



Noise Impact Assessment for the Extension to an Existing Quarry

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CONTENTS

AUTHORISATION AND VERSION CONTROL	2
TABLES	4
EXECUTIVE SUMMARY	5
1. INTRODUCTION.....	7
Overview	7
Scope & Objectives	7
2. ENVIRONMENTAL NOISE SURVEY.....	8
Context & Subjective Impression	8
Environmental Noise Survey Results	9
3. NOISE ASSESSMENT	10
Specific Sound Levels.....	10
BS4142 Assessment	12
Planning Practice Guidance Mineral Extraction Noise Assessment.....	13
BS5228:2009-1 Construction Noise Assessment.....	14
Recommendations and Mitigation	14
APPENDIX A – ACOUSTIC TERMINOLOGY.....	16
APPENDIX B – LEGISLATION, POLICY AND GUIDANCE	19
B.1 – National Planning Policy Framework (2021)	19
B.2 – Noise Policy Statement for England (2010).....	19
B3 – British Standard BS5228 – 1:2009 ‘Code of practice for noise and vibration control on construction and open sites’	20
APPENDIX C – SITE PLANS.....	22
APPENDIX D – ENVIRONMENTAL SURVEY	23
D.1 – Tabulated Summary Noise Data.....	23
D.2 – Surveying Equipment	24
D.3 – Meteorological Conditions.....	24

Tables

<i>Table 1.0 – Environmental Survey Summary Results</i>	<i>9</i>
<i>Table 2.0 – Background Sound Level Summary Results</i>	<i>9</i>
<i>Table 3.0 – Plant Equipment Noise Data</i>	<i>10</i>
<i>Table 4.0 – HGV Loading/Unloading Noise Levels</i>	<i>10</i>
<i>Table 5.0 – Specific Sound Levels at NSRs Summary</i>	<i>12</i>
<i>Table 6.0 – Rating Noise Levels</i>	<i>12</i>
<i>Table 7.0 – BS4142:2014 Noise Assessment</i>	<i>12</i>
<i>Table 8.0 – Mineral Extraction Noise Assessment</i>	<i>13</i>
<i>Table 9.0 – ABC Method: Noise Impact Assessment</i>	<i>14</i>
<i>Table 10.0 – Sound Survey Summary Results.....</i>	<i>23</i>
<i>Table 11.0 – Measurement Equipment</i>	<i>24</i>
<i>Table 12.0 – Weather Summary</i>	<i>24</i>

Figures

<i>Figure 1.0 – Indicative Site Layout</i>	<i>8</i>
<i>Figure 2.0 – Specific Sound Level Map – 1.5m Grid Height</i>	<i>11</i>
<i>Figure 3.0 – MP1 Time History Graph</i>	<i>23</i>

Executive Summary

An environmental noise survey and noise impact assessment have been undertaken to assess the noise emissions from a proposed extension to an existing quarry on land off Huddersfield Road, Shelley, Huddersfield, HD8 8LJ. The measured ambient and background sound levels have allowed for Mineral Extraction and BS5228:2009 noise assessments to be undertaken.

The BS4142 assessment indicates the rating noise levels are expected to fall 7 – 8 dB above the background at all NSRs. The Mineral Planning Guidance states the following in relation to BS4142:

'Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours (0700-1900).'

Given the above statement, the BS4142 assessment is deemed to indicate 'Lowest Observed Effect Level' When assessed in accordance with the NPPF and NPSE.

The Mineral Planning Guidance assessment has shown that the noise emissions from the site are predicted to exceed the Mineral Extraction Guidance criteria by 1 dB at NSR 1. This level of exceedance is deemed negligible. Noise levels at NSR 2 and 3 fall within the criteria.

Further recommendations can be found in the table below.

Recommendations and Mitigation Measures

Primary Recommendations

- The site should not operate outside the hours of 07:00 and 17:30, Monday to Friday, and 08:00 to 12:30 on Saturdays.
- 3m tall earth binding should be implemented as per plan 320 – 1 PWQ – Extraction Plan V2.
- All works should be undertaken behind the earth bunds providing full shielding from the work area and the surrounding Noise Sensitive Receptors.

Further Recommendations

- Noise levels should not exceed 55 dB (free field) at any NSR during operational periods.
- Stationary plant such as generators should be located as far as possible away from the nearest sensitive receptors and engines should be turned off whilst idling.
- Plant should be used in accordance with the manufacturers' recommendations.
- Plant which may be used intermittently should be shut down between work periods or throttled down to a minimum.
- Appropriate screens or enclosures should be provided where practicable.
- All plant and machinery should be regularly maintained to control noise emissions, with emphasis on lubrication of bearings and integrity of silencers.
- Quiet reversing alarms/methods should be used, and any alarms should be white noise where applicable.

- Site staff should be aware that they are working in the vicinity of residential properties and avoid all unnecessary noise due to misuse of tools and equipment, shouting and radios.
- Any restrictions on operating hours or activities imposed by the Local Authority should be adhered to.

The findings of this report will require written approval from the Local Authority prior to work commencing.

1. Introduction

Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for an extension to an existing quarry on land off Huddersfield Road, Shelley, Huddersfield, HD8 8LJ ('the Site').

The applicant is preparing an application ('the Application') to be submitted to Kirklees Metropolitan Council.

The following technical noise assessment has been prepared to support the planning application to Kirklees Metropolitan Council. This report details the existing background and ambient sound climate at the nearest receptors, as well as the sound emissions associated with the Proposed Development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

Scope & Objectives

The scope of the noise assessment can be summarised as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the nearest sensitive receptor ('NSR') to Site;
- Detailed sound modelling, acoustic calculation and analysis in accordance with; ISO9613 – 1 ISO 9613-2 - Attenuation of sound during propagation outdoors prediction methodology, to predict sound levels at the NSR;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Policy Framework (2021), Noise Policy Statement for England (2010), The Ministry of Housing and Local Government – 'Planning Practice Guidance – Mineral Extraction' and British Standard BS5228:2009 – 'Code of practice for noise and vibration control on construction and open sites'. Further information on the legislation can be found in Appendix B.

2. Environmental Noise Survey

Measurement Methodology

In order to characterise the sound profile of the area at the closest Noise Sensitive Receptors (NSRs), an environmental sound survey was carried out from 09/06/22 to 11/06/22. For the long-term monitoring, a sound level meter was attached to a lamppost located on Huddersfield Road. The microphone was placed approximately 3.5m from the ground and not near any other reflective surfaces. The monitoring position was chosen in order to collect representative sound levels at the NSRs during the typical operational periods of the quarry extension. The monitoring location is shown in Figure 1.0 below (MP1).



Figure 1.0 – Indicative Site Layout

Context & Subjective Impression

The area surrounding the site consists of a mixture of residential dwellings and commercial/agricultural properties. The acoustic environment at the NSRs is of a moderate to high level and is dominated by road traffic noise emissions from Huddersfield Road. It is assumed that noise emissions from the quarry extension would not be out of place in the environment due to the continued use of the Peace Wood Quarry which is located to the north of the site.

Environmental Noise Survey Results

It is proposed that the quarry will operate between the hours of 07:00 and 17:30, Monday to Friday, and 08:00 to 12:30 on Saturdays. No operations will be undertaken during Sundays and Bank Holidays.

The tables below outline the lowest background and ambient sound levels measured during the proposed operational periods that will be used as the baselines for the noise assessments. Further summary results for the entire measurement period can be found in Appendix D.

Measurement Position MP1	
Measurement Time Period ('t')	L_{Aeq,t}
Day 3 - 11/06/22 - 08:00 to 12:30	70.0

Table 1.0 – Environmental Survey Summary Results

Measurement Position MP1				
Measurement Period ('t')	L_{A90,15min}	*SMR L_{A90,15min}	Min. L_{A90,15min}	Max. L_{A90,15min}
Day 1 - 09/06/22 - 11:00 to 17:30	58.0	56.0	51.0	64.0

Table 2.0 – Background Sound Level Summary Results

**Statistically Most Repeated*

As can be seen in the table above, the statistically most repeated L_{A90,15min} value is 56 dB. The range of measured background sound levels is moderate, however, the statistical value sits near the bottom of the range. As such, the statistically most repeated L_{A90,15min} value is deemed to be 'robust' and will be used in the following assessment.

3. Noise Assessment

Specific Sound Levels

The main noise generating equipment that will be used on site is as follows:

- 1no. 30 tonne excavator,
- 1no. Cat D6 bulldozer,
- 1no. 30 tonne dump truck,
- HGV collections.

The table below shows the noise levels for the equipment. The makes/models of the dump truck and excavator are yet to be finalised, however, the noise levels shown in the table are thought to present a realistic estimation.

It is noted that it is unlikely that all plant machinery will be operational simultaneously, and as such, the following assessment is deemed to represent a robust assessment.

Description	Sound Pressure Level at 10m (L_{Aeq} , dB)	Sound Power Level (L_{wA} , dB)
30 Tonne Excavator*	80.0	108.0
Cat D6 Bulldozer	--	109.0
30 Tonne Dump Truck**	82.0	110.0

Table 3.0 – Plant Equipment Noise Data

* Taken from BS5228:2009.

** Example product data from Volvo A30G used.

HGV Movements and Collections

It is stated in the Pre-Application document that the mineral exportation from the site will not exceed the currently permitted amounts. As such, HGV movements will not be included in the noise model.

The noise level of the HGVs being loaded / tipping has also been taken from BS5228:2009. The following table shows the noise level with a time correction applied to account for the loading/tipping process taking approximately 25 minutes per hour. This is thought to present a worst-case scenario, as typically the process could take closer to approximately 5 minutes.

BS5228:2009 Process Description	L_w (dB)	Total On-Time (mins/hour)	Time Corrected L_w (dB)
Loading Sand to Lorry	110.0	25	106.0

Table 4.0 – HGV Loading/Unloading Noise Levels

Predictive Noise Modelling

The specific sound levels at the NSRs have been calculated using SoundPlan 8.2, which undertakes its calculations in accordance with the guidance given in ISO9613 – 1:1993 and ISO9613 – 2:1996.

The following assumptions have been made within the calculation software:

- To accurately model the land surrounding the development the topographical data has been taken from Google Maps, it is assumed this has an accuracy within the last 3 years.
- The ground between the source and receiver is mixed is a mix of 'soft' and 'hard' surfaces.
- The sound levels presented above have been inputted into the software.
- The grid height of the noise map is set to 1.5m.
- All site activities have been modelled at heights of 1m.
- The site activities have been evenly distributed across the site.
- 3m tall earth bunds have been inputted into the model as per plan 320 – 1 PWQ – Extraction Plan V2.
- The graphic below is presented at 1.5m grid height however the noise levels used in the assessment are taken from the most exposed point on the façade either the ground or 1st floor.

The sound map showing the specific sound level emissions from the site extension can be seen below in the figure below.

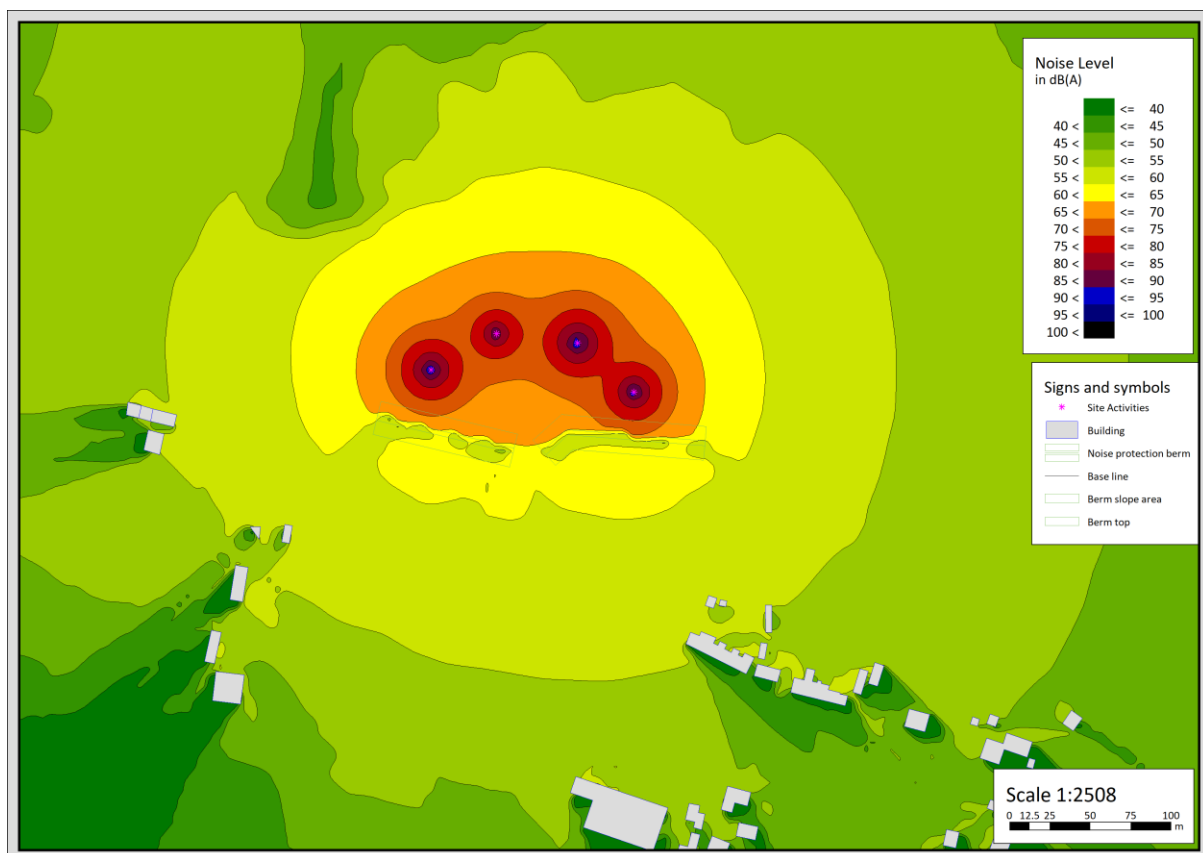


Figure 2.0 – Specific Sound Level Map – 1.5m Grid Height

A summary of the specific sound levels at the NSRs based on the sound map shown in Figure 2.0 can be seen in the following table.

NSR	Specific Sound Level (dBA)
NSR1	56.0
NSR2	55.0
NSR3	55.0

Table 5.0 – Specific Sound Levels at NSRs Summary

BS4142 Assessment

The following section of the report outlines the BS4142 assessment of the noise from the development.

The following table indicates the rating penalties that have been applied to the predicted Noise levels at the NSR in order to establish a Rating Noise Level for the BS4142 Assessment.

NSR	Specific Sound Level (dBA)	Rating Penalties	Rating Noise Level at NSR (dBA)
NSR1	56.0	+2dB Tonality, +3dB Impulsivity, + 3dB Intermittency	64.0
NSR2	55.0		63.0
NSR3	55.0		63.0

Table 6.0 – Rating Noise Levels

The BS4142 Assessment of the noise associated with the development is outlined in the table below.

Results	NSR 1 (dBA)	NSR 2 (dBA)	NSR 3 (dBA)
Rating Sound Level	64.0	63.0	63.0
Background Sound Level	56.0	56.0	56.0
Excess of Rating over Background Sound Level	+8.0	+7.0	+7.0

Table 7.0 – BS4142:2014 Noise Assessment

Discussion:

As can be seen in the assessment above the rating noise levels are expected to fall 7 – 8 dB above the background at all NSRs. The Mineral Planning Guidance States the following in relation to BS4142:

'Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours (0700-1900).'

Given the above statement, the BS4142 assessment is deemed to indicate 'Lowest Observed Effect Level' When assessed in accordance with the NPPF and NPSE.

Planning Practice Guidance Mineral Extraction Noise Assessment

It is thought that the noise emissions from the site should be assessed against guidance governing mineral extraction (Planning Practice Guidance). It is stated in the guidance that,

"Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations, during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations, during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event, the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property."

The table below shows the predicted noise level at each NSR compared with the mineral extraction criteria.

Mineral Extraction Noise Assessment			
Location	Predicted Sound Level (dBA)	Day Time Threshold Level (LAeq,1hour, dB)	Exceedance of Criteria (dB)
NSR1	56.0	55.0	+0.1
NSR2	55.0	55.0	0.0
NSR3	55.0	55.0	0.0

Table 8.0 – Mineral Extraction Noise Assessment

Discussion

As can be seen in the assessment above, the noise levels at NSR1 are + 1 dB above the defined criterion. However, given the human ear cannot perceive a difference in noise level of 3dB this level of exceedance is deemed negligible. The noise levels at NSR 2 and 3 fall within the criteria this indicates low impact in accordance with the Mineral Planning Guidance.

BS5228:2009-1 Construction Noise Assessment

BS5228:2009 is used to calculate the level of impact caused by construction projects. It is thought that the noise emissions from the quarry are similar to construction noise, and as such, an assessment will also be undertaken considering the BS5228:2009 criteria.

Based on the measured noise levels shown in Section 2.0, the appropriate threshold values have been determined for the NSRs using the BS5228-1:2009 ABC method. As can be seen in the table below, the lowest L_{Aeq} ambient noise level measured during the operational period was 70 dB. As such, the threshold should be set to 'Category C'. This means that a threshold of 75 dB is the recommended noise limit level.

The table below shows the predicted noise levels at the most affected NSRs added to the existing ambient noise levels. This is then compared with the threshold level.

ABC Method: Noise Impact Assessment			
Location	Cumulative Sound Level (dBA)	Day Time Threshold Level ($L_{Aeq,12hour}$, dB)	Significance
NSR1	70.0	75.0	Not Significant
NSR2	70.0	75.0	Not Significant
NSR3	70.0	75.0	Not Significant

Table 9.0 – ABC Method: Noise Impact Assessment

Discussion

As can be seen in the assessment above, considering the predicted sound emissions from the proposed activities, no significant impact is expected on the most affected NSRs according to BS5228:2009.

Recommendations and Mitigation

The following section outlines the recommendations and mitigation measures that should be implemented at the site to ensure the guidance and criteria can be achieved.

- The site should not operate outside the hours of 07:00 and 17:30, Monday to Friday, and 08:00 to 12:30 on Saturdays.
- 3m tall earth binding should be implemented as per plan 320 – 1 PWQ – Extraction Plan V2.
- All works should be undertaken behind the earth bunds providing full shielding to the surrounding Noise Sensitive Receptors.

Further Recommendations

Best working practices should be implemented during each phase of the quarry works and close attention should be paid to work within the vicinity of NSRs. The works will follow the guidelines in

BS5228-1:2009 and the guidance in BRE Controlling particles, vapour and noise pollution from construction sites, Parts 1 to 5, 2003.

- Noise levels should not exceed 55 dB (free field) at any NSR during operational periods.
- Stationary plant such as generators should be located as far as possible away from the nearest sensitive receptors and engines should be turned off whilst idling.
- Plant should be used in accordance with the manufacturers' recommendations.
- Plant which may be used intermittently should be shut down between work periods or throttled down to a minimum.
- Appropriate screens or enclosures should be provided where practicable.
- All plant and machinery should be regularly maintained to control noise emissions, with emphasis on lubrication of bearings and integrity of silencers.
- Quiet reversing alarms/methods should be used, and any alarms should be white noise where applicable.
- Site staff should be aware that they are working in the vicinity of residential properties and avoid all unnecessary noise due to misuse of tools and equipment, shouting and radios.
- Any restrictions on operating hours or activities imposed by the Local Authority should be adhered to.

If at any time it is necessary to undertake temporary actions that are likely to cause elevated levels of noise, the TCM (or designated responsible person) will contact the Council's Environmental Health Team and any other interested parties before such actions are taken to inform them of the operations being undertaken and that the elevated levels of noise will be of a temporary nature. Where practicable, such actions will only proceed when the prevailing wind direction is away from sensitive receptors.

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s ₁ and s ₂ is given by 20 log ₁₀ (s ₁ / s ₂). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
L _{eq,T}	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L _{max,T}	A noise level index defined as the maximum noise level during the period T. L _{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L _{90,T}	A noise level index. The noise level exceeded for 90% of the time over the period T. L ₉₀ can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L _{10,T}	A noise level index. The noise level exceeded for 10% of the time over the period T. L ₁₀ can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} .

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms

Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

B.1 – National Planning Policy Framework (2021)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2021. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 174e, it states:

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;

Paragraph 185 states:

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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- 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; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 185 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;*
- Mitigate and minimise adverse impacts on health and quality of life;*
- Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B3 – British Standard BS5228 – 1:2009 ‘Code of practice for noise and vibration control on construction and open sites’

Guidance on the prediction and assessment of noise from development sites is given in BS 5228 – 1:2009 “Code of practice for noise and vibration control on construction and open sites – Part 1 :Noise”.

Construction noise can have disturbing effects on the surrounding neighborhood. The effects are varied and are complicated further by the ever changing locations of the site works throughout the construction process. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will occur for a limited period. BS5228 -1

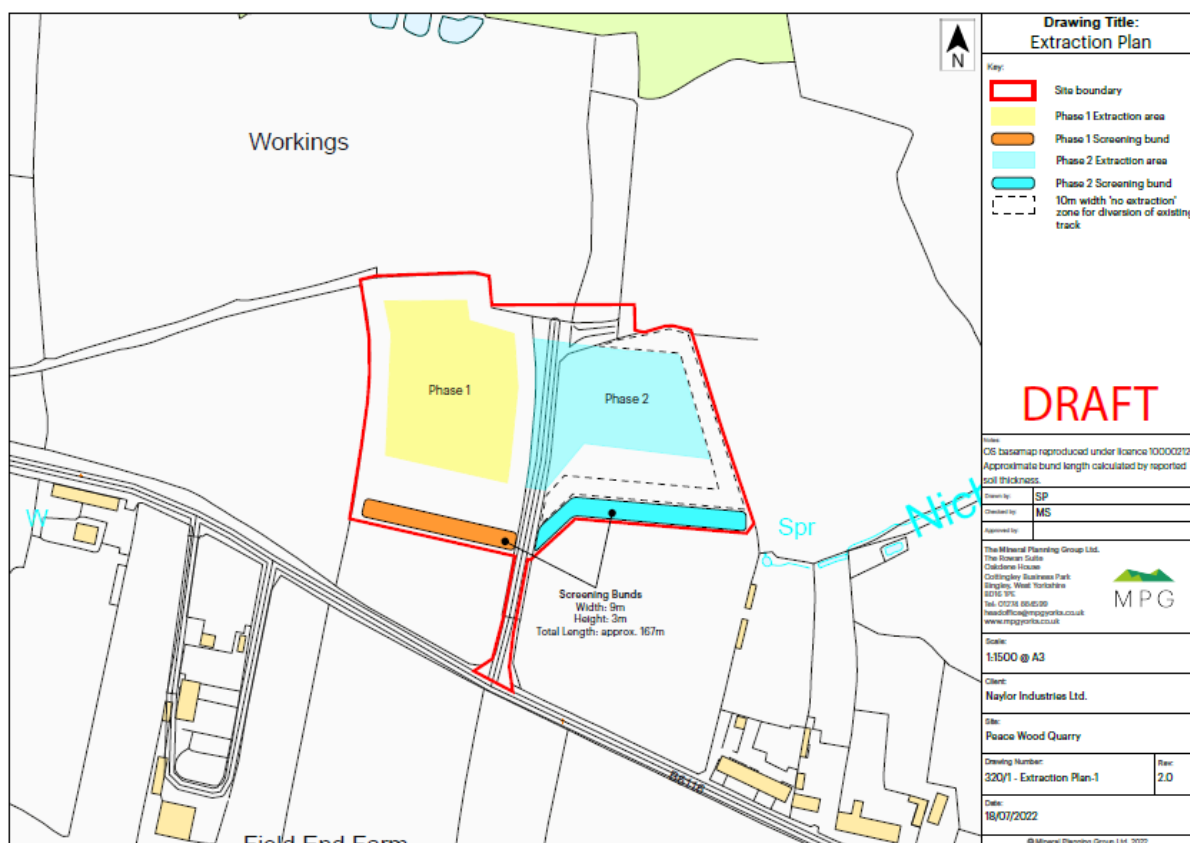
provides guidance on significance criteria for assessing the potential noise impact associated with the construction phase of large projects, which would be applicable to construction activities. For the purpose of this noise assessment, the noise likely to be generated during the construction phase have been assessed against the significance criteria established using the BS5228 -1 ABC method.

The ABC method for determining significance criteria requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value, A B or C, as detailed in Table 1.0 below.

Table 1: Thresholds of significant impact from construction noise at residential receptors in accordance with the ABC method of BS5228-1			
Assessment category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category A*¹	Category B*²	Category C*³
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
Evening and weekends	55	60	56
* ¹ Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
* ² Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
* ³ Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			

The predicted noise level likely to be generated at the receptor during the construction phase, i.e. the ambient noise level plus construction noise, is then compared to the appropriate category value. If the noise level is greater than the appropriate category value, a significant noise impact may be registered.

Appendix C – Site Plans



Appendix D – Environmental Survey

D.1 – Tabulated Summary Noise Data

Measurement Position MP1 – Full Measurement Summary				
Measurement Time Period ('t')	L _{Aeq,t}	L _{Amax,t}	L _{A90,t}	L _{A10,t}
Day 1 – 09/06/22 – 11:00 – 23:00	69.0	103.0	66.0	70.0
Night 1 – 09/06/22 – 23:00 – 07:00	62.0	94.0	53.0	66.0
Day 2 – 10/06/22 – 07:00 – 23:00	70.0	105.0	67.0	71.0
Night 2 – 10/06/22 – 23:00 – 07:00	62.0	97.0	56.0	65.0
Day 3 – 11/06/22 – 07:00 – 21:00	69.0	102.0	67.0	70.0
Measurement Position MP1 – Operational Hours Summary				
Measurement Time Period ('t')	L _{Aeq,t}	L _{Amax,t}	L _{A90,t}	L _{A10,t}
Day 1 – 09/06/22 – 11:00 – 17:30	70.0	93.0	58.0	71.0
Day 2 – 10/06/22 – 07:00 – 17:30	70.0	98.0	68.0	71.0
Day 3 – 11/06/22 – 08:00 – 12:30	70.0	102.0	60.0	70.0
Measurement Position MP1 – Operational Hours L _{A90,t} Summary				
Measurement Time Period ('t')	L _{Aeq,t}	L _{Amax,t}	L _{A90,t}	L _{A10,t}
Day 1 – 09/06/22 – 11:00 – 17:30	58.0	56.0	51.0	64.0
Day 2 – 10/06/22 – 07:00 – 17:30	68.0	59.0	47.0	68.0
Day 3 – 11/06/22 – 08:00 – 12:30	60.0	60.0	56.0	65.0

Table 10.0 – Sound Survey Summary Results

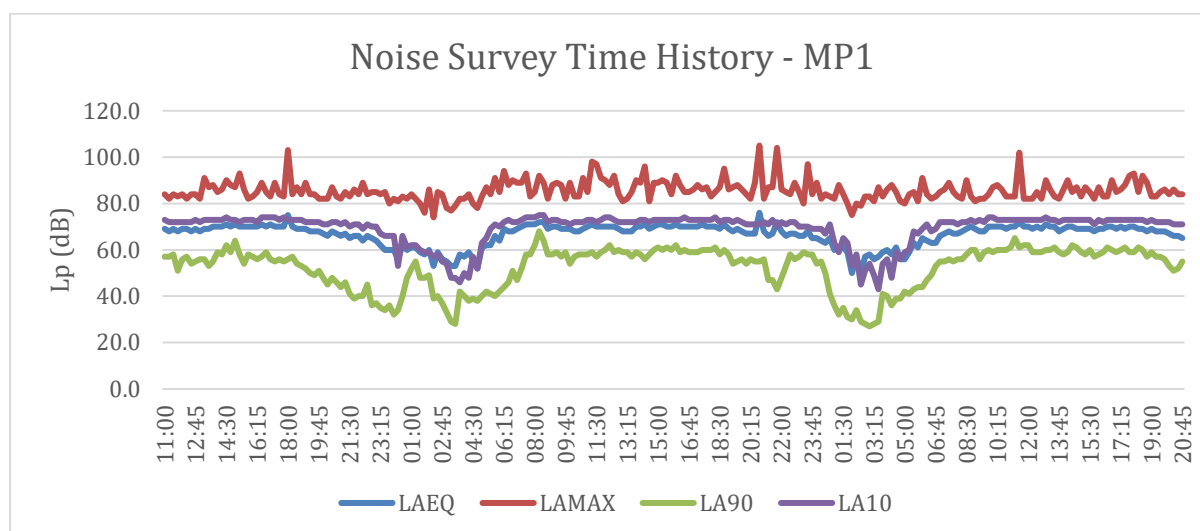


Figure 3.0 – MP1 Time History Graph

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T244498	≤0.5
CESVA CB006 Class 1 Calibrator	901910	

Table 11.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – South Crosland – Approx. 11km West of Site				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
09/06/22 – 00:00 – 23:59	9.9 – 15.9	0.0	S	0.0 – 5.8
10/06/22 – 00:00 – 23:59	11.7 – 19.1	0.0 – 0.3	SSE	0.0 – 0.8
11/06/22 – 00:00 – 23:59	11.3 – 17.6	0.0	SSE	0.0 – 11.0*

Table 12.0 – Weather Summary

*High wind speeds were recorded outside of the assessment period and as such have not affected the analysis.