

LOWERCROFT ROAD, BURY - PROPOSED RESIDENTIAL DEVELOPMENT

NOISE IMPACT ASSESSMENT

On behalf of:
HJK Construction

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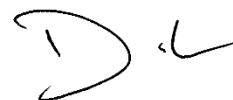
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CONTENTS

1.0	INTRODUCTION	1
2.0	GUIDANCE AND ACOUSTIC DESIGN CRITERIA	2
3.0	ROAD TRAFFIC NOISE SURVEY	7
4.0	NOISE MITIGATION SCHEME	9
5.0	SUMMARY	11
FIGURE 1 – SITE LOCATION & NOISE MEASUREMENT POSITION		12
FIGURE 2: PROPOSED SITE LAYOUT & NOISE MITIGATION SCHEME		13
APPENDIX I: NOISE UNITS & INDICES		14
APPENDIX II: NOISE SURVEY RESULTS		16

1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by HJK Construction to carry out a noise impact assessment in connection with a proposed planning application for residential development at Lowercroft Road in Bury.
- 1.2 The development is located on Lowercroft Road as shown in Figure 1. The land is currently unused and overgrown following the demolition of a former mill building. The development proposals are to construct four detached dwellings on the site, three of the dwellings are to be set back around 30m from Lowercroft Road. The side elevation of Plot 1 is to be located 6m from the nearside carriageway of Lowercroft Road. The proposed site layout is shown in Figure 2.
- 1.3 The noise climate at the development site is primarily due to road traffic on Lowercroft Road, that bounds the site to the east. Lowercroft Road has an incline from south to north such that the southern end the development land sits around two metres higher than the carriage way which reduces to less than one metre above the road at the northern end of the site. There are commercial premises including an automotive services centre bounding the site to the south. To the north and west are existing dwellings.
- 1.4 The noise assessment has included:
- An inspection of the site and surrounding area;
 - Measurement of ambient noise levels incident upon the site for representative periods of the daytime and night-time;
 - Assessment of potential noise impact on the proposed dwellings; and,
 - Recommendation of appropriate mitigation measures.
- 1.5 The purpose of the noise mitigation measures recommended in this report is twofold; firstly, to adequately protect the amenity of the dwellings from noise, and secondly (in respect of noise from the existing commercial premises), in so doing, to safeguard the commercial interests of the established businesses now and in the future.
- 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 AND ACOUSTIC DESIGN CRITERIA

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 impact 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 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 8233:2014

- 2.3 No specific guidance is given in the NPPF, nor NPSE, on acoustic design criteria for new residential developments, therefore, the guidance discussed below has been used for acoustic design purposes, which carries the full weight of an adopted British Standard.
- 2.4 Guidance on acceptable noise levels in habitable rooms of proposed new dwellings is set out in British Standard 8233: 2014, *‘Guidance on sound insulation and noise reduction for buildings’*. BS 8233 recommends that it is desirable that noise from external sources does not exceed the guideline

values that are shown in Table 1 inside habitable rooms for daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods.

Table 1: BS 8233:2014 Recommended Acoustic Design Criteria (dB $L_{Aeq,T}$)

Activity	Location	Daytime 07:00 – 23:00 hours	Night-time 23:00 – 07:00 hours
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.5 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of $L_{Amax,F}$ values and these can be highly variable and unpredictable.

BS 4142:2014+A1:2019

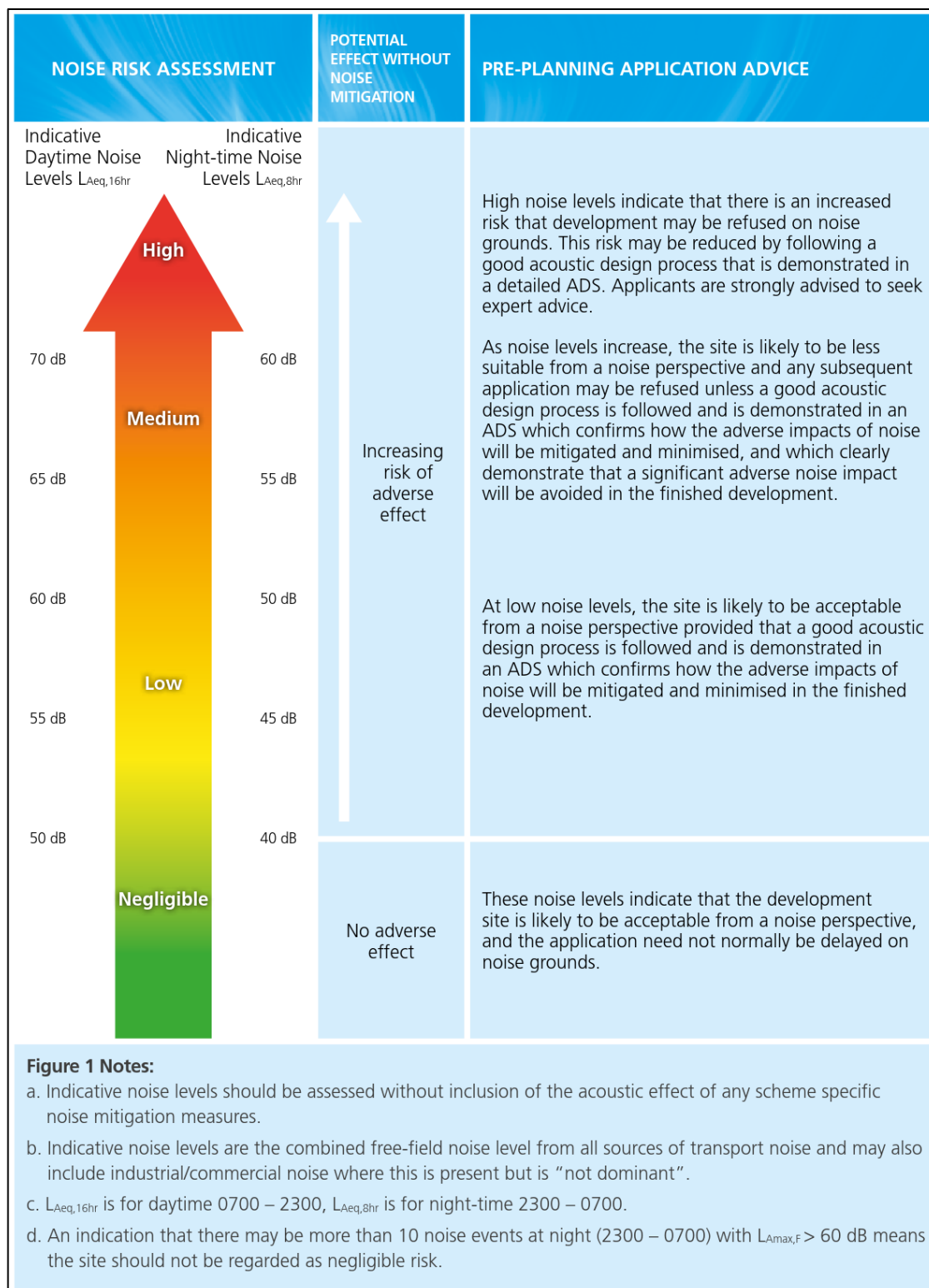
- 2.6 It was proposed to assess any significant commercial/industrial noise sources in accordance with the rating method described in BS 4142:2014 '*Methods for rating and assessing industrial and commercial sound*'. However, it was found that the development site was not exposed to any significant commercial/industrial noise and any noise from commercial/industrial premises was below the noise of distant road traffic and is closed during the evening and night. Thus, a quantitative noise assessment is not possible. However, when considering the need for any noise mitigation, due consideration must also be given to the future proofing the dwellings from noise from commercial premises.
- 2.7 In cases such as this, it is appropriate to adopt a pragmatic approach and to implement a noise mitigation scheme that takes into account not only the measured levels of noise, but possible daily variations and changes in the future. This approach is in accordance with the aims of paragraph 182 of the *National Planning Policy Framework (NPPF)* which states:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities ... Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

- 2.8 Therefore, noise mitigation measures have been recommended for the two properties at the southern boundary of the site to protect the amenity of the new residents in perpetuity and, in so doing, safeguard the business interests of nearby commercial premises. The recommended noise mitigation measures are described in Section 4.

ProPG

- 2.9 There is also guidance in 'ProPG: Planning & Noise – New Residential Development' (2017), although this guidance does not constitute official government guidance and has no legal standing. The ProPG describes a staged approach to the assessment of noise impact on proposed new residential development sites. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.10 The ProPG initial site noise risk assessment criteria are shown in Chart 1.

Chart 1: ProPG Stage 1: Initial Site Noise Risk Assessment Criteria

2.11 Chart 1 broadly sets out indicative noise levels that define the element of risk of noise impact on proposed residential development land, ranging from 'Negligible' to 'High'.

- 2.12 The guidance states that these noise levels *“should be interpreted flexibly having regard to the locality, the project and the wider context”*.
- 2.13 Similarly, to BS 8233, ProPG recognises that regular individual noise events at night can cause sleep disturbance. The ProPG guidance suggests that for design purposes, wherever practicable, peaks of noise inside bedrooms from external sources should be controlled so as not to exceed 45 dB $L_{Amax,F}$ more than 10 times per night.

Acoustic Design Criteria

- 2.14 For this assessment, we therefore recommend that the following noise criteria be adopted in order to assess the suitability of the site for residential development in terms of environmental noise and to ascertain any requirements for noise mitigation measures.
- 2.15 The criteria are to apply with windows closed and trickle ventilation provided:
- Daytime noise not exceeding 35 dB $L_{Aeq,16hr}$ inside living rooms and bedrooms, 40 dB $L_{Aeq,16hr}$ inside dining rooms; and
 - Night-time noise levels not exceeding 30 dB $L_{Aeq,8hr}$ and generally not exceeding 45 dB $L_{Amax,F}$ in bedrooms (i.e. no more than 10 times per night).
- 2.16 For private outdoor amenity spaces of the new houses (e.g. rear gardens) BS 8233 states that ‘it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments’. However, the standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable and, in such cases, for sites near to the ‘strategic transport network’ higher noise levels than 55 dB $L_{Aeq,T}$ in gardens may be acceptable.
- 2.17 Our outline recommendations for noise mitigation to achieve the adopted noise design criteria are described in Section 4.

3.0 ROAD TRAFFIC NOISE SURVEY

- 3.1 Environmental noise measurements were taken at a location on the development site representative of the proposed dwelling closest to the adjacent noise sources (i.e. the road and adjacent commercial premises). The noise survey location is indicated in Figure 1 and are described below:
- Location A: 6m from Eastern Boundary adjacent to Lowercroft Road
- 3.2 The noise measurements were taken for a representative sample period of the daytime between approximately 13:00 and 16:00 on Thursday 23rd March 2023. Night-time/early morning noise measurements were taken for the entire night between 23:00 on Thursday 23rd March and 07:00 on Friday 24th March 2023.
- 3.3 The noise surveys were carried out using a NTi Audio XL2 'Type 1' integrating sound level meter (s/n: A2A-20228-E0) complying with BS EN 60804:2001 and independently calibrated within the preceding 24 months.
- 3.4 Field calibration of the sound level meter was carried out before and after the noise measurements using an acoustic calibrator that had been calibrated within the preceding 12 months. No significant variation in the calibrated noise level was observed.
- 3.5 The noise measurements have been carried out in general compliance with BS 7445: 2003. The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.5m above the ground. Octave band frequency analysis was also carried out to assist with the design of sound insulation measures.
- 3.6 Weather conditions during the daytime survey were cool (8-10°C), dry and overcast with a light south easterly breeze (3-4 m/s). During night-time/early morning survey the weather conditions were cool (7-8°C), dry and overcast with a southerly breeze (<5 m/s).
- 3.7 During the daytime noise survey, whilst the adjacent commercial premises were open and trading, there was no significant noise from these sources. The noise climate was dictated by road traffic on Lowercroft Road.
- 3.8 The daytime noise levels have been evaluated in accordance with the 'shortened measurement method' described in the Department of Transport document '*Calculation of Road Traffic Noise*' (CRTN), 1988. The memorandum was prepared to enable entitlement under the *Noise Insulation*

Regulations 1975 to be determined, but as is stated in the document, the guidance is equally appropriate to the calculation of traffic noise for land use planning purposes.

- 3.9 The CRTN shortened measurement method involves taking noise measurements (L_{A10}) over representative time periods within any three consecutive hours between 10:00 and 17:00. By using the $L_{A10,3hr}$, as the arithmetic mean of the measured L_{A10} values, the $L_{A10,18hr}$ value can then be calculated. The correction to obtain the $L_{A10,18hr}$ value from the $L_{A10,3hr}$ level is -1 dB.
- 3.10 The $L_{A10,18hr}$ values have then been converted into the equivalent $L_{Aeq,16hr}$ values by applying a correction of -2 dB, as set out in paragraph 6.2.2 of BS 8233.
- 3.11 The measured night-time L_{Aeq} values have been logarithmically averaged to obtain a $L_{Aeq,8hr}$ value.
- 3.12 The results of the noise survey are summarised in Table 2 and include Location B where appropriate distance attenuation reductions to the frontage of dwellings have been included. Full results of the survey are shown in Appendix II:

Table 2: Calculated Road Traffic Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq,16hr}$	Night-time $L_{Aeq,8hr}$
A. 6m from Lowercroft Road	63	54
B. 30m from Lowercroft Road	56	47

- 3.13 Corresponding peaks of noise at night were in the range 45-83 dB L_{Amax} at Location A due to passing vehicles. With the 10th highest peak being 74 dB L_{Amax} . The calculated 10th highest peak at Location B is 67 dB L_{Amax} .
- 3.14 The implications of the noise exposure values are set out in Section 4.0

4.0 NOISE MITIGATION SCHEME

Initial Noise Risk Assessment

- 4.1 By reference to Chart 1, the noise exposure levels for Location A fall in to the 'medium' risk category of ProPG in the daytime and "medium-low' during the night-time, and at Location B the noise exposure levels fall into 'low' for both daytime and night.
- 4.2 In terms of the ProPG, the site is therefore suitable for residential development subject to the noise climate being taken into account and appropriate noise mitigation measures implemented where necessary.

Sound Insulation of Dwellings

- 4.3 Windows of standard well-sealed thermal double glazing (4mm glass – 4mm glass) and standard non-acoustic trickle vents would provide a typical sound reduction performance of 25 dB $R_w + C_{tr}$ (note $R_w + C_{tr}$ is sometimes notated as R_{tra}).
- 4.4 Therefore, where noise levels are below 60 dB $L_{Aeq,16hr}$ during the daytime and/or 55 dB $L_{Aeq,8hr}$ and/or 70 dB L_{Amax} at night, no specific sound insulation measures are warranted.
- 4.5 The adopted noise criteria will be achieved for the dwellings located away from Lowercroft Road without the need for any specific sound insulation measures. However, for Plot 1 we recommend the following upgraded sound insulation scheme (29 dB $R_w + C_{tr}$) for living rooms and bedrooms as highlighted in green on Figure 2. Typically, this would be achieved with double glazing specifications of:
- 6mm glass - nominal (12-20mm) cavity - 4mm glass.
- 4.6 Whilst no significant noise was measured from the commercial units to the south, we consider that it would be prudent to incorporate some sound insulation measures for elevations of the dwellings along the southern boundary with a view of the commercial units beyond. This approach would protect the amenity of future residents and safeguard the business interests of the nearby commercial premises to the south.
- 4.7 For such elevations (as indicated in Figure 2) we recommended the same upgraded standard of double glazing as above (i.e. with an airborne sound insulation performance of at least 29 $R_w + C_{tr}$).

- 4.8 Due care and attention must be taken to ensure that all glazing is well-fitted and well-sealed.

Ventilation

- 4.9 For all rooms that require upgraded glazing we recommend acoustic ventilation instead of standard window frame slot trickle vents, either of the following ventilation systems should be installed:

- Aereco EHA₂ '3-part' Acoustic Trickle Ventilator with internal acoustic humidity control, external acoustic canopy and acoustic sleeve ($42 \text{ dB } D_{n,e,w} + C_{tr}$); or
- Rytons AAC125HP Super Acoustic Controllable LookRyt AirCore Ventilator ($43 \text{ dB } D_{n,e,w} + C_{tr}$); or
- Another suitable acoustic ventilation system with a minimum performance of at least $42 \text{ dB } D_{n,e,w} + C_{tr}$.

Private Rear Gardens

- 4.10 The site layout as shown in Figure 2 indicates that the majority of dwellings will be sufficiently set back from the road and orientated in such a way that noise levels will be controlled to be within $55 \text{ dB } L_{Aeq,16hr}$ in private gardens without any specific noise mitigation measures.
- 4.11 However, for Plot 1, we recommend that acoustic fencing of minimum 1.8m height is installed on the boundary with Lowercroft Road as shown in blue in Figure 2. This fencing will ensure that road traffic noise levels are controlled to within $55 \text{ dB } L_{Aeq,16hr}$ in all private gardens.
- 4.12 For the gardens of the dwelling closest to the commercial units, to ensure the protection of residential amenity in perpetuity, we recommend that proprietary acoustic timber fencing of 1.8m minimum height is installed for the gardens as shown in blue in Figure 2.
- 4.13 Acoustic timber fencing should be of at least 20mm thickness and have double-rebated boards or joint cover strips. Some suppliers of proprietary acoustic fences include Jacksons Fencing (jacksonsfencing.co.uk), Guardian Fencing (guardianfencing.com), GRAMM barriers (grammbarriers.com) and Ransfords (ransfords.co.uk). Alternatively, solid brick walls could be installed.

5.0 SUMMARY

- 5.1 The impact of noise has been assessed for a proposed residential development on land off Lowercroft Road in Bury.
- 5.2 The assessment has included the measurement of noise levels at an appropriate location on the site during representative periods of the daytime and the entire night. Road traffic noise levels at the location of the nearest dwellings to the Lowercroft Road were found to be moderate. There was no significant noise measured from any of the nearby commercial premises.
- 5.3 For Plot 1 we have recommended some enhanced sound insulation measures for living rooms and bedrooms. We have also recommended that an appropriate scheme of sound insulation is implemented for the new houses that will protect the amenity of the new residents and also safeguard the business interests of the nearby commercial premises, both now and in the future.
- 5.4 The implementation of an adequate scheme of noise mitigation measures can be ensured by the use of an appropriately worded planning condition.





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} 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} 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_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10} This is the A-weighted noise level exceeded for 10% of the time period. L_{A10} is usually used as a measure of traffic noise.

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

Appendix II: Noise Survey Results

Date(s):	Wednesday 23 rd - Thursday 24 th March 2023
Equipment	NTi XL2 'Class 1' sound level meters (s/n: A2A-20228-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Daytime – Dry, ~8-10°C, overcast and easterly breeze 3-4 m/s Night-time – Dry, ~7-8°C, overcast skies and southerly breeze <5 m/s

All levels in dB(A)

Location A: Daytime

Time		Measured Noise Levels (dB)				Comments
Start	End	L_{AFmax}	$L_{A10,T}$	$L_{Aeq,T}$	$L_{A90,T}$	
13:00	13:15	73.6	64.4	60.1	48.9	Road traffic. Birdsong
13:15	13:30	72.2	64.6	59.7	45.9	
13:30	13:45	74.1	64.8	60.4	48.5	
13:45	14:00	71.2	65.0	60.6	49.6	
14:00	14:15	74.7	66.6	61.6	49.6	
14:15	14:30	74.0	65.1	60.8	47.9	
14:30	14:45	80.1	65.4	61.7	49.4	
14:45	15:00	73.2	66.2	62.5	50.6	
15:00	15:15	71.2	66.7	62.6	52.5	
15:15	15:30	72.7	65.7	61.7	49.1	
15:30	15:45	72.3	66.8	62.5	51.2	
15:45	16:00	81.7	66.6	63.1	50.8	

Location A: Night