	20
6	Day	52	32
	Evening	49	25
	Night	43	17
7	Day	41	30
	Evening	32	26
	Night	34	20
8	Day	46	29
	Evening	39	24
	Night	45	27

11.5

Project Description

For a detailed description of the Peat Extraction Phase, the Current Phase and Remedial Phase please refer to Chapter 4. The below outlines the noise emanating specific elements of the Peat Extraction Phase, the Current Phase, and the Remedial Phase.

11.5.1

Peat Extraction Phase (July 1988 – June 2020)

As outlined above, by 1988 peat extraction was well established at the Application Site. The Application Site was drained, milled peat extraction was underway, and railway infrastructure was in place (refer to Chapter 4 for further detail). The annual breakdown of primary activities associated with the Peat Extraction Phase are outlined in Table 11-7.

Table 11-7 Annual Peat Extraction and Ancillary Activities 1988-2020

Calendar Quarter	Activities
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January to March	Drain/Machinery/Pump/Silt Pond maintenance, stockpile removal, peat transportation
April to June	Peat extraction, stockpile development/removal, peat transportation
July to September	Peat extraction, stockpile development/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, stockpile removal, peat transportation

The types of noise generating peat extraction machines used during the Peat Extraction Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEiAR and are summarised below.

- Drainage and Bog Preparation Machinery such as Dragline/Shovel Excavator;
- Peat Extraction Machinery such as:
 - Tractors (H.D, LHT, and Ridger)
 - Windrow Machine
 - Milled Peat Harvester
- Dump Truck;
- Wheeled Loader Lorry;
- Track Excavator;
- Dozer;
- Dewatering Pumps;
- Rail Lifter;
- Locomotive and Wagons;
- Motor Cycles; and
- Service Vehicles.

In addition to these machines peat haulage locomotives delivered peat which had been extracted at the Application Site and transported to directly to end users via internal private rail, with unladen wagons returning to the Application Site daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

From 2000 onwards, the Application Site has operated under IPC Licence P0500-01. Condition 8 of the IPC Licence includes the following limits on noise levels:

Condition 8:

- 8.1 *Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits (Leq,30min) subject to Condition 3 of this licence:*

Day-time: 55 dB(A)

Night-time: 45 dB(A).

- 8.2 *There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.*

Condition 3:

3.3 Noise

3.3.1 *Noise from the activity shall not give rise to sound pressure levels (Leq,T) measured at noise sensitive locations which exceed the limit value(s) by more than 2 dB(A).*

As activity on the Application Site has been carried out in daytime hours only, i.e. between 08:00 hrs and 22:00 hrs, the relevant noise level limit is 55dB LAeq,30min at NSLs. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the Application Site for that period.

Review of the Annual Environmental Reports (See Appendix 4-3) on noise monitoring shows that are no breaches of noise limits by the onsite activities and no records of noise complaints received regarding the Application Site for the period 2000 to 2024.

11.5.2 Current Phase (June 2020 – Present Day)

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on site is much reduced when compared to the Peat Extraction Phase. On site activities are limited to removal of the existing peat stockpiles from the Application Site, which was completed by the end of 2024. The types of noise generating machines during the Current Phase are listed below in Table 11-8. Following the cessation of peat extraction in June 2020, stockpiled peat from the Application Site was supplied to the Derrinlough Briquette Factory until its closure in June 2023, nearby ESB West Offaly Power Station, and to horticultural peat processing plants. A majority of the stockpiled peat was moved from the Application Site to end-users by rail until 2023, where the remaining stockpiles were delivered via HGV using the public road network. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

However, due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, these movements are at a much lesser volume than during the Peat Extraction Phase. The onsite machinery which are used during the Current Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEiAR, and are summarised below:

- > Wheeled Loader Lorry;
- > Track Excavator;
- > Locomotive and Wagons;
- > Dump Truck; and,
- > Tractors.

Section 11.6.2 presents the noise assessment for the Current Phase. Based on the predicted noise levels, the Application Site has been in full compliance with the noise limits set out in the IPC Licence during the Current Phase.

11.5.3 Remedial Phase

The Remedial Phase refers to managed rehabilitation of the bogs in accordance with the requirements of Condition 10 of the IPC Licence. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The rehabilitation of the Application Site will support biodiversity e.g., plants, insects, bird and mammals, and the formation of wetland habitats. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape, and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity, habitat regeneration and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peat forming ecosystems to establish.

It is a requirement of 'Condition 10 Cutaway Bog Rehabilitation' of the IPC Licence that Bord na Móna, following decommissioning of use of all or part of their bogs, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Decommissioning and Rehabilitation Plan, included as Appendix 4-2 Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan. Ecologists and site managers will visit the Application Site regularly for monitoring purposes. Noise generating machinery will be limited to occasional tractors or excavators to facilitate in the drain blocking process across the Application Site. These activities will be limited to the first 2 years of the Remedial Phase. In addition, ecologists and site managers will travel to and from the Application Site daily in light goods vehicles (LGVs) to oversee these activities. The majority of peat stockpiles have been removed from the Application Site as of 2024 with a few remaining stockpiles to be levelled onsite, as such no Heavy Goods Vehicles (HGVs) movements associated with the removal of stockpiles are anticipated to be required during the Remedial Phase. The onsite machinery to be used during year 1 and 2 of the Remedial Phase are listed below:

- Tracked Excavator, and
- Tractor.

From year 3 onwards, the only vehicles on site will be infrequent site visits (1-2 per month) by ecologists and site managers in Light Goods Vehicles (LGVs) to monitor the progress of the Draft Cutaway Bog Decommissioning and Rehabilitation Plan.

Again, during the Remedial Phase, despite the significant reduction in noise generating machinery the Applicant is committed to complying with all conditions, including noise, set out in the IPC Licence, where applicable.

11.6 Likely Significant Effects and Associated Mitigation Measures

11.6.1 'Do-Nothing' Option

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the project not be carried out. Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and ancillary activities had ceased from 1988 onwards, then consequently there would have been no noise emissions from the Application Site and no noise or vibration effects.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction and ancillary activities but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and ancillary activities have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction and ancillary activities at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will

continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

As part of Bord na Móna's statutory obligations under IPC licence requirements, a Cutaway Bog Decommissioning and Rehabilitation Plan will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of this plan is included in the impact assessment below.

11.6.2 Identification and Description of Potential Impacts

11.6.2.1 Peat Extraction Phase (July 1988- June 2020)

11.6.2.1.1 Peat extraction and ancillary activities

A variety of items of machinery were in use for the purposes of peat extraction and ancillary activities. There were vehicular movements to and from the Application Site that made use of existing roads. Potential noise impacts are discussed in the following sections. It should be noted that peat extraction was seasonal, with peat extraction and ancillary activities occurring during summer months when weather permitted. Potential noise impacts from machinery and equipment would have been experienced intermittently during the active periods due to the continuous movement of machinery around the Application Site, i.e., no machinery operated continuously in the one location near NSLs.

The approach below predicts noise levels at various distances to determine if significant effects are likely to have occurred.

As discussed in Section 11.3.4 the calculation methods in BS5228 are suitable for the calculation of noise levels at NSLs near open sites such as the Application Site. The assessment begins with a set of machinery items that are considered typical for the activity of peat extraction and ancillary activities which are listed below in Table 11-8.

Table 11-8 Representative Peat Extraction Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB L _{Aeq,T})
Dump Truck (C4.2)	78
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dewatering Pumps (D7.70)	80
Tractors (H.D, LHT, Ridger)	81
Rail Lifter	81
Locomotive and Wagons	81
Dragline/Shovel Excavator	81
Windrow Machine	81
Milled Peat Harvester	81
Motorcycles	81
Service Vehicles	81

Table 11-9 presents the operational noise levels for the Peat Extraction Phase at various distances from the activity. Again, due to the nature of the bog landscape it is assumed that the ground between the peat extraction and ancillary activities and the NSL is 'soft'; i.e., no acoustic screening was in place. The 'on-time' is assumed to be 80%, i.e., the machinery was operating for 80% of the working day. As a conservative measure, the calculations assume that all items of machinery listed in Table 11-8 above

operated at the same time at the stated distance from a NSL though this is unlikely to have been the case at all times.

Table 11-9 Typical Noise Emission Levels due to Peat Extraction

Phase	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	200m set back	250m set back	300m set back	350m set back
Peat Extraction	55	53	51	49

At distances of 200 m and beyond, the levels of noise are below the operational noise criterion of 55 dB $L_{Aeq,T}$ adopted in Section 11.3.4. Figure 11-3 shows the NSLs with a coloured buffer of 200m around each one. Figure 11-4 shows highlighted yellow areas where the parts of the Application Site lie within 200m of an NSL.

Any vibration generated by the machinery listed in Table 11-8 would be imperceptible at NSLs at the distances listed above.

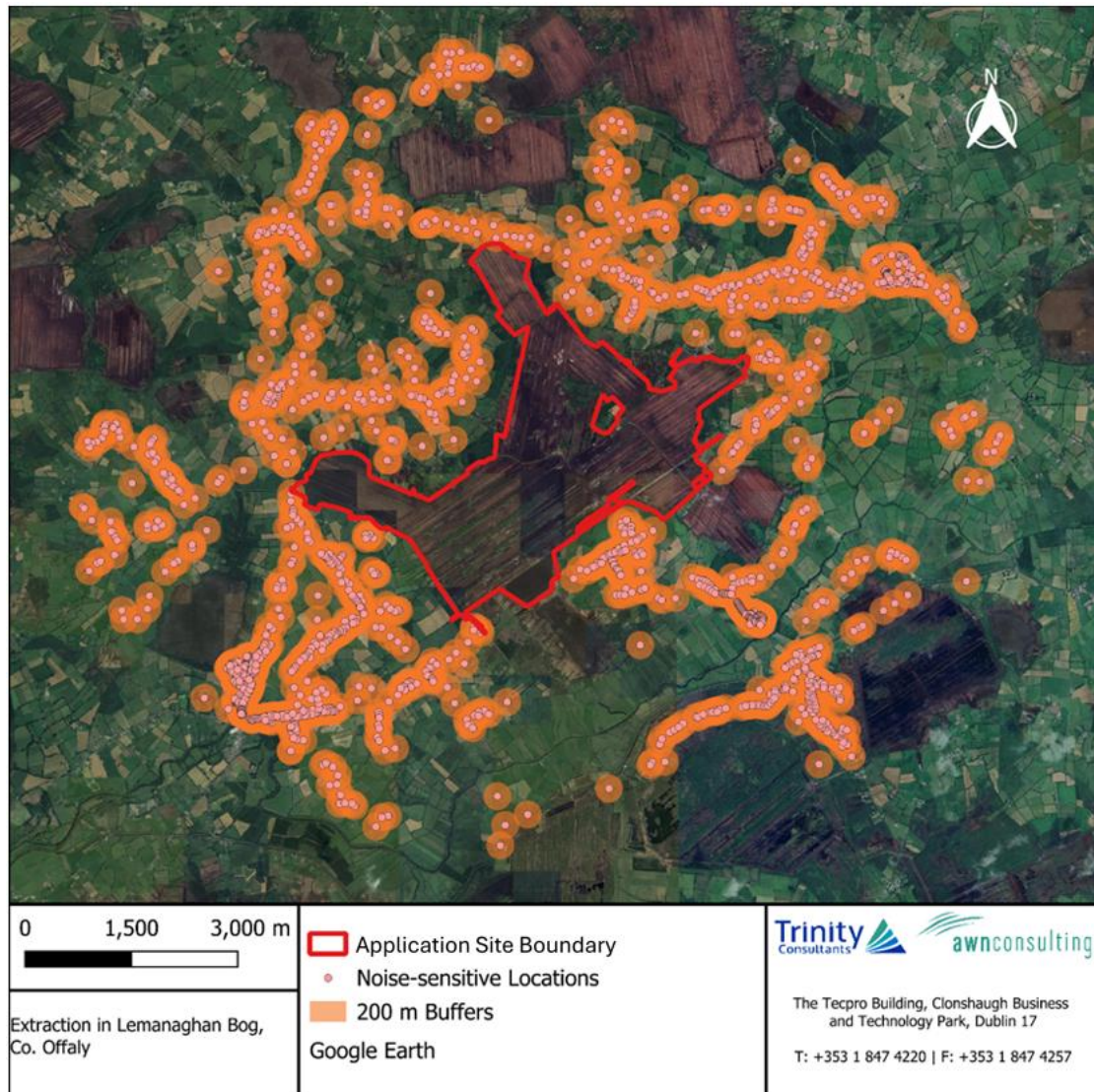


Figure 11-3 NSLs with 200m buffers.

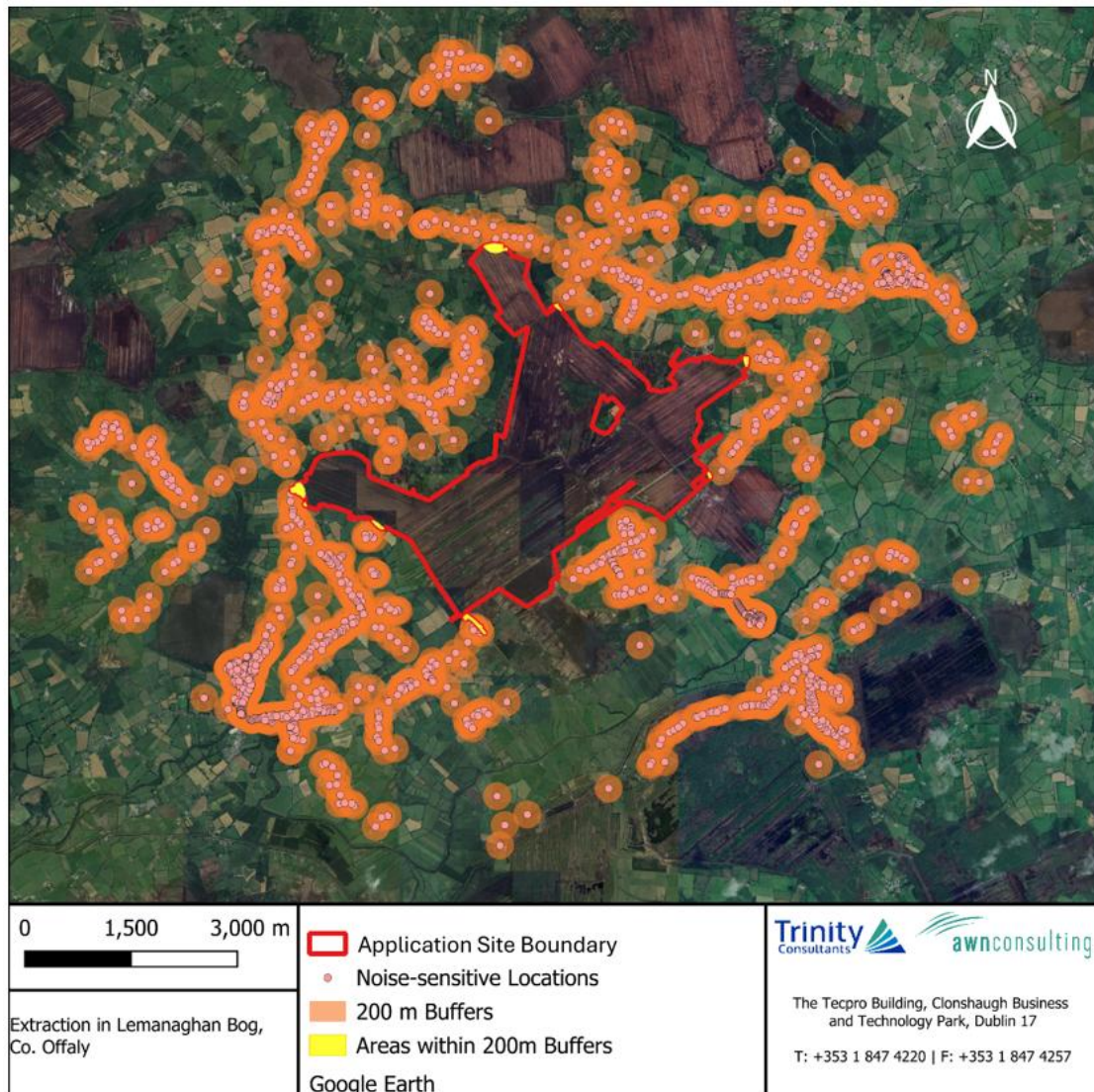


Figure 11-4 Areas, shown in yellow, where bog is within 200m of NSLs.

The diagrams show that limited number of locations at the Application Site, the peat extraction and ancillary activities had the potential to be within 200m of an NSL. Beyond 200m, noise levels are calculated to be within the noise criterion.

The purpose of Figure 11-4 is to demonstrate that the area within which works could have resulted in noise levels above the noise level criterion were very limited in the context of the whole site. It is therefore unlikely that a significant noise effect was caused by peat extraction and ancillary activities.

Vibration

Criteria for vibration at NSLs have been presented in Section 11.3.2.2 in terms of a vibration parameter Vibration Dose Value (VDV). No vibration measurements are available from the Peat Extraction Phase and Current Phase, however for context, the following comment is offered:

Vibration measurements carried out by AWN Consulting, for an unrelated project, at a distance of 15 m from the main Dublin to Limerick/Cork train line yielded a VDV value of $0.02 \text{ m}\cdot\text{s}^{-1.75}$. With reference to Table 11-1, this value is below the criteria for adverse comment, even during night-time periods. Considering the much lower speeds of the locomotives and wagons in use during the Peat

Extraction Phase and Current Phases, it is not considered that a significant vibration effect occurred. The resultant vibration impact was negative, not significant and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at the nearest NSLs associated with the Peat Extraction Phase are as described below. As the noise levels are below the criterion (see Table 11.9), the effect is considered Not Significant.

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Negative	Not Significant	Long-term but limited to daytime (08:00 hrs – 22:00 hrs) and was seasonally dependant

11.6.2.1.2 Additional Traffic on Public Roads

Peat was transported solely by internal rail network during the Peat Extraction Phase (July 1988 – June 2020). In Section 14.2.4.1 of Chapter 14 Material Assets, it is stated that employees travelling to and from the Application Site gave rise to an average of 31 daily vehicle movements. Chapter 14 also states “1 HGV would have come to the site per day for the entirety of the Peat Extraction Phase for activities such as construction work, fuel deliveries, maintenance activities, and collections and deliveries”. In terms of the effect of this number of vehicle movements in the context of the road network, it is stated in Section 14.2.5.2 that the average annual LGV and HGV traffic movements generated by the Peat Extraction Phase contributed to a range of <0.1% - 1.9% of the AADT (Year 1988) for the four representative TII count locations.

In order to increase traffic noise levels by 1 dB relative traffic volumes would need to increase by the order of 25%. According to Table 11-2, a 1 dB increase in traffic noise level results in a change in noise level which is not significant.

Based on an increase of up to 1.9%, it is considered that the effects at noise-sensitive locations of Application Site traffic during the Peat Extraction Phase were therefore neutral, imperceptible and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at NSLs associated with the additional traffic generated during the Peat Extraction Phase are as described below. The effect is considered Not Significant.

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Imperceptible	Long-term

Prior to 2000, control measures pertaining to noise comprised of machinery maintenance:

1. All peat harvesting machinery listed above in 11.6.2.1.1 were stored at the Lemanaghan Works or local holding areas at the end of the workday.
2. All machinery were regularly inspected, serviced.
3. Railway tracks and railway locomotives underwent continuous inspection and maintenance in compliance with the IPC license.

As discussed in Section 11.3.2, since May 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

Day-time (08:00 hrs to 22:00 hrs): 55 dB(A)

Night-time (22:00 hrs to 08:00 hrs): 45 dB(A).

Since 2000 there have been no breaches of noise limits by the onsite activities or noise complaints from NSLs in the vicinity of the Application Site according to the AERs presented in Appendix 4-1 of this rEiAR.

The following comments are taken from an Inspectors report issued in 1999 for the licence application:³

No noise complaints have been received by the Agency with respect to operations associated with this application. The most dominant noise source associated with peat harvesting is rail movement while noise emissions also arise from the milling/harvesting operations. A baseline noise survey was conducted at two of the Bord na Móna Groups (Allen & Boora) and these were stated as being representative of noise emissions from all of the sites. The studies concluded that noise levels resulting from activities at the sites are unlikely to have any significant impact on the local environment. This was confirmed by noise monitoring undertaken during the peat harvesting season. The noise condition in the proposed determination will limit noise emissions from activities at the sites to daytime 55 L_{eq} dBA and night-time 45 L_{eq} dBA at noise sensitive locations.

11.6.2.2 Current Phase (June 2020 – Present Day)

11.6.2.2.1 Peat Stockpile Removal and Rehabilitation

During the Current Phase, the noise generating activities at the Application Site have been much reduced with respect to the Peat Extraction Phase. Following the cessation of peat extraction and ancillary activities in June 2020, stockpiled peat from the Application Site has been supplied to the Derrinlough Briquette Factory until its closure in June 2023 and to a third party. A majority of the stockpiled peat was moved to end-users by rail, with the remaining via HGV deliveries using the public road network. Other elements of the Current Phase are the environmental and ecological monitoring, and some rehabilitation works, neither of which generate significant noise.

Similar to the Peat Extraction Phase, the approach taken predicts noise levels at various distances, to evaluate as to whether any significant effect is occurring or likely to have occurred. The machinery involved in peat removal are listed in Table 11-10.

³ https://epawebapp.epa.ie/licences/lic_eDMS/090151b28004350c.pdf, From Licence application Reg 500, page, 4, 1999

Table 11-10 Representative Peat Removal and Rehabilitation Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB L _{Aeq,T})
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dump Truck (C4.2)	78
Rehabilitation: Plough	81

Table 11-11 presents the noise levels for the Current Phase at various distances from the activity. Again, it is assumed that the ground between the Current Phase activity and the NSL is 'soft', i.e., no acoustic screening was in place.

Table 11-11 Typical Noise Emission Levels due to Peat Removal

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB L _{Aeq,T})			
	150	200	250	300
Peat Removal and Rehabilitation Machinery	53	49	47	45

As there have been fewer noise sources in the Current Phase than in the Peat Extraction Phase, less noise has been generated and the distances at which the criteria would be exceeded is less: at distances of 150 m and beyond, the levels of noise have been below the operational noise criterion of 55 dB L_{Aeq,T}. Similar to the Peat Extraction Phase, the number of NSLs within 150m is limited.

Noting that Figure 11-4 shows the very limited areas within the Application Site which are 200 m from any NSL, it is inferred that the corresponding areas within 150 m from any NSL is further reduced; it is therefore unlikely that a significant noise effect was caused during the Current Phase.

Vibration

As discussed above in relation to the Peat Extraction Phase, likely vibration levels have been well below the criteria for adverse impacts, even during night-time periods. It is not considered that a significant vibration effect has occurred. The resultant vibration impact has been negative, not significant and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects associated with noise and vibration for the Current Phase at the nearest NSL are described below. The effect is considered Not Significant.

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Negative	Not Significant	Short-term

11.6.2.2.2 **Additional Traffic on Public Roads**

As stated in Section 14.2.5.3 of the Chapter 14 Material Assets, the average annual LGV and HGV traffic movements generated during the Current Phase has contributed to a range of 0.17-0.36% of the AADT for the four representative TII count locations.

In order to increase traffic noise levels by 1 dB relative traffic volumes would need to increase by the order of 25%. Based on an increase of up to 0.36%, it is considered that the effects at noise-sensitive locations of Application Site traffic during the Peat Extraction Phase have therefore been neutral, imperceptible and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at noise sensitive locations associated with the additional traffic generated during the Current Phase are as described below. The effect is considered Not Significant.

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Imperceptible	Short-term

11.6.2.2.3 **Control Measures**

The assessment in Section 11.6.2.2.1 has found that there are no significant noise impacts. However, as stated in Section 11.6.2.1.3, since April 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

- > Day-time: 55 dB(A) *Leq,30min*
- > Night-time: 45 dB(A) *Leq,30min*

11.6.2.3 **Remedial Phase**

11.6.2.3.1 **Rehabilitation Works**

The main activity associated with the Remedial Phase comprises the blocking of drains across the Application Site and involves a limited amount of machinery, as listed in

Table 11-12. The drain blocking is expected to occur in years 1 and 2. During this phase, ecologists and site managers will oversee the works and therefore, personnel vehicles will travel to and from the Application Site daily. From year 3 onwards, monthly site visits by ecologists and site managers will occur to monitor the rehabilitation works.

Table 11-12 Machinery for the Remedial Phase and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB L _{Aeq,T})
Track Excavator (C2 22)	72
Tractor (n/a)	81

Table 11-13 presents the operational noise levels for the Remedial Phase at various distances from the activity.

Table 11-13 Representative Noise Emission Levels due to Remedial Phase year 1 and 2 only

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB L _{Aeq,T})			
	80	100	125	150
Rehabilitation Machinery	55	53	51	49

Similarly, as the number of noise-generating items required is less than those associated with the Peat Extraction Phase, the distances at which the criteria would be exceeded are further reduced; at distances of 80 m and beyond, the levels of noise are below the operational noise criterion of 55 dB L_{Aeq,T}. Similar to the Current Phase, the number of NSLs within 80m is limited.

Vibration

During the Remedial Phase, there will be no significant vibration-generating sources operating on the Application Site. The vibration effects are neutral, imperceptible and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects associated with noise and vibration at the nearest NSL associated with the Remedial Phase are described below. The effect is considered Not Significant.

Quality	Significance	Duration
Neutral	Imperceptible	Long-term

11.6.2.3.2 Additional Traffic on Public Roads

Traffic on public roads in the Remedial Phase will be further reduced compared to Peat Extraction Phase and Current Phase. As stated in Section 14.2.5.4 of Chapter 14 Material Assets, the average annual LGV and HGV traffic movements generated during this phase will contribute to a change in

traffic flows of less than 0.1% of the daily traffic volumes. An increase of less than 0.1% is insignificant it is considered that the effects at noise-sensitive locations from Application Site traffic during the Remedial Phase will be neutral, imperceptible and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at noise sensitive locations associated with the additional traffic generated during the Remedial Phase are as described below. The effect is considered Not Significant.

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Imperceptible	Long-term

11.6.2.3.3 **Mitigation Measures**

The Applicant will continue to comply with the conditions relating to noise set out in the IPC Licence Conditions 3 and 8 as applicable.

11.6.3 **Residual Effects**

11.6.3.1 **Peat Extraction Phase (July 1988- June 2020)**

The potential residual effects at the nearest NSLs associated with the peat extraction and ancillary activities in the Peat Extraction Phase are described as negative, not significant and long-term.

In respect of noise and vibration from additional traffic on public roads due to activity on site, the residual effects at the nearest NSL were also negative, not significant and long-term. The effect is considered Not Significant.

11.6.3.2 **Current Phase (June 2020 – Present Day)**

The potential residual effects at the nearest NSLs associated with the Current Phase activities are described as negative, not significant and short-term. The effect is considered Not Significant.

11.6.3.3 **Remedial Phase**

The potential residual effects at the nearest NSLs associated with the Remedial Phase activities are described as neutral, imperceptible, and long-term. The effect is considered Not Significant.

11.6.4 **Significance of Effects**

11.6.4.1 **Peat Extraction Phase (July 1988- June 2020)**

The effects at the nearest NSLs associated with the Peat Extraction Phase are described as not significant.

11.6.4.2 **Current Phase (June 2020 – Present Day)**

The effects at the nearest NSLs associated with the Current Phase are described as not significant.

11.6.4.3 Remedial Phase

The effects at the nearest NSLs associated with the Remedial Phase are described as imperceptible.

11.6.5 Cumulative and In-Combination Effects

11.6.5.1 Peat Extraction Phase (July 1988- June 2020)

Chapter 4 describes in detail the peat extraction and ancillary activities from 1960 until 1988. There is no temporal overlap between peat extraction and ancillary activities during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.3 of Chapter 2 lists all the relevant plans and projects for consideration of cumulative impacts. Under the precautionary scenario, the cumulative list of projects and developments as of 2025 is assumed to have been present in 1988 where in reality the list of projects and developments present in 1988 would have been less. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Peat Extraction Phase, there is no potential for significant cumulative effects with typical rural background noise-generating activities.

11.6.5.2 Current Phase (June 2020 – Present Day)

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Current Phase, there is no potential for significant cumulative effects with typical rural background noise-generating activities.

11.6.5.3 Remedial Phase and Overall Cumulative Effect

Chapter 4 describes in detail the peat extraction and ancillary activities from 1960 until 1988. There is no temporal overlap between peat extraction and ancillary activities during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.5 of Chapter 2 lists all the relevant plans and projects for consideration of cumulative impacts. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Project, there is no potential for significant cumulative effects with typical rural background noise-generating activities.

The proposed Lemanaghan Wind Farm will be subject to a separate EIAR and contains an assessment of noise from the construction, operation and decommissioning phase of the wind farm in accordance with best practice, i.e. *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*, (Institute of Acoustics, 2013) and *Wind Energy Development Guidelines* (Department of the Environment, Heritage, and Local Government, 2006). As wind turbine noise varies with wind speed at any time, a specific noise assessment methodology is used which takes account of the variability of noise levels over the operating wind speed range. Wind turbine noise at NSLs is described in terms of the L_{A90} , parameter which is the level which is exceeded for 90% of the measurement period. It will therefore exclude the effects of brief, intermittent events and is used to estimate a background level.

Noise from the machinery associated with the Remedial Phase (years 1 and 2) is not dependent on the wind speed and is therefore assessed differently, i.e. calculating the external noise level at the façade of NSLs. These noise levels are then compared to criteria as discussed in Section 11.3.2, in terms of the

L_{Aeq} parameter, which is the equivalent continuous sound level. Each assessment method is robust and appropriate to the noise source in each case.

If the planned Lemanaghan Wind Farm is consented, it is extremely unlikely the drain blocking activities of the Remedial Phase will occur concurrently to the operation of the wind farm. The drain blocking will be done either in advance of any wind farm construction or post construction. However, in the unlikely event they occurred at the same time, the noise criteria for the Remedial Phase (day-time) activities are 55 dB L_{Aeq} (defined in Section 11.3.2). Therefore, based on the below limits for the proposed wind farm in line with best practice guidance, it is considered that there is no significant potential for cumulative effects should the two events run concurrently.

The proposed operational limits at the nearest noise sensitive locations for the Lemanaghan Wind Farm will be confirmed in the associated EIAR. It can be assumed that these limits will align to best practice guidance couched in terms of the $L_{A90,10min}$ parameter which are typically as follows:

- > 40 dB $L_{A90,10min}$ for quiet daytime environments of less than 30 dB $L_{A90,10min}$;
- > 45 dB $L_{A90,10min}$ for daytime environments greater than 30 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher), and;
- > 43 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher) for night-time periods.

Taking into account the above comments, there is no potential for significant cumulative noise effects with the proposed Lemanaghan Wind Farm and Remedial Phase activities such as those outlined in the Draft Cutaway Bog Decommissioning and Rehabilitation Plan.

11.7

Conclusion

This chapter of the rEIAR has assessed the potential for any likely significant effects of noise and vibration due to past activities at the Application Site. Noise and vibration impacts have been identified, described and then assessed as 'not significant' for the Peat Extraction Phase and the Current Phase, and as 'imperceptible' for the Remedial Phase.

In respect of vibration none of the three phases included or will include any significant vibration-generating sources operating on the Application Site; this includes rail movements, due to the low speeds did not give rise to any significant effects at sensitive receptors.

The assessment of potential cumulative effects of the Remedial Phase and the proposed Lemanaghan Wind Farm has concluded that there is no potential for significant cumulative noise effects.