***Noise Impact Assessment of a Hot Food Takeaway***

| | |
|---|---|
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| **Site Address:** | 29 Spotland Road, Rochdale, OL12 6PE |
| **Date:** | 11/12/2022 |

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**Executive Summary**

An environmental noise survey and noise impact assessment have been undertaken at 29 Spotland Road, Rochdale, OL12 6PE to assess the potential impact from a hot food takeaway on the surrounding Noise Sensitive Receptors (NSRs). The measured background sound levels have allowed for a BS4142:2014 noise assessment to be carried out.

At this stage of the development, the plant specification is not finalised. As such, a plant noise limit level has been defined.

The BS4142:2014 assessment indicates that provided the limit level is not exceeded, the noise emissions from the takeaway plant equipment should be 5 dB below the prevailing background sound level (with BS4142:2014 rating penalties applied). This indicates low impact in accordance with BS4142:2014 and 'No Observed Effect Level' (NOEL) when assessed with the NPSE and NPPF.

An overview of the recommendations can be found below:

| **Recommendations and Mitigation Measure Overview** |
| --- |
| - All mechanical plant associated with the development should not exceed the cumulative plant noise limit level of **46 dBA** at the most affected NSR.<br>- Once all plant has been specified a suitably qualified person should assess all emissions and plant locations to ensure the plant limit level can be achieved.<br>- The plant limit level is inclusive of any penalties that should be applied to account for characteristics of the sound that could be deemed to cause increased levels of annoyance, such as tonality or intermittency, in accordance with BS4142:2014.<br>- It is recommended that the floor and wall partitions between the proposed takeaway and the adjacent residential properties score a minimum of 53 dB $D_{nT,w}$ + $C_{tr}$ when tested for airborne sound insulation. Partition constructions that are predicted to provide this level of attenuation can be found in Section 3.0. |

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 a hot food takeaway development ('the Proposed Development') at 29 Spotland Road, Rochdale, OL12 6PE ('the Site').

The applicant has submitted a planning application, 22/01059/FUL – '*Proposed change of use at ground floor from dwelling (Use Class C3) to shop (Use Class A1) with new shop front and the provision of a first floor flat (Use Class C3)*' ('the Application') to Rochdale Metropolitan Borough Council (the 'Local Authority'). The Local Authority have requested additional supporting documentation in order to approve the application.

This report details the existing background 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 summarized as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the closest Noise Sensitive Receptors ('NSRs') 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) and British Standard BS4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound. 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 NSRs, an environmental sound survey was carried out from the 02/12/22 to 06/12/22. For the long-term monitoring, a sound level meter was attached to a drainpipe on the rear façade of the existing building. The microphone of the sound level meter was positioned approximately 3.5m from the ground, protruding 1m from the façade. As such, appropriate façade corrections have been applied to the measured results. The monitoring position was chosen in order to collect representative sound levels at the NSR during the typical operational periods of the proposed development. The monitoring location is shown in Figure 1.0.

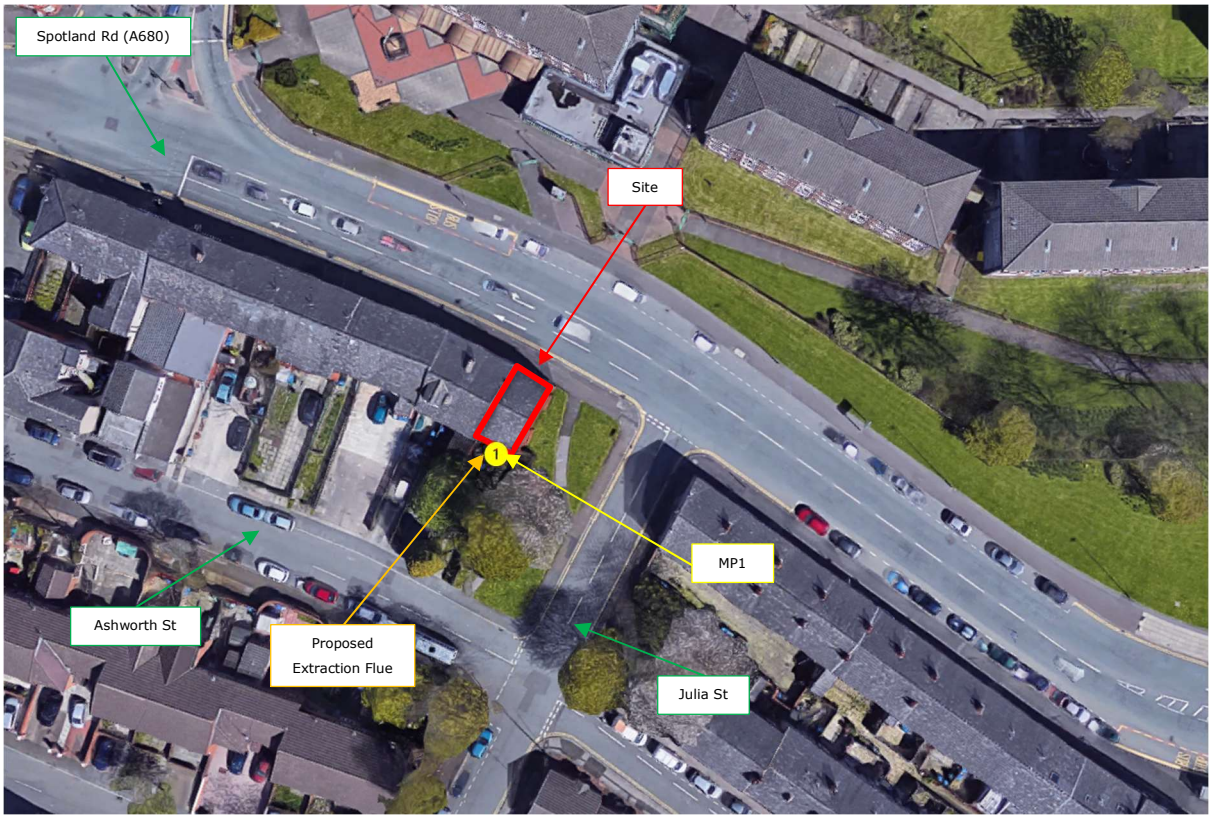


*Figure 1.0 – Indicative Site Layout*

***Context & Subjective Impression***

The area surrounding site is primarily residential in nature mixed with scattered commercial premises. The noise profile is typical for this type of area and is dominated by road traffic noise emissions from Spotland Road. The attending engineer noted that activity from surrounding commercial premises was not audible above the prevailing residual noise environment at the NSRs. The proposed development will incorporate a hot food takeaway on the ground floor and a residential dwelling on the first floor. The client has informed NOVA Acoustics that the proposed extraction flue will be installed to the rear of the development site, and we would expect it to terminate at least 1m above the eaves of the building.

***Environmental Noise Survey Results***

The proposed takeaway will operate all week between the hours of 16:00 and 23:00. The table below outlines the background sound levels measured during the proposed operational periods, that will be used as the baseline for the noise assessment. Further summary results for the entire measurement period can be found in Appendix D.

| **Measurement Position MP1** | |
|---|---|
| **Measurement Period ('t')** | **Typical $L_{A90,15min}$** |
| 02/12/22 to 06/12/22 – 16:00 – 23:00 | 51.0 |

*Table 1.0 – Background Sound Level Summary Results*

The 'typical' background noise level has been defined considering the distribution of $L_{A90,15min}$ measurements. This can be seen in the histogram below.

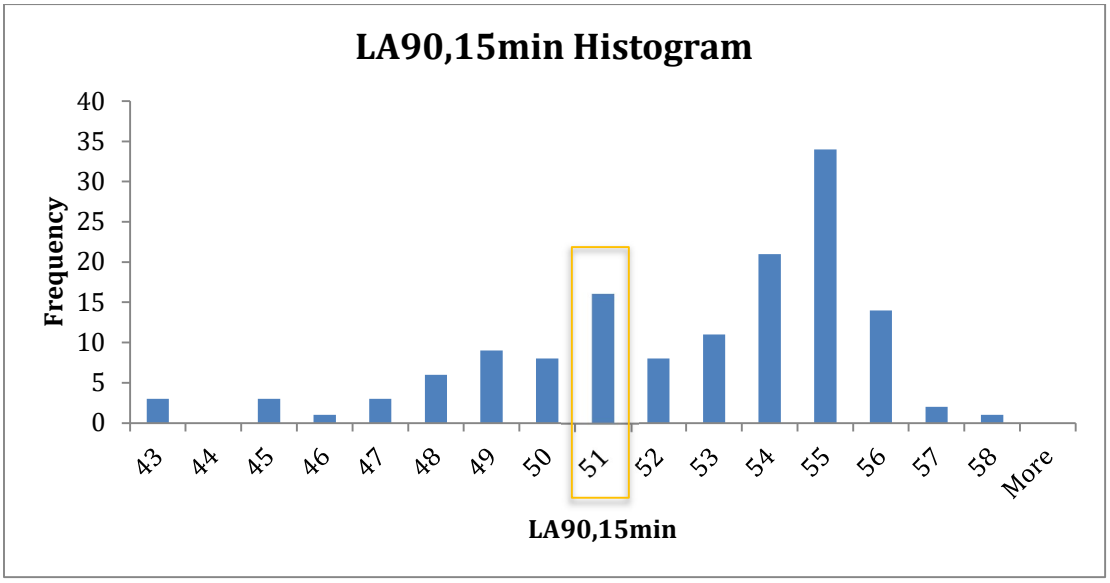


*Figure 2.0 – $L_{A90,15min}$ Histogram – Proposed Operational Hours*

The selected 'typical' background noise level is the third most repeated $L_{A90,15min}$ value. This has been chosen as it sits near to the centre of the range and as such presents a more robust assessment baseline than the higher statistical values.

## 3. BS4142:2014 Noise Assessment

The specification and exact locations for the external plant has not yet been defined. Consequently, a cumulative plant noise limit level has been calculated to ensure that all plant noise emissions fall significantly below the background sound level at the surrounding NSRs.

The table below shows the cumulative plant noise limit level at the NSRs. The plant limit level is inclusive of any penalties that should be applied to account for characteristics of the sound that could be deemed to cause increased levels of annoyance, such as tonality or intermittency, in accordance with BS4142:2014.

| Description | Value (dB) |
|---|---|
| Typical Background Noise Level ($L_{A90,15min}$) | 51.0 |
| Cumulative Plant Noise Limit Level at NSR | **46.0** |
| Exceedance of Background Noise Level | -5.0 |

*Table 2.0 – External Plant Limit Level*

***Discussion:***

As can be seen in the assessment above, providing the limit level is adhered to, all plant noise emissions will be 5 dB below the lowest typical background noise level. When assessed in accordance with BS4142:2014 this indicates 'Low Impact', and when assessed with the NPPF and NPSE this indicates 'No Observed Effect Level' (NOEL).

***Recommendations & Mitigation***

The following mitigation measures are necessary to ensure low impact at the surrounding NSRs:

- All mechanical plant associated with the development should not exceed the cumulative plant noise limit level of **46.0 dBA** at the closest NSR.
- Once all plant has been specified a suitably qualified person assess all emissions and plant locations to ensure the cumulative plant limit level can be achieved.
- All plant should be installed on appropriate anti-vibration mountings.

## 4. Noise Breakthrough Assessment

The proposed development is located below and adjacent to residential properties. As such the level of noise breaking through the adjoining partitions must be assessed. The takeaway is not expected to generate high levels of noise, however, to ensure the amenity of future residents is fully protected, it is recommended that the separating partitions achieve a minimum of 10 dB above the criteria specified in Part E of Building regulations. This means the partitions must score a minimum of 53 dB $D_{nT,w} + C_{tr}$ when tested for airborne sound attenuation.

The following floor construction is predicted to achieve the required attenuation:

- 4mm iKoustic MuteBarrier (min. density of 2500 kg/m$^3$)
- 18mm Chipboard or floorboards
- 200mm Timber Joists with 100mm Slab Mineral Wool Insulation (min. density of 45 kg/m$^3$)
- Gyproc Acoustic Hangers
- MF Ceiling (min. drop of 100mm)
- 2no. 15mm SoundBloc Plasterboards

The following wall construction is predicted to achieve the required attenuation:

- 200mm Existing Brickwork
- 25mm Air Cavity
- 48mm Steel Studwork with 50mm Slab Mineral Wool Insulation (min. density of 45 kg/m$^3$)
- 1no. 15mm SoundBloc Plasterboards

**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 s1 and s2 is given by 20 log10 ( s1 / s2 ). 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. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq 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. L90 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. L10 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 be 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.

### *B.3 – British Standard BS4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound*

**Overview**

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency, and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added

to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

***Rating Penalty***

Section 9 of BS4142:2014 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142:2014 states:

*"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:*

*a) subjective method*
*b) objective method for tonality*
*c) reference method."*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

*"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse, or other characteristics occurs, or is expected to be present, for new or modified sound sources."*

BS4142:2014 defines four characteristics that should be considered when deriving a rating penalty, namely, tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

*a) Tonality*

A rating penalty of +2 dB is applicable for a tone which is "just perceptible", +4 dB where a tone is "clearly perceptible", and +6 dB where a tone is "highly perceptible".

*b) Impulsivity*

A rating penalty of +3 dB is applicable for impulsivity which is "just perceptible", +6 dB where it is "clearly perceptible", and +9 dB where it is "highly perceptible".

*c) Other Sound Characteristics*

BS4142:2014 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."

*d) Intermittency*

BS4142:2014 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

***Background Sound Level***

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

***Assessment of Impact***

BS4142:2014 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."
- "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact, depending on the context."

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level
- The lower the rating sound level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore be classified as a No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time-period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

## Appendix D – Environmental Survey

### *D.1 – Tabulated Summary Noise Data*

| Measurement Position MP1 | | | | |
|---|---|---|---|---|
| **Measurement Period ('t')** | **$L_{Aeq,t}$** | **$L_{Amax,t}$** | **$L_{A90,t}$** | **$L_{A10,t}$** |
| 02/12/22: 12:00 – 23:00 | 59.0 | 88.0 | 57.0 | 60.0 |
| 02/12/22: 23:00 – 07:00 | 54.0 | 88.0 | 50.0 | 55.0 |
| 03/12/22: 07:00 – 23:00 | 60.0 | 95.0 | 57.0 | 61.0 |
| 03/12/22: 23:00 – 07:00 | 54.0 | 86.0 | 51.0 | 56.0 |
| 04/12/22: 07:00 – 23:00 | 60.0 | 100.0 | 57.0 | 61.0 |
| 04/12/22: 23:00 – 07:00 | 54.0 | 77.0 | 48.0 | 57.0 |
| 05/12/22: 07:00 – 23:00 | 59.0 | 88.0 | 57.0 | 61.0 |
| 05/12/22: 23:00 – 07:00 | 53.3 | 82.0 | 48.0 | 56.9 |
| 06/12/22: 07:00 – 23:00 | 60.0 | 93.0 | 57.0 | 61.0 |
| **LA90 Analysis** | | | | |
| **Measurement Period ('t')** | **$L_{A90,t}$** | **SMR $L_{A90,t}$** | **Min. $L_{A90,t}$** | **Max. $L_{A90,t}$** |
| 02/12/22: 12:00 – 23:00 | 57.0 | 55.0 | 47.0 | 58.0 |
| 02/12/22: 23:00 – 07:00 | 42.0 | 42.0 | 37.0 | 46.0 |
| 03/12/22: 07:00 – 23:00 | 57.0 | 56.0 | 44.0 | 58.0 |
| 03/12/22: 23:00 – 07:00 | 45.0 | 43.0 | 40.0 | 50.0 |
| 04/12/22: 07:00 – 23:00 | 57.0 | 55.0 | 43.0 | 58.0 |
| 04/12/22: 23:00 – 07:00 | 48.0 | 42.0 | 36.0 | 54.0 |
| 05/12/22: 07:00 – 23:00 | 57.0 | 56.0 | 43.0 | 59.0 |
| 05/12/22: 23:00 – 07:00 | 48.0 | 35.0 | 35.0 | 52.0 |
| 06/12/22: 07:00 – 23:00 | 57.0 | 56.0 | 43.0 | 58.0 |
| **Noise Survey Time History** | | | | |

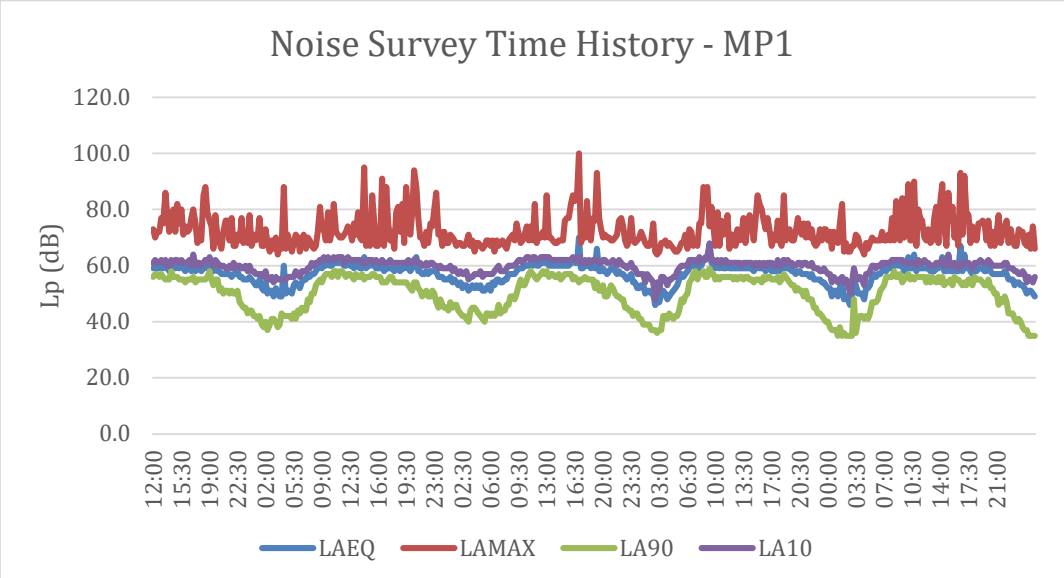


*Table 3.0 – Sound Survey Summary Results*

### *D.2 – Surveying Equipment*

| Piece of Equipment | Serial No. | Calibration Deviation |
|---|---|---|
| Svantek 971 Class 1 Sound level meter | 77796 | ≤0.5 |
| Svantek SV33B Class 1 Calibrator | 116639 | |

*Table 4.0 – 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 – North Turton (Approx. 15km North-West of Site) | | | | |
|---|---|---|---|---|
| **Time Period** | **Air Temp ($^0$C)** | **Rainfall (mm/h)** | **Prevailing Wind Direction** | **Wind Speed (m/s)** |
| 02/12/22: 00:00 – 23:59 | 1.8 – 6.5 | 0.0 – 1.2 | E | 0.0 – 2.9 |
| 03/12/22: 00:00 – 23:59 | 2.6 – 6.0 | 0.0 | NE | 0.3 – 4.7 |
| 04/12/22: 00:00 – 23:59 | 2.5 – 5.1 | 0.0 – 1.8 | ENE | 0.0 – 4.8 |
| 05/12/22: 00:00 – 23:59 | 1.6 – 5.9 | 0.0 | NE | 0.0 – 3.6 |
| 06/12/22: 00:00 – 23:59 | -2.1 – 5.0 | 0.0 | ESE | 0.0 – 1.5 |

*Table 5.0 – Weather Summary*