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Noise Impact Assessment

Project Number
18865

Issued For
Urban & Provincial

EXECUTIVE SUMMARY

This noise impact assessment has been undertaken in order to assess a proposed change of use from SUI Generis formed of an electricity undertaker's depot to a dual use of Class B8 and SUI Generis retaining the existing electricity undertaker's depot.

A background noise survey has been undertaken as detailed in the report, in order to determine an appropriate noise emission criterion, in accordance with the requirements of the London Borough of Bromley.

Calculations were undertaken for the nearest receiver, identified as the rear facade of the residential properties on Clock House Road. It should be noted that if there are closer receivers that Clement Acoustics is not aware of, a reassessment will be necessary, and this should therefore be confirmed by the Client.

It has been demonstrated that the change of use will comply with the established criterion, provided the site is only operational between 06:30 and 18:30 and the predicted noise emissions are in line with the on-site noise emissions for the proposed use.

If there is any deviation from the above, Clement Acoustics must be informed, in order to establish whether a reassessment is necessary.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment.

This report is designed to be suitable to discharge noise related planning conditions, as per our original scope of work.

CONTENTS

LIST OF ATTACHMENTS

18865-SP1 & SP2	Indicative Site Plans
18865-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology

Issue	Date of Issue	Author	Reviewed	Authorised
RevB	12/03/24	**Cian Grunfeld** Acoustic Consultant MSc AMIOA	**Andrew Thomas** Principal Consultant BSc (Hons) MIOA	**Duncan Martin** Director BSc (Hons) MIOA

Issue	Comment
0	First Issue
RevA	Noise data from survey of scaffolding site
RevB	Relocation of loading area

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Urban & Provincial to undertake an assessment of the proposed open storage (Class B8) site at Churchfields Road, Beckenham.

Measured noise levels have been used to determine noise emissions criteria for the proposed change of use in agreement with the planning requirements of the London Borough of Bromley.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

An acoustic terminology glossary is provided in Appendix A.

2.0 SITE DESCRIPTION

The site is located in an industrial area accessible from Churchfields Road. The site is bound to the east by a railway line. To west of the site is Churchfields Road Reuse and Recycling Centre. To the north and south are public recreational fields.

Current proposals are a change of use from SUI Generis formed of an electricity undertaker's depot to a dual use of Class B8 and SUI Generis retaining the existing electricity undertaker's depot. It is understood that the site will have operational hours of 06:30 to 18:30 as a worst case.

The residential dwellings to the south-east, beyond the railway line have been identified as the nearest affected receivers. These nearest noise sensitive receivers were identified through observations on-site. If there are any receivers closer than those identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receiver should be confirmed by the client before the site becomes operational or any noise mitigation measures are implemented.

Locations are shown in attached site plan 18865-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 18865-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receiver.

The microphone was mounted onto a fence at the southern corner of the site approximately 2.5 m above ground level. This position was considered to be free-field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore not been applied.

Continuous automated monitoring was undertaken for the duration of the survey between 10:50 on 16 January 2024 and 10:55 on 18 January 2024.

The measurement procedure generally complied with BS 7445: 1991: 'Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use'.

3.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment the weather conditions were good with low wind speed and no rain. It is understood that the weather conditions during the unattended survey remained dry with low wind.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

3.3 Attended Noise Survey Procedure

Noise levels were measured at Masons Scaffolding yard in Southwark during truck loading/unloading on 28 February 2024. Measurements were undertaken at two positions as shown on indicative site drawing 18865-SP2.

At both positions the microphone was mounted to a tripod approximately 1.2 m above ground level. MP1 was on the eastern edge of the truck loading area approximately 5 m from a truck being loaded. MP2 was on the western edge of the storage area where forklifts were stacking equipment. Both positions were considered to be free-field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore not been applied.

The measurement procedure generally complied with BS 7445: 1991: 'Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use'.

3.4 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 971 Class 1 Sound Level Meter
- Svantek Type SV33B Class 1 Calibrator

4.0 RESULTS

4.1 Unattended Noise Survey Results

The $L_{Aeq:\,5min}$, $L_{Amax:\,5min}$, $L_{A10:\,5min}$ and $L_{A90:\,5min}$ acoustic parameters were measured at the location shown in site drawing 18865-SP1.

Measured noise levels are shown as a time history in Figure 18865-TH1, with average ambient and typical background noise levels summarised in Table 4.1.

It should be noted that the guidance of the latest revision of British Standard 4142: 2014 +A1 2019 *'Methods for rating and assessing industrial and commercial sound'* [BS 4142], as detailed in Section 8.1 of the standard is as follows:

> *'The objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.'*

Therefore, the typical background noise level will be used for the purpose of this assessment.

Position	Time Period	Average ambient noise level $L_{Aeq:\,T}$, dB	Typical background noise level $L_{A90:\,5min}$, dB
1	Daytime (07:00 - 23:00)	56	42
	Night-time (23:00 - 07:00)	51	30
	Proposed Operational Hours (06:30 – 18:30)	56	42

Table 4.1 Average ambient and typical background noise levels

4.2 Attended Noise Survey Results

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured at the locations shown in site drawing 18865-SP2.

Position	Time Period	Ambient noise level $L_{Aeq:\ T}$, dB	Background noise level $L_{A90:\ 15min}$, dB
1	15:30-15:45 (No truck)	62	53
	16:39-16:54 (Truck Loading)	67	51
2	15:37-15:42 (Inactive)	60	54
	16:58-17:07 (Active)	67	52

Table 4.2 Measured ambient and background noise levels

The noise impact from the forklifts piling at Position 2 is the most significant, thus this noise level and spectrum will be used to inform this assessment.

5.0 NOISE CRITERIA

5.1 Relevant Local Policy

The assessment and recommendations in this report have been undertaken in accordance with Policy D14 of the London Plan 2021, which contains the following relevant sections:

> *"D14. In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:*
>
> *5) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses".*

5.2 Proposed Criteria

For the breakout of industrial noise from the proposed use, an assessment according to the guidance of BS 4142 is considered appropriate.

In a BS 4142 assessment, corrections are applied to noise levels in order to calculate a noise rating level for the effects of proposed activities on nearby noise sensitive receivers. This calculated receiver noise level is compared with the typical measured background noise level.

BS 4142 recommends penalties that can be applied to noise emissions to account for tonality and intermittency. Where a sound source is neither tonal nor impulsive, but is still distinctive against the residual acoustic environment, a penalty may still be applied.

The available penalties for different characteristics are summarised in Table 5.1 overleaf.

Characteristic	Comments	Maximum Penalty
Tonality	Can be converted to 2 dB for a tone which is just perceptible, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible	6 dB
Impulsivity	Can be converted to 3 dB for impulsivity which is just perceptible, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible	9 dB
Distinctiveness	Intended for sources that are neither tonal nor impulsive, but distinctive against background noise sources	3 dB
Intermittency	When the sound has identifiable on/off conditions	3 dB

Table 5.1 Available penalties according to BS 4142

BS 4142 states that a noise rating 5 dB above the background noise level is likely to be an indication of an adverse impact. If the difference is 10 dB or more, then this is stated as likely to be an indication of a significant adverse impact. Where the rating level does not exceed the background sound level, this is stated as an indication of the sound source having a low impact.

Calculated noise emissions will be assessed against the background sound levels shown in Table 4.1, specifically the operational hours background sound level of **42 dB(A)**.

6.0 NOISE IMPACT ASSESSMENT

6.1 Noise Emissions

The proposed development is a change of use from SUI Generis formed of an electricity undertaker's depot to a dual use of Class B8 and SUI Generis retaining the existing electricity undertaker's depot..

The proposed use for the site is a scaffolding storage yard. Noise levels were measured at Masons Scaffolding yard in Southwark during truck loading/unloading. The source noise level was measured to be 67 dB(A) at 6 m. This level and spectrum has been used to inform this assessment.

6.2 Construction of 3D Noise Model

In order to provide an accurate and robust assessment of proposed activities, noise emissions have been considered by developing a noise map.

The noise model was constructed using the proprietary noise modelling software package CadnaA, utilising the following assumptions and parameters:

- Scaffolding loading noise modelled as a point source in the anticipated location of operations
    - Noise levels modelled and calibrated using the measured noise levels described in Section 6.1.
- Locations of obstacles such as building envelopes (existing)
- Presence of reflecting surfaces
- Ground between the sources and receivers modelled as hard and reflective
- Attenuation due to atmospheric absorption
- Receiver heights for ground floor windows are modelled at 1.5 m above ground
- Receiver height for first floor windows are modelled at 4 m above ground

It should be noted that all calculations in the CadnaA model, including those for distance and screening of intermediate building envelopes are undertaken according to International Standard ISO 9613-2:1996 '*Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation*' [ISO 9613]. This standard is the preferred method stated in BS 4142 to minimise uncertainty.

The specific noise level has been derived by the use of the 3D noise map model following the calculation method stated in ISO 9613. Calculations are performed over single octave bands from 63 Hz to 8 kHz.

It was observed at the Southwark site that the loading and unloading of scaffolding equipment from the trucks takes place in close proximity to the storage area, ensuring that any noise is generated within a small space. To minimise noise impact on the nearest sensitive receivers, the loading and storage area will be on the north-western edge of the site. Therefore, the noise is modelled as a point source towards the north-western edge of the site.

It should be noted that if proposals are changed to relocate operations closer to the identified receptors, an updated noise impact assessment will be required.

Figure 6.1 overleaf shows a plan view of noise propagation from the site, towards the identified receptors, with scaffolding loading operational.

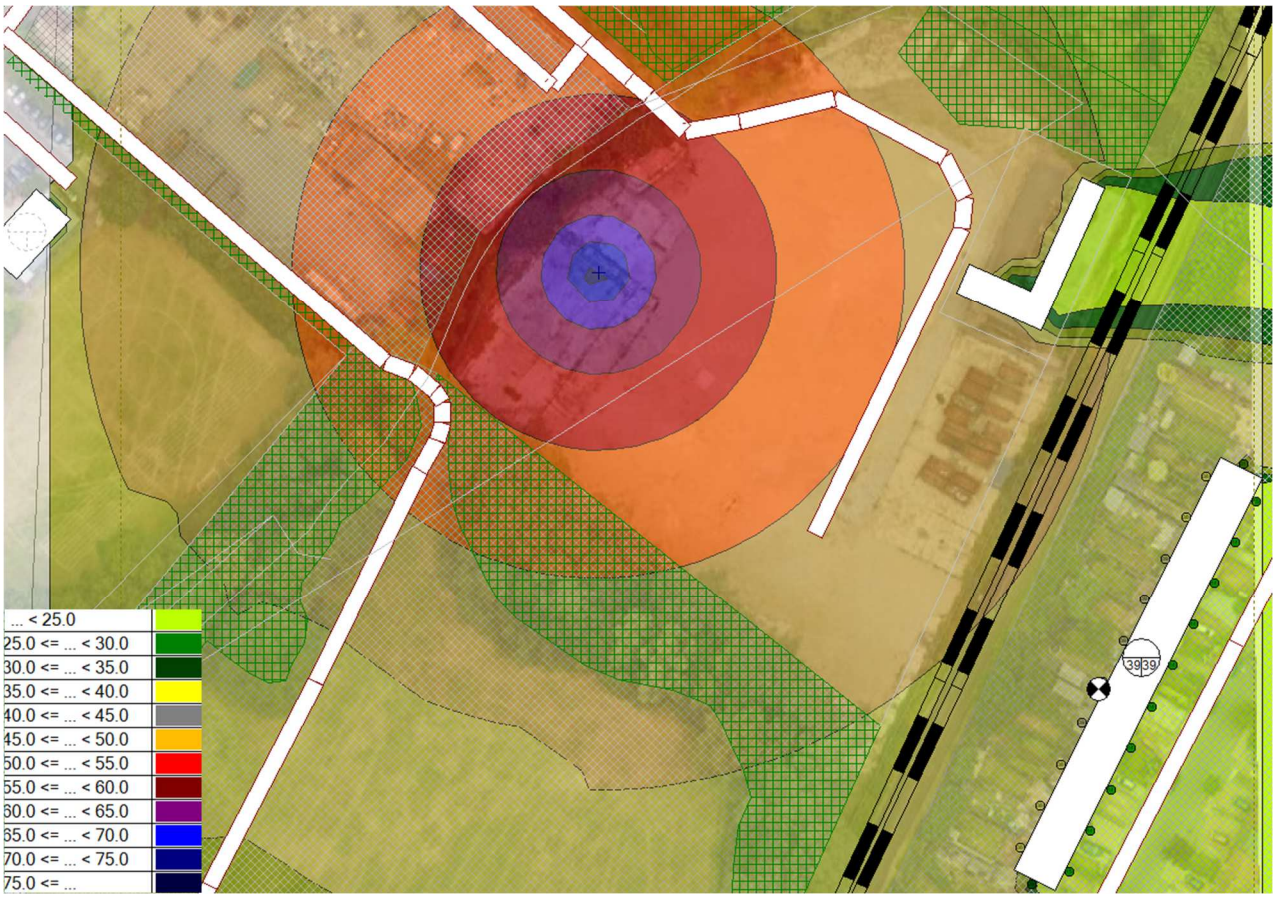

Figure 6.1 Plan view of noise propagation in 3D noise model

6.3 Noise Impact Assessment

The closest receivers have been identified as the windows on the rear facade of the residential properties on Clock House Road, which is a minimum of 100 m from the proposed area of operations.

As the proposed plant installation includes loading and unloading of metallic items, a certain amount of impulsivity could be expected. A +3 dB penalty for tonal noise emissions has been included, which is considered suitably robust as mitigation will be designed to ensure there is no adverse impact.

No tonal content would be expected from the assessed operations.

In terms of the potential intermittency, the following guidance taken from Section 9.2 of BS 4142 is noted below:

"*Intermittency*

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and

then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

For the assessed worst-case periods, activities are assumed to be in constant operation, in line with the above guidance. It can therefore be determined that there will be no intermittency within that period.

The resulting noise levels incident on the identified residential windows would be as shown in Table 6.1 below.

Calculated Specific Level at Receiver $L_{Aeq,15min}$	Calculated Noise Rating Level at Receiver $L_{Aeq,15min}$	Typical Measured Background Noise $L_{A90,5mins}$	Difference	Indication
39 dB(A)	42 dB(A)	42 dB(A)	0 dB	No adverse impact

Table 6.1 Noise levels and assessment at noise sensitive receivers

As presented in Table 6.1, the proposed change of use would be expected to result in a noise rating level that does not impact the noise environment.

7.0 CONCLUSION

An environmental noise survey has been undertaken at Churchfields Road, Beckenham. The results of the survey have enabled criteria to be set for noise emissions from the proposed change of use in accordance with the requirements of the London Borough of Bromley.

A noise impact assessment has then been undertaken using measured noise data to predict the noise levels, due to the proposed change of use, at the nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed change of use are predicted to have a low impact in accordance with the guidance of BS 4142.

N

Not to scale

Description:
Indicative site plan showing noise monitoring position and nearest sensitive receiver

Date	12 March 2024
Reference	18865-SP1
Project Name	Churchfields Road
Image ©	Google Earth

Key:	
	Unattended Noise Survey Position
	Noise Sensitive Receivers
	Attended Noise Survey Position

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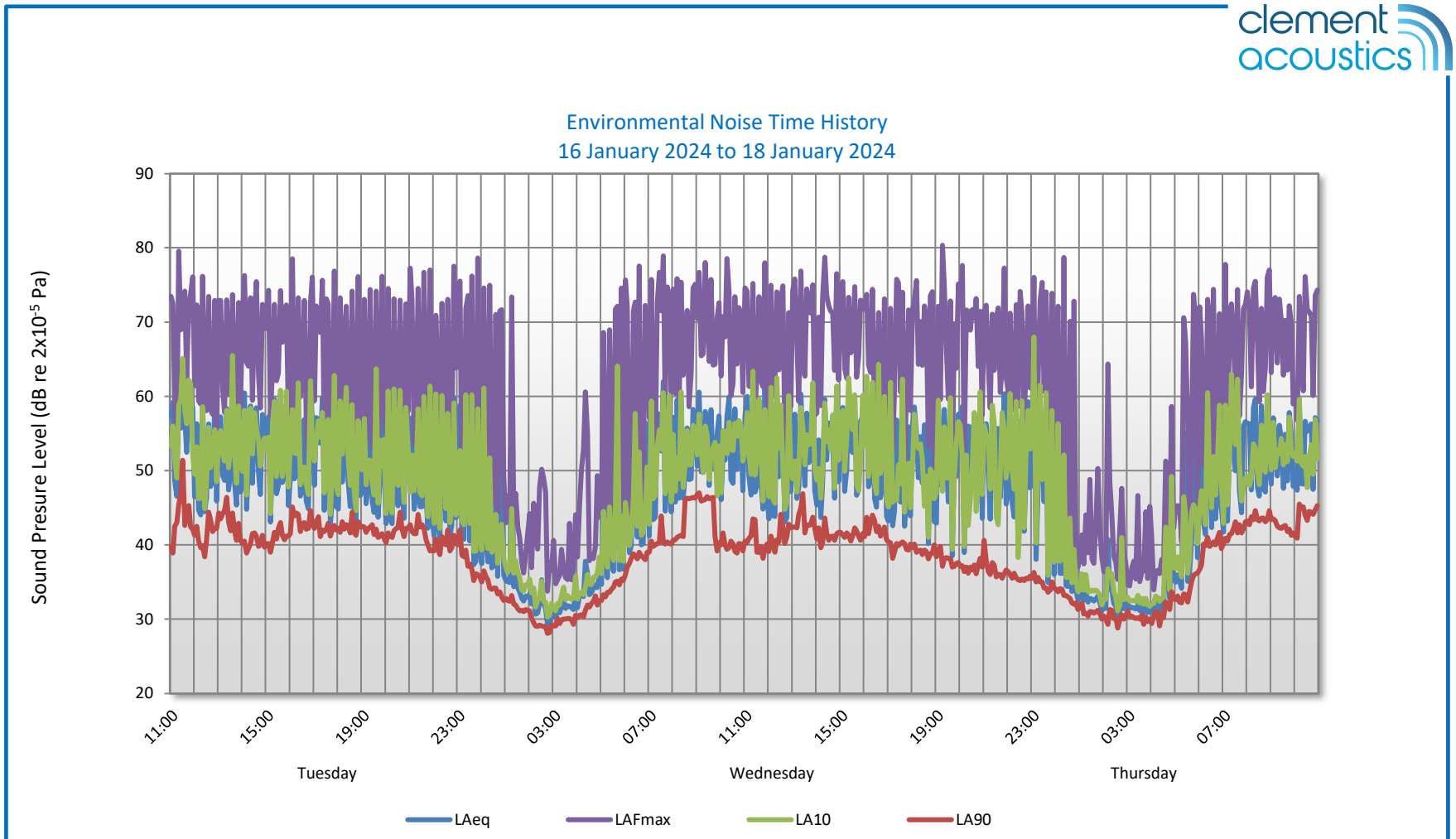
N

Not to scale

Description:
Indicative site plan showing noise monitoring position and nearest sensitive receiver

Date	12 March 2024
Reference	18865-SP2
Project Name	Churchfields Road
Image ©	Google Earth

Key:	
	Attended Noise Survey Position


Environmental Noise Time History
16 January 2024 to 18 January 2024
Sound Presure Level (dB re 2x10-5 Pa)
90
80
70
60
50
40
30
20
11:00
15:00
19:00
23:00
03:00
07:00
11:00
15:00
19:00
23:00
03:00
07:00
Tuesday
Wednesday
Thursday
LAeq
LAFmax
LA10
LA90

-TH1

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 10 dB 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 3 dB for each doubling of distance.

APPENDIX A

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.