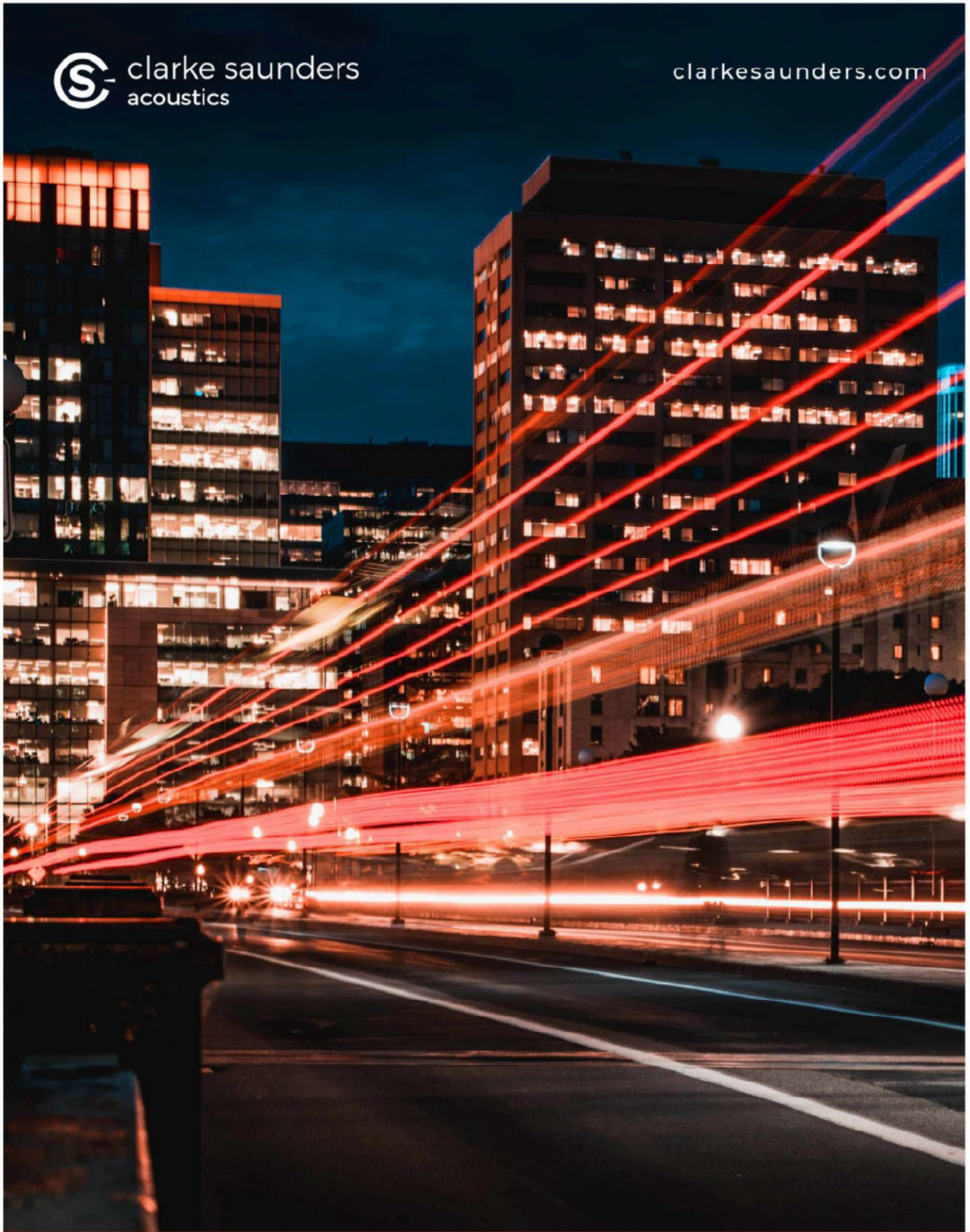




PREPARED: Tuesday, 25 July 2023

PROPG STAGE 1 RISK ASSESSMENT (REV.A) BROAD OAK, BOTLEY

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LIST OF ATTACHMENTS

AS12976/PROPG	ProPG Stage 1 Risk Assessment
AS12976/AVOG	AVOG Level 1 Risk Assessment
AS12976/TH1-TH12	Environmental Noise Time Histories
APPENDIX A	Acoustic Terminology

Project Ref:	AS12976	Title:	Broad Oak, Botley
Report Ref:	AS12976.230413.RA Rev.A	Title:	ProPG Stage 1 Risk Assessment REV.A
Client Name:	The trustees of The Mulberry Investments Pension Scheme'		
Project Manager:	Daniel Saunders		
Report Author:	Michael Symmonds		
Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 EXECUTIVE SUMMARY

- 1.1 Clarke Saunders Acoustics (CSA) has been commissioned by the trustees of The Mulberry Investments Pension Scheme to undertake an assessment of the current environmental noise impact at the land at Broad Oak, Botley, to assess its suitability for residential development.
- 1.2 Noise will be assessed in accordance with the National Planning Policy Framework, ProPG: Planning and Noise¹ for new residential developments (ProPG) and with reference made to the relevant guidance set out in BS8233:2014 *Guidance on sound insulation and noise reduction for buildings* and ANC *Acoustics Ventilation and Overheating Residential Design Guide, 2020*² (AVOG).
- 1.1 A survey of the prevailing noise climate and subsequent risk assessment following the ProPG has shown there to generally be a low to medium risk in terms of noise impact and overheating without mitigation across the development site.
- 1.2 ProPG recommends that a Stage 2 Acoustic Design Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline measures as appropriate for the proposed residential development. An AVOG Level 2 assessment is also recommended. This could be considered at a later stage, typically if/when dynamic thermal modelling, (e.g. utilising CIBSE TM59 methodology), is undertaken by a qualified third party.

2.0 INTRODUCTION

- 2.1 The applicant is proposing to erect a variety of dwellings within the development site on the vacant land at Broad Oak, Botley.
- 2.2 CSA has been commissioned by the trustees of The Mulberry Investments Pension Scheme to undertake an assessment of the current environmental noise impact on the site. Noise will be assessed in accordance with the National Planning Policy Framework, ProPG: Planning and Noise for new residential developments and with reference made to relevant guidance set out in BS8233:2014 *Guidance on sound insulation and noise reduction for buildings* and the ANC *Acoustics Ventilation and Overheating Residential Design Guide, 2020*.
- 2.3 This report presents the results of the ProPG Stage 1 Risk Assessment and Level 1 AVOG Assessment which will be used to inform the requirement for a subsequent Stage 2 Acoustic Design Statement and AVOG Level 2 Assessment.
- 2.4 Please refer to Appendix A for details of the acoustic terminology used throughout this report.

¹ <http://ioa.org.uk/publications/propg>

² <https://www.association-of-noise-consultants.co.uk/avo-guide/>

3.0 SITE DESCRIPTION

- 3.1 The site is located east of Hedge End and is bounded by residential properties off Broad Oak (A334) to the north, further residential properties off Cobbett Way to the east, and agricultural land to the south.
- 3.2 The proposed development site is shown in the attached risk assessment summary sheets AS12976/PROPG and AS12976/AVOG.

4.0 ENVIRONMENTAL NOISE SURVEY

- 4.1 A survey of the existing environmental noise levels was conducted at the locations shown in the attached risk assessment summary sheets AS12976/PROPG and AS12976/AVOG. Measurements of consecutive L_{Aeq} , L_{Amax} , L_{A10} , L_{A90} sound pressure levels were taken between 12:45 hours on Wednesday 12th April and 09:50 hours on Tuesday 18th April 2023.
- 4.2 The following equipment was used during the survey:
 - 1 no. Rion NL32 sound level meters;
 - 1 no. NTi XL2 sound level meter;
 - 1 no. Rion NC74 sound level calibrator.
- 4.3 The calibration of the sound level meters was verified before and after use. No significant calibration drift was detected. All equipment has current laboratory calibration and certification is available upon request.
- 4.4 There were high wind speeds and rainy periods between the start of the survey and 02:00 hours on Thursday 13th April. This period has been excluded from the analysis. The wind speeds and extent of rainfall reduced over the following two days, with calm weather between Saturday and the end of the survey. Inspection of the data indicates that the moderate wind speeds and period of rain on Thursday and Friday did not notably affect the measured noise levels.
- 4.5 Measurements were made following procedures in BS7445:1991 (ISO:1996-2:1987) *Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use*.

5.0 RESULTS

- 5.1 Figures AS12976/TH1-TH12 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at the measurement positions. The ambient sound climate is primarily determined by road traffic using Broad Oak (A334).
- 5.2 The average noise levels at the monitoring positions for the daytime and night-time periods are shown in the table below, along with the typical night-time maximum levels, derived from the 90th percentile of the measured L_{AFmax} data.

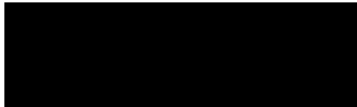
Daytime $L_{Aeq,16hour}$	Night-time $L_{Aeq,8hour}$	Typical Night-time L_{AFMax}
Position 1: 60 dB Position 2: 52 dB	Position 1: 54 dB Position 2: 49 dB	Position 1: 72 dB Position 2: 68 dB

Table 5.1 – Average noise levels

- 5.3 A Stage 1 Risk Assessment Summary for ProPG: Planning and Noise (AS12976/PROPG) and AVOG Level 1 Site Risk Assessment Summary relating to the overheating condition (AS12976/AVOG) are attached, identifying the development area as low to medium risk in terms of noise impact and overheating without mitigation.
- 5.4 The ProPG recommends that a good acoustic design process is followed, and a Stage 2 Acoustic Design Statement of appropriate detail is prepared to demonstrate that noise impact has been minimised for future occupants.
- 5.5 An AVOG Level 2 assessment is also recommended. This could be considered at a later stage, typically if/when dynamic thermal modelling, (e.g., utilising CIBSE TM59 methodology), is undertaken by a qualified third party.

6.0 CONCLUSIONS

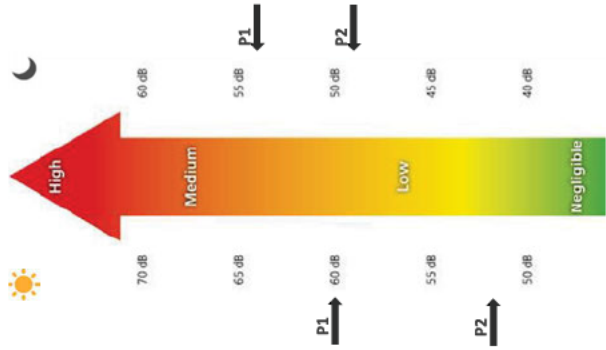
- 6.1 The ProPG Stage 1 Risk Assessment has identified the development area as generally low to medium risk in terms of noise impact. The ProPG recommends that a process of good acoustic design is followed and a Stage 2 Acoustic Design Statement should be prepared to demonstrate how noise impact on future occupants will be minimised.
- 6.2 An AVOG Level 1 risk assessment following the AVOG guidance has demonstrated a low to medium risk in the context of the overheating scenario. An AVOG Level 2 assessment is recommended. This could be considered at a later stage, typically if/when dynamic thermal modelling, (e.g., utilising CIBSE TM59 methodology), is undertaken by a qualified third party.

pp. 

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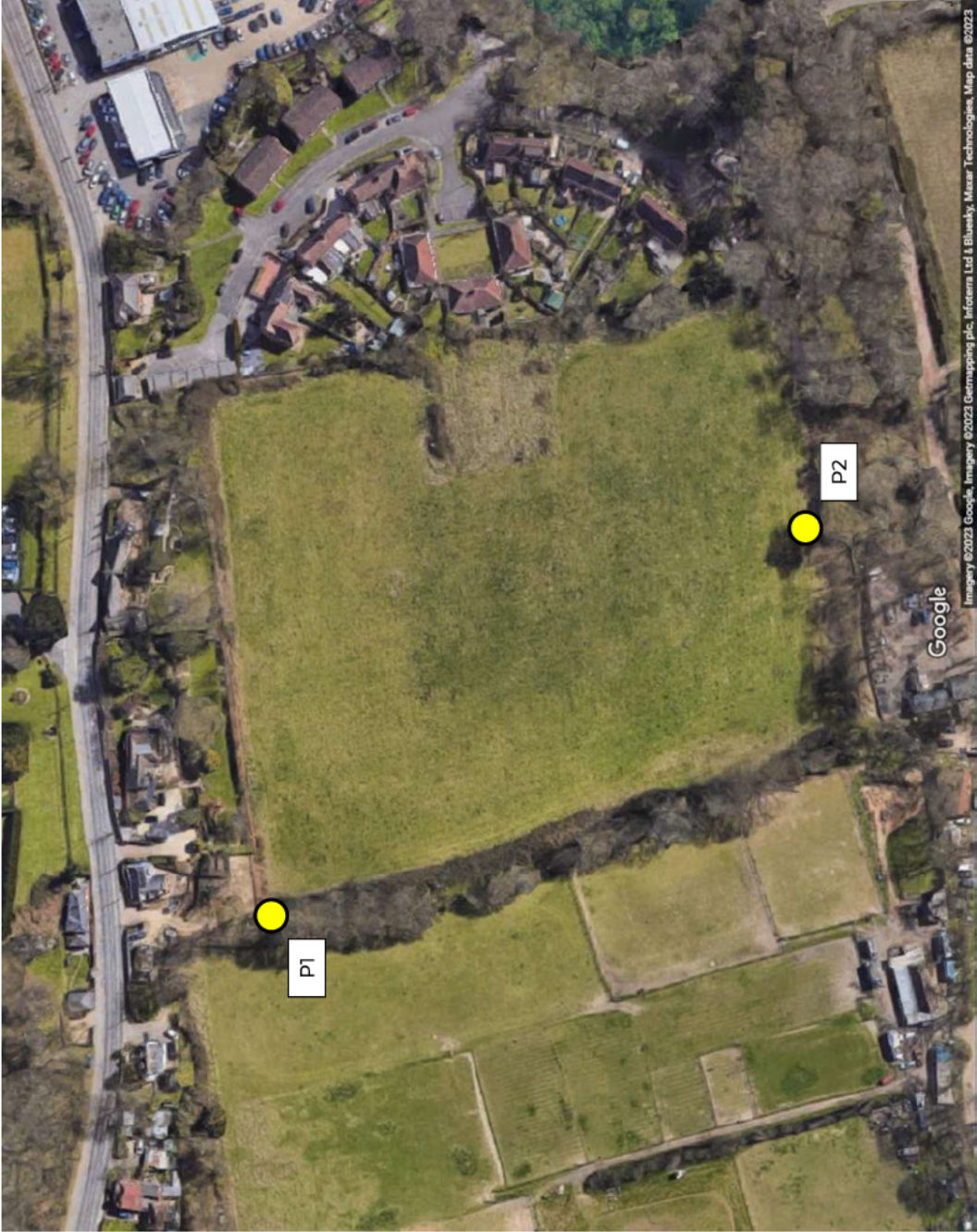
Project:	Broad Oak, Botley
Figure:	AS12976/PROPG
Date:	24 April 2023
Daytime:	P1: 60 dB $L_{Aeq,1hr}$ P2: 52 dB $L_{Aeq,1hr}$
Night-time:	P1: 54 dB $L_{Aeq,1hr}$ P2: 49 dB $L_{Aeq,1hr}$



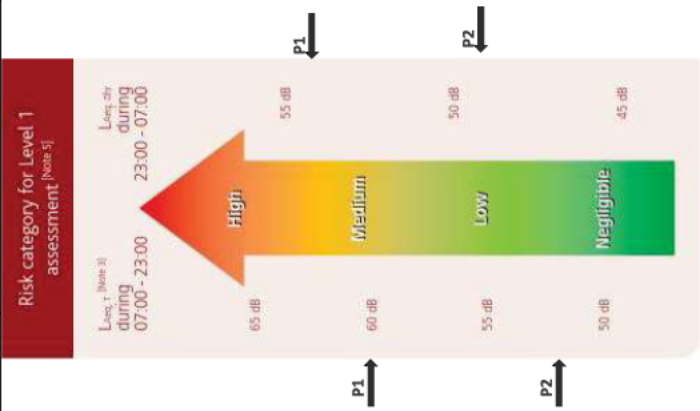
ProPG: Planning & Noise – Stage 1 Risk Assessment Summary

A survey of the existing noise climate was undertaken at the monitoring positions between Wednesday 12th April and Tuesday 18th April 2023.

Noise levels are considered to represent a **low** to medium risk in terms of impact for the majority of the development site. The ProPG recommends that a Stage 2 Acoustic Design Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline mitigation measures as appropriate for the proposed residential development.



Project:	Broad Oak, Botley
Figure:	AS12976/AVOG
Date:	24 April 2023
Daytime:	P1: 60 dB $L_{Aeq,1hr}$ P2: 52 dB $L_{Aeq,1hr}$
Night-time:	P1: 54 dB $L_{Aeq,1hr}$ P2: 49 dB $L_{Aeq,1hr}$

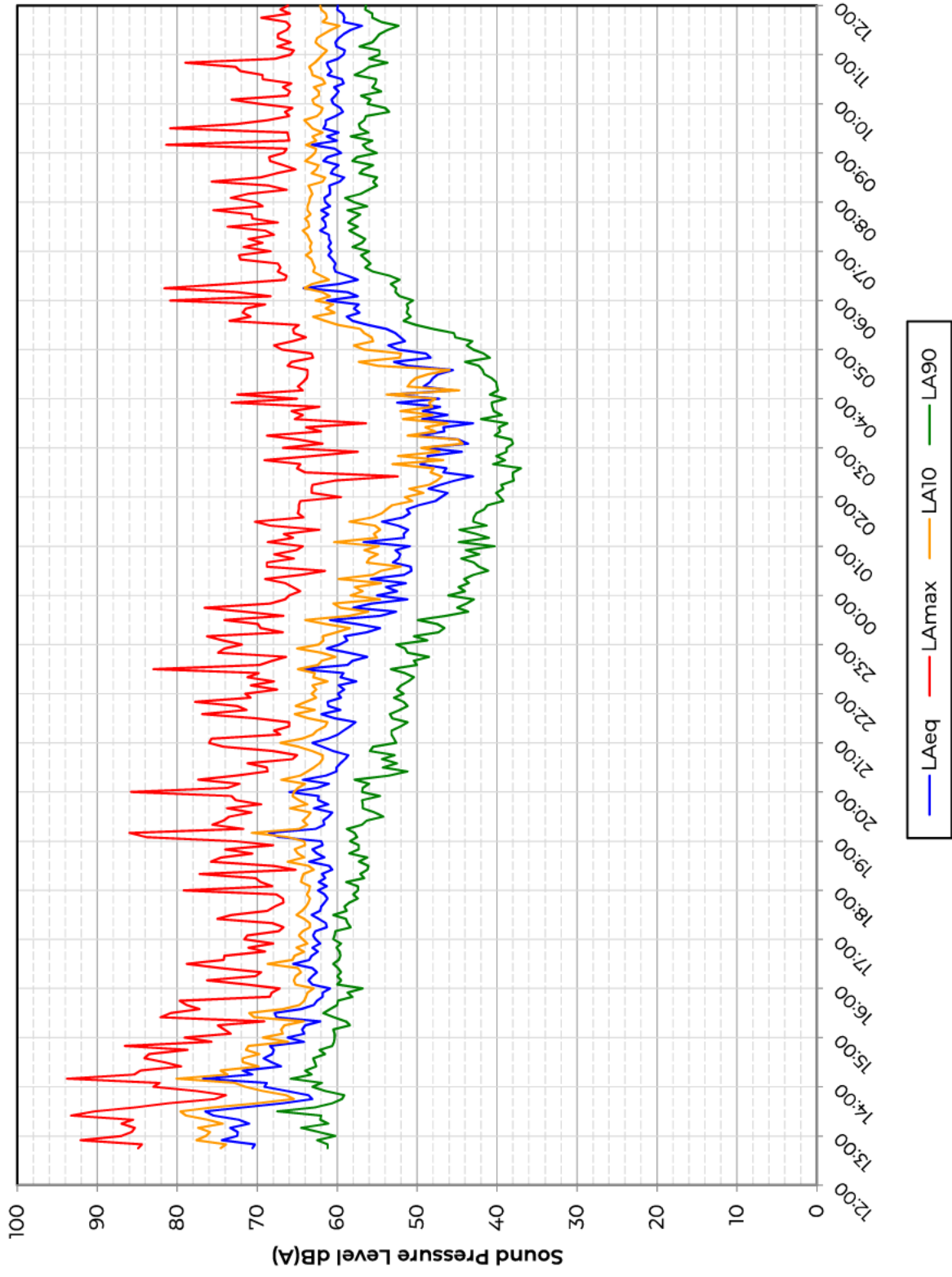


AVOG: Level 1 Site Risk Assessment for Overheating Condition Summary

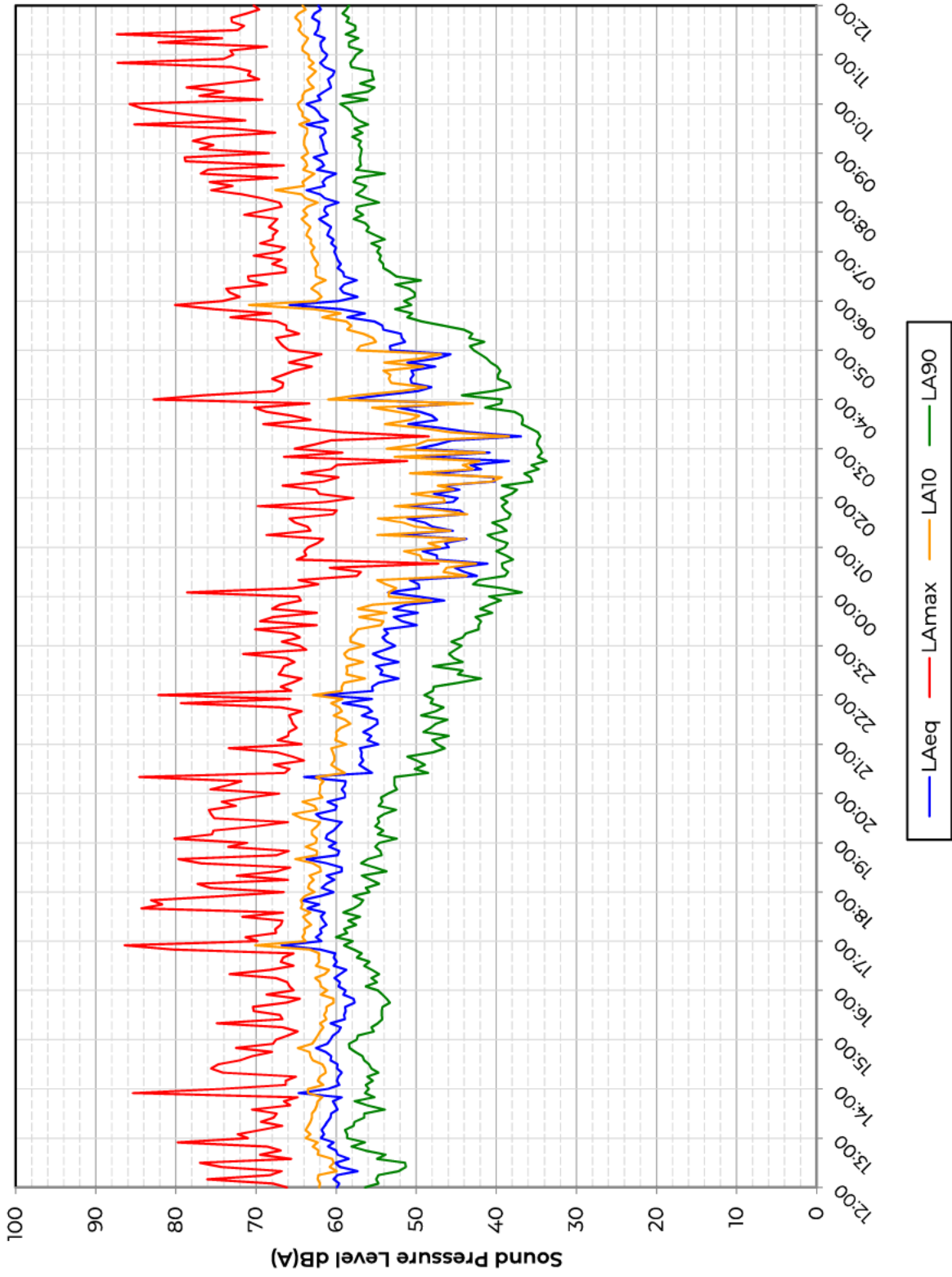
A survey of the existing noise climate was undertaken at the monitoring positions between Wednesday 12th April and Tuesday 18th April 2023.

Noise levels are considered to represent a low to medium risk of adverse effect in respect of overheating without mitigation for the majority of the development site, therefore an AVOG Level 2 assessment is recommended. This could be considered at a later stage, typically if/when dynamic thermal modelling is undertaken by a qualified third party.

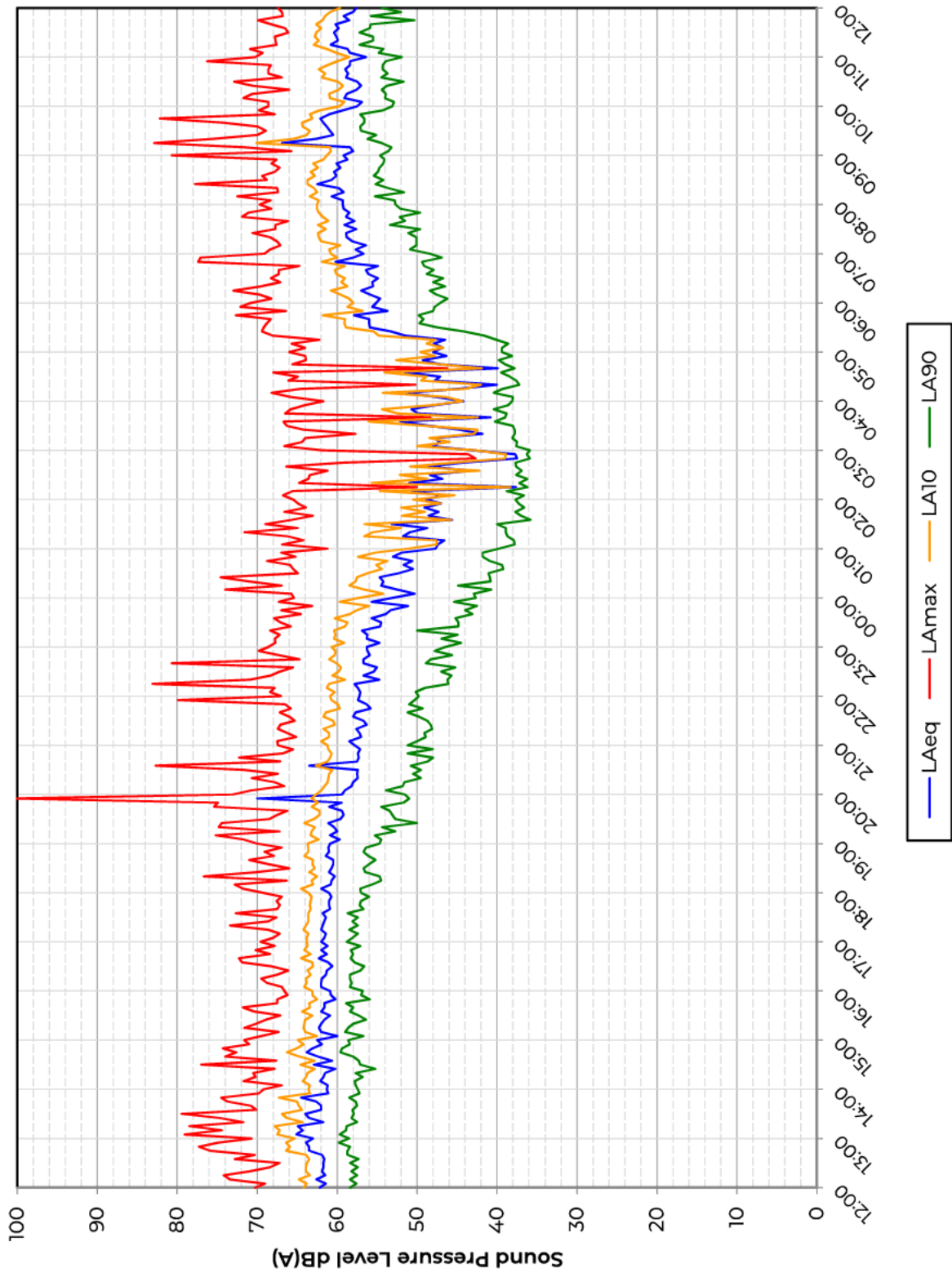
Position 1



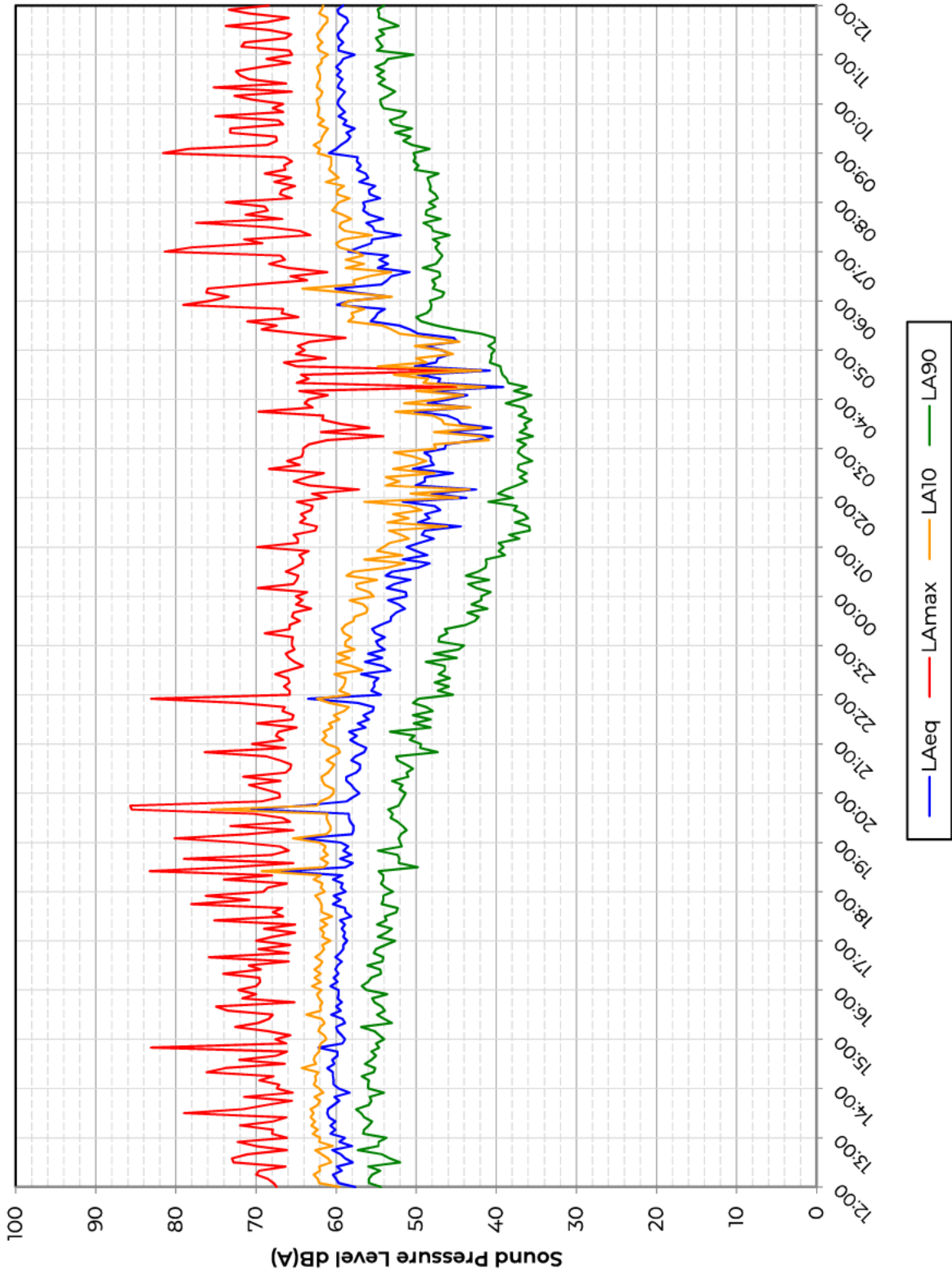
Position 1



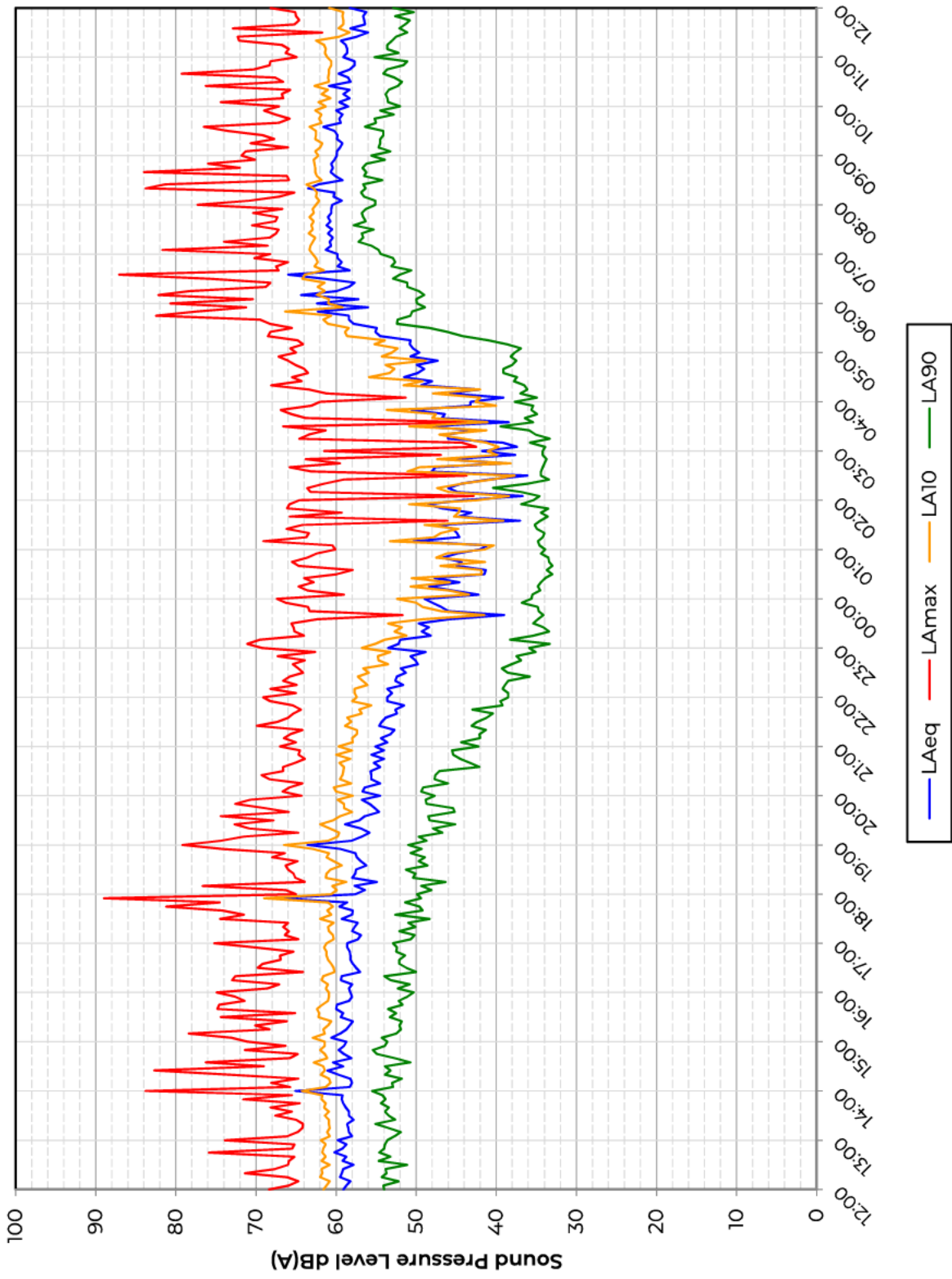
Position 1



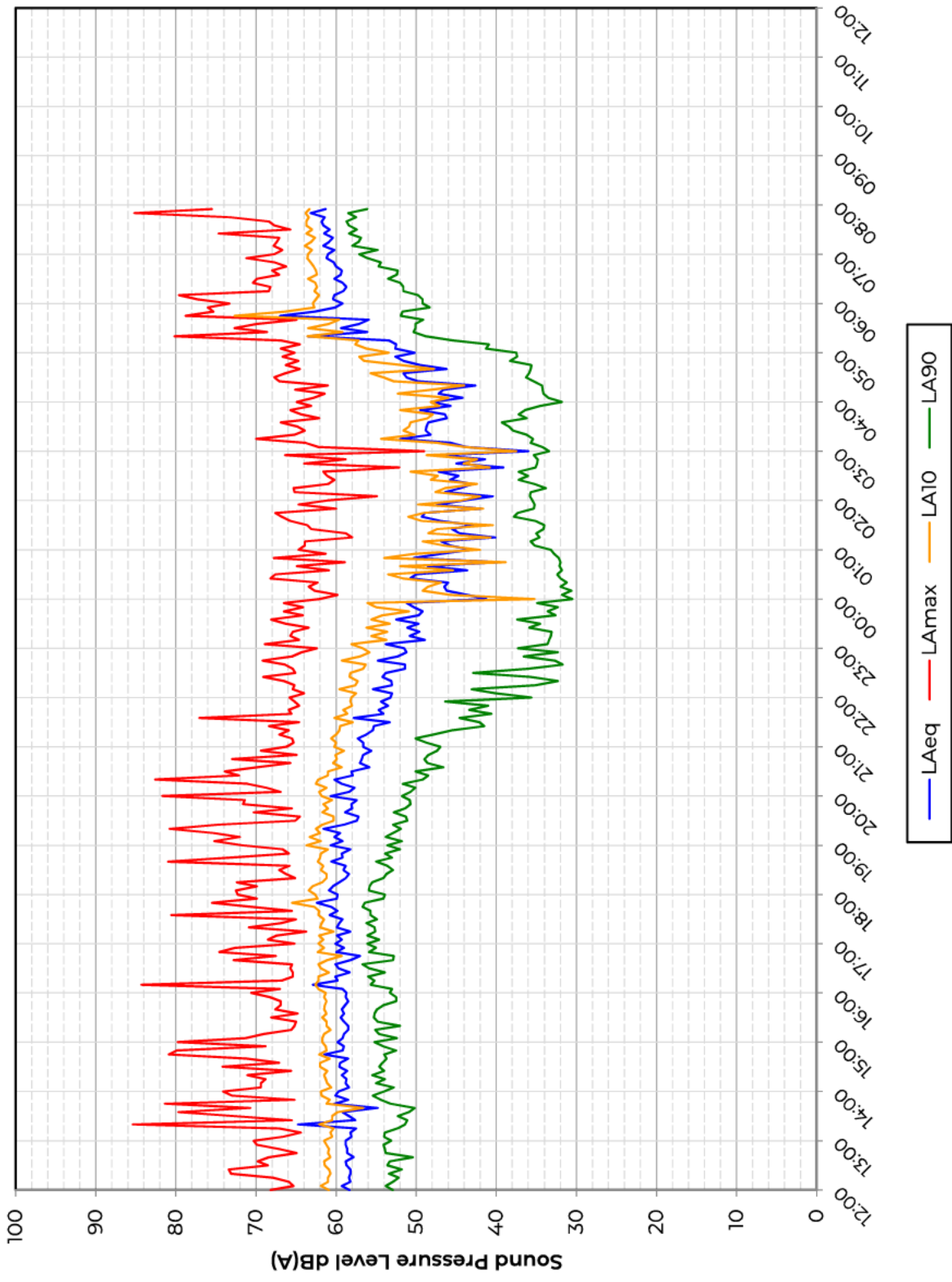
Position 1



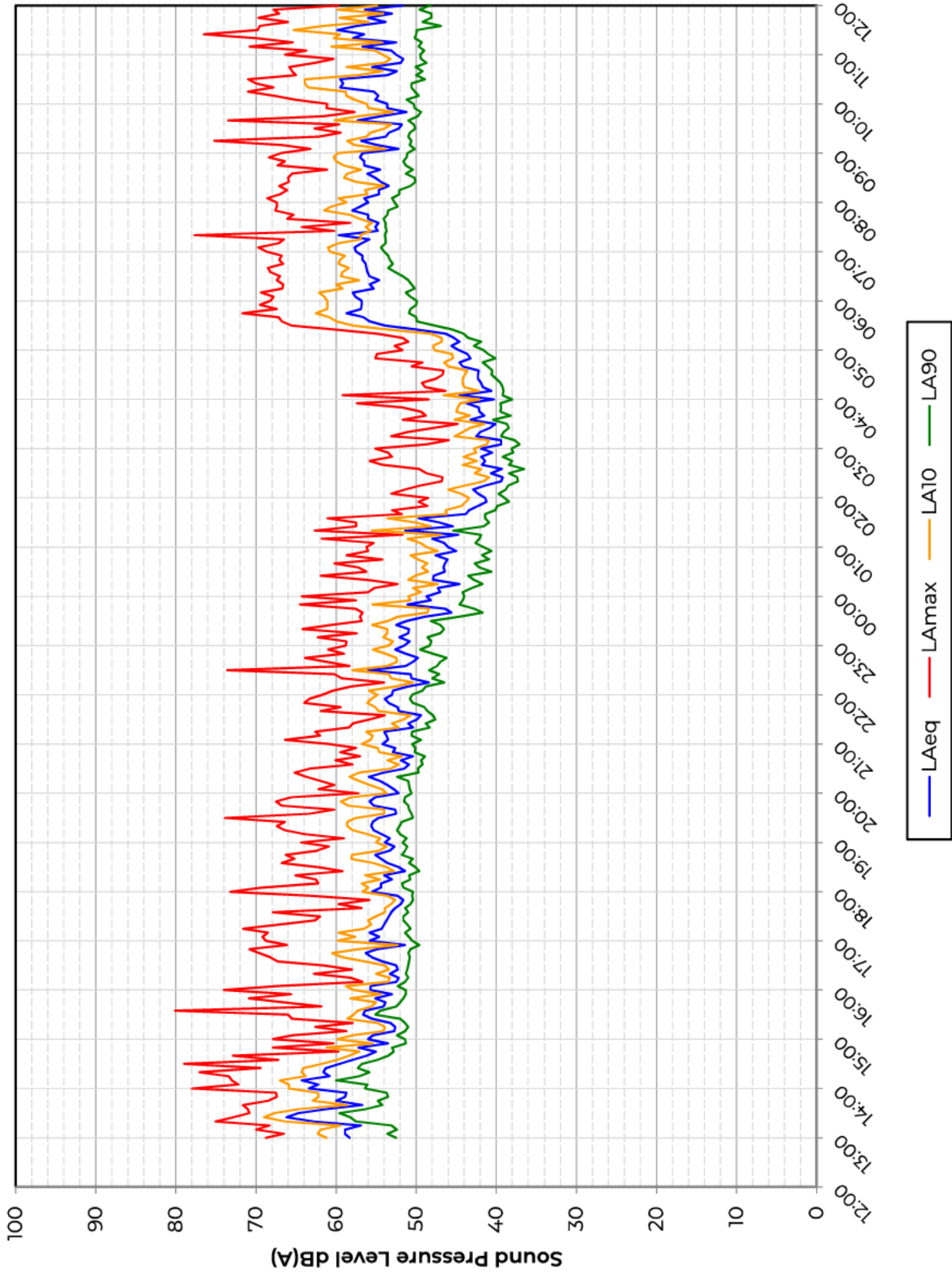
Position 1



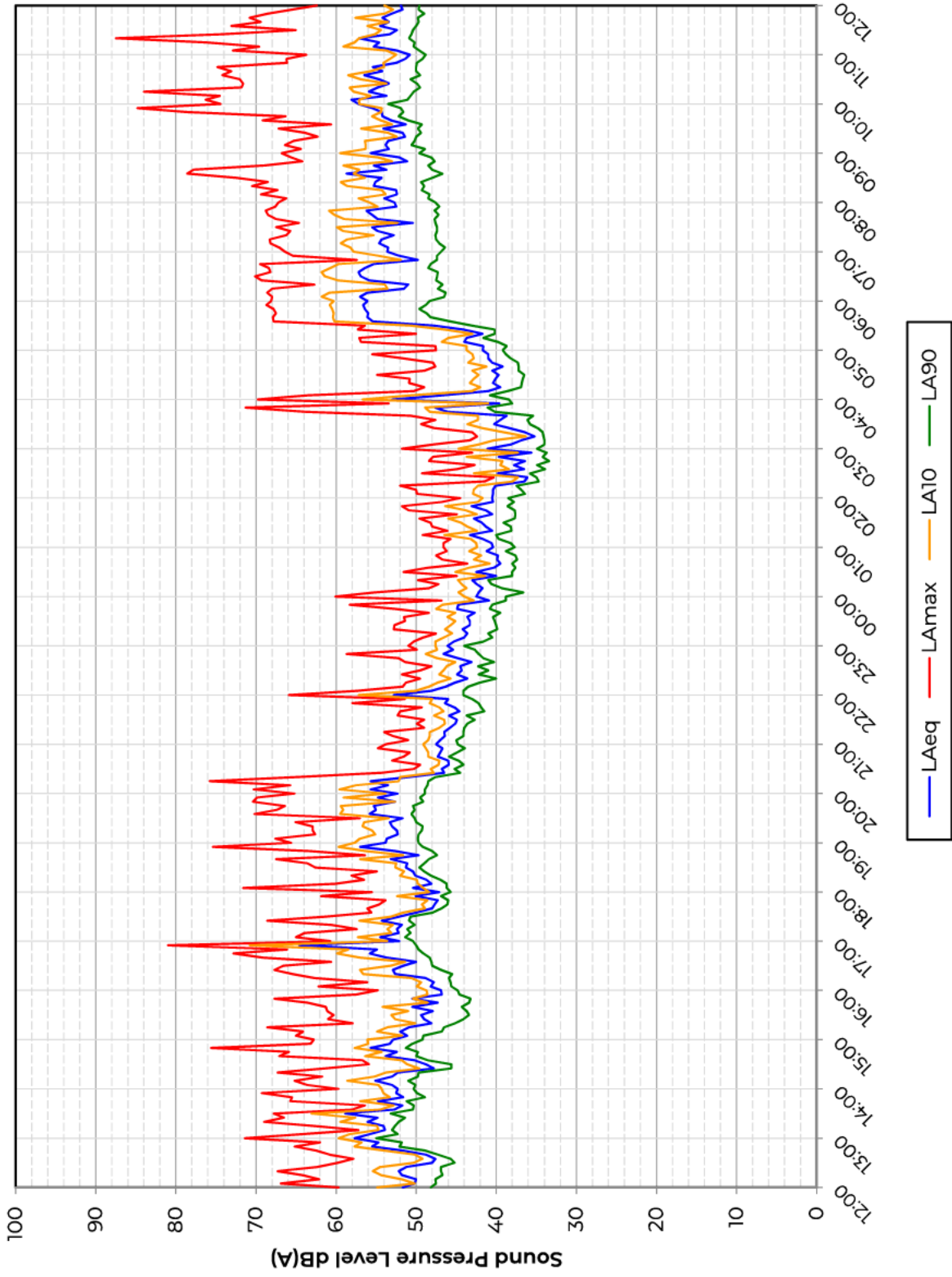
Position 1



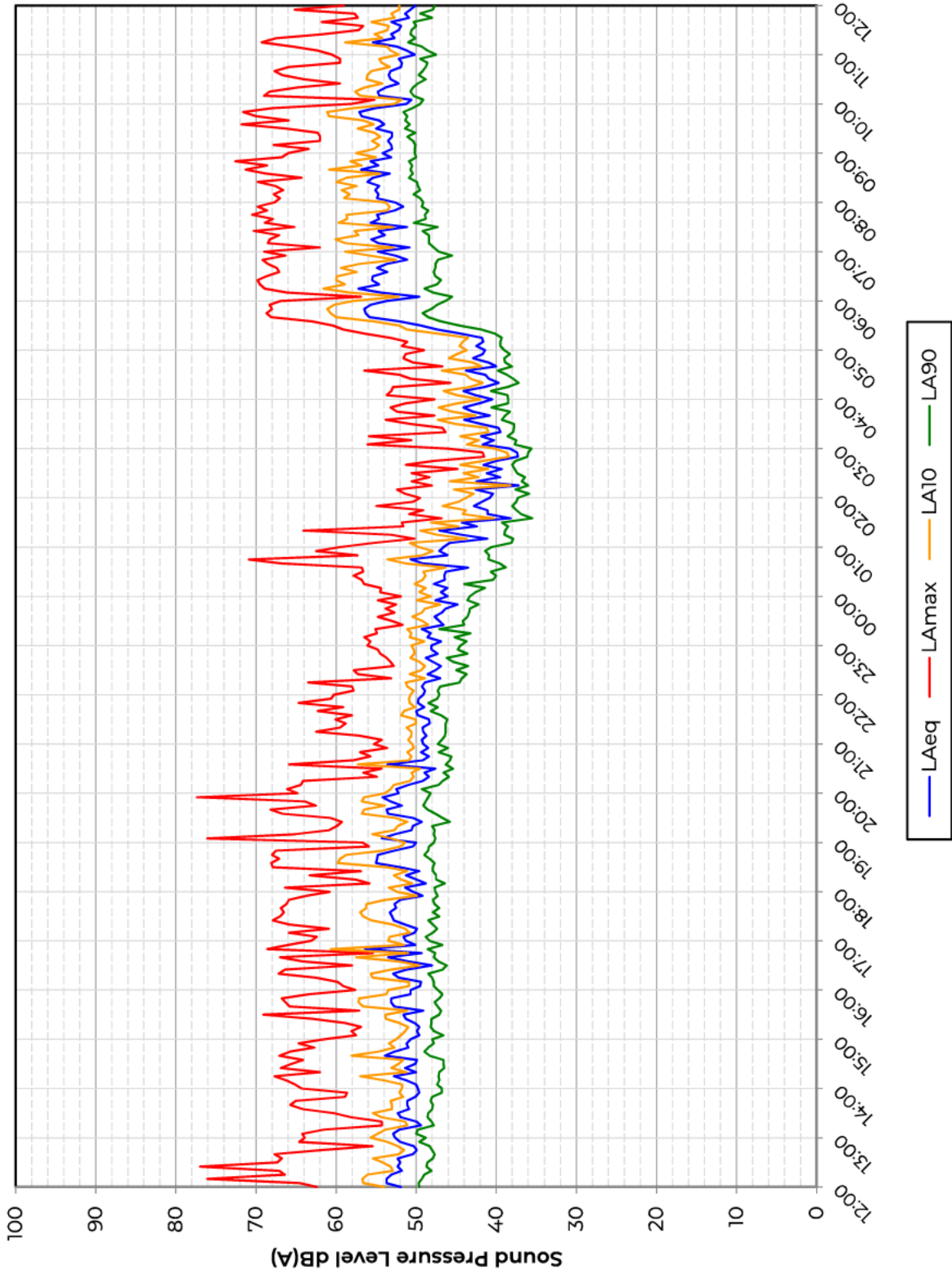
Position 2



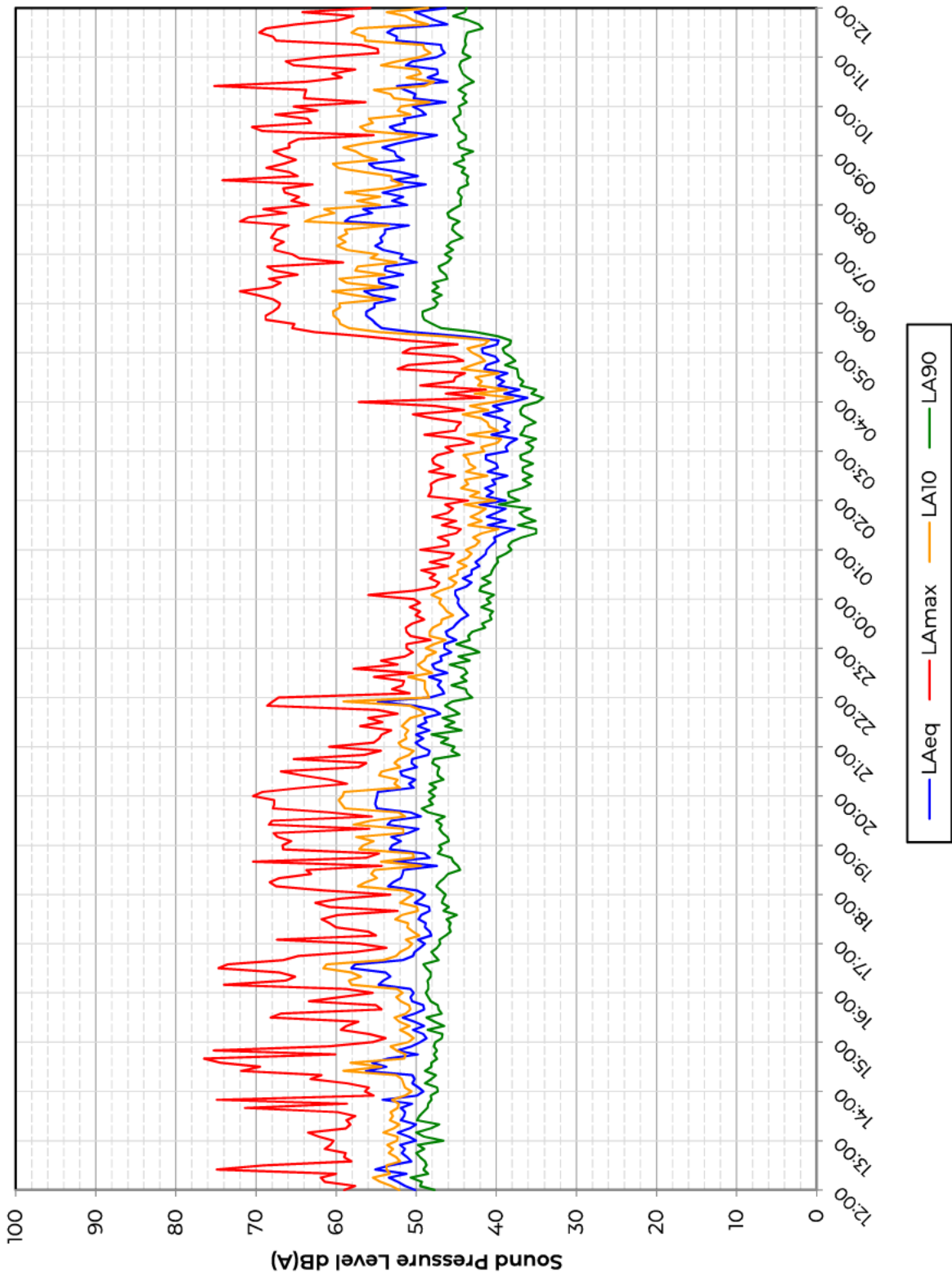
Position 2



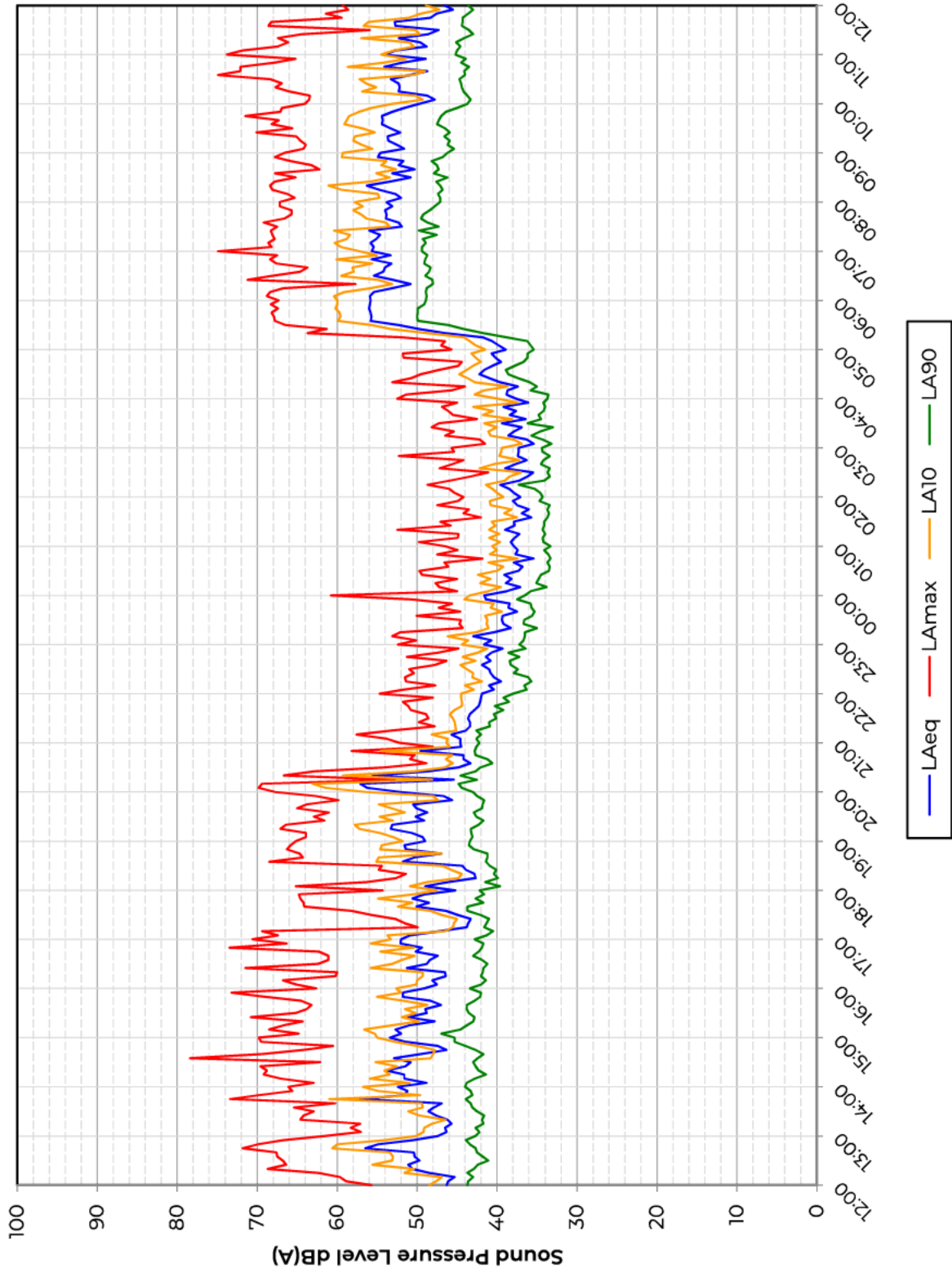
Position 2



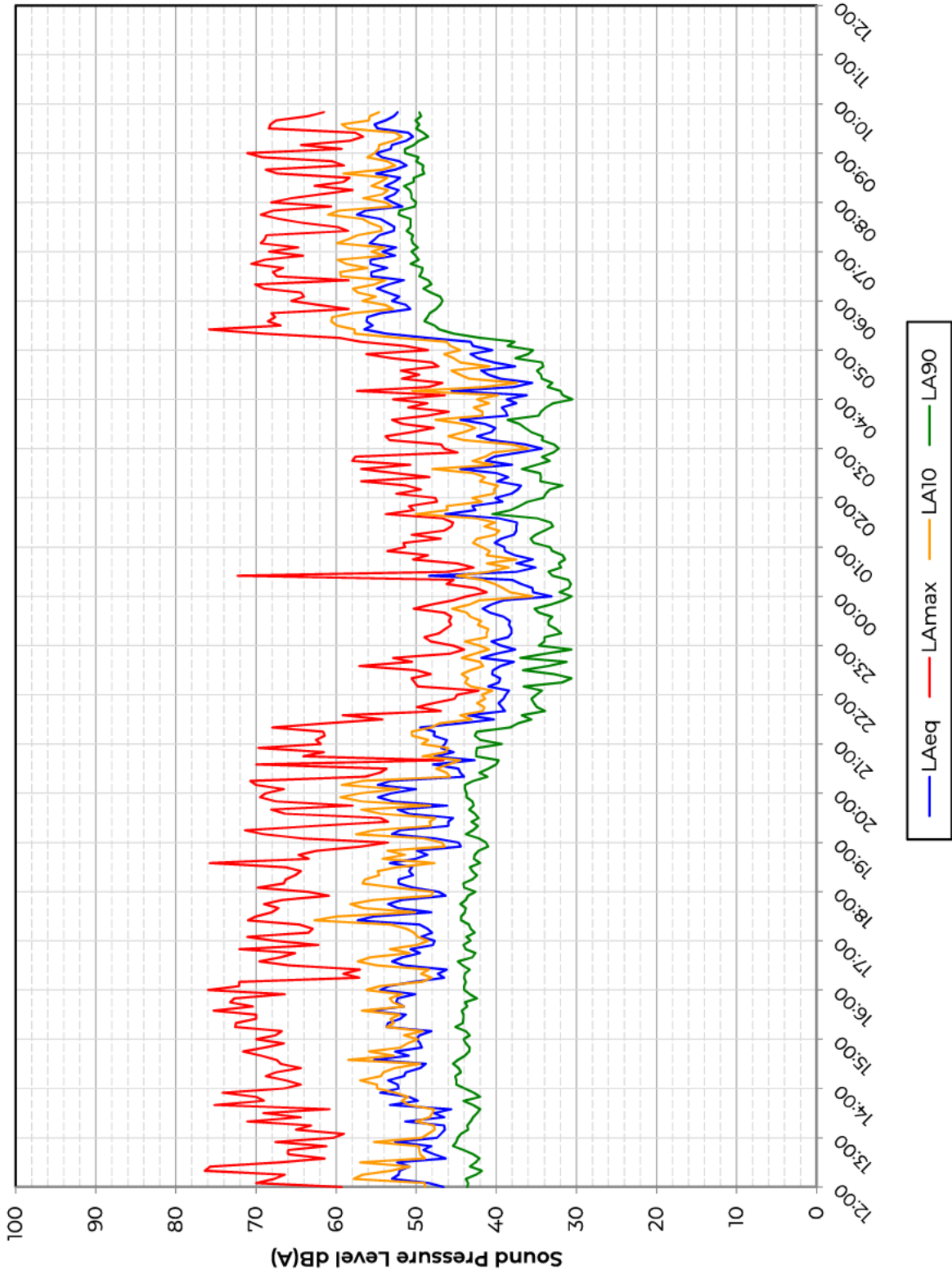
Position 2



Position 2



Position 2



Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A .
L_{eq}:	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90}:	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max}:	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band.

In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz.

The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000
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Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.