

**PROPOSED GRAIN DRYING EQUIPMENT  
TOP HOUSE FARM, BOUNDARY LANE, KIRKBY  
NOISE IMPACT ASSESSMENT**

On behalf of:  
**RE&S Baldwin Limited**

## PROPOSED GRAIN DRYING EQUIPMENT TOP HOUSE FARM, BOUNDARY LANE, KIRKBY NOISE IMPACT ASSESSMENT

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## 1. INTRODUCTION

- 1.1 Hepworth Acoustics was commissioned by RE&S Baldwin Limited to carry out a noise impact assessment in connection with a proposed agricultural building at Top House Farm, Boundary Lane, Kirkby. The assessment was requested in connection with a planning application for the development.
- 1.2 The proposed location of the building is farmland and also bounded by open farmland in all directions. The site location is shown in Figure 1.
- 1.3 The nearest dwelling to the development is Top House Farm, which is outside of the applicant's ownership and not associated with the development. The dwelling is more than 250 metres from the proposed building.
- 1.4 The building will be a standard portal frame construction with walls of precast concrete panels and upper elevations/roof of coated metal sheeting. The proposed building is shown in Figure 2. There is potential for mobile grain drying equipment to be used within the building at certain times of the year.
- 1.5 Therefore, this noise assessment considers this potential noise source and includes the following:
  - An inspection of the site and environs;
  - Measurement of ambient/background noise levels over representative periods on a weekday;
  - Adopting appropriate noise design limits for fixed plant/equipment
  - Recommendation of appropriate outline noise mitigation measures.
- 1.6 The various acoustics indices referred to in this report are described in Appendix A. All noise levels in the text have been rounded to the nearest decibel as fractions of a decibel are imperceptible.

## 2. GUIDANCE & ACOUSTIC CRITERIA

### Correspondence

- 2.1 Following instruction liaison with the Local Authority was sought to agree the assessment methodology. Planner Reece Black stated that Environmental Health require for consideration to be given within the noise assessment to *“open windows of the nearest property”*.
- 2.2 It is assumed that this requires that the control of noise from the proposed equipment should consider the need to achieve suitable internal noise levels within existing dwellings where ventilation is being provided by open windows.

### Local Policy

- 2.3 Policy CS19 Design Quality and Accessibility in New Development set out in the Knowsley Local Plan Core Strategy which was adopted in January 2016 states:

*2) To maintain a good standard of amenity for all existing and future occupants of land and buildings, development proposals will be required to:*

*a) Avoid unacceptable impacts on existing residents, business occupiers, and future occupiers;*

- 2.4 The document also promotes the design of new development which avoids *“unacceptable impacts which affect the amenity and living conditions of occupiers of buildings”*. Such effects can include generation of noise.

### NPPF:2024

- 2.5 Paragraph 198 of the National Planning Policy Framework (NPPF) December 2024 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

- 2.6 The Noise Policy Statement for England (NPSE) 2010, which is referred to in the 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**

- 2.7 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 such as grain drying equipment.
- 2.8 BS 4142 requires a 'rating' level ( $L_{A,r,Tr}$ ) 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).
- 2.9 The rating level ( $L_{A,r,Tr}$ ) 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*" when present at residential locations.
- 2.10 The acoustic character corrections, where necessary, are applied to the specific sound level in order to obtain the rating level and can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.
- 2.11 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the rating level and the background sound level.
- 2.12 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.

- 2.13 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*”.
- 2.14 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.
- 2.15 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact.

### BS 8233:2014

- 2.16 In order to consider open windows at existing dwellings the guidance discussed below has been used.
- 2.17 Guidance on acceptable noise levels in habitable rooms 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 guidelines 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<br>07:00 – 23:00<br>hours | Night-time<br>23:00 – 07:00<br>hours |
|----------------------------|------------------|-----------------------------------|--------------------------------------|
| Resting                    | Living room      | 35                                | -                                    |
| Dining                     | Dining room/area | 40                                | -                                    |
| Sleeping (daytime resting) | Bedroom          | 35                                | 30                                   |

- 2.18 It is however noted that the design criteria set out in Table 1 relate to noise without any specific character. Where the noise under consideration does have characteristics that make it potentially more intrusive, lower noise criteria may be appropriate.

### 3. NOISE SURVEY

- 3.1 An environmental noise survey was carried out at a location that is representative of the nearest existing dwellings to the west of the site i.e. Top House Farm. The noise measurement location is shown in Figure 1.
- 3.2 An automated noise survey was carried out between approximately 11:00 hours on Wednesday 15 and 11:00 hours on Thursday 16 April 2026 in terms of a series of consecutive 15-minute measurements.
- 3.3 Field-calibration checks were carried out both before and after the survey with no variance in levels observed. Frequency analysis and audio recordings were also undertaken to assist in identifying significant noise sources. Weather conditions during the survey were suitable for environmental noise measurements.
- 3.4 The results of the noise survey are summarised in Table 2. The full results along with details of the equipment used and the weather conditions during the survey are shown in Appendix B.

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

| Period                           | $L_{Aeq,15mins}$ | $L_{A90,15mins}$ |
|----------------------------------|------------------|------------------|
| Daytime (07:00 – 23:00 hours)    | 40 – 60          | 38 – 49          |
| Night-time (23:00 – 07:00 hours) | 40 – 55          | 38 – 47          |

- 3.5 The noise climate in the area was associated with distant road traffic and birdsong.
- 3.6 BS 4142 shows an example of “*statistical analysis of the results of all the measurement periods in order to determine a background sound level*”. This involves consideration of the mode, mean or even the median, selecting the lowest or the most apparent values over the periods of interest. Given there is potential for the equipment to operate in the day or the night, the most sensitive periods have been selected i.e. the evening and night-time.
- 3.7 From analysis of the measured noise levels representative background sound levels for evening and night-time periods have been determined as shown in Table 3.

**Table 3: Representative Background Sound Levels (dB  $L_{A90,T}$ )**

| Period                                  | Noise level (dB) |
|-----------------------------------------|------------------|
| Evening Period (19:00 - 23:00 hours)    | 41               |
| Night-time Period (23:00 - 07:00 hours) | 40               |

- 3.8 The values selected tended to show a good correlation between all statistical indices (i.e. mode, mean and median), although the mean and median values were 1-2 dB higher than the mode, therefore the mode was selected as representative. In line with the guidance set out in BS 4142 these values have been adopted in our assessment described in Section 4.0.

## 4. NOISE ASSESSMENT

- 4.1 As there are no details of the noise emissions from this equipment at this stage, appropriate noise design limits have been derived from the adopted representative background sound levels which will need to be taken into account in the selection, specification and installation of the grain drying equipment.
- 4.2 Controlling the potential equipment rating levels to the measured background sound level in the evening in terms of 41 dB  $L_{A,r,Tr}$  and similarly 40 dB  $L_{A,r,Tr}$  at night outside the nearest dwelling would indicate a low impact in terms of BS 4142. Considering the reduction provided by an elevation with an open bedroom window would result in internal noise levels of 30 dBA at night. The residual acoustic environment is 48 dB LAeq,8hr and includes regular events higher than the recommended noise limit of 40 dB further masking any noise from the fixed plant.
- 4.3 On this basis, the recommended fixed plant/equipment rating sound level limits (i.e. rated according to BS 4142) are shown in Table 4.

**Table 4: Fixed Plant Noise Rating Level Design Limits (dB  $L_{A,r,Tr}$ )**

| Location                | Daytime (07:00-23:00) | Night (23:00-07:00) |
|-------------------------|-----------------------|---------------------|
| Dwellings Boundary Lane | 41                    | 40                  |

- 4.4 Based on noise emissions measured previously from similar grain drying equipment, providing that adequate noise controls are incorporated the noise levels outside the nearest dwelling will comfortability meet these design limits.
- 4.5 Therefore, the following outline measures to control noise from the equipment is recommended:
- Specifying low noise equipment;
  - Operating the drying equipment within the building with doors closed;
  - Installation of noise attenuators, acoustic louvres, etc;
  - Careful siting of attenuated exhaust ducts away from dwellings (i.e. on eastern elevation of the proposed building);
  - Carrying out regular maintenance of equipment to minimise noise emissions.

### Planning Condition

- 4.6 Noise impact of any grain drying equipment associated with use of the proposed development can be adequately controlled by adhering to the environmental noise limits recommended in this report, which, if necessary, could form the basis of an appropriately worded planning condition.

### Conclusion

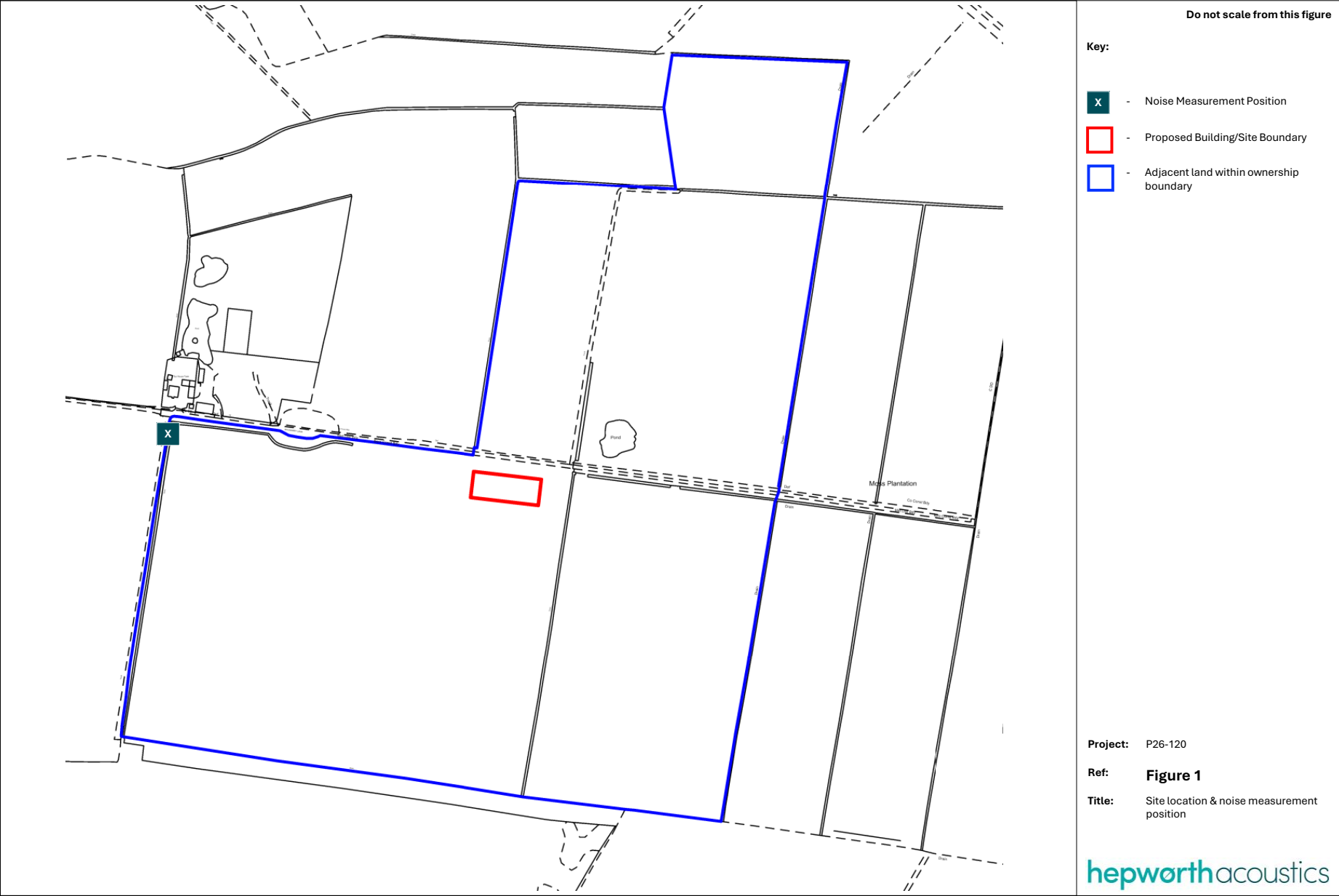
- 4.7 It is concluded that subject to the environmental noise limits recommended above, the potential noise impact from the proposed grain drying equipment would not result in any unacceptable harm

to residential amenity by reason of noise disturbance. These noise limits can be formalised by an appropriately worded planning condition.

- 4.8 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 and local policies.

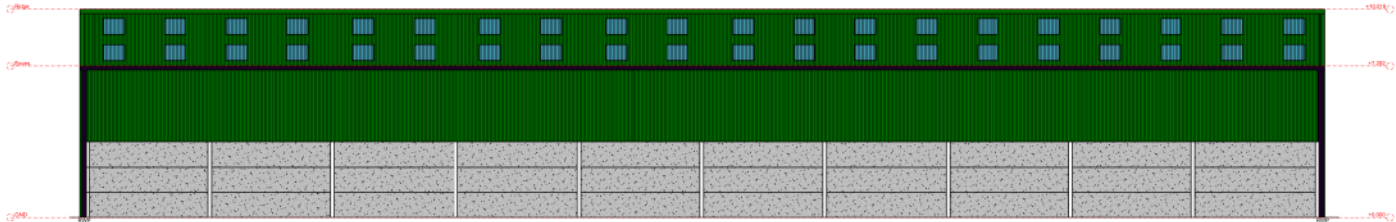
## 5. SUMMARY

- 5.1 Hepworth Acoustics was commissioned by RE&S Baldwin Limited to carry out a noise impact assessment in connection with proposed grain drying equipment at Top House Farm, Kirkby.
- 5.2 The baseline noise survey has established the existing ambient and background noise levels at a location representative of the nearest dwelling to the west of the site on a weekday over appropriate periods.
- 5.3 Appropriate noise limits have been recommended for the equipment and can be ensured by the use of a suitably worded planning condition.

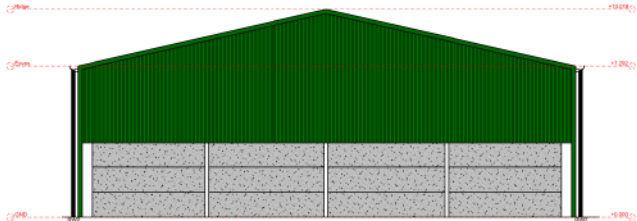


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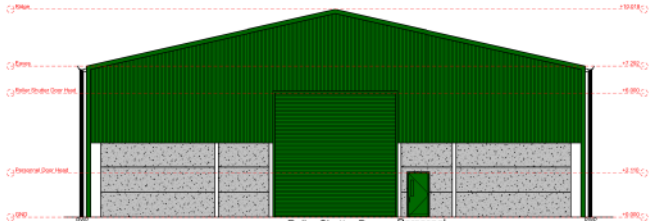
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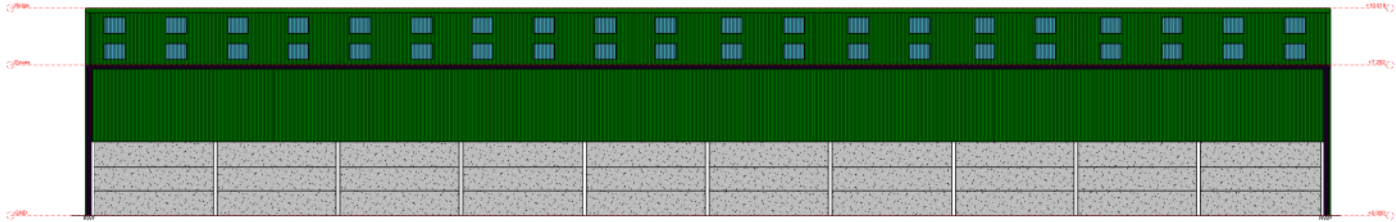
**Proposed Elevation 02**  
Scale: 1:100 @ A1



**Proposed Elevation 04**  
Scale: 1:100 @ A1



**Proposed Elevation 01**  
Scale: 1:100 @ A1



**Proposed Elevation 03**  
Scale: 1:100 @ A1

Project: P26-120

Ref: **Figure 2**

Title: Proposed Building Elevations

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## APPENDIX A: ACOUSTICS 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. There are also a number of ways to describe sound insulation performance.

The indices used in this report are described below:

- $L_{Aeq,T}$**       **A-weighted Equivalent Continuous Sound Level:** An average of the total sound pressure measured over a specified time period ( $T$ ). In other words,  $L_{Aeq,T}$  is the level of a steady sound which has the same total A-weighted sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.
- $L_{Amax}$**       **Maximum A-weighted Sound Level with Fast Time-weighting:** The maximum A-weighted sound pressure level during the measurement period, using the Fast time-weighting of 125ms.  $L_{Amax}$  used in this report refers throughout to  $L_{AFmax}$  with the Fast time weighting, denoted  $L_{AFmax}$  or  $L_{Amax,f}$  in other documents but  $L_{Amax}$  in BS 8233:2014 standard notation.
- $L_{A90,T}$**       **A-weighted 90 Percentile Level:** The A-weighted sound level exceeded for 90% of a measurement time period ( $T$ ).  $L_{A90,T}$  is generally used as a measure of Background Sound Level.
- $L_{A,T}$**       **Rating Level:** An A-weighted value most commonly used in BS 4142 assessments, which is the sound level of the noise source under assessment, at the assessment location, evaluated over the reference assessment period ( $T_r$ ) and includes numerical adjustments for the characteristic features of the sound.

**APPENDIX B: NOISE SURVEY RESULTS**

|                  |                                                                                                                                                      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Date(s)</b>   | Wednesday 15 – Thursday 16 April 2026                                                                                                                |
| <b>Equipment</b> | NTi Audio XL2-TA ‘Class 1’ sound analyser (s/n: A2A-20228-E0)<br>with associated calibrator(s) and tripod(s)/environmental outdoor monitoring kit(s) |
| <b>Weather</b>   | Daytime: 11 – 15 °C, sunny spells, partially overcast, generally dry, SW wind <5 m/s<br>Night-time: 10 °C, partially overcast, dry, SW wind <4 m/s   |

Chart(s) overleaf

Location 1: Western boundary of the site

