Appendix 15-1: Construction Noise and Vibration Report

Calderdale Energy Park

PEIR Volume 3
PINS Reference: EN0110023
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Reg 5 (2) (a).

7 April 2026

Calderdale energy park

A specialist energy consultancy

Technical Appendix 15.1

Construction Noise and Vibration Report

Calderdale Energy Park

Calderdale Wind Farm Limited

15809-010-D0
20 March 2026

PUBLISHED

Calderdale energy park

Quality Assurance

TNEI Services Ltd, TNEI Africa (PTY) Ltd and TNEI Ireland Ltd operate an Integrated Management System and is registered with The British Assessment Bureau as being compliant with ISO 9001 (Quality), ISO 14001 (Environmental) and ISO 45001 (Health and Safety).

Disclaimer

This document is issued for the sole use of the Customer as detailed on the front page of this document to whom the document is addressed and who entered into a written agreement with TNEI. All other use of this document is strictly prohibited and no other person or entity is permitted to use this report unless it has otherwise been agreed in writing by TNEI. This document must be read in its entirety and statements made within may be based on assumptions or the best information available at the time of producing the document and these may be subject to material change with either actual amounts differing substantially from those used in this document or other assumptions changing significantly. TNEI hereby expressly disclaims any and all liability for the consequences of any such changes. TNEI also accept no liability or responsibility for the consequences of this document being relied upon or being used for anything other than the specific purpose for which it is intended, or containing any error or omission which is due to an error or omission in data used in the document that has been provided by a third party.

This document is protected by copyright and may only be reproduced and circulated in accordance with the Document Classification and associated conditions stipulated or referred to in this document and/or in TNEI's written agreement with the Customer. No part of this document may be disclosed in any public offering memorandum, prospectus or stock exchange listing, circular or announcement without the express and prior written consent of TNEI. A Document Classification permitting the Customer to redistribute this document shall not thereby imply that TNEI has any liability to any recipient other than the Customer.

Any information provided by third parties that is included in this report has not been independently verified by TNEI and as such TNEI accept no responsibility for its accuracy and completeness. The Customer should take appropriate steps to verify this information before placing any reliance on it.

Document Control

Revision	Status	Prepared by	Checked by	Approved by	Date
R0	FIRST ISSUE	RE	JS	MT	20/03/2026

TNEI Services Ltd
Company Registration Number: 03891836 **VAT Registration Number: 239 0146 20**

Registered Address 5th Floor 10 Chapel Walks, Manchester, M2 1HL Tel: +44 (0)161 233 4800	7th Floor West One Forth Banks Newcastle upon Tyne NE1 3PA Tel: +44 (0)191 211 1400	7th Floor 80 St. Vincent Street Glasgow G2 5UB Tel: +44 (0)141 428 3180

TNEI Ireland Ltd
Registered: 104 Lower Baggot Street, Dublin 2, DO2 Y940
Company Registration Number: 662195 **VAT Registration Number: 3662952IH**

Unit S12, Synergy Centre
TU Dublin Tallaght Campus
Tallaght
D24 A386
Tel: +353 (0)190 36445

TNEI Africa (Pty) Ltd
Registered: Mazars House, Rialto Rd, Grand Moorings Precinct,7441 Century City, South Africa
Company Number: 2016/088929/07

Unit 514 Tyger Lake
Niagara Rd & Tyger Falls Blvd
Bellville, Cape Town
South Africa, 7530

TNEI Inc.
Company Number: 2588437

4960 S.Gilbert Road
#1-759, Chandler
Arizona, 85249
Tel: +1 (980) 245-4024

Executive Summary

TNEI Services Limited (TNEI) was commissioned by Calderdale Wind Farm Limited ('the Applicant') to undertake predictions of noise levels associated with the construction of the proposed Calderdale Energy Park (the Proposed Development).

The noise predictions were used to assess the potential impact of noise attributable to the construction of the Proposed Development on the occupiers of nearby noise sensitive receptors (properties, people or fauna that are sensitive to noise or vibration and, therefore, may require protection from nearby noise or vibration sources).

The construction noise impact assessment was undertaken using guidance contained in BS 5228: Part 1 2009+A1:2014 *'Noise and vibration control on construction and open sites- Noise'* and the calculation methodology in ISO9613: 2024 *'Acoustics - Attenuation of sound during propagation outdoors' -Part 2: General Method of Calculation*', together with noise data for appropriate construction plant.

Forty-two residential receptors neighbouring the Proposed Development were identified as the nearest properties located to the proposed construction activities. Predictions have been made assuming that all items of plant are operating continually throughout the assessment period to provide a worst-case scenario. In addition, the noise model assumes that noise sources would be located within the most likely activity areas closest to the receptors, whereas in reality plant would move around and only a proportion of the plant may be operating at any one time. As such, the predictions are inherently likely to over-predict the actual sound levels that are likely to be experienced.

The results show that the predicted noise levels would be below the most stringent of the noise threshold levels detailed in BS 5228, with the exception of one residential receptor during BS 5228's defined daytime period. However, the effects are deemed to be Not Significant; this is due to the short duration of the works and small magnitude of the exceedance where the daytime Threshold is exceeded, and that no works are anticipated during the weekend and evening assessment period. Nevertheless, mitigation in the form of good practice during construction is recommended to keep noise to a minimum and recommendations in accordance with BS 5228 have been made in this report.

The construction traffic noise assessments identifies that the maximum total increase in traffic flow on any road is predicted to be 9.9 %, substantially below the 25% threshold indicating a 1 dB change in noise level. As such, the effects of construction traffic noise are deemed to be Not Significant.

The assessment identifies that no vibration inducing activities will be undertaken in the near vicinity of any sensitive receptors. Accordingly, no vibration effects are anticipated and no further assessment of vibration is required.

Contents

TABLES

APPENDICES

1 Introduction

1.1 Brief

TNEI was commissioned by Calderdale Wind Farm Limited to undertake a construction noise and vibration assessment for the Calderdale Energy Park (the 'Proposed Development'). The following steps summarise the noise assessment process, which considers the potential for impacts attributable to construction activities:

- Establish typical ambient noise levels at sensitive receptors located closest to the anticipated construction activities and derive appropriate noise threshold levels;
- Undertake predictions of activity noise throughout the construction period that that would be incident at the nearest sensitive receptors;
- Compare the predicted noise levels across the construction period with the derived threshold values; and,
- Identify any requirements for mitigation measures, if needed.

In addition, TNEI have undertaken a construction traffic noise assessment, which considers the impacts of noise related to construction traffic. This assessment is based on a comparison of baseline traffic flows to predicted traffic flows. Construction vibration is considered qualitatively, as no vibration causing activities are anticipated to occur in close proximity to receptors and therefore a detailed assessment is not required.

The following terms and definitions are used throughout this report:

- **Emission** refers to the sound level emitted from a sound source, expressed as either a sound power level or a sound pressure level;
- **Immission** refers to the sound pressure level received at a specific location from a noise source(s);
- **SWL** indicates the sound power level in decibels (dB);
- **SPL** indicates the sound pressure level in decibels (dB);
- **NSR** (Noise Sensitive Receptor) are identified receptors that are sensitive to noise;
- **NML** (Noise Monitoring Location) refers to any location where baseline or specific noise levels have been measured; and
- **CNAL** (Construction Noise Assessment Location) refers to any location where the noise immission levels are calculated and assessed.

Unless otherwise stated, all noise levels refer to free field levels i.e. noise levels without influence from any nearby reflective surfaces.

All coordinates refer to Ordnance Survey (OS) British National Grid using Eastings, Northings.

1.2 Location of the Proposed Development Description

The Proposed Development is located north of Hebden Bridge. The approximate OS Grid Reference for the centre of the Proposed Development is 396500, 433600 and the proposed layout is shown on Figure A1.1 in Annex 1.

The Proposed Development would be accessed from the north west via Lancashire Moor Road (the 'Western Access Route') or via the east via Cold Edge Road (the 'Eastern Access Route'). During the

construction phase, it is proposed to use the Western Access Route for all main activities (deliveries, bringing plant onsite, staff arriving, etc.) whilst the Eastern Access Route will predominantly be for staff access only. Noise impacts from the construction and use of both Access Routes are considered in this assessment. In addition, the assessment considers construction traffic outside of the Proposed Development boundary (the 'PEIR Boundary') i.e. vehicles travelling to and from the Proposed Development during the construction phase.

Figure A1.1 in Appendix A shows the current proposed infrastructure layout.

1.3 Proposed Development Description

A detailed description of the Proposed Development and the construction requirements can be found within Chapter 4: The Proposed Development of the PEIR.

At this PEIR stage, it is anticipated that the construction of the Proposed Development will require the establishment of three construction compounds and a temporary laydown area, the laying of tracks from the entrances on the public highways up to the construction compound and the internal site access tracks to the wind turbine locations, excavation of turbine foundations, construction of turbine bases, installation of turbines and the installation of a substation and other infrastructure.

The anticipated construction compounds comprise a primary compound located in the centre of the Turbine Area and two satellite compounds located on each Access Route.

At this stage, up to five borrow pits may be opened up onsite, though these would not be operate concurrently and not all borrow pits may be required. Concrete batching will occur on site at one location.

The construction period is anticipated to last for 30 months. Table 1-1 (overleaf), presents an indicative construction timetable. Yellow coloured cells indicate construction activities that have been included in the construction noise assessment, whereas cells shaded grey indicate construction activities that would not typically generate high levels of noise, and as such are excluded from the assessment. Examples of such activities could include wiring of plant, activities using handheld tools, and turbine commissioning tests.

Construction activities are expected to be limited to the following hours:

- Monday – Friday 07:00 – 18:00; and
- Saturday 08:00 -14:00.

Standard construction activities are not anticipated outside of these times; however, it should be noted that exceptions to these working hours may arise, under certain conditions. Examples include construction activities that cannot be stopped once they have begun, such as concrete pours; or where deliveries need to occur outside of standard working hours, for example, to receive and offload Abnormal Indivisible Loads (AILs).

No night-time construction activities are expected, however, there may be requirement to run a small amount of fixed plant during the night-time, for example generators to provide power to site cabins or provide lighting for health and safety reasons. The assessment, therefore, also considers the potential for night-time noise impacts.

Table 1-1: Indicative Construction Timetable

Construction Activity	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	Night
Enabling Works Western Access Route												
A6088 Junction												
Access Track to Lancs Moor Road												
Highway Upgrades												
Two Laws Rd Junction												
Enabling Works Eastern Access Route												
Highway improvements Cold Edge Road to Hill House Edge Lane												
Access to Hill House Edge												
New Access Track												
Highway access Track to A6033												
A6033 Access Junction at Cock Hill												
Western Access Route to Turbine Area												
Compound 1 and Internal Site Access Track												
WTG Internal Site Access Track Section 1												
WTG MT8 - Substation Compound												
Substation Compound												
Main Site Compound												
WTG Internal Site Access Track Section 2												
Internal Site Access Tracks Section 2												
WTG Internal Site Access Track Section 3												
Internal Site Access Tracks Section 3												
WTG Base construction												

Construction Activity	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	Night
Section 1												
Section 2												
Section 3												
Establish Concrete Batching plant												
Operating site batching												
Onsite Sub Station												
Switchgear and Ancillary buildings												
External Equipment												
On Site Cabling installation												
Grid Cabling												
Onsite Section1												
Offsite Section 2												
Offsite Section 3												
Offsite Section 4												
Offsite Section 5												
Offsite Section 6												
Offsite Section 7												
Offsite Section 8												
Works At Bradford West Substation												
Site Substation Commissioning												
WTG Supply Install and Commissioning												
Deliveries												
WTG Installation												
WTG Commissioning												

2 Legislation, Policy and Guidance

2.1 Legislation

The Control of Pollution Act 1974 (COPA 74) [1] is used to control the noise impacts of construction works. Specifically, Section 60 allows Councils to impose restrictions on construction works, including specifying the plant allowed to be used, hours of activity, or the setting of noise levels that may be emitted from a site. Section 61 allows contractors to apply for permission from the relevant Council(s) to undertake 'noisy' construction activities, for example, railway maintenance during night-time hours, or demolishing a building close to residential receptors.

The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 [2] approves both parts of BS 5228:2009 [3] [4] as Codes of Practice in relation to Section 60 of COPA 74.

2.2 National Planning Policy

The Overarching National Policy Statement for energy (EN-1) [5] (NPS EN-1) contains the following that is relevant to the assessment of construction noise.

Paragraph 5.12.9 states that "*For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards [footnote 232] and other guidance which also give examples of mitigation strategies.*"

Paragraphs 5.12.13 – 5.12.16 also state "*the Secretary of State should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the Secretary of State may wish to impose mitigation measures. Any such mitigation measures should take account of the NPPF or any successor to it and the Planning Practice Guidance on Noise.*

Mitigation measures may include one or more of the following:

- *Engineering: reducing the noise generated at source and/or containing the noise generated;*
- *Lay-out: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose-built barriers, or other buildings;*
- *Administrative: using planning conditions/ obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise limits/ noise levels, differentiating as appropriate between different times of day, such as evenings and late at night, and taking into account seasonality of wildlife in nearby designated sites; and*
- *Insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building.*

The project should demonstrate good design through selection of the quietest or most acceptable cost-effective plant available; containment of noise within buildings wherever possible, taking into account any other adverse impacts that such containment might cause (e.g. on landscape and visual impacts; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission).

A development must be undertaken in accordance with statutory requirements for noise. Due regard must be given to the relevant sections of the Noise Policy Statement for England [footnote 233], the NPPF, and the government's associated planning guidance on noise."

The National Policy Statement for Renewable Energy Infrastructure EN-3 [6] (NPS EN-3) references the generic information on the assessment of construction noise in NPS EN-1.

The *National Planning Policy Framework* (NPPF) [5] at paragraph 198 states that all planning policies and decisions should:

"a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life,"; and,

"b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".

The National Planning Policy Framework includes the following relevant policies:

"*15. Conserving and enhancing the natural environment*

187. Planning policies and decisions should contribute to and enhance the natural and local environment by: …

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans…".

"Ground conditions and pollution

198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; "

The National Planning Policy Framework Plan-making and national decision-making policies contain the following policies [7]:

"P3: Living conditions and pollution:

1. *Development proposals should:….*

   c. Not give to, or contribute to…unacceptable levels of...noise...on or beyond the site."

2. *Within this context development proposal should:*

   c. Not result in levels of noise exposure which would have a significant observed adverse effect."

The NPPF is supported by the Noise Policy Statement for England (NPSE) [6], which states that its aims are to:

- *"Avoid significant adverse impacts on health and quality of life while taking into account the guiding principles of sustainable development;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

Neither document, however, provides specific guidance on appropriate construction noise assessment methods or acceptable levels of construction noise, therefore, it is the approved Code of

Practice (BS 5228), as detailed above, that is used to define the construction noise assessment methodology used in this report.

2.3 Relevant Guidance

Part 1 of BS 5228 provides useful guidance on practical noise control and management, with recommendations for basic methods of noise control, including sections on community relations, training, occupational noise effects, neighbourhood nuisance and project supervision. The annexes provide information on typical construction noise sources, noise calculation procedures, mitigation measures and their effectiveness. Part 2 of BS 5228 provides similar guidance in respect of vibration.

Annexes C and D of Part 1 and Annexes C and D of Part 2 present measured noise and vibration levels from construction activities measured across multiple construction sites in the UK. The noise level data may be used to inform the prediction of noise from proposed construction activities. Annex E of Part 1 and Annex B of Part 2 present methods of assessing the significance of effects [1] from construction noise.

In respect of assessing noise from construction traffic, *Calculation of Road Traffic Noise* (CRTN) [(7)] provides a methodology for the prediction of road traffic noise and *Design Manual for Roads and Bridges LA111 Noise and Vibration* (DMRB) [(8)] provides a methodology for the assessment of road traffic based on a predicted increase in traffic flow levels.

[1] Note; Significance of Effects is a term used within the BS 5228 standard, and not EIA terminology.

3 Methodology

3.1 Considering the Potential for Noise and Vibration Impacts

Noise levels from construction activities will vary continually over time, as activities and plant start and stop, and move around the site. To assess the potential impacts of construction noise, a series of worst-case scenarios can be considered, where construction plant and activities are assumed to be working continually and in locations closest to the nearest sensitive receptors.

It would not be appropriate, however, to assume a worst case scenario where a particular item of mobile plant is located directly opposite a receptor for any prolonged period of time (under most circumstances). An example of this could be where an excavator is working along a line to dig a cable trench over a number of weeks, which passes close to a receptor for only a few hours or days. Therefore, in the case of mobile plant, this is modelled as a point source that moves along a defined path, averaging out the sound power level across the length of that line, rather than concentrating it in a single location next to the receptor. In such cases, the predicted noise level will represent an average level expected to be received for the majority of the activity period, however, it should be recognised that when directly opposite a receptor, noise levels would be higher than predicted for a short period of time.

Notwithstanding these discrete occasions, the overall noise level attributable to construction activities from the Proposed Development will tend to be higher in the assessment than what will actually occur for the majority of the time, given that all plant is assumed to be operating continually and concurrently.

BS 5228 provides empirical formulae to estimate the levels of vibration that may be received from particular construction activities, however, the types of activity that are generally recognised as having the potential to generate vibration are restricted to piling, ground compaction and tunnelling. Piling and tunnelling are, at this stage, not relevant to the Proposed Development and the only relevant ground compaction that may occur is in relation to the use of vibratory rollers for the construction of tracks, which would be located at a minimum distance of 160m from the closest property for the Western Access Route and 50m from the closest property for the Eastern Access Route. In summary, no vibration inducing activities will be undertaken in the near vicinity of any sensitive receptors. Accordingly, no vibration effects are anticipated and no further assessment of vibration is required.

Although BS 5228 provides a method for calculating noise from a moving noise source i.e. mobile plant, there is no specific guidance available for the assessment of noise from construction traffic travelling outwith a designated construction area, for example, on public roads. Therefore, a bespoke assessment methodology has therefore been derived, drawing on guidance presented in CRTN and DMRB.

3.2 Study Area

Noise Sensitive Receptors (NSRs) are properties, people or fauna that are sensitive to noise or vibration and, therefore, may require protection from nearby noise or vibration sources. The Study Area for the construction noise assessment is defined through the identification of the closest NSRs to the Proposed Development, on the assumption that if levels are acceptable at the closest receptors, then they should also be acceptable at more distant locations.

A representative sample of Construction Noise Assessment Locations (CNALs) have been chosen to represent the closest receptor or group of receptors to the Proposed Development. The CNALs are the locations at which the noise levels are predicted and assessed. Figure 1.1 (Appendix A) details the location of the nearest identified CNALs.

The study area for the construction traffic noise assessment considers the roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development and aligns with the study area described in Chapter 14: Transport and Access of the PEIR and includes the roads detailed in Figure 6 of Technical Appendix 14-1: Transport Assessment of the PEIR.

3.3 Methodology for the Prediction of Construction Noise

To predict the noise immission levels attributable to the construction of the Proposed Development, a noise propagation model has been produced using the propriety noise modelling software CadnaA. Within the software, complex models can be used to simulate the propagation of noise according to a range of international calculation standards, including BS 5228 and *ISO 9613 2:2024 Acoustics - Attenuation of sound during propagation outdoors: Engineering method for the prediction of sound pressure levels outdoors.*

For this assessment, noise modelling was undertaken using the ISO 9613-2 propagation model, which was chosen in preference to the calculation method presented in BS 5228, primarily because of the significant distances from source to receptor evident for the Proposed Development. Specifically, BS 5228 notes in F 2.2.2.2, that at distances over 300m, noise predictions using the BS 5228 methodology should be treated with caution, especially where a soft ground correction factor has been applied because of the increasing importance of meteorological effects; whereas ISO 9613-2 provides equations that have been validated up to greater distances.

The model uses the octave band sound power output of the proposed construction plant as its acoustic input data, and calculates on an octave band basis, attenuation due to geometric spreading, atmospheric absorption, topography and barriers and ground effects.

For the purposes of this assessment, all noise level predictions have been undertaken using a receiver height of 1.5m above local ground level. Soft ground (G=1) attenuation has been assumed at all locations except for water bodies, construction compounds, turbine bases and similar areas of hardstanding, which have been modelled with a ground attenuation of G=0 (hard ground).

Air absorption based on a temperature of 10°C and 70 % relative humidity has been assumed to represent a reasonably low level of air absorption.

3.4 Limitations of the Noise Model

The noise propagation models are intended to give a good approximation of the construction noise level and the contribution of each individual noise source. However, it is expected that actual levels are unlikely to be matched exactly with modelled values and the following limitations in the model should be considered:

- In accordance with ISO 9613-2, all assessment locations are modelled as downwind of all noise sources and propagation calculations are based on a moderate ground-based temperature inversion, such as commonly occurs at night;
- The predicted barrier attenuation provided by local topography, embankments, walls, buildings and other structures in the intervening ground between source and receiver can only be approximated and not all barrier attenuation will have been accounted for;
- Unless specifically stated, the modelled scenarios assume all noise sources are operating continuously and simultaneously, estimating a worst-case noise level; and
- All mobile plant assumed to be working along tracks (e.g. excavators, dozers, rollers) have been modelled as moving point sources along their anticipated movement paths and the sound power level of the source is effectively averaged out across the length of the entire line. This will give an approximation of the overall noise levels from mobile plant at receptor

locations; however, in reality noise levels would fluctuate as construction plant and activities move around in their activity areas.

3.5 Methodology for the Assessment of Construction Noise

The construction noise assessment is undertaken as follows:

- Define Construction Noise Assessment Locations (CNALs) to represent the closest NSRs;
- Identify applicable Threshold Levels to identify potentially significant effects;
- Predict noise levels for various construction activities or phases at each CNAL;
- Compare the predicted levels and duration of exposure to the BS 5228 Threshold Levels; and
- Where necessary, develop suitable mitigation measures to minimise any significant adverse effects.

Annex E, part E.3.2 of BS 5228-1, provides example methods for assessing the significance of construction noise effects and gives examples of acceptable levels for construction noise.

Table E.1 of BS 5228-1 (represented in this report as Table 3-1) contains an example of the significance criteria that can be used to assess construction noise for residential receptors.

Three categories of thresholds are provided for varying assessment periods (night-time, evenings and weekends). The appropriate category for any given receptor can be chosen after quantifying the existing ambient noise levels[2] at that location for the given assessment period. BS 5228 provides the following advice regarding the thresholds:

- *"Note 1: A potential significant effect is indicated if the LAeq,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 LAeq,T noise level for the period increases by more than 3 dB due to site noise.*
- *Note 3: Applied to residential receptors only."*

Therefore, the assessment of construction noise reflects a specific noise threshold for the locality for a particular period of the day, rather than an absolute noise level limit.

[2] Ambient noise levels are required to be rounded to the nearest 5 dB.

Table 3-1: Example of Threshold of Potential Significant Effect at Dwellings

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB		
	Category A[(A)]	Category B[(B)]	Category C[(C)]
Night-Time (23:00 – 07:00)	45	50	55
Evenings and Weekends[(D)]	55	60	65
Daytime (07:00 – 19:00) & Saturdays (07:00 to 13:00)	65	70	75

(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 and 07:00 – 23:00 Sundays.

It should be noted that exceedance of the threshold does not in itself indicate a significant effect, rather, the standard states; *"If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect".*

3.6 Methodology for the Prediction of Construction Traffic Noise

The assessment of construction traffic noise is undertaken with reference to both existing baseline traffic and proposed construction traffic i.e. it considers the change in traffic flows that may occur during the construction phase.

The assessment methodology follows a three-stage process, as follows:

- Stage 1 Scoping – to differentiate between road sections that need further assessment and road sections where negligible noise impacts will occur.
- Stage 2 Simple Assessment – to determine whether road traffic noise is above or below a threshold where adverse effects may occur (the Lowest Observable Adverse Effects Level (LOAEL)).
- Stage 3 Detailed Assessment – To determine the magnitude of change for road sections where the LOAEL is exceeded.

The assessment uses the following terminology:

- **Baseline traffic flow.** This is the traffic count data scaled up for the peak year of construction.
- **Development traffic flow.** This is the traffic flow attributable to the construction of the Proposed Development only.

- **Total traffic flow.** This is the baseline traffic flow plus the Proposed Development traffic flow.

Stage 1 Scoping Assessment: Methodology

For each road section to be assessed, the baseline traffic flow is compared to the predicted traffic flow. It is recognised that an increase in traffic flow of 25% or a decrease in traffic flow of 20% results in a noise level change of 1dB, and in respect of the Scoping stage as the DMRB states: *"is the project likely to cause a change in the [baseline noise level] of 1dB LA10,18hr in the do-minimum opening year (DMOY) compared to the do-something opening year (DSOY)?"*.

In this case, the DMOY is taken as the baseline traffic flow in 2031 without the Proposed Development present and the DSOY is the 2031 baseline traffic flow plus any traffic associated with the construction of the Proposed Development.

Where road sections are determined to have an increase in traffic flow of less than 25%, no further assessment is required, as any increase in traffic flow will be negligible in terms of noise, i.e. less than a 1 dB change. In this instance, construction traffic effects would be considered Not Significant.

Stage 2 Simple Assessment: Methodology

Where the need for further assessment is identified, a study area is defined to consider all NSRs in the vicinity of the road section of interest (i.e. that is to be considered through simple assessment). The study area is usually defined as 600m from new roads and 50m from other roads, although variations in the study area are allowed to suit the individual project. In this case, no new public roads are being considered, so the study area has been set to a 50m area, either side of all roads of interest.

Road traffic noise levels are then modelled on the road section of interest in accordance with CRTN, as modified by the *Appendix A 'Operation Noise Calculations'* recommendations in DMRB.

DMRB uses the concept of Observable Adverse Effects Levels to inform noise assessments. The Lowest Observable Adverse Effects Level (LOAEL) i.e. the minimum level required for adverse effects to occur, is defined in DMRB as 55 dB $L_{10,18\,hour}$ (façade) for daytime (06:00 – 24:00). Where the predicted noise levels are below the indicator of the LOAEL, no further assessment is necessary and construction traffic effects would be considered Not Significant.

Stage 3 Detailed Assessment: Methodology

If NSRs are identified within the study area with noise levels above the LOAEL, then the next step is to determine a magnitude of change, as detailed in 3.54a of DMRB and replicated in this report as Table 3-2.

DMRB provides values for Magnitude of Change in the 'short-term' and 'long-term'. Short-term refers to year one / year of opening, whereas long-term refers to year 15. The assessment for short-term is much more stringent, with a change of +5 dB indicating a Major Magnitude of Change, as opposed to +10 dB for Major, which is used for the long-term.

The values for short-term Magnitude of Change are most appropriate to assess a construction phase, as construction noise will be of a short-duration and temporary i.e. there is no long-term construction noise.

Table 3-2: DMRB Magnitude of Change - Short Term

Short Term Magnitude	Short Term Noise Change (dB $L_{A10,10hour}$)
Major	Greater than or equal to 5.0

Short Term Magnitude	Short Term Noise Change (dB $L_{A10,10hour}$)
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	Less than 1.0

As stated in Section 3.1, as there is no specific methodology for the assessment of construction traffic noise, an 'Initial Assessment of Operational Noise Significance' is then undertaken in line with the DMRB, with due regard to the values presented in Table 3-2, where:

- a Major or Moderate magnitude of change is deemed to be Significant; and
- a Negligible or Minor magnitude of change is deemed to be Not Significant.

The levels of magnitude of change in the above bullets are taken directly from DMRB.

Following on from the 'Initial Assessment of Operational Noise Significance', DMRB states: *"Where the magnitude of change in the short term is negligible at noise sensitive buildings, it shall be concluded that the noise change will not cause changes to behaviour or response to noise and as such, will not give rise to a likely significant effect."*

Where a Minor, Moderate or Major magnitude of change is identified, then additional considerations need to be made to determine the 'Final Operational Significance on Noise Sensitive Buildings' in line with the DMRB. These considerations may include:

- Noise level change (whether the magnitude of change is close to the minor/moderate boundary);
- Differing magnitude of change in the long term to magnitude of impact in the short term;
- Absolute noise level with reference to LOAEL and Significant Observable Adverse Effects Levels (SOAEL);
- Location of noise sensitive parts of a receptor;
- Acoustic context; and
- Likely perception of change by residents.

3.7 Determining the Threshold Levels

A baseline noise survey was undertaken as part of the operational noise assessment for the Proposed Development, and this is reported in detailed in *Technical Appendix 15-2 Operational Noise* of the PEIR.

Data from 9 Noise Monitoring Locations (NMLs) has been used in order to set the appropriate BS 5228 threshold levels. The NMLs can be seen on Figure 1.1 (Appendix A).

Table 3-3 details the average $L_{Aeq(t)}$ noise level at each NML[3] after filtering for rainfall events and windspeeds of 5 m/s and above. The levels were calculated for each of the periods defined in BS 5228 for weekday and weekend daytime, evening and night-time. Measurement periods that included significant number of data points with high wind speed or precipitation events have been excluded. Appendix C includes a table of the measured noise levels for all assessment periods, with cells shaded green to indicate data that has been used to calculate the levels detailed in Table 3-3. Unshaded cells

[3] Rounded to the nearest 5 dB as required by BS5228

indicate periods where the noise data has been filtered out and not used for calculation of the averages.

Table 3-3: Typical Ambient Noise Levels, $L_{Aeq(t)}$ for each NML.

Noise Monitoring Location	Daytime M - F	Daytime Sat	Evenings	Weekend	Night-time
	Weekdays 07:00 - 19:00	Saturday 07:00 - 13:00	Weekdays 19:00 - 23:00	Saturday 13:00 – 23:00 Sunday 07:00 to 23:00	All days 23:00 - 07:00
NML01	45	45	40	40	40
NML02	45	40	40	40	35
NML03	40	40	35	35	35
NML04	45	45	40	40	40
NML05	40	45	35	40	40
NML06	40	40	35	40	35
NML07	40	40	35	40	35
NML08	45	45	40	45	40
NML09	50	45	45	50	35

Having due regard to the existing ambient noise levels at NSRs around the Proposed Development, the BS 5228 Category A Threshold Values have been used for all receptors and all time periods. These are the most stringent threshold values and reflect the low ambient noise levels measured in the area during the baseline survey.

Accordingly, given the working hours (listed above) and Category A Threshold values, the assessment has been made against the following noise levels at all CNALs:

- 65 dB $L_{Aeq(t)}$ for daytime weekdays 07:00 – 18:00 and Saturday 08:00 – 14:00. These are the core construction hours for this Proposed Development;
- 55 dB $L_{Aeq(t)}$ for weekday evenings 19:00 – 23:00, Saturday 13:00 – 23:00 and Sunday 07:00 -23:00. This is outside of working hours for the Proposed Development but considered nevertheless for potential instances where works may be required to continue outside of the main working hours; and
- 45 dB $L_{Aeq(t)}$ for night-time 23:00 – 07:00. This is outside of the working hours for the Proposed Development but is considered nevertheless against predictions of a potential scenario of generators operating within the construction compounds.

4 Noise Impact Assessment

4.1 Modelling of Individual Sound Sources

Noise immission levels would vary throughout the construction period as construction activities, plant and locations vary. For much of the working day, the noise associated with construction activities would be less than predicted, as the assessment assumes all equipment is continually operating at full power and in locations closest to the NSRs, whereas in practice, equipment load, and precise location may vary throughout the day. This approach has been adopted to represent a worst-case assessment.

At this stage, a detailed plant list is not available, therefore, a generic plant list based upon experience of similar projects has been used. All modelled noise sources and associated sound power level (SWL) and sound pressure level (SPL) data is included in Appendix C: Noise Model Data.

Source Noise Level Data for trenchless construction activities has been taken from on-site measurements of an active Horizontal Directional Drilling (HDD) in the UK. For all other construction activities, source noise level data has been taken from Annex C of BS 5228, which provides octave band SPL levels for a wide variety of construction plant and activities suitable for the estimation of noise immission levels.

Construction noise sources for any given activity would generally comprise a mix of both moving and static sources. Mobile sources include mobile construction plant and Heavy Goods Vehicles (HGVs), while static construction plant could include pumps. Static equipment is usually located at a fixed location for an extended period of time.

For both mobile and static plant, activity noise levels would be transient in nature due to changes in location, on/off periods, and fluctuations of load on any individual machine.

All static items of plant and activities have been modelled as single point sources. All mobile plant (excavators, dozers, dumpers) have been modelled as either a moving point source (line source) along their anticipated movement paths or as a stationary point source located at the closest point of its anticipated work area to any given CNAL.

4.2 Modelling of Construction Activities

Noise propagation modelling has been undertaken considering the key activities that are likely to occur throughout the construction period. This is based on the indicative information found in Chapter 4: The Proposed Development of the PEIR and detailed in Table 1-1 of this report.

A number of scenarios have been modelled which consider the works planned during core construction hours for one month within each quarter of the construction period where noise immission levels are anticipated to be highest. Each quarter has been marked in bold on Table 1-1. All construction activities within each quarter have been modelled as close to the nearest CNAL as possible, however, in reality this would not be the case as plant and activities may only occur for a defined period at that location and not the full length of the quarter. As such, the assessment is likely to overpredict the noise level during each scenario.

Whilst construction activities are not planned outside of core construction hours, it may be necessary to complete works such as turbine erection or concrete pours, or to receive AIL deliveries which cannot take place during standard working hours. A specific evening and weekend scenario has not been modelled but the predicted noise levels for the quarters where these activities are planned can be compared to the threshold value to consider this.

Although no construction activities are anticipated during the night-time, there may be a requirement for generators to operate within the construction compound outside of daylight hours, as detailed in

Section 1.3 above. As such, a night-time scenario which considers diesel generators for lighting rigs/ welfare facilities has also been modelled.

Details of the items of plant assumed to be operating in each modelled scenario, as well as noise data for each modelled noise source, are included in Appendix C.

The following scenarios have been modelled:

- **Quarter 4 2029:** Initial construction activity is underway, with enabling works beginning for the Western Access Route at the A6088 and Eastern Access Route at Cold Edge Road.
- **Quarter 1 2030:** The Access Routes upgrades continue along Lancashire Moor Road and Hill House Edge Lane respectively towards the Turbine Area with progression from initial main road junctions, access tracks continue being laid and upgrades to existing roads continue heading closer to the Turbine Area.
- **Quarter 2 2030:** Final construction activity for both Access Routes are completed and reach the respective entrances into the Turbine Area.
- **Quarter 3 2030:** Eastern Construction Compound and its associated internal site access track is completed and construction of other internal site access tracks, including access track to Substation Compound and Main Site Compound. Construction of onsite substation and turbine bases begin.
- **Quarter 4 2030:** Construction of internal site access tracks is complete, and concrete batching plant is constructed and becomes operational. Onsite substation construction continues;
- **Quarter 1 2031:** Construction of turbine bases continue. Substation construction continues and onsite cabling installation begins. Works at the Point of Connection with Bradford West Substation begin.
- **Quarter 2 2031:** Construction of turbine bases continues. Substation construction continues and onsite cabling installation completed. Initial deliveries of wind turbines begins. Works at the Point of Connection at Bradford West Substation continue and export cabling installation begins. Trenchless (e.g. Horizontal Directional Drilling) works begin along the Bradford West Cable Corridor.
- **Quarter 3 2031:** Construction of the onsite substation is nearing completion, with the export cabling installation continuing. Works at the Point of Connection at Bradford West Substation continue alongside the wind turbine deliveries. Trenchless (e.g. Horizontal Directional Drilling) works continue to be used along the Bradford West Cable Corridor.
- **Quarter 4 2031:** Construction of the onsite substation buildings are completed and electrical equipment deliveries begin. Work on export cabling route continues and works at the Point of Connection at Bradford West Substation continue. Wind turbine deliveries continue and the installation of wind turbines begins. Trenchless (e.g. Horizontal Directional Drilling) works continue along the Bradford West Cable Corridor.
- **Quarter 1 2032:** Electrical equipment is fully brought onto site for the substation and works at the Point of Connection with Bradford West Substation near completion. Wind turbine installation continues.
- **Quarter 2 2032:** Works at Bradford West Substation are completed and the onsite substation undergoes commissioning. Wind turbine installation is completed and commissioning begins.
- **Night –** The noise model assumes generators may be running within the site compounds to provide power and lighting.

The calculated noise immission levels for each modelled scenario are presented in Table 4.1.

4.3 Calculated Immission Levels

Table 4.1: Calculated Immission Levels (dB $L_{Aeq,t}$)

CNAL	Noise Immission Levels (dB $L_{Aeq,t}$)											
	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	NIGHT
CNAL 1	18	16	26	51	55	55	55	55	47	40	41	18
CNAL 2	18	16	25	46	48	48	48	46	41	37	38	15
CNAL 3	18	16	26	54	54	54	54	51	48	39	38	17
CNAL 4	18	17	26	51	52	51	51	49	45	41	39	18
CNAL 5	18	17	25	42	42	41	42	41	39	38	36	16
CNAL 6	18	17	25	40	41	41	40	40	37	35	35	14
CNAL 7	34	46	56	54	54	53	51	51	51	35	34	26
CNAL 8	24	26	43	43	43	43	36	35	35	33	35	17
CNAL 9	23	23	37	40	39	39	37	35	34	32	36	14
CNAL 10	26	22	33	39	36	37	38	34	35	31	34	15
CNAL 11	37	30	36	37	32	39	33	32	32	27	30	18
CNAL 12	44	36	36	36	31	42	33	32	31	26	28	18

CNAL	Noise Immission Levels (dB $L_{Aeq,t}$)											
	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	NIGHT
CNAL 13	53	46	38	36	31	45	33	32	31	26	28	19
CNAL 14	53	47	38	36	31	46	33	33	31	26	28	19
CNAL 15	41	34	47	42	33	48	37	34	34	30	31	27
CNAL 16	28	22	38	41	36	41	39	34	38	30	36	19
CNAL 17	28	23	40	40	35	39	38	33	36	29	34	21
CNAL 18	24	20	35	38	35	38	40	33	34	30	36	16
CNAL 19	27	21	37	37	34	39	37	32	35	28	33	18
CNAL 20	24	19	33	36	34	38	39	32	34	29	36	15
CNAL 21	22	17	29	34	34	36	36	32	32	29	33	12
CNAL 22	20	16	27	39	40	44	44	37	39	34	40	13
CNAL 23	20	16	28	38	39	44	44	36	38	33	40	13
CNAL 24	19	16	26	43	43	45	45	40	40	35	40	14
CNAL 25	25	20	34	40	37	42	39	34	38	32	38	16
CNAL 26	35	31	68	52	34	38	48	34	34	31	33	29

CNAL	Noise Immission Levels (dB $L_{Aeq,t}$)											
	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	NIGHT
CNAL 27	41	35	46	42	33	47	37	34	33	29	31	27
CNAL 28	53	47	38	36	31	46	33	32	31	26	28	19
CNAL 29	43	20	30	30	28	30	29	31	27	22	24	11
CNAL 30	29	20	25	28	26	28	27	40	27	21	22	8
CNAL 31	26	18	24	27	25	27	26	59	27	20	21	7
CNAL 32	23	16	22	26	24	26	25	45	29	19	20	6
CNAL 33	22	16	22	26	24	25	25	55	31	19	20	5
CNAL 34	21	15	21	25	23	25	25	50	35	18	19	4
CNAL 35	19	13	19	24	22	23	23	38	62	17	18	3
CNAL 36	25	17	23	26	25	26	26	44	28	19	20	6
CNAL 37	20	14	20	24	23	24	24	49	30	18	19	4
CNAL 38	42	55	44	44	43	43	53	53	52	33	31	17
CNAL 39	59	48	38	38	38	38	48	48	48	28	29	13
CNAL 40	45	42	34	36	34	34	40	40	40	29	26	10

CNAL	Noise Immission Levels (dB $L_{Aeq,t}$)											
	Q4 2029	Q1 2030	Q2 2030	Q3 2030	Q4 2030	Q1 2031	Q2 2031	Q3 2031	Q4 2031	Q1 2032	Q2 2032	NIGHT
CNAL 41	48	29	21	38	23	22	41	41	41	19	20	1
CNAL 42	58	33	31	44	32	31	40	39	39	26	24	9

The predicted construction noise levels are below the BS 5228 daytime Category A threshold value of 65 dBA at all CNALs, for all quarters, with the exception of CNAL26, which exceeds the threshold value by 3 dB for one quarter (Q2 2030). This coincides with the construction and upgrading of the A6033 Access Junction at Cock Hill, which is at a distance of approximately 50m from the receptor, however, the presence of construction plant at this separation distance is only likely to occur for a short period of time and noise levels would not be at this level for the entire quarter. Rather, the calculated level presents a worst-case noise level that may occur for a short period of time i.e. several days, rather than weeks.

Although the large majority of construction activities are not anticipated to occur outside of the weekday and Saturday morning time periods, it is also worth noting that the predicted noise levels are also below the BS 5228 evening and weekend Category A threshold value of 55 dBA for the majority of the construction period. The exceptions to this are as follows:

- At CNAL01, construction noise levels are expected to be 55 dBA i.e. right at the evening/weekend threshold level for up to four consecutive quarters. This is in respect of noise that may be generated from the construction of the substation. Accordingly, evening and weekend working must be avoided in this area of the Proposed Development to avoid a significant effect.
- Noise levels exceed the evening and weekend threshold at seven additional CNALs, though this is attributable to works that unlikely to last for long periods of time. Nonetheless, it would be advisable to avoid evening and weekend working in the vicinity of NSRs represented by CNALs 7, 26, 31, 33, 35, 39 and 42 i.e. junction upgrades for CNAL7 and 26 and HDD works along the export cable route.

Although generation plant may operate during night-time hours within the construction compounds, noise levels at night-time for this type of plant are comfortably below the night-time threshold levels for all receptors and all time periods.

4.4 Cumulative Construction Noise Assessment

It is noted that there are numerous surrounding developments at various stages, including pending decision and operational. After reviewing these applications, there are no proposed sites where the construction phase would overlap with the Proposed Development, and which are also sufficiently near to the Proposed Development so as to have the potential for cumulative construction noise effects. Refer to Chapter 24: Cumulative Effects Assessment of the PEIR. Operational developments are not included with this assessment.

4.5 Construction Traffic Noise

The data used for the assessment of construction traffic noise comprises of Automatic Traffic Count (ATC) data and predicted traffic flow numbers associated with the construction of Proposed Development. All data used in the noise assessment is taken from Chapter 14: Transport and Access of the PEIR and the ATC locations are shown in Figure 8 of Appendix 14-1: Transport Assessment.

The baseline data has been scaled up to provide estimated daily traffic flows for the peak construction period (2031) and the construction traffic flow numbers are the daily flows associated with the peak month.

Table 4-2 details the predicted % increase in daily traffic flows resulting from construction traffic, as required for Stage 1 Scoping Assessment as outlined above.

Table 4-2: 2031 Predicted Construction Traffic Flow Increases

Location	Baseline Traffic Flow	Proposed Development Construction Traffic Flow	Total Traffic Flow	Total Traffic % Increase
	(Average Daily 2031)	(Daily Flow for Peak Month)	(Daily Flow for Peak Month)	
A6068 Keighley Road, Cowling	8,993	8	9,878	0.1%
A6068 Access Junction	7,503	247	8,864	2.9%
A6068 Laneshawbridge	10,514	247	12,052	2.1%
A6068 Colne	12,767	239	14,399	1.7%
C682 Lancashire Moor Rd / Two Laws Rd	2,172	247	2,767	9.9%
A6033 Hebden Road Bridge	2,091	74	2,325	3.3%
A6033 Hebden Bridge	3,761	22	4,065	0.5%
A6033 Howarth	2,754	32	3,064	1.0%
A646 Burnley Road, Hebden Bridge	12,638	18	13,720	0.1%
A646 Bankfoot, Burnley	13,803	4	14,915	0.0%
A629 at Rawlings Street, Keighley	16,643	32	17,248	0.2%
M65 at Burnley	64,782	100	67,053	0.1%
A56 at Kelbrook	17,254	148	18,012	0.8%
A56 northeast of Thornton in Craven	10,453	148	11,089	1.4%
A59 West of Skipton	16,353	148	17,385	0.9%
Moor End Road, Halifax	6,219	22	6,297	0.4%
Mount Tabor Road	2,139	22	2,208	1.0%
Cold Edge Road	318	22	343	6.9%

The greatest increase is predicted to occur on the C682 Lancashire Moor Road / Two Laws Road, where flows are expected to increase by 9.9%, substantially below the 25% increase threshold. The increase in noise levels due to construction traffic are therefore considered negligible, and no further assessment is required.

5 Noise Mitigation Measures

No significant effects resulting from construction noise during the working hours are predicted. Nevertheless, a range of good practice measures would be employed to reduce noise impacts.

Section 8 of BS 5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that can be employed onsite:

- Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;
- Ensure that any extraordinary construction work continuing throughout 24 hours of a day (for example, crane operations lifting components onto the tower) would be programmed, when appropriate, so that haulage vehicles would not arrive at or leave the site outside of morning and afternoon peak hours or other specific delivery hours, with the exception of abnormal loads that would be scheduled to avoid significant traffic flows;
- Ensure all vehicles and mechanical plant would be fitted with effective exhaust silencers and be subject to programmed maintenance;
- Select inherently quiet plant where appropriate - all major compressors would be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which would be kept closed whenever the machines are in use;
- Ensure all ancillary pneumatic percussive tools would be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Instruct that machines would be shut down between work periods or throttled down to a minimum;
- Regularly maintain all equipment used onsite, including maintenance related to noise emissions; and
- Vehicles would be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation.

Ensure all ancillary plant, such as generators and pumps, are positioned so as to cause minimum noise disturbance and, if necessary, temporary acoustic screens or enclosures should be provided. The above will be secured by the outline Construction Environmental Management Plan (oCEMP).

Based on the preliminary assessment, the following activities will need to be restricted to working hours only i.e. no evenings and weekends, however, this may be able to be refined at the ES stage when more information is available.

- HDD activities; and
- Junction upgrade activities at site entrances.

6 Summary

The construction noise impact assessment has considered the existing noise environment at the CNALs to determine appropriate noise threshold levels for construction activities. The CNALs were chosen to represent the closest NSRs to the construction activities.

Noise propagation modelling has been undertaken in accordance with ISO 9613-2 and the anticipated noise immission levels presented for scenarios likely to occur throughout the construction period. The modelled scenarios consider the 'noisiest' activities that are likely to occur and the modelling assumes that the construction activities are occurring at locations that are closest to the CNALs.

The predicted construction noise levels are below the BS 5228 daytime Category A threshold value of 65 dBA at all CNALs, for all quarters, with the exception of CNAL26, which exceeds the threshold value by 3 dB during one quarter (Q2 2030). The duration of exposure, however, will be short and no significant effect is anticipated.

Although no works are proposed outside of the working hours, predicted noise levels have been compared to the evening and weekend threshold levels. This has indicated that any activities related to junction upgrades or HDD should be avoided during the evening.

Although generation plant may operate during night-time hours within the construction compounds, noise levels at night-time are comfortably below the night-time threshold levels for all receptors and all time periods.

Construction traffic noise has been considered, using a bespoke methodology referencing CRTN and DMRB. The highest predicted level of change of any assessed road was 5.9%, on the C682 Lancashire Moor Road / Two Laws Road, substantially below the 25% change in flow required to increase noise levels by 1 dB. As such, no significant effects are anticipated due to construction traffic noise.

7 References

1. **UK Government.** Control of Pollution Act 1974. *legislation.gov.uk.* [Online] [Cited: 21 4 2025.] https://www.legislation.gov.uk/ukpga/1974/40/contents.

2. —. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. *legislation.gov.uk.* [Online] [Cited: 25 4 2025.] https://www.legislation.gov.uk/uksi/2015/227.

3. **British Standards Institute.** *5228 Part 1: Code of Practice for Noise and Vibration Control on Construction and Open Sites. Noise.* s.l. : BSI, 2014. BS 5228:2009 +A1:2014.

4. —. *5228 Part 2: Code of practice for noise and vibration control on construction and open sites. Vibration.* UK : BSI, 2014. BS 5228-2:2009+A1:2014.

5. **Ministry of Housing, Communities and Local Government.** National Planning Policy Framework (NPPF). *gov.uk.* [Online] [Cited: 25 4 25.] https://www.gov.uk/guidance/national-planning-policy-framework.

6. **Department for Envionment, Food and Rural Affairs DEFRA.** *Noise Policy Statement for England (NPSE).* UK : The Crown, 2010.

7. **Department of Transport (DoT).** *CRTN - Calculation of Road Traffic Noise.* s.l. : DoT Welsh Office, 1988.

8. **Highways England.** *Design Manual for Roads and Bridges LA111 Noise and Vibration.* s.l. : Highways England, 2020.

Appendix A – Figures

- Figure 1.1 – Study Area

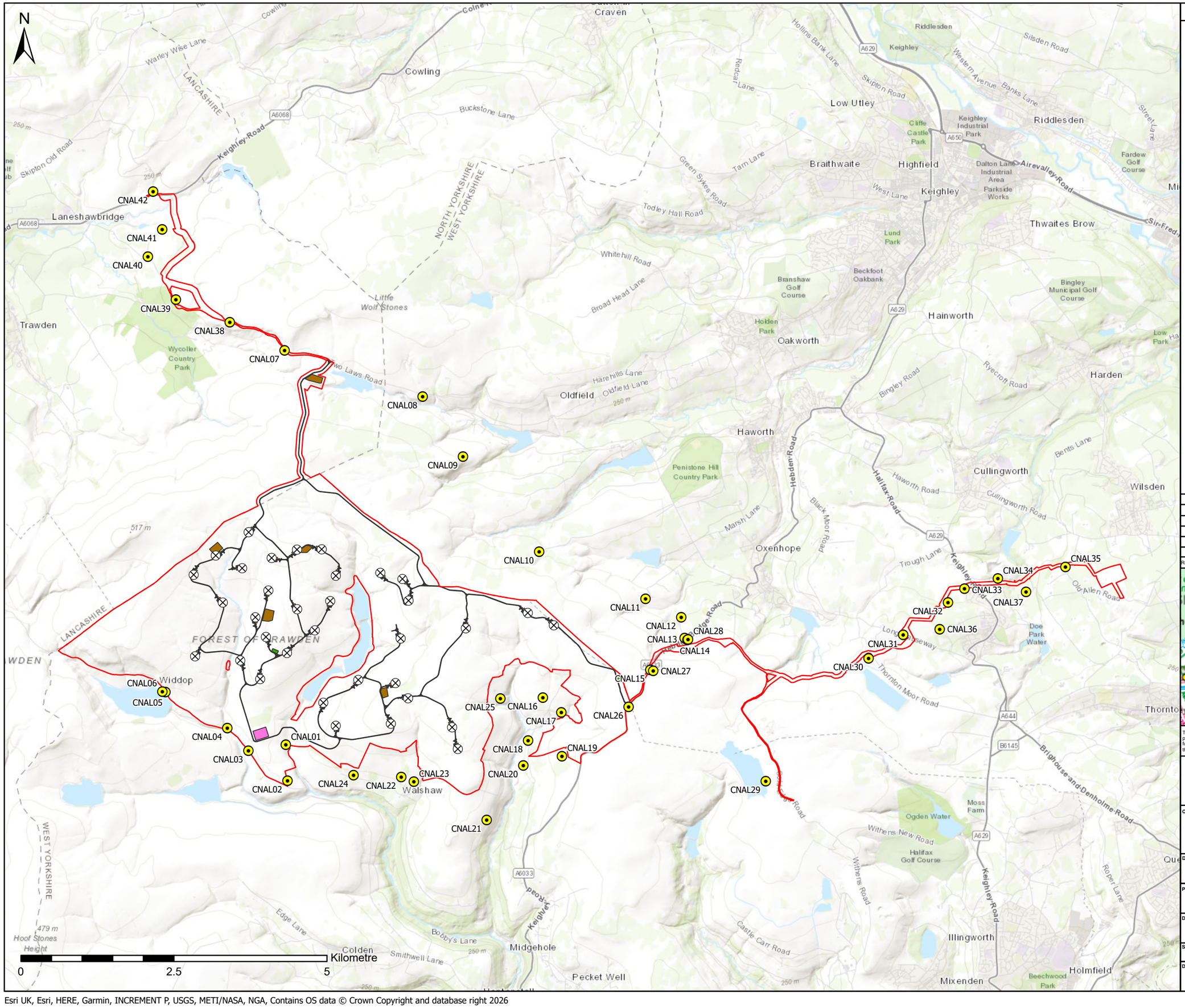
Appendix B – Baseline Data

- Ambient Sound Levels

Appendix C – Noise Modelling Data

Appendix A – Figures

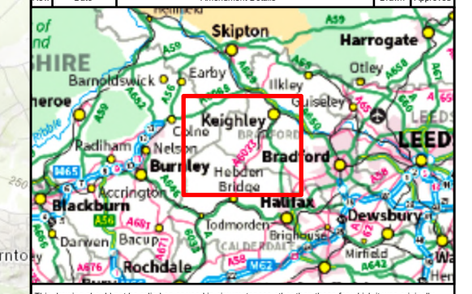
- Figure 1.1 – Study Area



LEGEND

- Construction Noise Assessment Locations (CNALs)
- Proposed Development Boundary
- Proposed Wind Turbines
- Substation Platform
- Proposed Tracks
- Existing Tracks
- Floated Tracks
- Turning Heads
- Borrow Pits
- Construction Compounds
- Working Areas - Tower Storage
- Auxiliary Crane Pads
- Blade Storage Areas
- Crane Hardstands

Rev.	Date	Amendment Details	Drawn	Approved
0	04/02/2026	FIRST ISSUE	MT	JS



This drawing should not be relied on or used in circumstances other than those for which it was originally prepared and for which TNEI Services Ltd was commissioned. TNEI Services Ltd accepts no responsibility for this drawing to any party other than the person by whom it was commissioned. Any party which breaches the provisions of this disclaimer shall indemnify TNEI Services Ltd for all loss or damage arising therefrom.

tnei

Client: Calderdale energy park

Drawing Status: FOR PLANNING

Project Title: CALDERDALE ENERGY PARK

Drawing Title: FIGURE A1.1: CONSTRUCTION NOISE STUDY AREA

Scale:	Original Size:	Spatial Reference:
1:57,016	A3	British National Grid

Drawing Number: 15809-032

Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, Contains OS data © Crown Copyright and database right 2026

Appendix B – Baseline Data

- Ambient Sound Levels

TNEI BS5228 Baseline Analysis: Calculated Ambient Noise Levels, LAeq (t)

NML01	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
13/03/2025	42	160			38	240			37	480
14/03/2025	42	410			41	20			34	440
15/03/2025			41	360			40	600	38	480
16/03/2025							42	360		
17/03/2025	42	60							31	20
18/03/2025									40	250
19/03/2025	42	630			38	240			36	480
20/03/2025	43	570								
21/03/2025									34	10
22/03/2025			43	110			44	210		
23/03/2025							43	10		
24/03/2025	43	460								
25/03/2025	46	260			41	110				
26/03/2025	45	170								
27/03/2025										
28/03/2025									43	40
29/03/2025										
30/03/2025							41	140	37	340
31/03/2025	43	720			40	150			32	120
01/04/2025	49	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							42	90	37	380
07/04/2025	43	720			40	240			38	480
08/04/2025	43	720			44	240			36	410
09/04/2025	43	460			31	10			52	290
10/04/2025	46	690			45	10			43	10
11/04/2025	44	640			41	230			37	480
12/04/2025			46	300			46	100		
13/04/2025							44	170		
14/04/2025					36	90			42	120
15/04/2025	46	720			42	100				
16/04/2025									45	10
17/04/2025	45	400			40	240			39	190
18/04/2025	48	30								
19/04/2025									31	90
20/04/2025							43	720	31	50
21/04/2025	45	160			42	140				
22/04/2025	47	500			40	180			43	160
23/04/2025	42	530			41	40			39	10
24/04/2025	42	680			41	130			39	270
25/04/2025	43	680			44	80			40	400
26/04/2025			44	330			49	600	39	320
27/04/2025							50	450		
28/04/2025	51	580			45	80				
Average	44		43		40		42		38	

NML02	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
13/03/2025	39	210			38	240			38	480
14/03/2025	43	410			40	20			39	440
15/03/2025			41	360			36	600	37	480
16/03/2025							40	360		
17/03/2025	45	60							28	20
18/03/2025									40	250
19/03/2025	48	630			46	240			39	480
20/03/2025	44	570								
21/03/2025									33	10
22/03/2025			44	110			40	210		
23/03/2025							44	10		
24/03/2025	43	460								
25/03/2025	42	260			36	110				
26/03/2025	40	170								
27/03/2025										
28/03/2025									32	40
29/03/2025										
30/03/2025							36	140	32	340
31/03/2025	44	720			41	150			31	120
01/04/2025	39	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							43	90	40	380
07/04/2025	46	720			37	240			37	480
08/04/2025	47	720			38	240			33	410
09/04/2025	48	460			22	10			37	290
10/04/2025	47	690			38	10			42	10
11/04/2025	44	640			38	230			39	480
12/04/2025			40	300			44	100		
13/04/2025							44	170		
14/04/2025					43	90			42	120
15/04/2025	47	720			41	100				
16/04/2025									36	10
17/04/2025	44	400			43	240			39	190
18/04/2025	48	30								
19/04/2025									41	90
20/04/2025							44	720	28	50
21/04/2025	51	160			45	140				
22/04/2025	47	500			42	180			43	160
23/04/2025	48	530			43	40			46	10
24/04/2025	55	680			48	130			45	270
25/04/2025	52	680			47	80			41	400
26/04/2025			51	330			45	600	34	320
27/04/2025							44	450		
28/04/2025	43	580			46	240			42	480
29/04/2025	45	720			40	240			39	480
30/04/2025	45	720			41	210			40	450
01/05/2025	43	450			39	40			41	280
02/05/2025	43	720			39	240			33	250
03/05/2025			45	90			42	390	33	130
04/05/2025							42	190		
05/05/2025	39	350			38	240			34	480
06/05/2025	43	700			41	240			37	480
07/05/2025	44	480								
Average	46		40		40		42		37	

NML03	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
13/03/2025	42	210			32.1	240			31.1	480
14/03/2025	43.2	410			41.6	20			29.6	440
15/03/2025			41.2	360			33.1	600	29.2	480
16/03/2025							37.7	360		
17/03/2025	32.1	60							27.3	20
18/03/2025									29.1	250
19/03/2025	41.9	630			28.2	240			34.3	480
20/03/2025	38.6	570								
21/03/2025									33.5	10
22/03/2025			41.7	110			35.5	210		
23/03/2025							39.5	10		
24/03/2025	37.9	460								
25/03/2025	37.6	260			35.1	110				
26/03/2025	33.5	170								
27/03/2025										
28/03/2025									31.7	40
29/03/2025										
30/03/2025							32.2	140	29.2	340
31/03/2025	39.7	720			34.3	150			26.9	120
01/04/2025	38.5	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							44.3	90	34.7	380
07/04/2025	41.8	720			33.9	240			30.2	480
08/04/2025	46.6	720			34.9	240			29.3	410
09/04/2025	40.8	460			23.3	10			30.1	290
10/04/2025	41.7	690			26.5	10			50.6	10
11/04/2025	41.6	640			38	230			37.3	480
12/04/2025			38.1	300			39.2	100		
13/04/2025							32.8	170		
14/04/2025					33.6	90			38.3	120
15/04/2025	40.5	720			36.3	100				
16/04/2025									44.5	10
17/04/2025	39.6	400			35.9	240			34	190
18/04/2025	34.8	30								
19/04/2025									25	90
20/04/2025							36.8	720	26.6	50
21/04/2025	38.5	160			38.9	140				
22/04/2025	40.1	500			33.7	180			36.2	160
23/04/2025	42	530			37.7	40			31.2	10
24/04/2025	42.8	680			35.6	130			39.4	270
25/04/2025	36.7	680			32.6	80			38.6	400
26/04/2025			43.1	330			38.1	600	31.8	320
27/04/2025							41.6	450		
28/04/2025	44.3	440								
Average	41		41		34		37		33	

NML04	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
12/03/2025					35	30			32	20
13/03/2025	39	210			33	240			35	480
14/03/2025	43	410			38	20			36	440
15/03/2025			42	360			34	600	40	480
16/03/2025							38	360		
17/03/2025	37	60							23	20
18/03/2025									41	250
19/03/2025	40	630			29	240			40	480
20/03/2025	43	570								
21/03/2025									34	10
22/03/2025			42	110			39	210		
23/03/2025							41	10		
24/03/2025	42	460								
25/03/2025	43	260			35	110				
26/03/2025	42	170								
27/03/2025										
28/03/2025									36	40
29/03/2025										
30/03/2025							31	140	39	340
31/03/2025	48	720			45	150			32	120
01/04/2025	36	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							35	90	36	380
07/04/2025	44	720			45	240			36	480
08/04/2025	45	720			44	240			41	410
09/04/2025	44	450			30	10			37	290
10/04/2025	45	690			34	10			37	10
11/04/2025	38	640			37	230			45	480
12/04/2025			45	300			42	100		
13/04/2025							45	170		
14/04/2025					34	90			38	120
15/04/2025	49	720			46	100				
16/04/2025									40	10
17/04/2025	53	400			40	240			39	190
18/04/2025	38	30								
19/04/2025									26	90
20/04/2025							44	720	32	50
21/04/2025	45	160			41	140				
22/04/2025	41	500			43	180			45	160
23/04/2025	44	530			53	40			36	10
24/04/2025	41	680			53	130			45	270
25/04/2025	40	680			49	80			40	400
26/04/2025			52	330			42	600	33	320
27/04/2025							42	390		
Average	43		44		39		40		39	

NML05	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
45728					36	30			30	20
45729	35	210			33	240			42	480
45730	39	410			36	20			37	440
45731			40	360			35	600	36	480
45732							41	360		
45733	40	60							21	20
45734									39	250
45735	42	630			31	240			37	480
45736	44	570								
45737									33	10
45738			43	110			40	210		
45739							41	10		
45740	40	460								
45741	41	260			35	110				
45742	43	170								
45743										
45744									39	40
45745										
45746							36	140	35	340
45747	44	720			40	150			32	120
45748	38	20								
45749										
45750										
45751										
45752										
45753							42	90	40	380
45754	40	720			42	240			39	480
45755	41	720			37	240			34	410
45756	47	460			29	10			35	290
45757	66	690			48	10			36	10
45758	39	640			39	230			48	480
45759			43	300			45	100		
45760							40	170		
45761					35	90			41	120
45762	43	720			38	100				
45763									43	10
45764	43	400			37	240			42	190
45765	40	30								
45766									27	90
45767							43	720	35	50
45768	43	160			39	140				
45769	71	500			40	180			41	160
45770	45	530			40	40			46	10
45771	59	680			44	130			40	270
45772	45	680			42	80			43	400
45773			49	330			45	600	44	320
45774							45	420		
Average	42		44		37		41		39	

NML06	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime M - F		Daytime Sat		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
45728					37	30			28	20
45729	38	210			35	240			32	480
45730	40	410			42	20			32	440
45731			40	360			41	600	33	480
45732							45	360		
45733	42	60							32	20
45734									33	250
45735	44	630			29	240			31	480
45736	40	570								
45737									27	10
45738			44	110			39	210		
45739							38	10		
45740	40	460								
45741	40	260			35	110				
45742	41	170								
45743										
45744									35	40
45745										
45746							33	140	30	340
45747	39	720			38	150			30	120
45748	38	20								
45749										
45750										
45751										
45752										
45753							38	90	33	380
45754	38	720			35	240			34	480
45755	52	710			33	240			31	410
45756	43	460			28	10			34	290
45757	42	690			35	10			37	10
45758	37	640			41	230			35	480
45759			39	300			39	100		
45760							37	170		
45761					33	90			37	120
45762	44	720			39	100				
45763									39	10
45764	46	400			37	240			37	190
45765	41	30								
45766									28	90
45767							40	720	22	50
45768	43	160			42	140				
45769	60	500			32	180			39	160
45770	43	530			42	40			38	10
45771	40	680			42	130			37	270
45772	39	680			39	80			34	400
45773			40	330			37	600	29	320
45774							39	450		
Average	41		39		35		40		33	

NAL07	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime $_{M-F}$		Daytime $_{Sat}$		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
12/03/2025					39	30			34	20
13/03/2025	43	210			36	240			34	480
14/03/2025	40	410			40	20			31	440
15/03/2025			42	360			38	600	31	480
16/03/2025							39	360		
17/03/2025	41	60							23	20
18/03/2025									35	250
19/03/2025	40	630			27	240			32	480
20/03/2025	43	570								
21/03/2025									29	10
22/03/2025			40	110			38	210		
23/03/2025							41	10		
24/03/2025	40	460								
25/03/2025	38	260			35	110				
26/03/2025	38	170								
27/03/2025										
28/03/2025									32	40
29/03/2025										
30/03/2025							36	140	30	340
31/03/2025	40	720			36	150			29	120
01/04/2025	38	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							37	90	33	380
07/04/2025	41	720			36	240			34	480
08/04/2025	55	720			34	240			41	410
09/04/2025	44	460			26	10			33	290
10/04/2025	41	690			37	10			43	10
11/04/2025	41	640			35	230			31	480
12/04/2025			37	300			40	100		
13/04/2025							39	170		
14/04/2025					34	90			39	120
15/04/2025	42	720			43	100				
16/04/2025									46	10
17/04/2025	41	400			41	240			37	190
18/04/2025	40	30								
19/04/2025									32	90
20/04/2025							41	720	35	50
21/04/2025	42	160			41	140				
22/04/2025	41	500			33	180			39	160
23/04/2025	42	530			44	40			41	10
24/04/2025	40	680			47	130			39	270
25/04/2025	39	680			34	80			32	400
26/04/2025			39	330			38	600	36	320
27/04/2025							38	450		
28/04/2025	39	580			36	240			35	480
29/04/2025	39	720			31	240			35	480
30/04/2025	43	720			36	210			38	450
01/05/2025	44	450			41	40			33	280
02/05/2025	44	720			39	240			32	250
03/05/2025			42	90			41	390	37	130
04/05/2025							42	190		
05/05/2025	38	350			38	240			39	480
06/05/2025	41	700			37	240			40	480
07/05/2025	46	360								
Average	41		39		35		39		35	

NML08	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime $_{M-F}$		Daytime $_{Sat}$		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
13/03/2025	42	190			33	240			35	480
14/03/2025	45	410			31	20			41	440
15/03/2025			45	360			38	600	39	480
16/03/2025							45	360		
17/03/2025	38	60							32	20
18/03/2025									43	250
19/03/2025	43	630			33	240			40	480
20/03/2025	46	570								
21/03/2025									42	10
22/03/2025			47	110			45	210		
23/03/2025							42	10		
24/03/2025	46	460								
25/03/2025	40	260			31	110				
26/03/2025	44	170								
27/03/2025										
28/03/2025									44	40
29/03/2025										
30/03/2025							38	140	36	340
31/03/2025	43	720			38	150			34	120
01/04/2025	50	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							42	90	49	380
07/04/2025	56	720			42	240			42	480
08/04/2025	43	710			33	240			33	410
09/04/2025	47	460			27	10			40	290
10/04/2025	44	690			41	10			54	10
11/04/2025	46	640			46	230			45	480
12/04/2025			46	300			40	100		
13/04/2025							41	170		
14/04/2025					32	90			47	120
15/04/2025	48	720			47	100				
16/04/2025									48	10
17/04/2025	45	400			44	240			51	190
18/04/2025	51	30								
19/04/2025									22	90
20/04/2025							50	720	48	50
21/04/2025	51	160			45	140				
22/04/2025	45	500			41	180			52	160
23/04/2025	50	530			49	40			56	10
24/04/2025	50	680			43	130			52	270
25/04/2025	47	680			56	80			52	400
26/04/2025			53	330			49	600	43	320
27/04/2025							46	450		
28/04/2025	49	580								
Average	46		45		39		45		41	

NML09	Measured Sound Pressure Level (Filtered) dB LAeq (t)									
Assessment Period	Daytime $_{M-F}$		Daytime $_{Sat}$		Evenings		Weekend		Night-time	
	Weekdays 07:00 -		Saturday 07:00 -		Weekdays 19:00 -		Saturday 13:00 –		All days 23:00 -	
13/03/2025	57	180			35	240			31	480
14/03/2025	50	410			35	20			30	440
15/03/2025			52	360			52	600	31	480
16/03/2025							57	360		
17/03/2025	55	60							28	20
18/03/2025									37	250
19/03/2025	54	630			42	240			32	480
20/03/2025	51	570								
21/03/2025									35	10
22/03/2025			41	110			42	210		
23/03/2025							59	10		
24/03/2025	55	460								
25/03/2025	57	260			36	110				
26/03/2025	53	170								
27/03/2025										
28/03/2025									30	40
29/03/2025										
30/03/2025							35	140	45	340
31/03/2025	56	720			55	150			37	120
01/04/2025	43	20								
02/04/2025										
03/04/2025										
04/04/2025										
05/04/2025										
06/04/2025							46	90	37	380
07/04/2025	51	720			56	240			31	480
08/04/2025	51	710			49	240			32	410
09/04/2025	56	460			24	10			30	290
10/04/2025	44	690			52	10			33	10
11/04/2025	57	640			55	230			32	480
12/04/2025			46	300			58	100		
13/04/2025							56	170		
14/04/2025					43	90			36	120
15/04/2025	53	720			55	100				
16/04/2025									46	10
17/04/2025	53	400			51	240			31	190
18/04/2025	46	30								
19/04/2025									28	90
20/04/2025							47	720	34	50
21/04/2025	62	160			41	140				
22/04/2025	53	500			46	180			32	160
23/04/2025	54	530			40	40			34	10
24/04/2025	48	680			48	130			32	270
25/04/2025	50	680			63	80			34	400
26/04/2025			45	330			42	600	29	320
27/04/2025							59	450		
28/04/2025	51	580			44	240			34	480
29/04/2025	58	720			39	240			39	480
30/04/2025	47	720			42	210			35	450
01/05/2025	49	450			34	40			55	280
02/05/2025	49	720			39	240			32	250
03/05/2025			64	90			54	390	28	130
04/05/2025							57	190		
05/05/2025	60	350			54	240			35	480
06/05/2025	47	700			56	240			34	480
07/05/2025	50	430								
Average	52		45		47		50		34	

Annex C – Noise Model Data

Period	Construction Activity	Noise Source	BS5228 Reference
Quarter 4 2029	A6088 Junction	Vibratory Roller Articulated Dump Truck Tracked Excavator Dozer	C5.20LAeq C5.16LAmax C5.18LAeq C5.13LAeq
	Access Track to Lancs Moor Road	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C4.3LAmax C5.18LAeq C.5.13LAeq
	Highway Upgrades	Dumper Tracked Excavator Dozer	C4.3LAmax C.5.18LAeq C.5.13LAeq
	Access to Hill House Edge	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C4.3LAmax C.5.18LAeq C.5.13LAeq
	New Access Track	Articulated Dump Truck Tracked Excavator Dozer	C5.16LAmax C.5.18LAeq C.5.13LAeq
Quarter 1 2030	Access Track to Lancs Moor Road	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C4.3LAmax C5.18LAeq C.5.13LAeq
	Highway Upgrades	Dumper Tracked Excavator Dozer	C4.3LAmax C.5.18LAeq C.5.13LAeq
	New Access Track	Vibratory Roller Construction Planer	C5.20LAeq C.5.7LAeq
	Highway access Track to A6033	Vibratory Roller Construction Planer	C5.20LAeq C.5.7LAeq
Quarter 2 2030	Highway Upgrades	Dumper Tracked Excavator Dozer Vibratory Roller Construction Planer	C4.3LAmax C2.14LAeq C2.10LAeq C5.20LAeq C.5.7LAeq
	Two Laws Rd Junction	Vibratory Roller Articulated Dump Truck Tracked Excavator Dozer	C5.20LAeq C5.16LAmax C5.18LAeq C5.13LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
	Highway access Track to A6033		
	A6033 Access Junction at Cock Hill	Vibratory Roller Articulated Dump Truck Tracked Excavator Dozer	C5.20LAeq C5.16LAmax C5.18LAeq C5.13LAeq
	Compound 1	Diesel Generator (Lights) Diesel Generator Telescopic Handler Tracked Excavator Articulated Dump Truck Dozer	C4.86LAeq C4.76LAeq C2.35LAeq C2.14LAeq C2.33LAmax C2.10LAeq
	Access Track to Compound 1	Vibratory Roller Articulated Dump Truck Tracked Excavator Dozer	C5.20LAeq C2.33LAmax C2.14LAeq C2.10LAeq
Quarter 3 2030	Compound 1	Diesel Generator (Lights) Diesel Generator Telescopic Handler Tracked Excavator Articulated Dump Truck Dozer	C4.86LAeq C4.76LAeq C2.35LAeq C2.14LAeq C2.33LAmax C2.10LAeq
	Main Site Compound	Diesel Generator (Lights) Diesel Generator Telescopic Handler Tracked Excavator Articulated Dump Truck Dozer	C4.86LAeq C4.76LAeq C2.35LAeq C2.14LAeq C2.33LAmax C2.10LAeq
	WTG Access Track Section 1	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C.4.3LAmax C.5.18LAeq C.5.13LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck + truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C6.21LAmax C5.37LAeq
Quarter 4 2030	WTG Access Track Section 2	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C.4.3LAmax C.5.18LAeq C.5.13LAeq
	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck Truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C.4.29LAeq C6.21LAmax C5.37LAeq
	Operating site batching	Wheeled Excavator Dumper Conveyor Water Pump Mixing Pump Articulated Dump Truck Wheeled Loader	C.4.56LAeq C.4.3LAmax C.10.21LAeq C.4.88LAeq C.4.26LAeq C.10.18LAmax C.10.16LAmax
Quarter 1 2031	WTG Access Track Section 3	Vibratory Roller Dumper Tracked Excavator Dozer	C5.20LAeq C.4.3LAmax C.5.18LAeq C.5.13LAeq
	WTG Base Construction Section 1	Tracked Excavator Concrete Mixer Truck Mounted Concrete Pump w Boom Arm Dumper Dozer Vibratory Roller	C2.14LAeq C4.20LAeq C4.29LAeq C4.3LAmax C2.10LAeq C5.20LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck Truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C.4.29LAeq C6.21LAmax C5.37LAeq
	Operating site batching	Wheeled Excavator Dumper Conveyor Water Pump Mixing Pump Articulated Dump Truck Wheeled Loader	C.4.56LAeq C.4.3LAmax C.10.21LAeq C.4.88LAeq C.4.26LAeq C.10.18LAmax C.10.16LAmax
Quarter 2 2031	WTG Base Construction Section 2	Tracked Excavator Concrete Mixer Truck Mounted Concrete Pump w Boom Arm Dumper Dozer Vibratory Roller	C2.14LAeq C4.20LAeq C4.29LAeq C4.3LAmax C2.10LAeq C5.20LAeq
	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck Truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C.4.29LAeq C6.21LAmax C5.37LAeq
	Cabling - On Site Section1	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site

Period	Construction Activity	Noise Source	BS5228 Reference
	Cabling - Off Site Section 2	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Deliveries to Site	Road Lorry (Full)	C6.21LAmax
	Operating site batching	Wheeled Excavator Dumper Conveyor Water Pump Mixing Pump Articulated Dump Truck Wheeled Loader	C.4.56LAeq C.4.3LAmax C.10.21LAeq C.4.88LAeq C.4.26LAeq C.10.18LAmax C.10.16LAmax
Quarter 3 2031	WTG Base Construction Section 3	Tracked Excavator Concrete Mixer Truck Mounted Concrete Pump w Boom Arm Dumper Dozer Vibratory Roller	C2.14LAeq C4.20LAeq C4.29LAeq C4.3LAmax C2.10LAeq C5.20LAeq
	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck Truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C.4.29LAeq C6.21LAmax C5.37LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
	On Site Section1	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Off Site Section 3	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Off Site Section 4	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site

Period	Construction Activity	Noise Source	BS5228 Reference
	Off Site Section 5	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Off Site Section 6	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Deliveries to Site	Road Lorry (Full)	C6.21LAmax
	Operating site batching	Wheeled Excavator Dumper Conveyor Water Pump Mixing Pump Articulated Dump Truck Wheeled Loader	C.4.56LAeq C.4.3LAmax C.10.21LAeq C.4.88LAeq C.4.26LAeq C.10.18LAmax C.10.16LAmax
Quarter 4 2031	Switchgear and Ancillary buildings	Dumper Dozer Tracked Excavator Concrete Mixer Truck Truck mounted concrete pump + boom arm Road Lorry (Full) Mobile Telescopic Crane	C4.30LAmax C2.10LAeq C2.14LAeq C4.20LAeq C.4.29LAeq C6.21LAmax C5.37LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
	Off Site Section 6	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Off Site Section 7	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Off Site Section 8	HDD Drilling Machine HIAB Crane BBA Pump Exhaust EW Mud-Pump Exhaust BBA Pump Exhaust 2 Power Pack Drill Grate Power Pack Drill Grate 2 BBA Pump Grate BBA Pump Grate 2 EW Mud Pump Grate BBA Pump Grate 3 BBA Pump Grate 4 Generator 75/600 kVA 300 Kva Generator	Noise Data taken from on-site measurements of active HDD site
	Deliveries to Site	Road Lorry (Full)	C6.21LAmax
	WTG Installation	Telehandler Crane	C2.35LAeq C4.39LAeq

Period	Construction Activity	Noise Source	BS5228 Reference
Quarter 1 2032	WTG Installation	Telehandler Crane	C2.35LAeq C4.39LAeq
Quarter 2 2032	WTG Installation	Telehandler Crane	C2.35LAeq C4.39LAeq
Night-time Scenario (all Quarters)	Generators at construction compound	Diesel generator & Diesel generator- lights	BS5228 ref C4.76 and C4.86 respectively

Noise Source Library – Sound Power Levels

Name	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
300 kVA Generator*		85	82	86	80	79	75	66	57	90	111	TNEI Noise Library
BBA Pump Exhaust*	29	84	85	76	79	82	80	81	71	90	112	TNEI Noise Library
BBA Pump Exhaust 2*	30	87	86	88	85	86	86	81	75	94	115	TNEI Noise Library
BBA Pump Grate*	20	72	79	65	66	64	59	56	48	80	102	TNEI Noise Library
BBA Pump Grate 2*	21	61	68	68	64	64	63	63	54	74	100	TNEI Noise Library
BBA Pump Grate 3*	17	69	70	72	71	72	69	66	61	79	99	TNEI Noise Library
BBA Pump Grate 4*	26	64	76	71	74	74	71	67	61	81	105	TNEI Noise Library
Drilling Machine (Whole Cycle)*	25	76	79	88	94	93	87	81	74	98	107	TNEI Noise Library
EW Mud Pump Grate	16	52	58	63	73	82	79	73	62	85	95	TNEI Noise Library
EW Mud-Pump Exhaust*	33	83	72	77	78	84	81	72	60	88	114	TNEI Noise Library
Generator 75/60 kVA*		82	86	76	79	81	77	74	64	89	109	TNEI Noise Library
HIAB Crane*	25	70	73	91	84	84	83	76	69	93	106	TNEI Noise Library
Mixunit 343 566 Upper Surface 2*	24	68	75	81	86	88	86	81	74	92	104	TNEI Noise Library
Power Pack Drill*	30	87	89	91	96	94	92	86	76	100	115	TNEI Noise Library
Power Pack Drill Grate*	16	73	76	80	79	73	68	61	54	84	102	TNEI Noise Library
Power Pack Drill Grate 2*	16	69	72	78	82	79	76	69	61	86	99	TNEI Noise Library

Name	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Ground Excavation/Earthworks: Dozer		117	118	109	101	102	98	96	92	108	121	BS 5228-1:2009+A1:2014: Annex C. Reference C2.10
Ground Excavation/Earthworks: Tracked Excavator		113	106	105	105	101	99	96	91	107	115	BS 5228-1:2009+A1:2014: Annex C. Reference C2.14
Distribution of Material: Articulated dump truck		113	115	105	103	104	101	97	90	109	118	BS 5228-1:2009+A1:2014: Annex C. Reference C2.33
Distribution of Material: Lorry		101	106	106	106	102	101	96	94	108	112	BS 5228-1:2009+A1:2014: Annex C. Reference C2.34
Distribution of Material: Telescopic handler		113	107	97	95	92	90	84	75	99	114	BS 5228-1:2009+A1:2014: Annex C. Reference C2.35
Distribution of materials: Dumper		112	109	102	101	100	96	89	81	104	115	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.3
Mixing concrete: Concrete mixer truck		111	102	94	97	98	106	88	83	108	113	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.20
Pumping Concrete: Concrete pump + concrete mixer truck (idling)		103	104	99	98	99	96	92	88	103	109	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.26
Pumping Concrete: Concrete mixer truck		112	102	102	101	101	103	93	87	107	114	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.27
Pumping Concrete: Truck mounted concrete pump + boom arm		111	105	103	103	102	103	95	91	108	114	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.29
Concreting (Other): Mobile telescopic crane		115	110	106	102	99	95	88	80	105	117	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.39

Name	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Concreting (Other): Tracked mobile crane		96	99	96	90	94	94	83	74	99	103	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.50
Concreting (Other): Wheeled excavator		115	112	108	109	106	103	97	95	111	118	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.56
Power for site cabins: Diesel generator		108	102	85	82	81	76	73	65	89	109	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.76
Power for Lighting: Diesel generator		106	99	94	90	87	83	84	77	94	107	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.86
Pumping Water: Water pump (diesel)		98	93	94	92	92	91	84	74	97	102	BS 5228-1:2009+A1:2014: Annex C. Reference C.4.88
Road planing : Road planer		109	115	107	105	105	102	98	95	110	117	BS 5228-1:2009+A1:2014: Annex C. Reference C.5.7
Spreading Chipping/fill: Dozer		110	112	104	103	106	104	98	90	110	116	BS 5228-1:2009+A1:2014: Annex C. Reference C.5.13
Earthworks: Articulated dump truck		116	118	108	107	104	99	93	89	109	121	BS 5228-1:2009+A1:2014: Annex C. Reference C.5.16
Earthworks: Tracked excavator		104	107	103	103	104	101	98	93	108	112	BS 5228-1:2009+A1:2014: Annex C. Reference C.5.18
Rolling & Compaction: Vibratory roller		118	110	101	100	98	93	87	82	103	119	BS 5228-1:2009+A1:2014: Annex C. Reference C.5.20
Haulage: Road lorry (full)		124	110	102	101	105	100	99	92	109	124	BS 5228-1:2009+A1:2014: Annex C. Reference C.6.21

Name	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Cell excavation area: Dozer		110	116	109	108	103	100	91	85	109	118	BS 5228-1:2009+A1:2014: Annex C. Reference C.8.17
Face shovel loading dump trucks: Wheeled loader		116	116	115	113	114	111	105	98	118	122	BS 5228-1:2009+A1:2014: Annex C. Reference C.9.7
Breaking boulders/oversized material: Excavator mounted rock breaker		119	117	113	117	115	115	112	108	121	125	BS 5228-1:2009+A1:2014: Annex C. Reference C.9.12
Breaking boulders/oversized material: Tracked semi-mobile crusher		119	119	116	115	113	111	106	96	118	124	BS 5228-1:2009+A1:2014: Annex C. Reference C.9.15
Transport of material: Wheeled loader		111	117	120	108	99	97	92	86	113	122	BS 5228-1:2009+A1:2014: Annex C. Reference C.10.1
Transport of material: Articulated dump truck		115	113	111	109	106	102	99	94	111	119	BS 5228-1:2009+A1:2014: Annex C. Reference C.10.1
Field conveyor system: Conveyor drive unit		101	103	101	101	98	96	94	87	104	109	BS 5228-1:2009+A1:2014: Annex C. Reference C.10.2

* Plant sound power levels taken from an active UK site