

ACOUSTIC DESIGN NOTE

Ref: 18209/ADN001/js

Date: 13th July 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 It must be noted that both within the lightwell and on the eastern boundary of the site both the ambient and background noise levels are controlled by the existing Mercure Hotel plant. It is therefore considered that a different approach should be taken with respect of this proposed development.
- 2.3 The plant currently located on the eastern boundary of the site overlooking Cosmo Place is to be removed when the east elevation extension is constructed. There will therefore be a reduction in noise levels at residential properties overlooking Cosmo Place adjacent to the hotel building.
- 2.4 All of the air cooled condensers are to be located within the lightwell, increasing the number of units over and above those which are already in place and which control the ambient and background noise levels at the façade of Russell Mansions.
- 2.5 It is therefore suggested that the noise control criterion should be that the levels of noise at 1m from the Russell Mansions façade should be **no worse** with the proposed new plant in place those which are currently present.

3.0 Noise Survey and Results

3.1 Aims

To assess the current levels of background and ambient 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. As commented in 2.5 above, it is suggested that the design intent should be to “**make no worse**” the noise levels at the façade with Russell Mansions.
- 4.2 The corrected ambient noise levels ($L_{Aeq,15min}$) measured over the three assessment periods at location 2 (the lightwell), corrected by 3 dB to take account of the difference in distance from the plant of the measurement location and the Russell Mansions façade, are shown in table 1 below;

Table 1 : Corrected ambient noise levels

Period	Ambient Noise Level
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 61 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 58 dB

- 4.3 To comply with a “make no worse” situation noise from the proposed plant should therefore be controlled to be no more than those shown in Table 1.
- 4.4 Given that the proposed plant is of the same type as already operates within the lightwell there should be no change in the character of the sound and consequently there is no requirement for a reduction in noise levels by 5 dB to take account of a change in character to the sound at Russell Mansions.

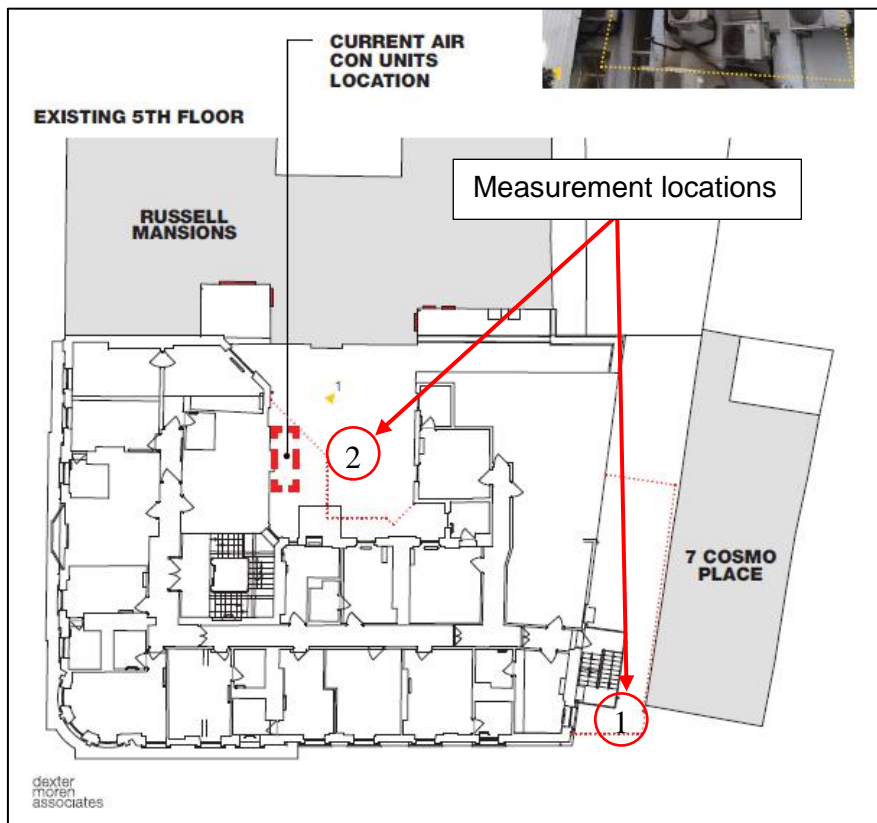
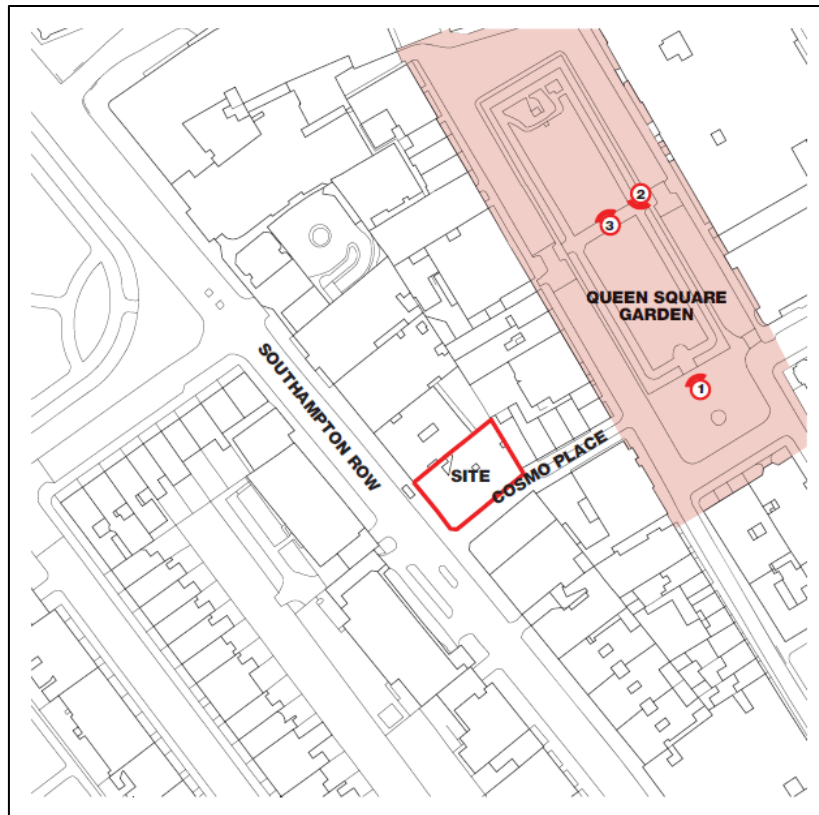
5.0 Summary

- 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 existing ambient and background noise levels at the boundary of the site and within the lightwell. It is proposed that the noise criteria for the plant should be one of making the ambient noise levels on the façade of Russell Mansions overlooking the lightwell no worse than are currently present.
- 3.3 Based upon the suggested “make no worse” criteria, and the intent of the Camden Councils’ noise policy, the noise criteria set out below are suggested with respect of plant noise at 1m from the façade of Russell Mansions.

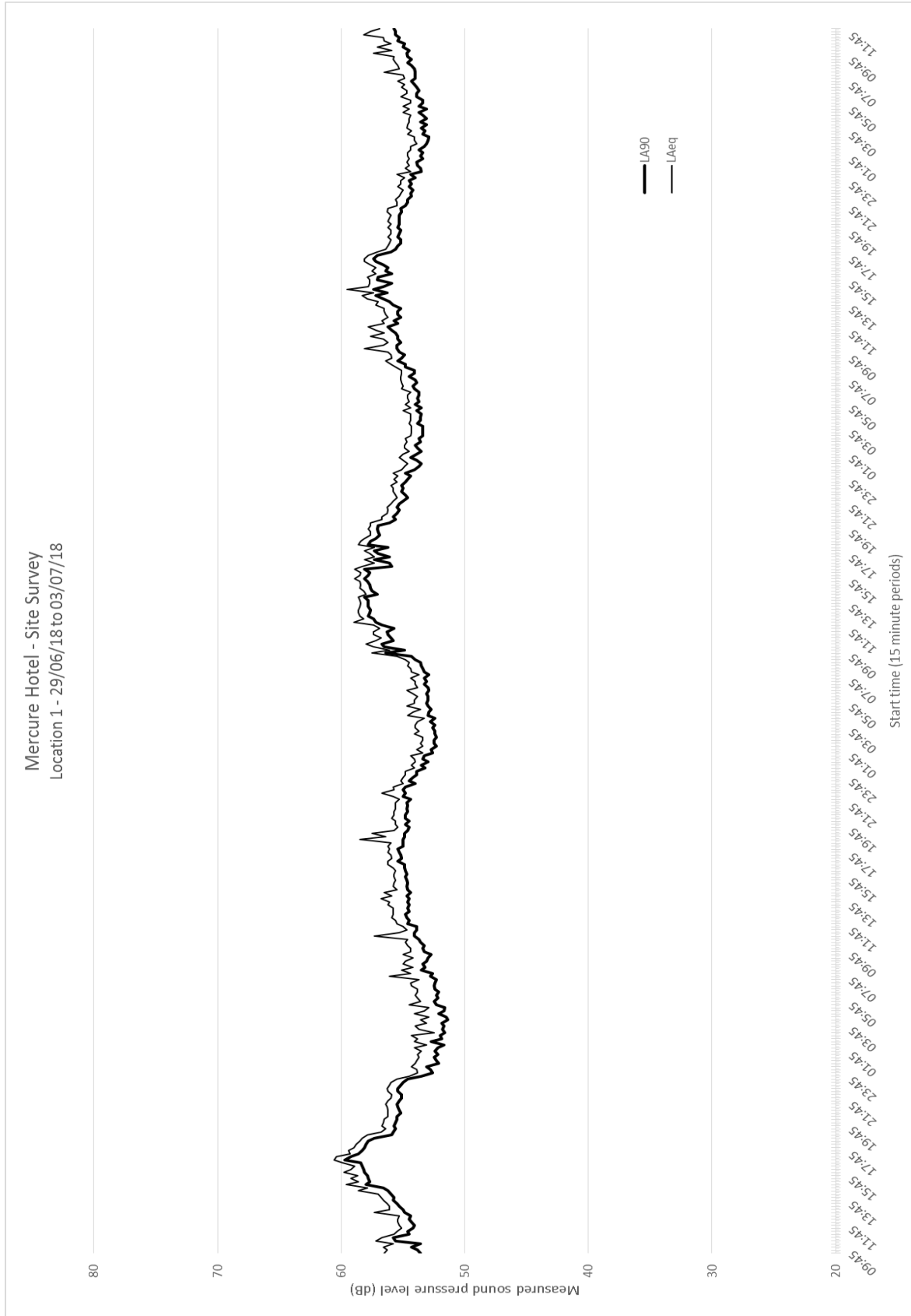
Period	Ambient Noise Level
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 61 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 58 dB

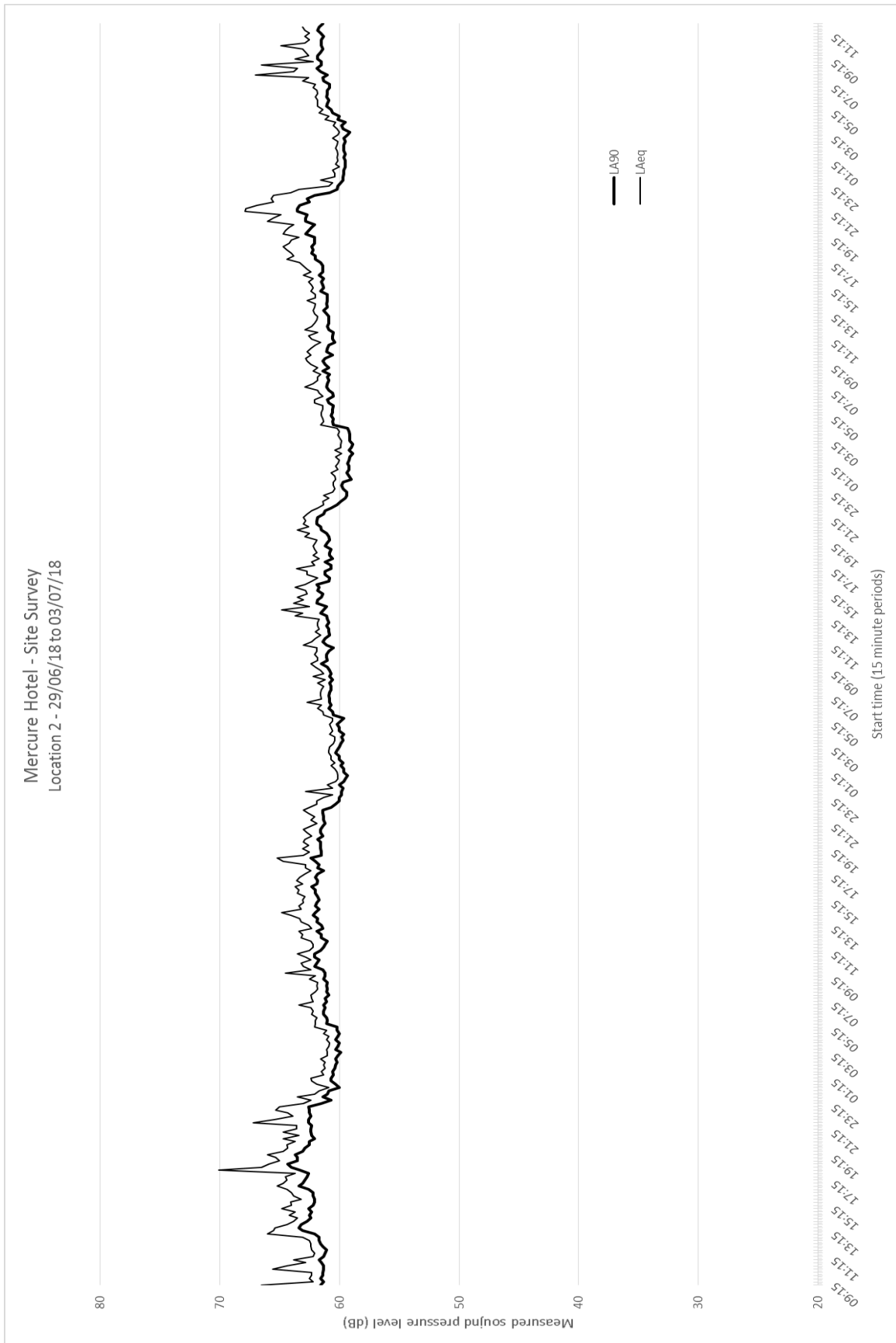
End of Note

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 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.

<p>$L_{A90,T}$</p>	<p>Background noise level</p>	<p>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.</p>
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