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45 HOLMES ROAD,
KENTISH TOWN, LONDON

NOISE EXPOSURE ASSESSMENT

Report **8822-NEA-01 RevA**

Prepared on 24 April 2015

Issued For

Tiuta Properties Limited

Unit 17 Spectrum House

32-34 Gordon House Road

Kentish Town

London

NW5 1LP

committed to CSCS Platinum award

ISO 17025

ISO 9001

Institute of Acoustics sponsoring organisation

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Tiuta Properties Limited, Unit 17 Spectrum House, 32-34 Gordon House Road, Kentish Town, London NW5 1LP to assess the suitability of the site at 45 Holmes Road, Kentish Town, London NW5 for residential development in accordance with the National Planning Policy Framework published on 27 March 2012 (replacing Planning Policy Guidance 24).

This report presents the results of the environmental noise surveys undertaken in order to measure prevailing background levels and outlines any necessary mitigation measures.

2.0 SITE DESCRIPTION

The proposed development site is an existing commercial building, bounded by existing commercial and residential properties to all directions.

Current proposals are to provide 8 residential flats above existing commercial space at ground floor level. Residential flats will be across 1st, 2nd and 3rd floors.

The main noise sources associated with the proposed dwellings will be from traffic noise from surrounding roads and noise from nearby commercial premises.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

Noise surveys were undertaken at two positions on the proposed site as shown in Figure 8822-SP1. These locations were chosen in order to collect data representative of the worst case levels expected due to all nearby noise sources.

Continuous automated monitoring was undertaken for the duration of the surveys between 11:30 on 10 December and 12:50 on 12 December 2013.

Noise levels at the monitoring position were dominated by road traffic noise from surrounding roads and noise from commercial activity.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise.

The measurement procedures generally complied with BS7445:1991 "*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*".

3.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 2 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 RESULTS

4.1 Environmental Noise Surveys

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured throughout the duration of the survey.

Measured levels are shown as time histories in Figures 8822-TH1-2.

	Ambient Noise Level $L_{Aeq,T}$	Typical Maximum Noise Level L_{Amax}
LOCATION 1 – NORTH/EAST OF SITE		
Daytime [07:00 - 23:00]	54 dB(A)	-
Night-time [23:00 - 07:00]	46 dB(A)	60 dB(A)
LOCATION 2 – SOUTH/WEST OF SITE		
Daytime [07:00 - 23:00]	57 dB(A)	-
Night-time [23:00 - 07:00]	45 dB(A)	57 dB(A)

Table 4.1: Site average noise levels for daytime and night time

The levels presented in Table 4.1 are commensurate with those expected for a quiet urban location. Provided adequate mitigation measures are put in place during the design and construction phase

of a development, recommended internal noise levels can be achieved. Outline mitigation measures are described in Section 5 of this report.

Maximum noise levels shown in Table 4.1 are deemed to be 'not normally exceeded' as required for maximum internal noise level specification purposes (described in Section 5.0).

5.0 NOISE EXPOSURE ASSESSMENT

5.1 Internal Noise Criteria

BS8233:2014 "*Sound insulation and noise reduction for buildings*" describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 5.1.

Activity	Location	Design range $L_{Aeq,T}$ dB	
		Daytime (07:00-23:00)	Night-time (23:00-07:00)
Resting	Living Room	35 dB(A)	-
Dining	Dining Room/Area	40 dB(A)	-
Sleeping	Bedroom	35 dB(A)	30 dB(A)

Table 5.1: BS8233 recommended internal background noise levels

The latest revision of the document does not include a recommended maximum internal noise level. However, in order to provide a suitably robust assessment, the guidance of the previous document (1999 revision) will be used, which is based on WHO recommendations.

BS8233:1999 states that for reasonable standards in a bedroom at night, individual noise events should not normally exceed a maximum noise level L_{Amax} of 45 dB(A).

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

5.2 External Building Fabric - Non Glazed Elements

It is currently assumed that the non-glazed external building fabric elements of the proposed development would be comprised of blockwork. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality double-glazed window configuration, as shown in Section 5.3.

All non-glazed elements of the building facades have been assumed to provide a sound reduction performance of at least the figures shown in Table 5.2 when tested in accordance with BS EN ISO, 140-3:1995.

Element	Octave band centre frequency SRI, dB					
	125	250	500	1k	2k	4k
Non glazed element SRI	41	43	48	50	55	55

Table 5.2 Non-glazed elements assumed sound reduction performance

5.3 External Building Fabric - Specification of Glazed Units

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to achieve recommended internal noise levels shown in Table 5.1, taking into account average and maximum noise levels monitored during the environmental noise survey.

As measured noise levels are similar across the site, worst case measured noise data has been used for all building facades.

For calculations, a bedroom on the first floor with a high ratio of glazing to masonry has been modelled. The specification presents the most robust assessment for BS8233:2014 criteria for internal noise levels in a bedroom.

As a more robust assessment, L_{Amax} spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB L_{Amax} for individual events, as specified in BS8233:1999.

The minimum sound reduction index (SRI) values required for all glazed elements to be installed are as shown in Table 5.3. The performances are specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents.

Sole glass performance data would not necessarily demonstrate compliance with this specification.

Glazing Type	Required Overall Sound Reduction Performance R_w	Glazing Type - *Indicative Only*
Type A [All Facades]	31 dB	31 dB R_w Double Glazing System [*eg 4mm glass / 12mm air / 4mm glass*] Acoustic Trickle Ventilator [*Required Performance 38dB $D_{n,e,w}$*]

Table 5.3 Required glazing performances

All major building elements should be tested in accordance with BS EN ISO 140-3:1995. No further mitigation measures would be required to achieve good internal noise levels.

6.0 PRELIMINARY NOISE IMPACT ASSESSMENT

Further to the above assessment, the results from the environmental noise surveys can be used to set noise emission criteria for any proposed plant units associated with the new build development.

6.1 Background Noise Measurements

Minimum background noise levels are shown in Table 6.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)	
	LOCATION 1	LOCATION 2
Daytime [*07:00 - 23:00*]	40	41
Night-time [*23:00 - 07:00*]	35	35

Table 6.1: Minimum background noise levels

6.2 Noise Criteria

The London Borough of Camden's general criterion for noise emissions of new plant installations is as follows:

> *"Design measures should be taken to ensure that specific plant noise levels at a point 1 metre external to sensitive façades are at least 5dB(A) less than the existing background measurement (L_{A90}) when the equipment is in operation. Where it is anticipated that equipment will have a noise that has distinguishable, discrete continuous note[...], special attention should be given to reducing the noise at any sensitive façade by at least 10dB(A) below the L_{A90} level."*

We therefore propose to set the noise criteria as shown in Table 6.2 in order to comply with the above requirements.

	Proposed Noise Emissions Criteria [*10 dB Below Minimum Measured Background Noise $L_{A90,5mins}$*]	
	LOCATION 1	LOCATION 2
Daytime [*07:00 - 23:00*]	30	31
Night-time [*23:00 - 07:00*]	25	25

Table 6.2: Proposed noise emissions criteria

6.3 Discussion

It is understood that there are a number of residential receivers within the vicinity of the proposed development.

Once more is known of the proposed plant installation and receiver locations are finalised, detailed calculations will be undertaken in order to demonstrate compliance with the requirements of the Local Authority. Calculations will take into account any mitigation measures that are deemed necessary based on the selected plant units.

7.0 CONCLUSION

Environmental noise surveys have been undertaken at the site at 45 Holmes Road, Kentish Town, London NW5.

Measured noise levels have allowed an assessment of the level of exposure to noise of the proposed development site to be made.

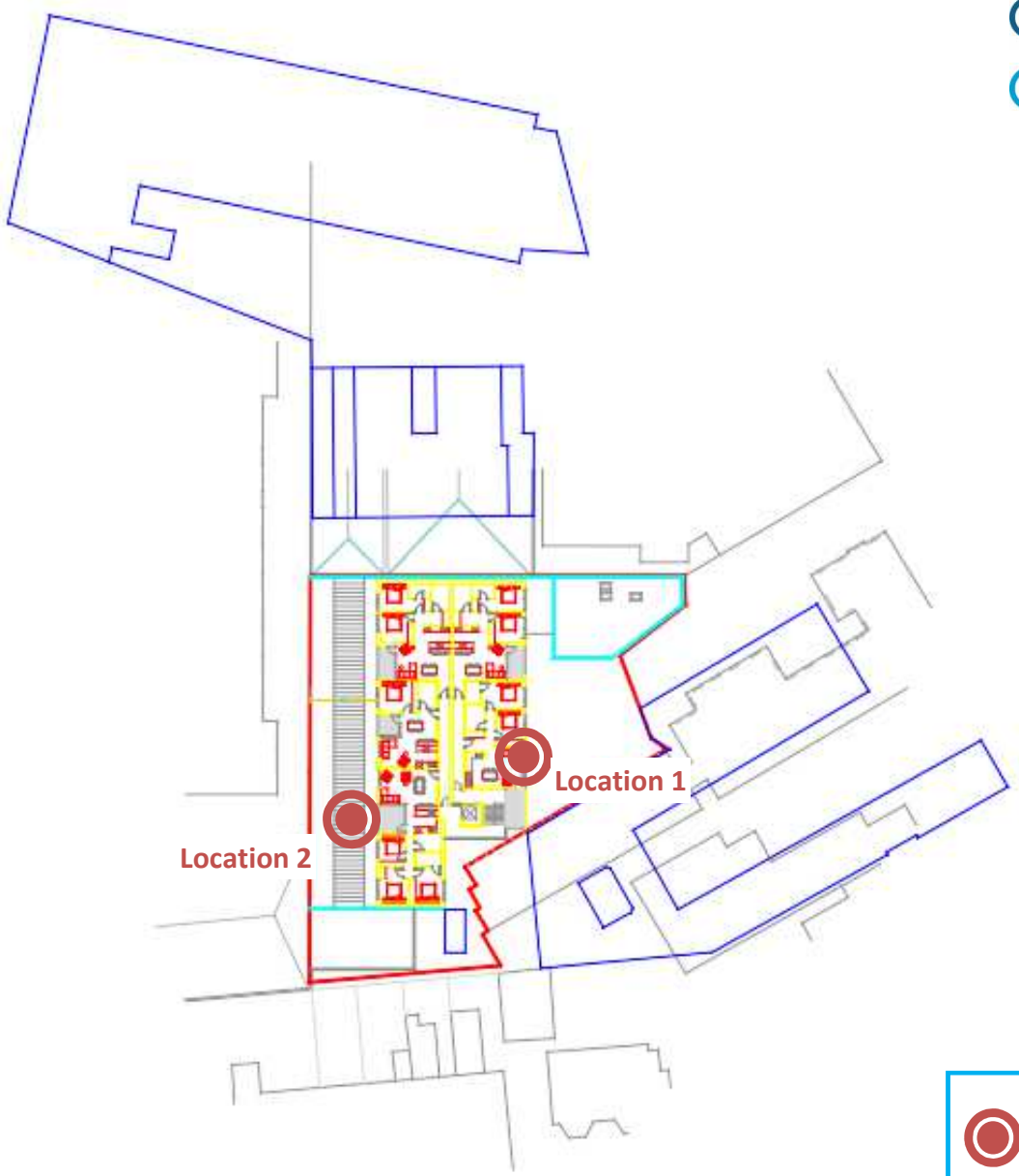
Outline mitigation measures including a glazing specification and acoustic trickle vents have been recommended and should be sufficient to achieve good internal noise levels for the proposed development according to BS8233:2014.

The results of the survey have enabled criteria to be set for noise emissions from the proposed plant installation in order to protect the amenity of noise sensitive premises.

These findings can be used in the future for undertaking a noise impact assessment for any proposed plant installations in agreement with the planning requirements of the Local Authority.

Further calculations will be undertaken once more is known of the proposed plant installation.

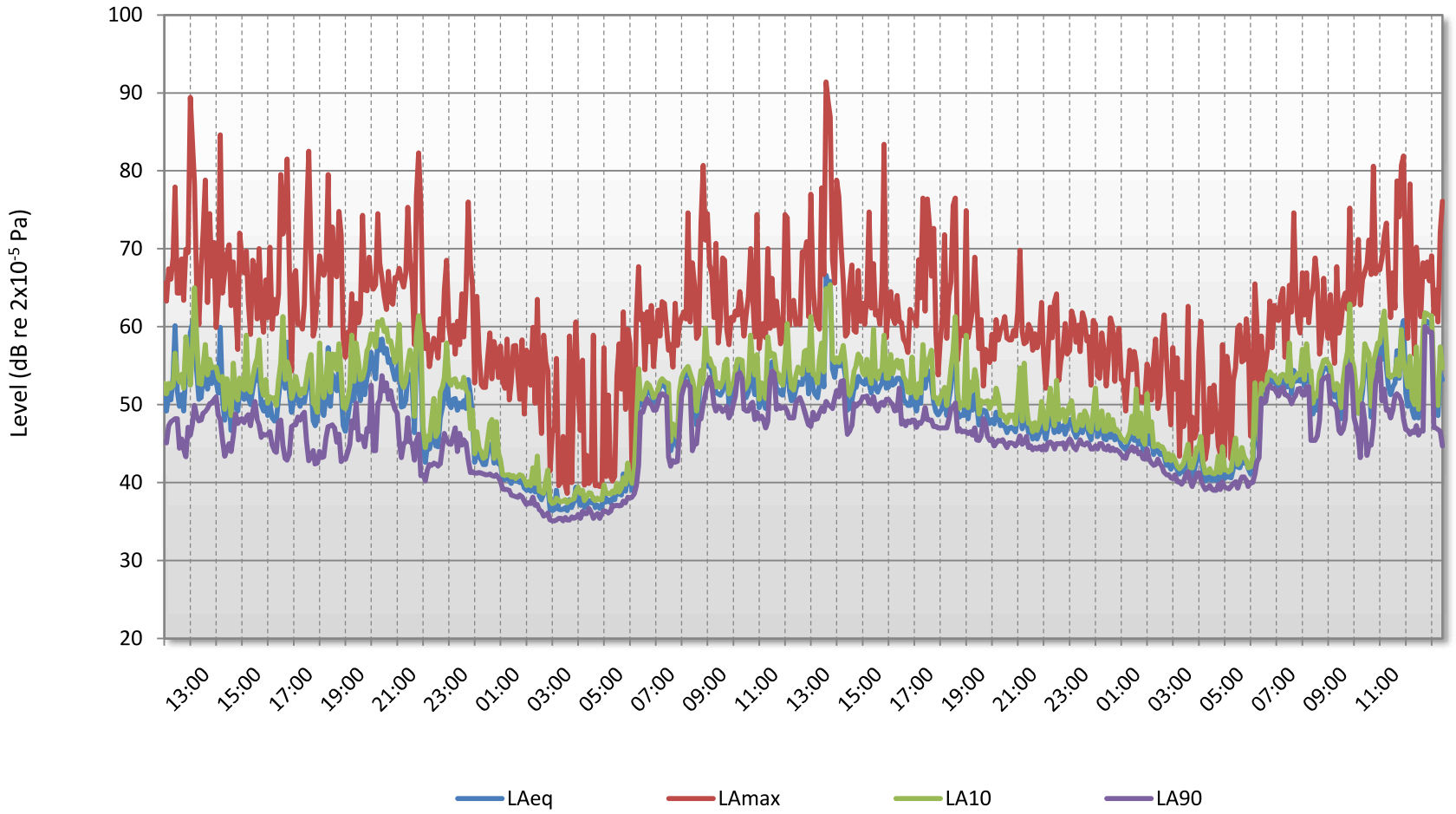
Report by	Checked by
Duncan Martin MIOA	**Florian Clement MIOA**



8822-SP1 Indicative site plan showing noise monitoring positions **Date:** 24 April 2015

45 HOLMES ROAD, KENTISH TOWN, LONDON [*Location 1*]

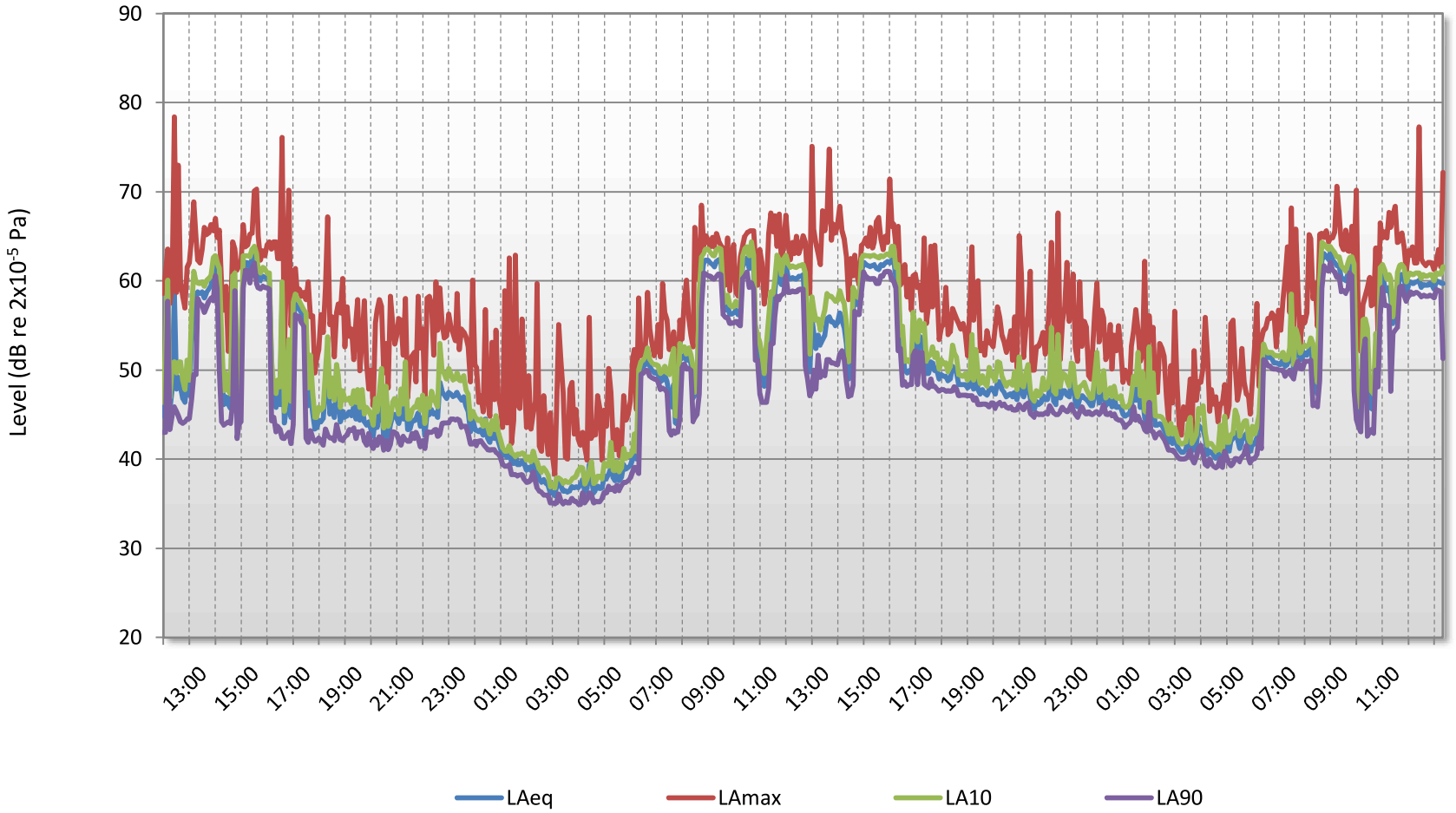
Environmental Noise Time History
10 December to 12 December 2013



8822-TH1

45 HOLMES ROAD, KENTISH TOWN, LONDON [*Location 2*]

Environmental Noise Time History
10 December to 12 December 2013



8822-TH2

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.