

HEPWORTH
ACOUSTICS
Noise and Vibration Consultants

**PROPOSED RESIDENTIAL CONVERSION OF
UPPER FLOORS OF 1 – 3 CHURCH STREET, BARNLEY**

NOISE IMPACT ASSESSMENT

**On behalf of:
Caldecotte Group**

Report No: P15-313-R01v1
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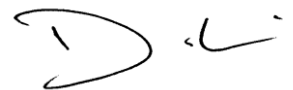
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NOISE IMPACT ASSESSMENT

Report prepared by:
Hepworth Acoustics Ltd
21 Little Peter Street
Manchester
M15 4PS

On behalf of:
Caldecotte Group

Report prepared by:
Donald Quinn BSc MIOA – Managing Director



Report checked by:
Paul Bassett BSc MSc FIOA – Technical Director



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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Caldecotte Group to assess the potential impact of external noise in connection with a proposed planning application for the conversion of the upper floors of 1 – 3 Church Street, Barnsley to apartments. The whole building is currently occupied by a Walkabout bar with trading area on the ground floor and offices and staff accommodation on the upper floors. However, the development proposals include the refurbishment of the ground floor to provide two new retail units. Therefore, there will be no noise from the Walkabout bar present upon completion of the apartments.
- 1.2 We have assumed that sound insulation between the ground floor retail units and the proposed apartments would be dealt with under the Building Regulations, and the control of any proposed plant associated with the new retail units could be controlled by an appropriately worded planning condition. As such, our assessment has focussed on the potential impact of the ingress of existing external noise.
- 1.3 The noise assessment has included:
- i. An inspection of the existing building and the surrounding area;
 - ii. Measurement of ambient noise levels on the front (Church Street) and rear elevations over a 24 hour period;
 - iii. Assessment of the potential noise impact on the development; and
 - iv. Recommendation of appropriate mitigation measures.
- 1.4 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 SITE DESCRIPTION AND PROPOSALS

Site Description

- 2.1 The building at 1 – 3 Church Street, including the upper floors is currently occupied by a Walkabout bar, with trading areas on the ground floor and staff accommodation and offices on the upper floors.
- 2.2 The ground floor of the building extends some way back from Church Street, and at the rear is a covered external drinking/dining area. The upper floors of the building only occupy the front part of the site, with existing windows of the first and second floors overlooking Church Street to the front. Only rooms on the second floor have windows to the rear. There is existing Walkabout air handling equipment located on the ground floor roof at the very back of the site (above the outdoor drinking/dining area), and steady noise from this is audible outside the rear looking upper floor windows. There is also an existing outdoor dining/.drinking area outside the front of the bar on Church Street.
- 2.3 Church Street is a busy town centre street with regular road traffic in the daytime and at night. There are other licensed premises in the vicinity including the White Bear public house to the north and the Funky Buddha bar on the far side of Church Street to the south east. The site location is shown in Figure 1.
- 2.4 The building is of masonry construction with existing timber-framed double-glazed windows to rooms on the upper floors.

Proposals

- 2.5 Proposals are for the existing ground floor to be subdivided to provide two new retail units, with the first and second floors converted to a total of five one/two bedroom apartments. The apartments will have living rooms and bedrooms on the outward facing elevations. No private outdoor amenity spaces proposed.
- 2.6 The proposed apartment layouts are shown in Figure 2.

3.0 NOISE SURVEY

- 3.1 Noise measurements were carried out over a 24 hour period on a weekday in a bid to minimise extraneous noise from the Walkabout premises as far as possible. The Walkabout bar was open and trading during the daytime and evening periods of the survey, but no noisy music events took place at Walkabout during the survey. Nevertheless, because the weather during the noise survey was warm and sunny, there were people in the Walkabout external drinking/dining area on Church Street during trading hours. Therefore, since development proposals include the replacement of the Walkabout bar with retail units, the noise survey which includes some noise from Walkabout represents a robust assessment of the potential noise impact on the proposed apartments.
- 3.2 Measurements were taken at two locations, with microphones of sound level meters protruding from second floor windows on each of the Church Street (front) and rear elevations. The measured noise levels to the rear were affected by noise from the Walkabout air handling units and therefore represent a worst-case (as this equipment would be removed as part of the development).
- 3.3 Auto-logging noise measurements were taken in terms of consecutive five minute periods between around 13:15 on Tuesday 10 June 2015 through until around 13:15 the following day. The weather during the survey was dry, clear, warm/mild, and generally calm.
- 3.4 The noise survey was carried out two Rion NL-52 'Type 1' sound level meters (s/n: 00320636 and 0000932323). Calibration checks were carried out both before and after the measurements with no variance in levels noted. The noise measurements were taken approximately 1m from the facades of the building and were therefore 'façade' measurements. Octave band frequency analysis was also carried out to assist with the design of sound insulation measures.
- 3.5 The full results of the noise survey are shown in Appendix II and summarised in Table 1:

Table 1: Summary of measured noise levels (dB)

Period	Church Street elevation		Rear elevation	
	Overall L _{Aeq}	Typical* L _{Amax}	Overall L _{Aeq}	Typical* L _{Amax}
Daytime (07:00 – 23:00)	67	-	55	-
Night-time (23:00 – 07:00)	58	76	46	59

*See para 4.4

- 3.6 As can be seen in Appendix II, the noise measurements at the rear of the building show that the measured noise levels were influenced by noise from the Walkabout plant that operated from the start of the survey until around 23:20 hours, and then again from around 11:20 hours on the following morning.
- 3.7 Our adopted design criteria and recommendations are set out in Sections 4.0 and 5.0.

4.0 ACOUSTIC DESIGN CRITERIA

4.1 The *National Planning Policy Framework* (NPPF) 2012 states at paragraph 17 that planning should always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings. In addition the NPPF provides some general guidance to local authorities on taking noise in to account in planning policies and decisions. This includes guidance (in paragraph 123) that local authorities should ‘aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development’ and ‘recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established’. 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.

4.2 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying online guidance, National Planning Practice Guidance ‘Noise’, nor the NPSE.

4.3 Therefore, it is necessary to refer to established national guidance such as the acoustic design goals for residential development that are set out in BS8233: 2014, *Guidance on sound insulation and noise reduction for buildings*, which carries the full weight of an adopted British Standard. The design criteria recommended in BS8233 for daytime periods (07:00 – 23:00 hours) and night-time periods (23:00 – 07:00 hours) are summarised in Table 2:

Table 2: BS8233 recommended acoustic design criteria

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	

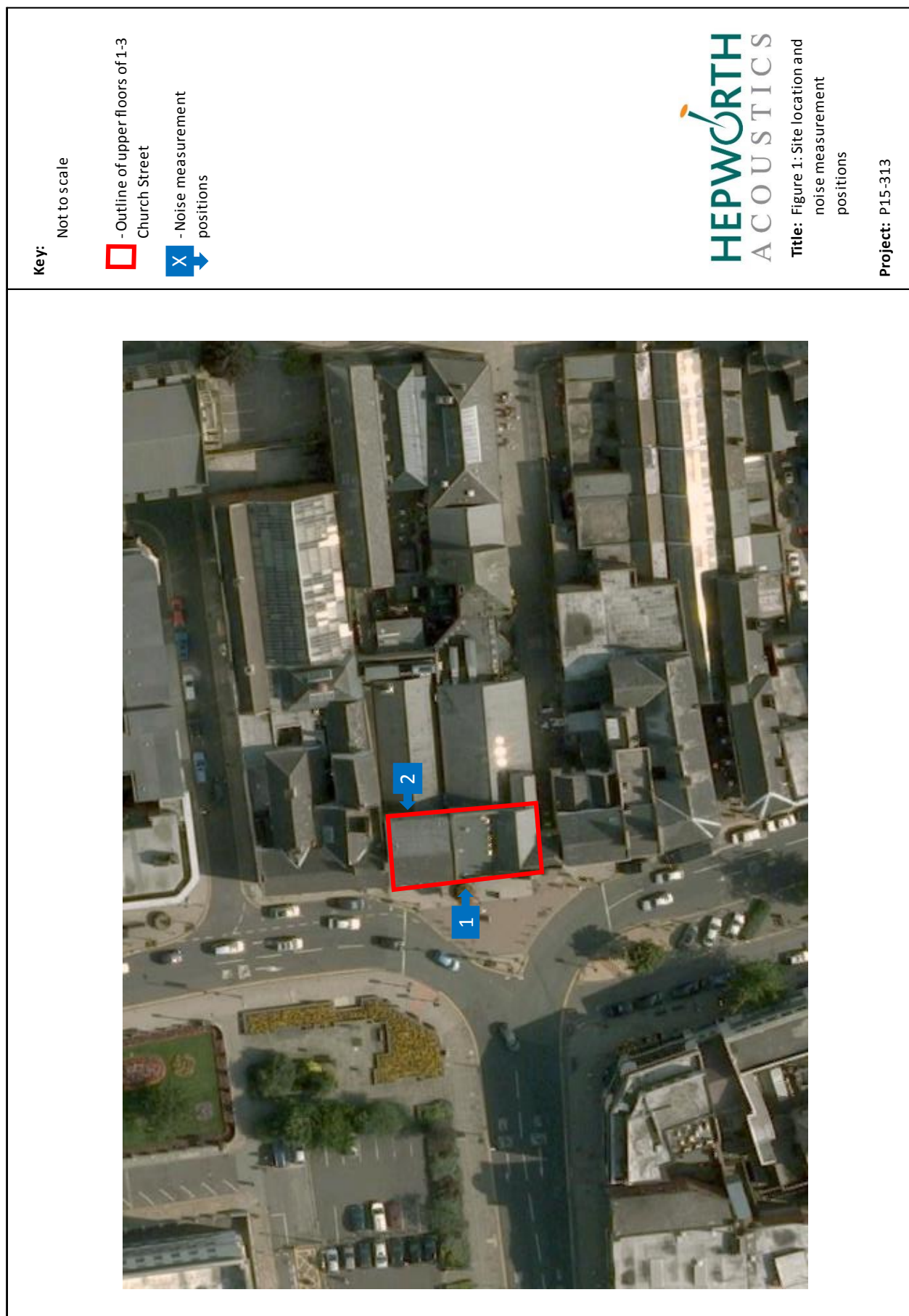
- 4.4 BS8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable such that for design purposes it is usual to take into account the findings of research described in WHO *Community Noise Guidelines* that states ‘for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night’. As such, for the purposes of determining a suitable noise mitigation scheme, we have determined the 15th highest night-time L_{Amax} value for the night-time period for each location. These values are 76 dB and 59 dB L_{Amax} for the front and rear elevations respectively as shown in Table 1.
- 4.5 For this development we therefore recommend the following noise criteria be adopted with windows closed and trickle ventilation provided:
- Daytime noise below 35 dB L_{Aeq} inside living rooms and bedrooms; and
 - Night-time noise levels not exceeding 30 dB L_{Aeq} and generally not exceeding 45 dB L_{Amax} in bedrooms.
- 4.6 Meeting the above adopted noise criteria will provide a good standard of protection of residential amenity for future residents of the proposed development.
- 4.7 Our noise mitigation recommendations to meet the adopted noise criteria are described in Section 5.

5.0 SOUND INSULATION MEASURES

- 5.1 Based upon the apartment layout drawings, and building elevation drawings, we have carried out calculations to determine appropriate glazing and ventilation specifications for the proposed apartments in order to meet the adopted acoustic design criteria set out in Section 4.0.
- 5.2 In order to adequately control the break-in of external noise to all living rooms and bedrooms on the front (Church Street) elevation, we recommend the following:
- New, well-fitted double glazing formed of 10mm glass – nominal (12-20mm) cavity – 6mm glass; or
 - New, well-fitted double glazing formed of 6mm glass – nominal (12-20mm) cavity – 8.4mm acoustic laminate glass;
- 5.3 All habitable rooms overlooking Church Street will also require acoustically treated means of ventilation in order to adequately control the break-in of external noise. We recommend the following:
- Acoustic trickle vents with a minimum sound reduction of 42 dB $D_{n,e,w}$ such as the Aereco EHA system (with acoustic canopy and sleeve); or
 - A fully ducted system within each apartment with terminations on the shielded (rear) elevation only).
- 5.4 For habitable rooms to the rear, even including the influence of existing Walkabout plant noise (which will not be present upon completion of the apartments), the adopted noise criteria will be achieved with the installation of standard well-sealed thermal double glazing and standard trickle vents.

6.0 SUMMARY AND CONCLUSION

- 6.1 The impact of noise has been assessed for the proposed residential conversion of the upper floors of the existing building 1 – 3 Church Street in Barnsley town centre.
- 6.2 The assessment has included the measurement of the prevailing noise climate on the Church Street (front elevation) and the rear elevations of the building over 24 hour period during the week.
- 6.3 Appropriate acoustic design criteria have been adopted that will ensure the protection of residential amenity. However, to achieve these criteria it will be necessary to implement some sound insulation measures for relevant elevations.
- 6.4 We have recommend upgraded glazing and ventilation specifications for habitable rooms on the Church Street elevation in order to achieve the adopted design criteria.
- 6.5 Therefore, in conclusion, an appropriate scheme of sound insulation measures has been recommended in this report that will achieve acceptable noise levels within habitable rooms. Such sound insulation measures are commonly required for city and town centre developments.
- 6.6 If necessary, the implementation of an adequate scheme of noise mitigation measures, as described in this report, can be ensured by the use of an appropriately worded planning condition.

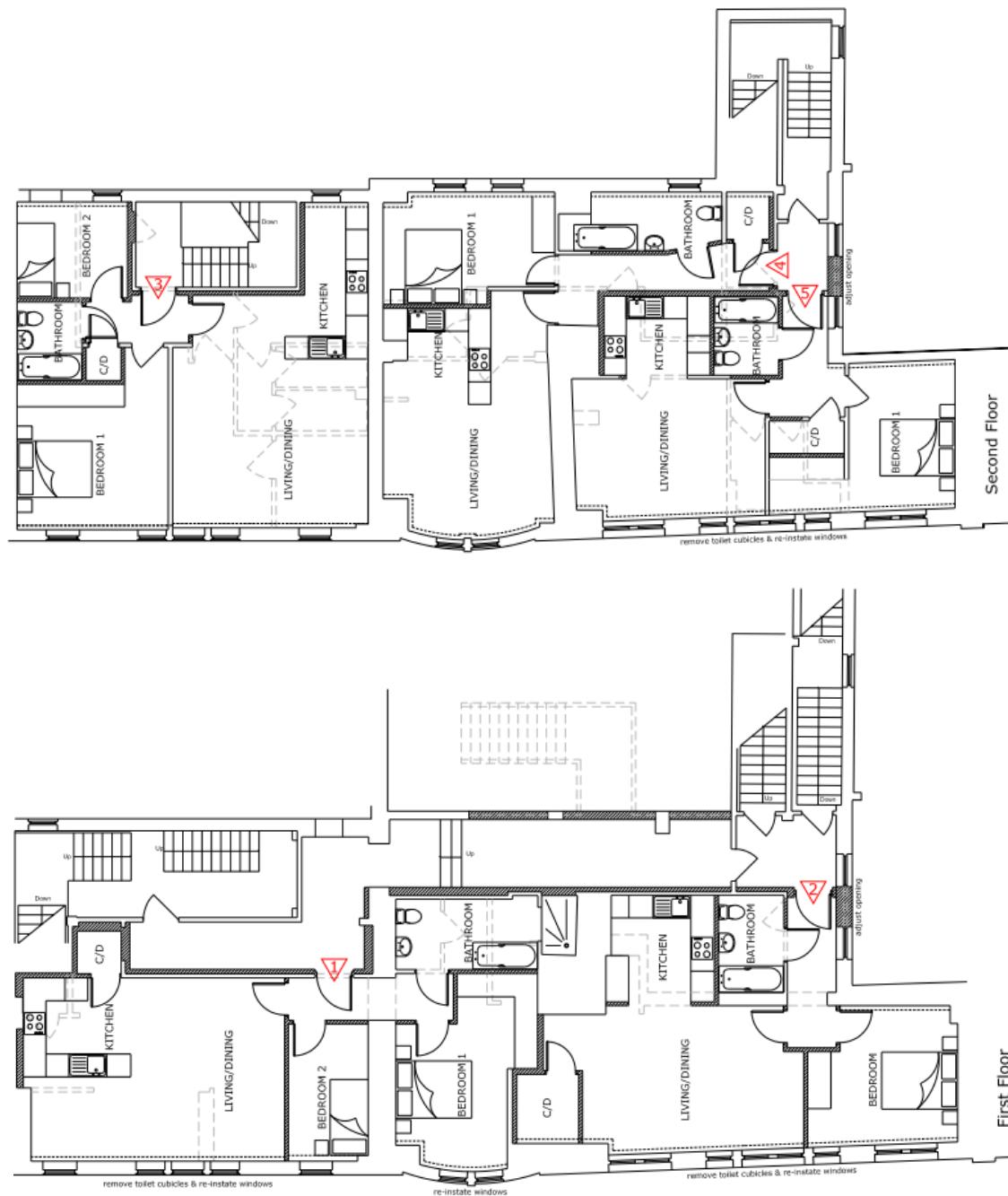


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Title: Figure 2: Proposed
apartment layout
drawings

Project: P15-313



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.

Appendix II: Noise Survey Results

Date(s): Start - 13:15 Wednesday 10 June 2015
 End – 13:15 Thursday 11 June 2015

Equipment: Rion NL-52 'Type 1' sound level meter (serial no. 00320636) with boom,
 extension cable and environmental windshield, calibrator
 Rion NL-52 'Type 1' sound level meter (serial no. 00932323) with boom,
 extension cable and environmental windshield, calibrator

Weather: Dry, mild with generally light winds (<5m/s), occasional gusts.

All levels in dB(A)

