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UNIFRAX, WIDNES - PROPOSED EXTENSION TO FACTORY:

NOISE IMPACT ASSESSMENT

On behalf of:

Unifrax

Report No: P22-009-R01v2
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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Heaton Planning Ltdon behalf of Unifrax to carry out a noise impact assessment in connection with a proposed extension of the Unifrax Saffil manufacturing facility in Widnes. The Saffil facility manufactures high-temperature fibres designed for a variety of industrial and commercial applications, including Saffil fibres.

1.2 The location of the site and the position of the proposed factory extension is shown in Figure 1. The factory is located in a predominately commercial/industrial area however permission was granted in March 2020 for a residential development on land located approximately 80 metres from the Unifrax site boundary. The housing development is not completed yet. The dwellings on the residential development that will be nearest to the proposed new external equipment will be approximately 240m to the west.

1.3 The new extension will accommodate an additional production line (line 4), involving an extension to the rear of an existing building and the installation of associated external fixed plant and machinery. The extension is on the far side of the existing building to the closest dwellings. The new production line will be the same as the existing line 3 which is located in the existing building and will therefore require installation of the same type of external fixed plant and machinery that is already installed. The factory currently operates 24 hours a day, seven days a week and the same is proposed for the additional production line.

1.4 The assessment has been based on the layout shown on drawing RAS-001-C-003 as provided by Heaton Planning Ltd dated June 2022. The proposed layout of the development is shown in Figure 2 of this report.

1.5 The scope of the noise assessment comprises:

- Inspection of the site of the proposed new extension and surrounding area;
- Measurement of existing noise levels in the vicinity of the nearest dwellings to the proposals;
- Measurement of source noise levels of equipment proposed for the new extension;
- Calculation of potential noise levels from the extension outside the nearest dwellings; and
- Recommendation of appropriate noise mitigation measures if necessary.

1.6 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE

NPPF:2021

2.1 Paragraph 185 of the National Planning Policy Framework (NPPF) 2021 states that planning policies and decisions should *"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;*"

NPSE:2010

2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to the in NPPF, includes three aims:

i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

iii. 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.

BS 4142:2014+A1:2019

2.3 British Standard 4142:2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound' is the appropriate guidance for assessing the potential noise impact at residential locations from commercial and industrial sources.

2.4 BS 4142 requires a 'rating' level ($L_{Ar\ Tr}$) calculated from the operation of the noise source to be compared with the background sound level ($L_{A90,T}$) which is measured in the absence of the noise source. The noise is evaluated over a 1-hour period for daytime operations (i.e. 07:00 - 23:00 hours) and 15-minute period for night-time operations (i.e. 23:00 - 07:00 hours).

2.5 The rating level ($L_{Ar,Tr}$) is based on the 'specific' sound level ($L_{Aeq,Tr}$) attributed to the operating noise source, with 'character corrections' added for sound sources where 'certain acoustic features can increase the significance of impact'.

2.6 The acoustic character correction applied to the specific sound level in order to obtain the rating level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.

2.7 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the background level and the rating level.

2.8 Regarding the outcome of the initial estimate, BS 4142 states that:

- Typically, the greater this difference, the greater the magnitude of 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; and,
- The lower the rating level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact. Where the rating level is does not exceed the background sound level, this is an indication of the specific sound source having low impact, depending on the context.

2.9 BS 4142 also states in respect of background sound levels that "*it is important to ensure that values are reliable and suitably represent the particular circumstances and periods of interest… the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods*".

2.10 BS 4142 states that all pertinent factors must be taken into account regarding the context in which the noise occurs, including but not limited to:

- The absolute level of sound.
- The character and level of the residual sound compared to the character of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.

2.11 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact.

3.0 NOISE SURVEYS

Environmental Noise Survey

3.1 Noise levels were measured at a location on the western boundary of the site, representative of the future nearest residential properties to the site. The measurement location is shown in Figure 1.

3.2 The purpose of the noise survey was to establish the existing noise climate of the area.

3.3 The noise measurements were undertaken for a period of over 24 hours by installing an automatic data-logging sound level meter. The survey was carried out in terms of a series of consecutive 15-minute measurements on Tuesday/Wednesday 1/2 March 2022. The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Frequency analysis and audio recording (for the identification of noise sources) was also carried out.

3.4 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.

3.5 The results of the noise survey are summarised in Table 1, and the full results along with details of the equipment used, and the weather conditions during the survey periods, are shown in Appendix II.

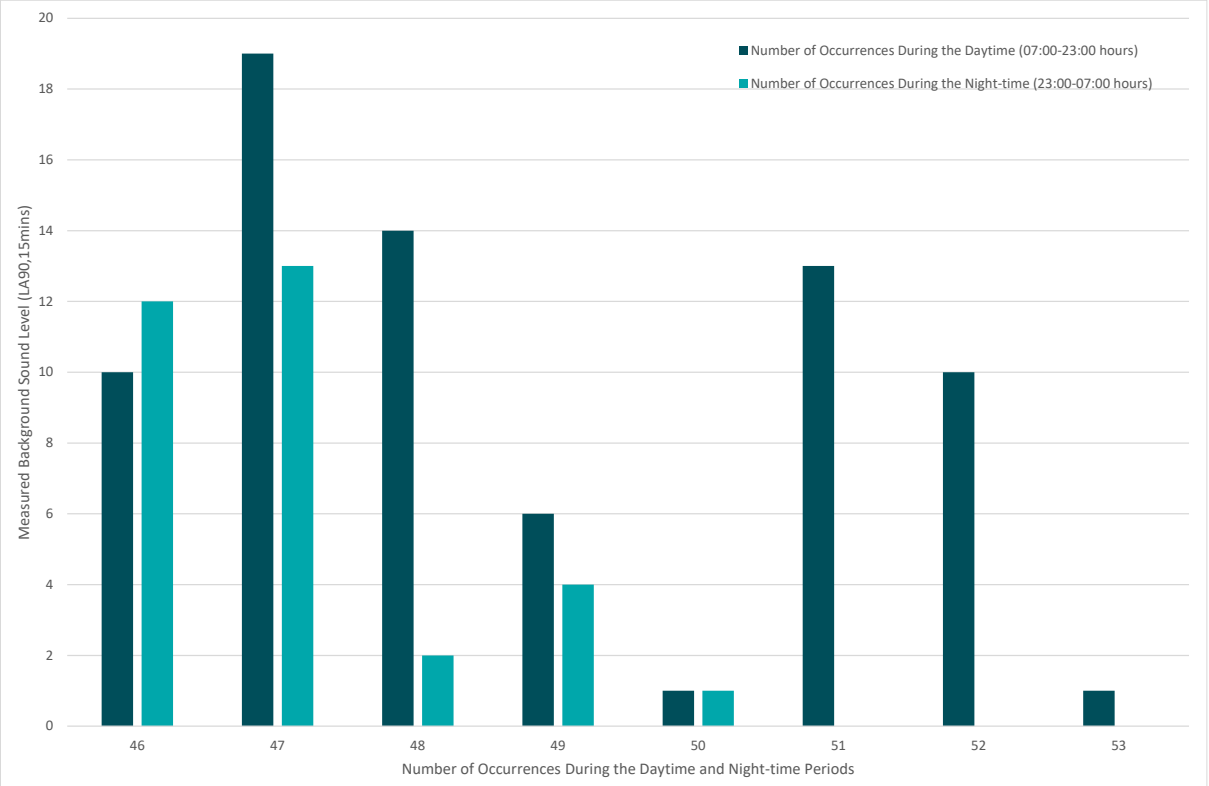
Table 1: Summary of Measured Baseline Noise Levels (dB)

Period	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
Daytime	47 – 55	46 – 53
Night-time	47 – 53	46 – 50

3.6 The noise levels measured during the survey were due to continuous fixed plant and distant road traffic.

3.7 We have carried out a modal analysis of the measured L_{A90} sound levels as shown in Graph 1 as a means of determining the representative background sound level at the nearest dwellings.

Graph 1 - Background Sound Levels during Daytime and Night-time Periods



3.8 From the graph, and the guidance within BS 4142, for the purposes of this assessment we have adopted the mode value of 47 dB $L_{A90,T}$ as the representative background sound level outside the nearest dwellings for both the day and night-time periods. This value has been adopted as noise design limit in our assessment described in Section 4.0.

Source Noise Measurements

3.9 An inspection of the existing production line and associated external fixed plant and machinery was undertaken on Wednesday 2 March 2022 and a series of source noise measurements were carried out. This data was required for use in our subsequent noise calculations for the proposed new production line.

3.10 It was noted on site that the external fixed plant and machinery was the main source of noise from the operation and therefore this external plant is the focus of this assessment.

3.11 The existing external equipment is quite complex with a number of fans, thermal oxidizers and filtration systems etc. However, noise measurements at a position set back from the boundary of the

equipment compound captured the overall noise level in a much better way than measuring each item of plant individually.

3.12 The measured $L_{Aeq,T}$ values associated with external fixed plant and machinery are given below in Table 2.

Table 2: Summary of Source Noise Levels Measured (dB)

Description	$L_{Aeq,T}$
10m from External Equipment & Machinery	66
At open roller shutter door to production line	65

3.13 These source noise levels (and corresponding octave band levels, where appropriate) have been used in calculations to determine the likely noise levels in terms of $L_{Aeq,T}$ outside the nearest dwellings resulting from operation of the proposed new production line. This is discussed in Section 4.

4.0 NOISE ASSESSMENT

4.1 We have calculated likely levels of noise outside the nearest dwellings from operation of the proposed extension taking into account the attenuation of sound over distance. The nearest dwelling on the (yet to be built) approved residential development will be approximately 240m from the proposed new equipment and machinery. The specific sound level calculated at the nearest dwellings is 39 dB $L_{Aeq,T}$. The noise from the proposed new equipment and machinery will be the same as the existing machinery which is of a steady continuous nature with no tonal or impulsive features. Moreover, because the equipment will be of the same type as the existing plant on site, the extension will not introduce a different type of noise source to the area. For these reasons, the addition of an acoustic feature penalty is not warranted for this development.

4.2 The calculation of resulting noise rating level outside the nearest dwellings is shown in Table 3 below.

Table 3: BS 4142 Initial Assessment at the nearest dwellings (dB)

Description	Nearest Dwelling
Specific sound level (L_s = $L_{Aeq,Tr}$)	39
Character correction	0
Rating level ($L_{Ar,Tr}$)	39
Background sound level ($L_{A90,T}$)	47
Excess of rating level over background level	-8
Likely Noise Impact	'No adverse impact'

4.3 The calculated rating sound level is 8 dB below the representative background sound levels measured at the nearest dwellings in the daytime and at night. Thus, in terms of BS 4142, the assessment concludes that operation of the proposed extension will not result in any adverse impact on the future residents of the approved residential development. There is no reason to modify the conclusion of the initial assessment.

4.4 Therefore, as long as noise emissions from the new line, and associated external plant, are the same as those of the existing plant, as measured and reported in Table 2, there are no requirements for specific noise control measures.

4.5 However, from the findings of the noise assessment report which accompanied the planning application for the approved residential development, we note that noise mitigation measures are to be incorporated into the design of the new dwellings.

Conclusion

4.6 We therefore conclude that operation of the proposed extension would not result in any unacceptable harm to residential amenity by reason of noise disturbance.

4.7 Furthermore, 'significant adverse impacts' would be avoided and any 'adverse impacts' would be mitigated/minimised, bringing the development in line with the aims of the Noise Policy Statement for England (NPSE) 2010.

5.0 SUMMARY

5.1 The potential noise impact from operation of the proposed extension at the Unifrax Saffil facility in Widnes has been assessed. The assessment was requested in connection with a planning application for the extension.

5.2 The new extension will accommodate an additional production line, involving a lateral extension to an existing building, and the installation of some associated external fixed plant and machinery.

5.3 This assessment has involved carrying out a baseline noise monitoring survey and evaluating potential noise impacts associated with the proposals.

5.4 A BS 4142 assessment has been undertaken the findings of which have shown that operation of the proposed new production line and associated external fixed plant and machinery will not result in any significant noise that would impact on the amenity of the nearest residents at an approved residential development.

Key:

Not to scale

X - Noise Measurement Position

- Position of New External Plant

- Approved Residential Development

N

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Title: Figure 1: Site Location & Noise Measurement Position

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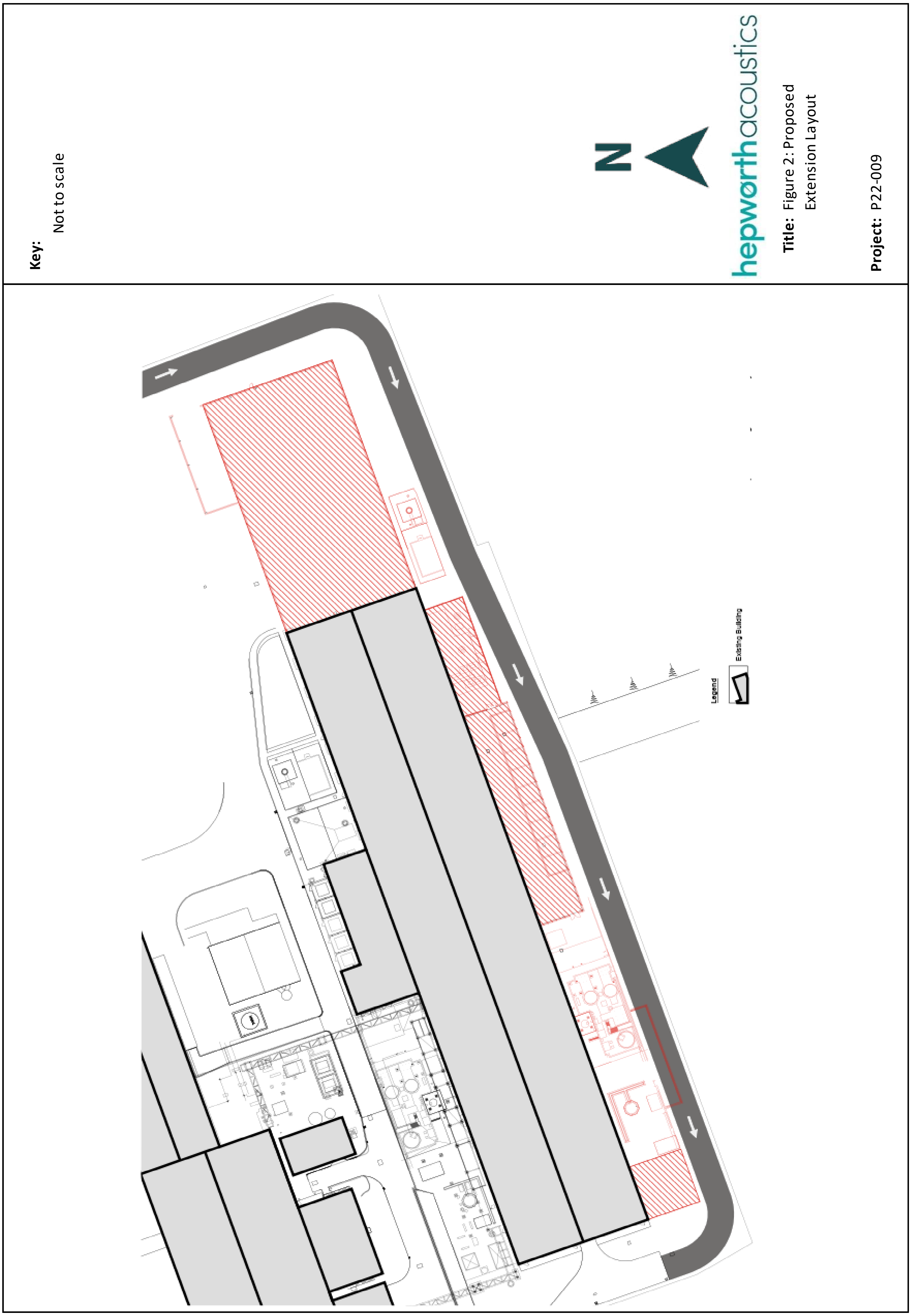

Title: Figure 2: Proposed Extension Layout

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{AFmax} This is the maximum A–weighted noise level that was recorded during the measurement period in terms of 'Fast' time weighting.

$L_{A90,T}$ This is the A–weighted noise level exceeded for 90% of the time period. $L_{A90,T}$ is used as a measure of background noise.

Appendix II: Noise Survey Results

Date(s):	Tuesday/Wednesday 1/2 March 2022
Equipment	B&K 2260 'Type 1' sound analyser (serial no. 2467016) with tripod and associated calibrator Rion NL-52 'Class 1' sound level meter (serial no. 00610178) with environmental outdoor monitoring kit
Weather	Dry, mild ~7°C, overcast and calm <2 m/s

All levels in dB(A)

Location : Eastern Site Boundary