ARUP

338 Euston Road

Noise Assessment Report

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Appendices

1. Introduction

Arup has been appointed to provide an environmental noise assessment for planning purposes for the conversion of Levels 6-8 of 338 Euston Road from office space to laboratory space with associated new on-floor mechanical services equipment.

This report identifies the proposed noise sources associated with the proposed changes to the building and the nearest noise sensitive receptors, and provides noise emission limits from new mechanical equipment in line with Camden Borough Council's noise policy.

A noise survey has been conducted to determine the existing noise levels at the nearest noise sensitive receptors. These have been used to establish the plant noise limits to protect the sensitive receptors.

A glossary of acoustic terminology is presented in Appendix A.

2. The Site and Surroundings

The footprint of 338 Euston Street is outlined in red in Figure 1, along with the location of the nearest receptor and the noise survey locations.

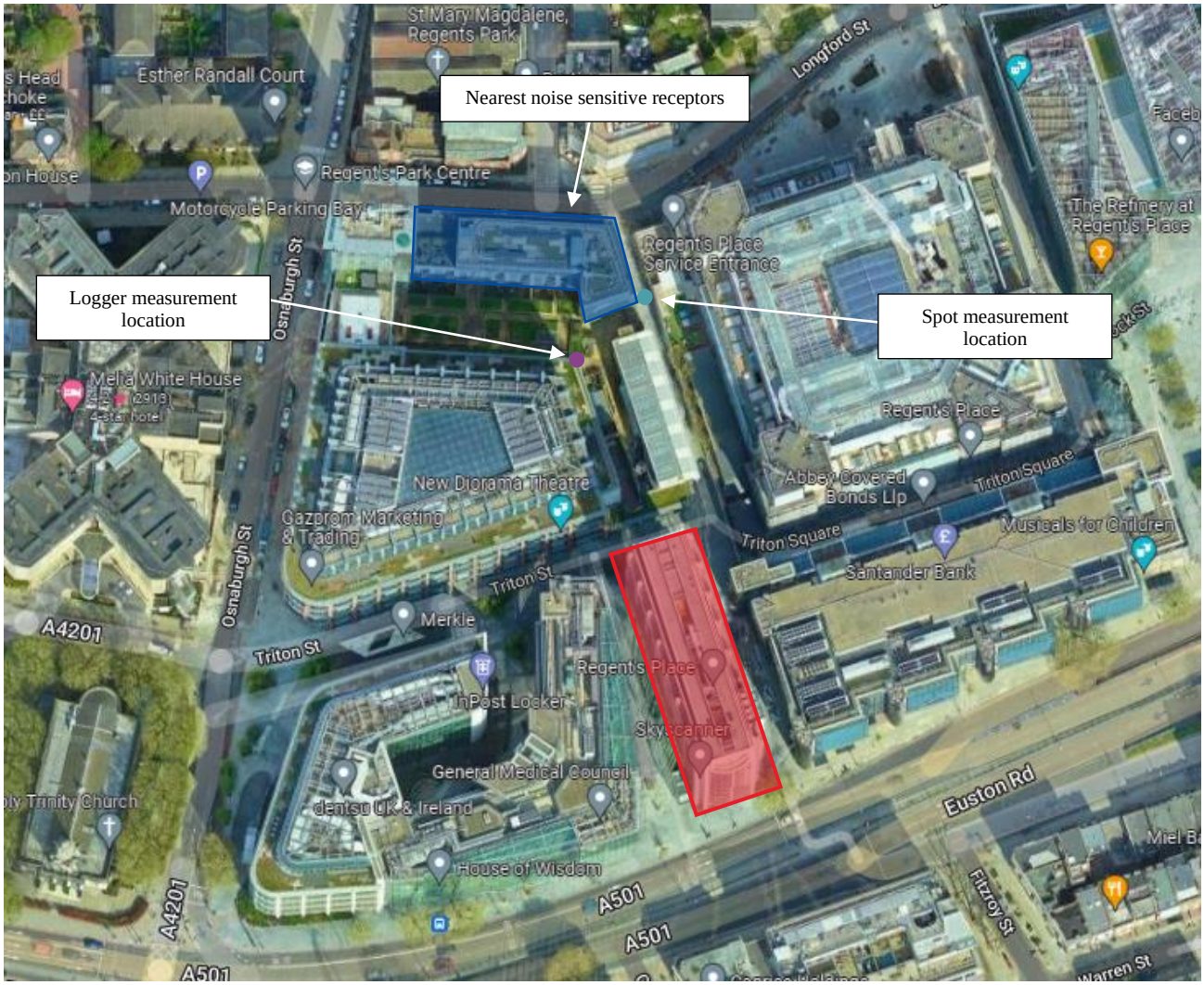

Figure 1: Site location plan

3. Noise Sensitive Receptors

The nearest noise sensitive receptors are the serviced apartments at 1 Osnaburgh Street.

The assessment of noise emission from plant has been carried out for the dwellings with windows facing south and 338 Euston Road. They are approximately 20 m from the noise monitoring location and 70 m from the closest façade of 338 Euston Road.

4. Potential Noise Sources

The following equipment is proposed for Level 6-8 of the building:

- 2 No. extract fans to each floor with louvres in the north façade of the building

The following images show the view of the nearest noise sensitive receptors from the existing Level 7 window in the north façade of the building as well as the proposed locations of the louvres on Levels 6-8.

Figure 2: View from Level 7 windows of 338 Euston Road facing north, showing sightline between the proposed louvre location and the nearest dwellings

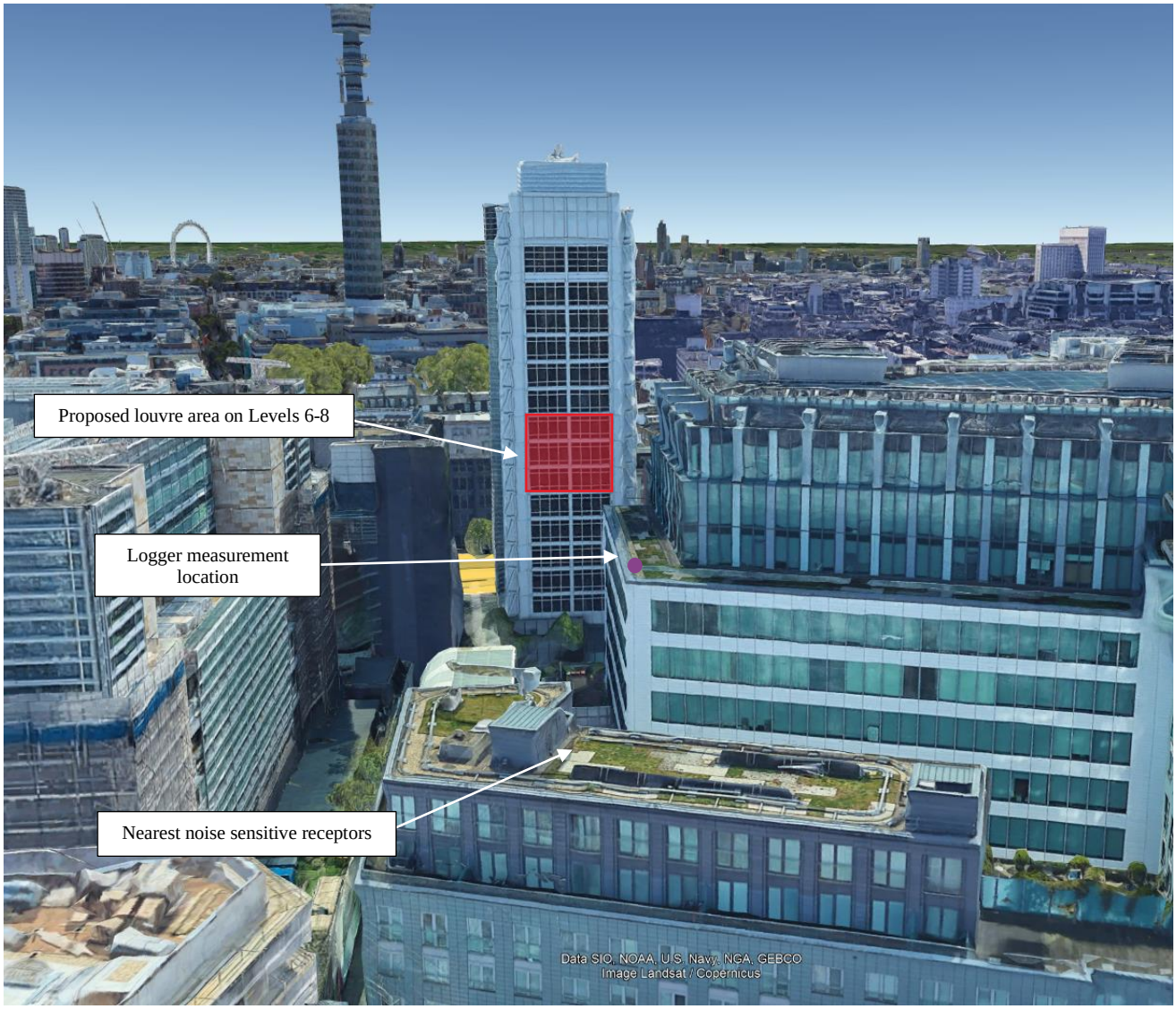

Figure 3: 3D Google Earth view of the rear of 338 Euston Road with proposed locations of plant and louvre shown

5. Baseline Noise Survey

A baseline noise survey has been undertaken to determine the existing noise climate around the building.

5.1 Aims

The purpose of the environmental noise survey is to measure the typical noise levels during the daytime and night-time at a location representative of the nearest noise sensitive receptors. This will help to determine noise limits for the proposed noise emitting equipment associated with the building.

To achieve this aim, an unattended noise monitor was deployed on the terrace of 20 Triton Street overlooking a private residential area off Triton Square. This was representative of the nearest residential properties to the north as it is at a similar level with the same distance and exposure to the nearby roads that are the dominant noise source.

A spot measurement was also taken to compare the noise levels at the logger position to another position at street level.

5.2 Dates, Times and Personnel

The noise monitor was installed by Nastassia Somikava MIOA and Grace Lampkin AMIOA of Arup.

The noise survey was conducted between 14:30 on Monday 11 April 2022 and 11:30 on Thursday 14 April 2022.

Weather conditions were dry and considered appropriate for an environmental noise survey.

5.3 Measurement Location

The noise monitor was installed on the northeast corner of the Level 7 terrace of 20 Triton Street, approximately level with the highest residential dwellings opposite.

The measurement location is shown in purple in Figure 1. Photos of the noise monitor in place are shown below.

Figure 4: Unattended noise monitor on 20 Triton Street terrace

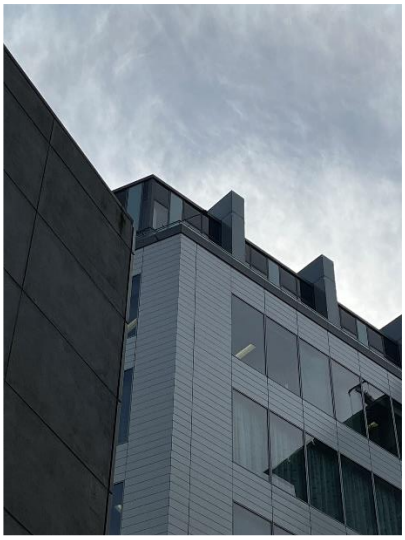

Figure 5: Unattended noise monitor viewed from Triton Square

Noise was dominated by road traffic on Euston Road. Occasional noise from construction work on Triton Square and Triton Street was also audible and we assume this only took place during normal construction hours.

5.4 Equipment and Methodology

For both measurement locations, statistical noise levels were recorded, storing L_{Aeq}, L_{A10}, L_{A90} and L_{Amax} indices. Octave band frequency spectra were also recorded.

All measurements during the survey were made over a 15-minute period in accordance with BS4142.

Measurements were carried out using the equipment detailed in Table 1. The sound level meter and microphone are Type 1 conforming to BS EN 61672-1: 2003. The sound level meter and microphone were calibrated before and after use, to confirm that there was no significant drift in meter response at the calibrator frequency and level. This verification indicated that there was no more than a 0.1 dB variation between checks. The meter is annually calibrated and this calibration is traceable to international standards. All measurements were made with A-weighting and fast (0.125 s) time constant.

Manufacturer	Type Number	Instrumentation
Logging kit		
Rion	NC-74	Sound Pressure Level Calibrator
Rion	NL-52	Sound Level Meter
Rion	UC-59	½" Microphone
Rion	NH-25	Preamplifier
Spot measurements kit		
B&K	2250	Sound Level Meter
B&K	4189	Microphone
B&K	4231	Sound Pressure Level Calibrator
B&K	ZC-0032	Preamplifier

Table 1: Noise survey measurement equipment

5.5 Results

A times trace of the measured L_{A90} is given in Figure 6 below.

Periods during which public realm "noisy works" were taking place on Triton Square and Triton Street are highlighted, as confirmed with the on-site contractor. This activity does not affect the overall background noise levels as determined below.

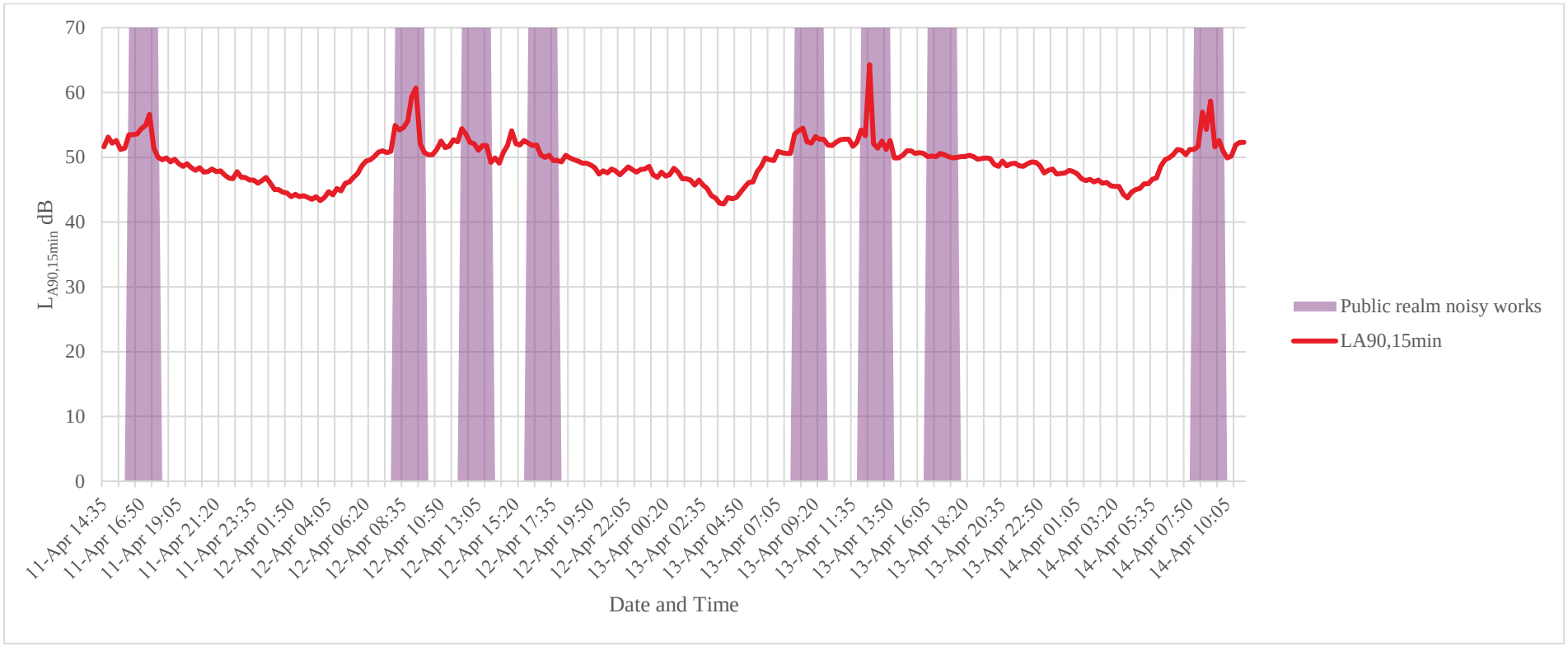

Figure 6: Time trace of measured background noise with time

The measured noise levels during the day (07:00 – 23:00) were between 49 and 74 $dBL_{Aeq,15min}$.

The measured noise levels during the night (23:00 – 07:00) were between 47 and 58 $dBL_{Aeq,15min}$.

A manned spot measurement was also carried out on Monday 11 April 2022 simultaneously to the logged 15 minute measurements. The measurement position is shown in Figure 7 and the results are shown in Table 2. These show that the noise logger measurements are representative of the nearest dwellings at street level.

Figure 7: Measurement locations

Time	Location of spot measurement	Measured background noise level, L_{A90}	
		Logger	Attended
15:20 – 15:35	A (street level)	53	52

Table 2: LA90 noise levels measured simultaneously by the logger (on Level 7 terrace) and by attended spot measurements

The background sound level is established in accordance with BS4142 using statistical analysis to determine values that are representative for the whole assessment period as below.

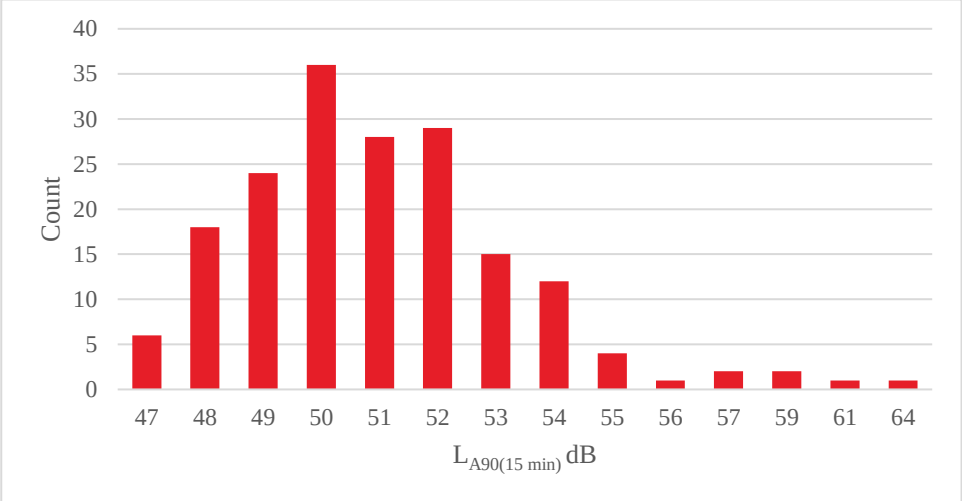

Figure 8: Statistical analysis of daytime background sound level

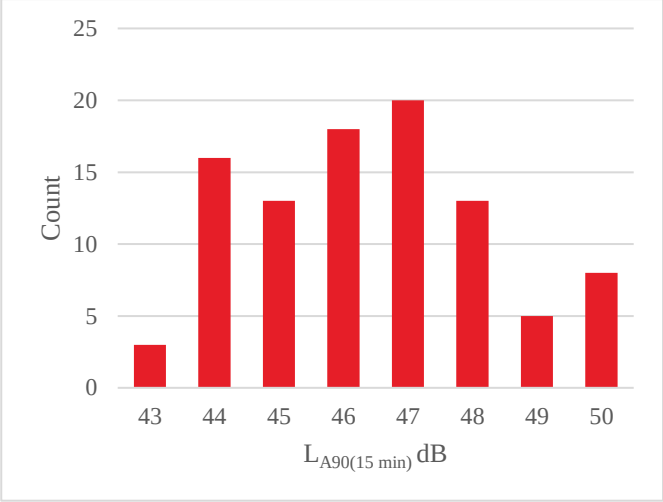

Figure 9: Statistical analysis of night-time background sound level

The resulting daytime and night-time background noise levels are presented below.

Time	**Measured background noise level, L_{A90}**
Daytime (07:00 – 23:00)	50
Night-time (23:00 – 07:00)	47

Table 3: Measured daytime and night-time background noise levels

6. Noise Emission Requirements

6.1 Design Criteria

The following information has been published by Camden Council with regards to maximum noise levels from building plant:

"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 (15 dB if tonal components are present) should be considered as the design criterion."

Based on this advice, the (non-tonal) rating level limit for the proposed building plant are presented in Table 4.

Time	**Rating level limit, L_{Aeq} dB**
Daytime (07:00 – 23:00)	40
Night-time (23:00 – 07:00)	37

Table 4: Daytime and night-time rating level limits

If the audible noise from the selected equipment is tonal or in any other way attention-catching, the criteria in Table 4 will reduce by 5 dB.

6.2 Plant noise assessment

The project is currently at Stage 2 and equipment selection is still in progress.

Based on the initial selections as described in Section 4, it is anticipated that the rating level can be achieved with conventional noise control measures such as attenuators and/or acoustic louvres, and Camden's noise policy complied with.

7. Conclusions

This report has identified the noise sources associated with the building, the nearest noise sensitive receptors and provides an assessment of noise at the sensitive receptors.

A noise survey has been conducted to determine the existing noise levels around the building. These have been used to establish plant noise limits in line with the local authority requirements to protect nearby noise sensitive receivers.

With appropriate noise control measures, it is expected that these levels can be met.

Appendix A

A.1 Acoustic Terminology

Decibel (dB)

The ratio of sound pressures which we can hear is a ratio of 106:1 (one million:one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

dBLA

The unit used to define a weighted sound level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz.

In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Equivalent continuous sound level

An index for assessment for overall noise exposure is the equivalent continuous sound level, Leq. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.

Frequency

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.

Sound power level

The sound power level (L_w) of a source is a measure of the total acoustic power radiated by a source. The sound power level is an intrinsic characteristic of a source (analogous to its volume or mass), which is not affected by the environment within which the source is located.

Sound pressure level

The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound.

The sound pressure level (Lp) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2×10^{-5}Pa (the threshold of hearing).

Thus L_p (dB) = 10 log $(P1/Pref)^2$ where Pref, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa).

The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Statistical noise levels

For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L10, the level exceeded for 10% of the time period under consideration, and can be used for the assessment of road traffic noise (note that L_{Aeq} is used in BS 8233 for assessing traffic noise). The L90, the level exceeded for 90% of the time, has been adopted to represent the background noise level. The L1, the level exceeded for 1% of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T) is normally included, e.g. $dBL_{A10, 5min}$ or $dBL_{A90, 8hr}$.