

ACOUSTIC DESIGN NOTE

Ref: 18209/ADN002/js

Date: 18th December 2018



PROJECT: Proposed Extension to Mercure Hotel, Bloomsbury, WC1B 5AF

TOPIC: Acoustic Survey and Plant Noise Criteria

1.0 Introduction

- 1.1 There is a proposal to extend the Mercure Hotel, Southampton Row, WC1B 5AF by a part ground floor extension to Southampton Row and Cosmo Place, an east elevation extension on Cosmo Place and a rear roof extension. Part of the works include the removal of air cooled condensers on the exiting east elevation and increasing the number of condenser units in the lightwell between the hotel and Russell Mansion. A site location plan is attached as Figure 1.
- 1.2 To establish existing ambient and background noise levels a noise survey was undertaken both within the lightwell and at the eastern boundary of the site with properties in Cosmo Place. The results from the noise survey have been used to set a design noise criterion with respect of the proposed air cooled condensers having regard to the planning policy requirements of Camden Council.
- 1.3 This acoustic design note sets out the results of the noise survey and the suggested design noise criterion. A glossary of acoustic terms is attached as Appendix 2.

2.0 Noise Criterion

- 2.1 In permitting (re)development including new plant, London Borough of Camden (LBC) generally impose a planning condition in respect of limiting noise from plant and equipment affecting noise sensitive properties. Details of the relevant policy to be adopted when determining this condition are set out in the Local Plan Adoption Version Appendix 3: Noise Threshold, which states the following:

Industrial and Commercial Noise Sources

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5 dB above background	'Rating level' greater than 5 dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57 dB L _{AMax}	'Rating level' between 9dB below and 5 dB above background or noise events between 57dB and 88dB L _{AMax}	'Rating level' greater than 5dB above background and/or events exceeding 88dB L _{AMax}

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

** levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

- 2.2 BS4142 advises that any assessment with respect of 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”, and, that “When making assessments and arriving at decisions, therefore, it is essential to place sound in context”. However it is understood that Camden take no account of this and will only accept assessments based upon their “one size fits all” criterion.
- 2.3 With respect of consideration of LOAEL and SOAEL as described in the Noise Policy Statement for England (NPSE) it is stated that “It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available”. However it is understood that again Camden take no account of this and will only accept assessments based upon their “one size fits all” criterion.

- 2.4 On the basis of the above therefore, the noise control criterion will be that noise from the proposed mechanical services plant must be controlled to at least 10 dB below existing background noise levels.

3.0 Noise Survey and Results

3.1 Aims

To assess the current levels of background noise in the vicinity of the site, in order to allow the setting of environmental noise criteria for external plant such that the requirements of the planning authority are achieved.

3.2 Instrumentation

Two NTI XL2 environmental noise level analysers, with both instruments being field calibration checked equipped both prior and subsequent to the completion of the survey. No drift in calibration was noted.

3.3 Locations:

On the 1st floor flat roof at the eastern end of the site adjacent to the boundary with the residential properties in Cosmo Place and within the lightwell formed by the Mercure Hotel and Russell Mansions. The microphone of both sound level meters were fixed to a tripod at approximately 1.5m above local grade height. See Figure 1 for the measurement locations.

3.4 Period:

Monitoring was continuous from approximately 09:15 on Friday 29th June 2018 until approximately 12:30 on Tuesday 3rd July 2018. The monitors were set up to monitor noise levels continuously in fifteen-minute intervals.

3.5 Weather:

Warm, dry with light to very light winds.

3.6 Site Noise Characteristics:

The background and ambient noise levels in the vicinity of the nearest residential windows are controlled by noise from the plant associated with the Mercure Hotel. It is thought that no unusual events occurred during the survey period, and the data includes a fair representation of background noise levels in the area.

3.7 Results:

The survey results are presented in graphical format in Appendix 1, showing the recorded values of $L_{Aeq,15min}$ and $L_{A90,15min}$.

3.8 Surveyor:

A Higgins AMIOA

4.0 Plant Noise Criteria

- 4.1 Limiting noise level criteria for new plant will be considered here in two distinct periods, related to the probable operating periods of the plant; i.e. daytime (07:00 to 23:00) and night-time (23:00 to 07:00) hours.
- 4.2 The typical background noise levels ($L_{A90,15min}$) measured over the two assessment periods at location 2 (the lightwell) are shown in table 1 below;

Table 1: Typical background noise levels

Period	Typical Background Noise Levels
Daytime (07:00 to 23:00)	$L_{A90,15min}$ 55 dB
Night-time (23:00 to 07:00)	$L_{A90,15min}$ 52 dB

- 4.3 To comply with the noise control criterion noise from the design noise criteria for the proposed mechanical services plant, at 1m from any noise sensitive faced, are as shown below;

Table 2: Design noise control criteria

Period	Design Noise Criteria
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 45 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 42 dB

- 4.4 Although onerous, particularly given the context of the site, the noise criteria should be achievable by, if necessary, installation of the proposed mechanical services plant in acoustic enclosures.

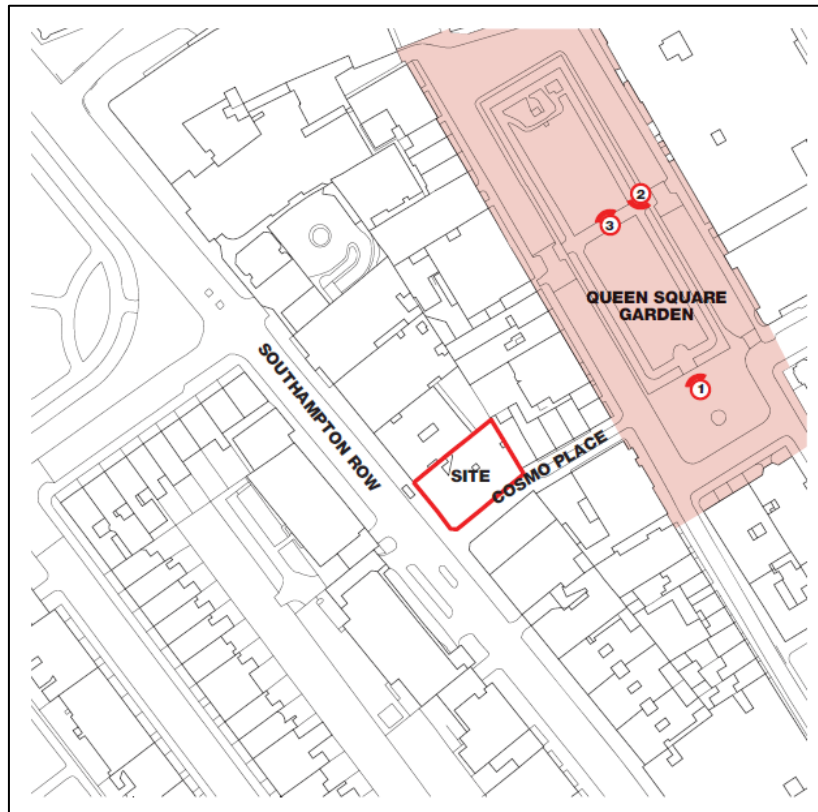
5.0 Summary

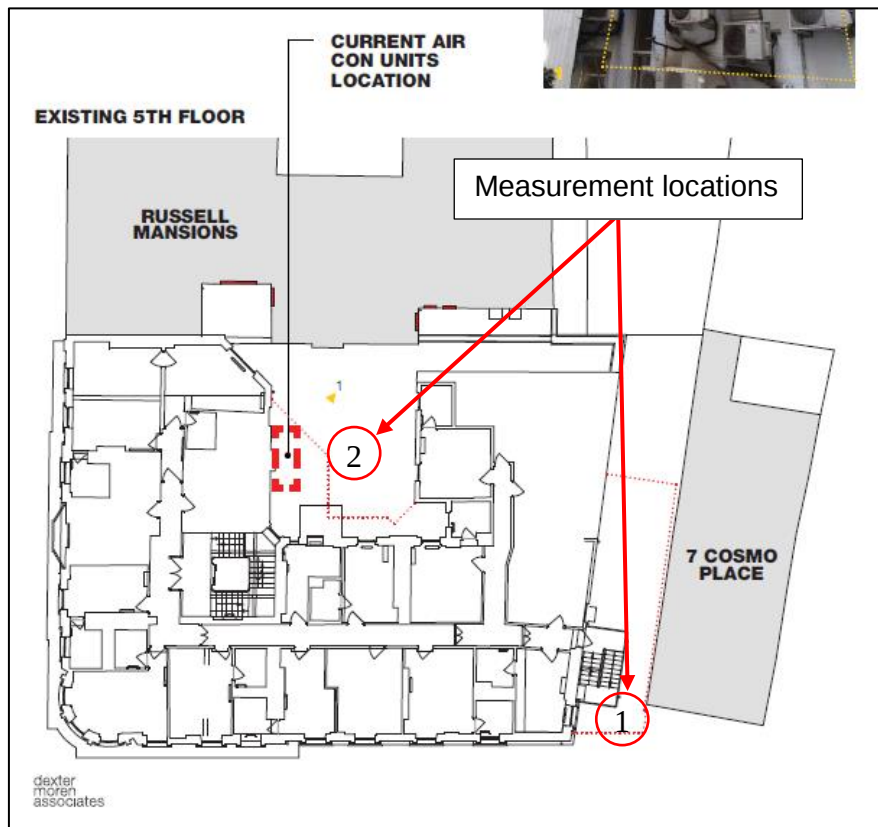
- 3.1 There is a proposal to extend the Mercure Hotel, Bloomsbury which includes the removal of some air cooled condensers at the boundary of the site and the installation of additional air cooled condensers in an enclosed lightwell.
- 3.2 A noise survey has been carried out to determine the typical background noise levels within the lightwell. The councils blanket “one size fits all” noise control criteria is based upon noise from the proposed mechanical services plant being controlled to at least 10 dB below existing background noise levels.
- 3.3 Camden Councils’ noise control criteria results in the design noise control limits, at 1m from the façade of Russell Mansions, as shown below.

Period	Design Noise Criteria
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 45 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 42 dB

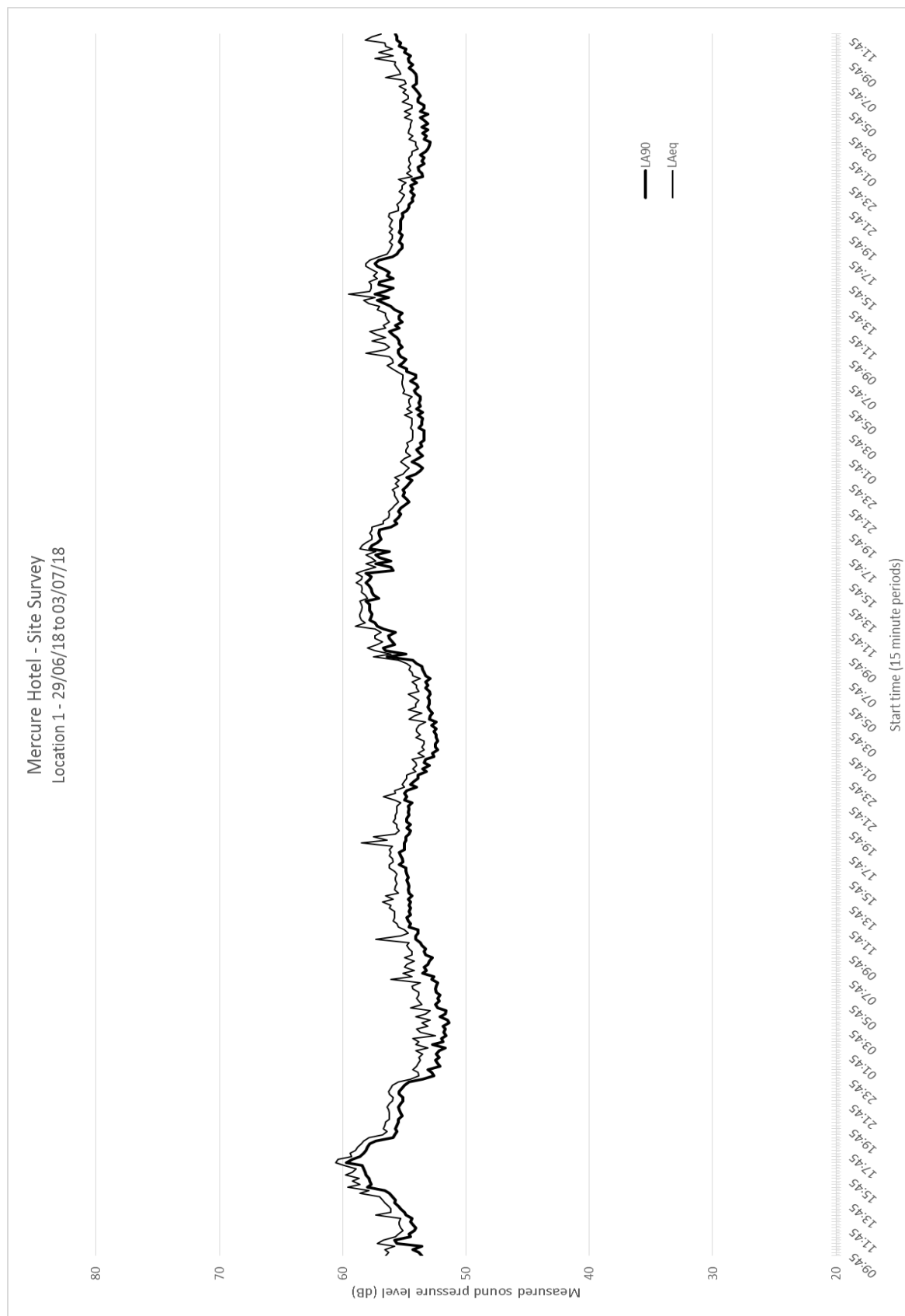
End of Note

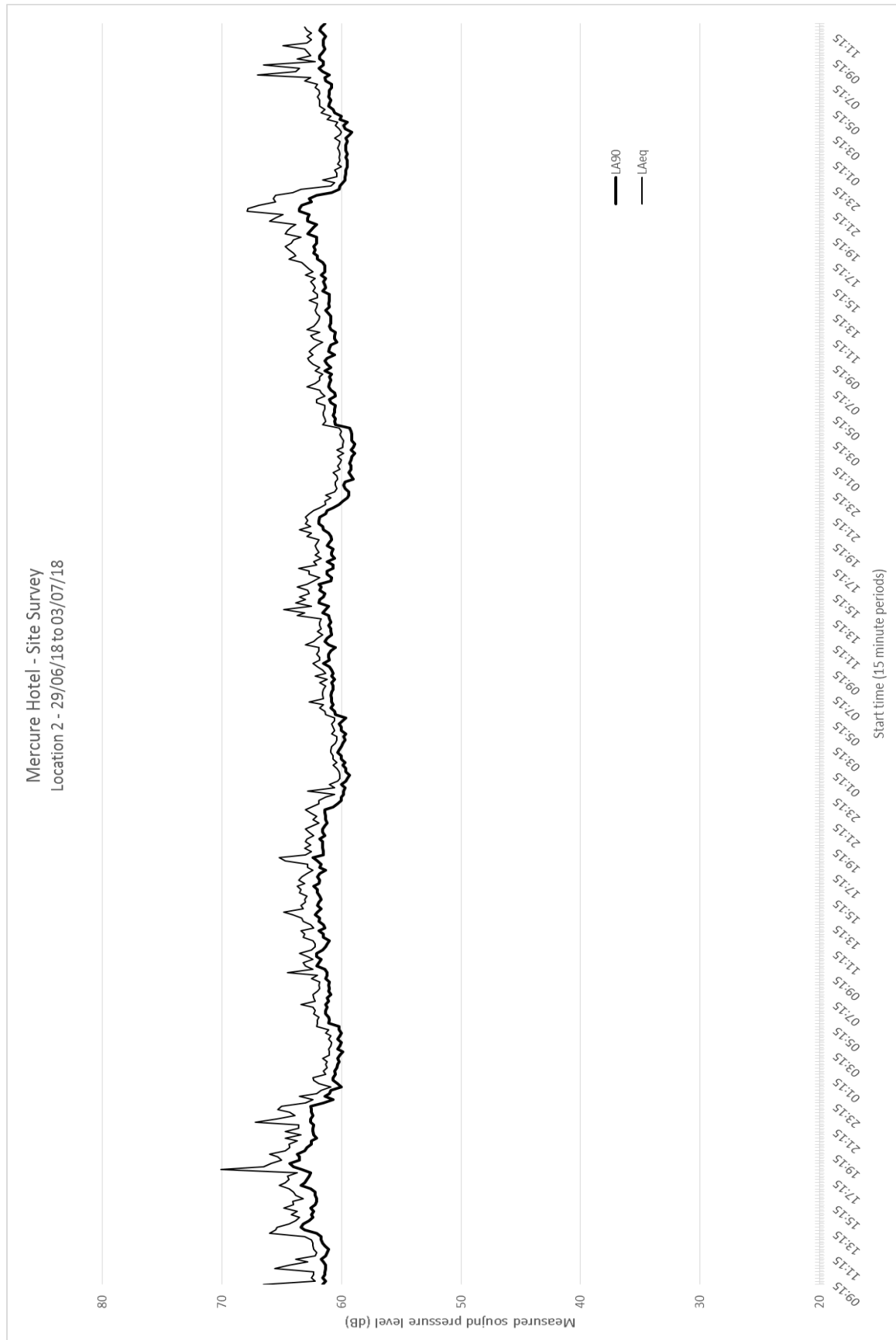
Figure 1: Site plan





Appendix 1: Survey Data





Appendix 2: Glossary of Terms

Term	Description	Explanation
	Noise	Unwanted sound. In the explanation given below the words 'sound' and 'noise' can often be used interchangeably, depending on context.
dB	The decibel scale	The decibel (or dB) scale is the scale on which sound pressure levels are commonly measured. It is a logarithmic scale and is used for convenience to compress the audible range of sound pressures into a manageable range, from 0 dB to 140 dB. The zero of the scale, 0 dB, corresponds to the threshold of hearing, 0.00002 Pa, and the upper limit, 140 dB, corresponds to 20 Pa, the threshold of pain.
	Sound pressure	Sound is a disturbance or fluctuation in air pressure, and sound pressure, measured in pascals (Pa), is used as a measure of the magnitude of the sound. The human ear can detect sound pressures in the range from 0.00002 Pa to 20 Pa. This is an enormously wide range and so for convenience sound pressures are commonly measured on a decibel (dB) scale.
Lp	Sound pressure level	Instantaneous value of Sound Pressure Level (Lp).
f	Frequency	The frequency of a musical note is what gives it its pitch. It is the number of cycles of the fluctuating sound pressure which occur each second, and is measured in cycles per second, or Hertz (Hz). The human ear can detect frequencies in the range 20 to 20 000 Hz. Most sounds and noises are a mixture of all frequencies, called broad-band noise.
	Octave bands Octave band spectra	In order to investigate the frequency content of broad band sounds, called its frequency spectrum, measurements of sound pressure are carried out over a range of frequency bands. The most common method is to split the audio frequency range into 8 or 9 octave bands. An octave is a frequency range from one particular frequency to double that frequency.
A	A-weighting	One of the three frequency weightings (A, C and Z) used in sound level meters, and defined in BS EN ISO 61672-1; a very widely used method of producing a single figure measure of a broad band noise which takes into account, in an approximate way at least, the frequency response of the human hearing system. The idea is that sound levels measured in this way should give an indication of the loudness of the sound.
L _A (dBA)	A- weighted sound pressure level	The value of the sound pressure level, in decibels, measured using an A-weighting electronic circuit built into the sound level meter. The vast majority of noise measurements are carried out in this way.
L _{Aeq,T}	Equivalent continuous sound level	It represents a measure of the 'average' sound level over the measurement period. It corresponds to the steady level of sound which, over the same period of time, T, would contain the same amount of (A-weighted) sound energy as the time varying noise. Also known as the Average sound level. This is the most common method of measuring time varying noise, and within certain limits gives the best correlation with human response to noise, for example with annoyance.

$L_{A90,T}$	Background noise level	Defined in BS 4142 as the value of the A-weighted residual noise at the assessment position that is exceeded for 90 % of a given time interval, T, (i.e. $L_{A90,T}$) measured using time weighting, F, and quoted to the nearest whole number of decibels. (Also see under residual noise). Background noise itself often varies with time and so the $L_{A90,T}$ is almost universally used as the best measure of the 'more or less always present' noise level which underlies short term variations from other sources of noise.
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