



PREPARED: 25 April 2025

101 OXFORD ROAD, READING PLANT NOISE IMPACT ASSESSMENT

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AS12906/SP1	Indicative Site Plan
AS12906/TH1-TH6	Environmental Sound Time Histories
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Project Ref:	AS12906	Project Name:	101 Oxford Road, Reading
Report Ref:	AS12906.250424.R2	Report Title:	Plant Noise Impact Assessment
Client Name:	Mr Babar Butt		
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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 has conducted a noise impact assessment of the proposed air source heat pump at ground level of 101 Oxford Road, Reading, RG1 7UD.
- 1.2 This assessment has been conducted in accordance with the requirements of Planning Condition 15 of the Decision Notice relating to planning application ref 230319.
- 1.3 Manufacturer data for the new ASHP has been used to predict the sound impact of the proposed plant at the neighbouring receptor. Compliance with the sound emissions design criteria have been demonstrated without specific mitigation measures.

2.0 INTRODUCTION

- 2.1 A new air source heat pump (ASHP) will be installed at ground floor level of 101 Oxford Road, Reading, RG1 7UD.
- 2.2 Clarke Saunders Acoustics (CSA) has been appointed to conduct a noise impact assessment, in accordance with Planning Condition 15 of the Decision Notice relating to planning application ref 230319.
- 2.3 This report describes the survey, noise impact assessment, and the findings.
- 2.4 A glossary relevant to the terminology used in this report is presented in Appendix A.

3.0 SITE DESCRIPTION

- 3.1 The site is situated on a street lined with terraced houses, with the eastern façade facing Howard Street and, beyond this, the A329, located in a deep cutting. On the other side of the A329 is student accommodation and a hotel. To the west of the site is the Providence Chapel, which hosts services throughout the week.
- 3.2 The proposals comprise a three-storey dwelling, with living areas at ground floor and bedrooms on the first and second floors.
- 3.3 The proposed ASHP will be located at ground floor level to the west of the building, whilst the closest residential receptor is 2 Howard Street, which has windows on the west façade.
- 3.4 A plan of the site and local area is provided at AS12906/SP1.

4.0 PLANNING CONDITION 15

- 4.1 Planning Condition 15 is worded as follows:

No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by the Local Planning Authority. The assessment shall be carried out in accordance with BS4142:2014 methodology. The predicted specific sound level ($L_{Aeq,TR}$) (with reference to BS:4142) as measured at a point 1 metre external to the nearest noise-sensitive facade shall be at least 10dB below the pre-existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The predicted rating level, $L_{Ar,Tr}$ (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to the nearest noise-sensitive facade (habitable window of a dwelling) shall not exceed the pre-existing background sound

level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The plant shall thereafter only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard.

5.0 ENVIRONMENTAL SOUND SURVEY

5.1 PROCEDURES & EQUIPMENT

5.1.1 A survey of the existing ambient and background sound levels was undertaken approximately 3.5m above local ground level at the position shown in the site plan.

5.1.2 Sound level meters were set to record synchronous measurements of consecutive 5 - minute L_{Aeq} , L_{Amax} , L_{A90} and L_{A10} sound pressure levels between 15:30 hours on Wednesday 18th January and 14:55 hours on Monday 23rd January 2023.

5.1.3 The following equipment was used during the course of the survey:

- Rion sound level meter type NA28;
- Rion sound level calibrator type NC74.

5.1.4 The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected.

5.1.5 There were sufficient periods of dry weather with light to moderate winds during the survey, which provided suitable conditions for the measurement of environmental sound.

5.1.6 Environmental sound survey measurements were made following procedures in BS 7445:1991 *Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use* and BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound* (BS4142).

5.2 SURVEY RESULTS

5.2.1 Figures AS12906/TH1-TH6 shows the L_{Aeq} , L_{Amax} , L_{A90} and L_{A10} sound pressure levels as time histories at the Howard Street monitoring position.

5.2.2 Road traffic sound from the A329 constitutes the predominant sound source present on site, with occasional contributions from vehicles on Howard Street.

5.2.3 The measured average ambient and typical background sound levels are summarised in Table 5.1. The typical background levels have been derived from the 10th percentile of the relevant L_{A90} dataset.

PERIOD	AVERAGE AMBIENT $L_{Aeq,T}$	TYPICAL LOWEST BACKGROUND L_{A90}
Daytime (07:00-23:00)	70 dB	62 dB
Night-time (23:00-07:00)	63 dB	49 dB

Table 5.1: Summary of survey results

[dB ref 20µPa]

6.0 PLANT SOUND CRITERIA

- 6.1 The plant sound criteria have been based on the data provided in Table 5.1, alongside the stated plant sound emissions criteria provided at Section 4.0.
- 6.2 The sound emissions criteria that should not be exceeded at the residential receptors are provided in Table 6.1.

PERIOD	SPECIFIC SOUND LEVEL	RATING LEVEL
Daytime (07:00-23:00)	$L_{Aeq,T} \leq 52$ dB	$L_{Ar,Tr} \leq 62$ dB
Night-time (23:00-07:00)	$L_{Aeq,T} \leq 39$ dB	$L_{Ar,Tr} \leq 49$ dB

Table 6.1 – Plant sound emissions design criteria

[dB ref. 20µPa]

7.0 PREDICTED SOUND IMPACT

7.1 PROPOSED PLANT

- 7.1.1 The selected ASHP has been confirmed as a single AUX ACHP-H04/4R2HA-M. The manufacturer's literature confirms this generates an overall sound pressure level of 56dB(A) at a distance of 1 metre. Spectral data for the unit is not available.

7.2 PREDICTED SOUND IMPACT

- 7.2.1 The sound level of the proposed ASHP has been assessed to the nearest off-site noise-sensitive receptor at 2 Howard Street.
- 7.2.2 The ASHP will be located circa 9m from the first-floor window on the west façade, and will be obscured from view by the building massing of 2 Howard Street. Distance propagation and screening attenuation effects have, therefore, been incorporated into the calculations, in addition to a +3dB correction to account for the façade reflection effect.
- 7.2.3 The overall predictions are presented in Table 7.1.

RECEPTOR	PREDICTED SPECIFIC SOUND LEVEL, $L_{Aeq,T}$	SPECIFIC SOUND LEVEL CRITERIA, $L_{Aeq,T}$
2 Howard Street	33 dB	Daytime: ≤ 52 dB Night-time: ≤ 39 dB

Table 7.1 – Summary of predicted plant noise levels

[dB ref. 20µPa]

- 7.2.4 As the Specific Sound Level is calculated to be more than 10dB below the Background Level, the ASHP is not anticipated to generate noticeable tonal, impulsive, intermittent or other distinctive sound characteristics at the receptor. The Rating Level would, therefore, be equal to the Specific Sound Level in this instance, thereby complying with the criteria of Planning Condition 15.
- 7.2.5 Full calculations are attached in Appendix B.

8.0 CONCLUSIONS

- 8.1 Clarke Saunders Acoustics has conducted a noise impact assessment of the proposed air source heat pump at ground level of 101 Oxford Road, Reading, RG1 7UD.
- 8.2 Results of environmental noise surveys have been used to establish the current background sound climate at the nearest noise sensitive receptors, which has enabled the acoustic suitability of the ASHP proposals to be assessed against the requirements of Planning Condition 15 of the Decision Notice relating to planning application ref 230319.
- 8.3 Manufacturer data for the new ASHP has been used to predict the sound impact of the proposed plant at the neighbouring receptor. Compliance with the sound emissions design criteria have been demonstrated without specific mitigation measures.

M Symmonds

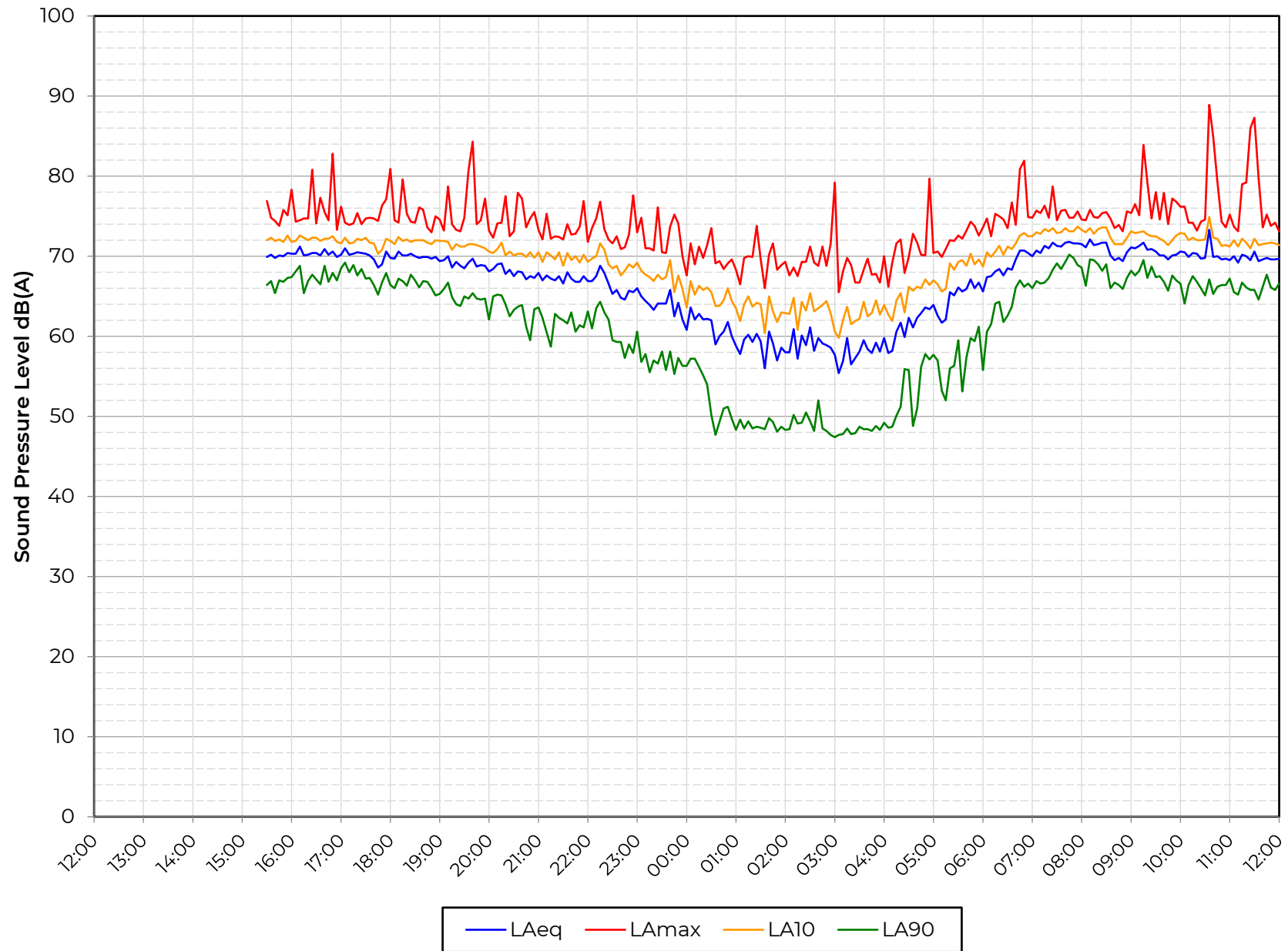
Michael Symmonds MIOA
CLARKE SAUNDERS ACOUSTICS



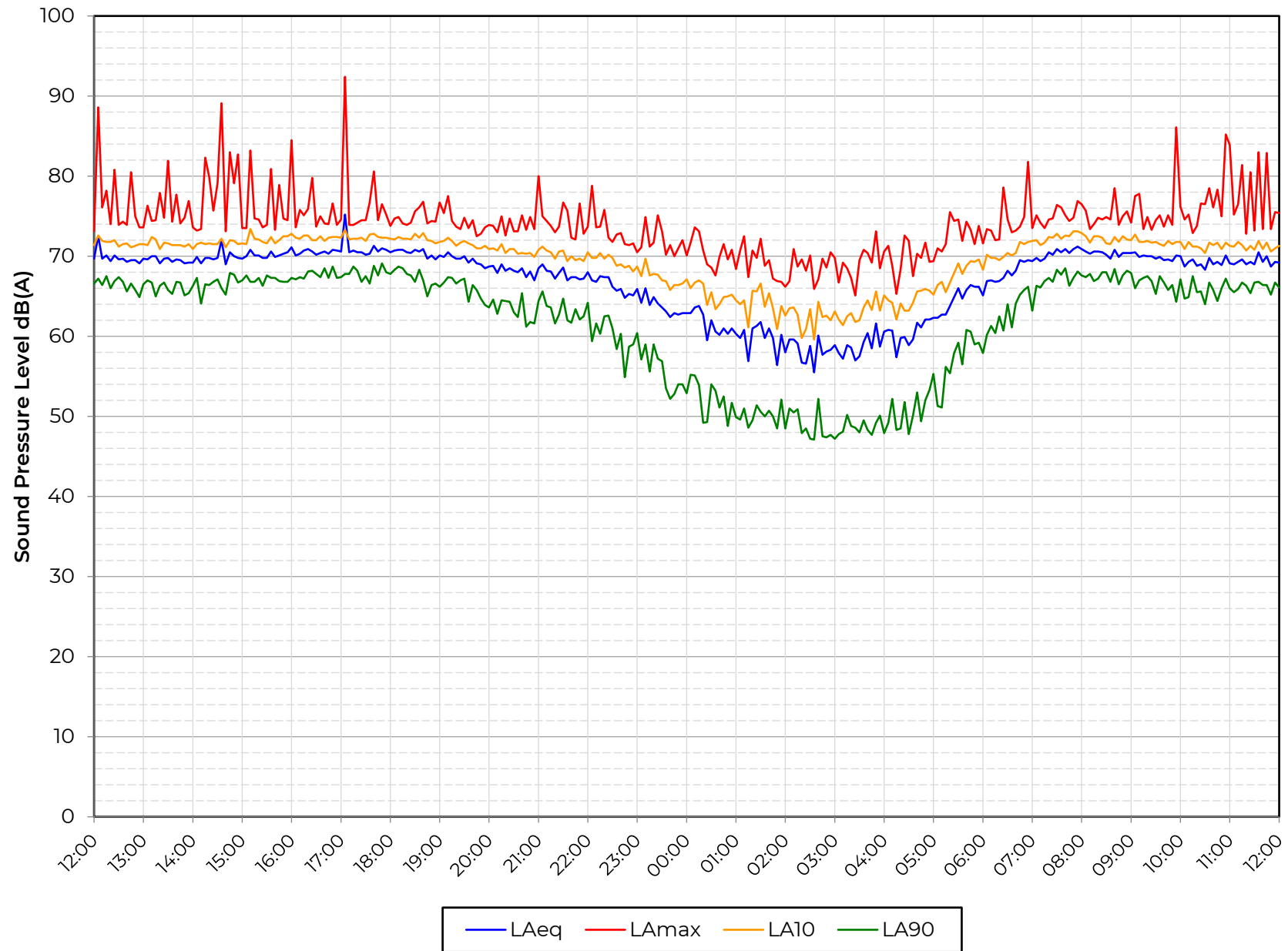
Indicative Site Plan

Figure AS12906.SP1

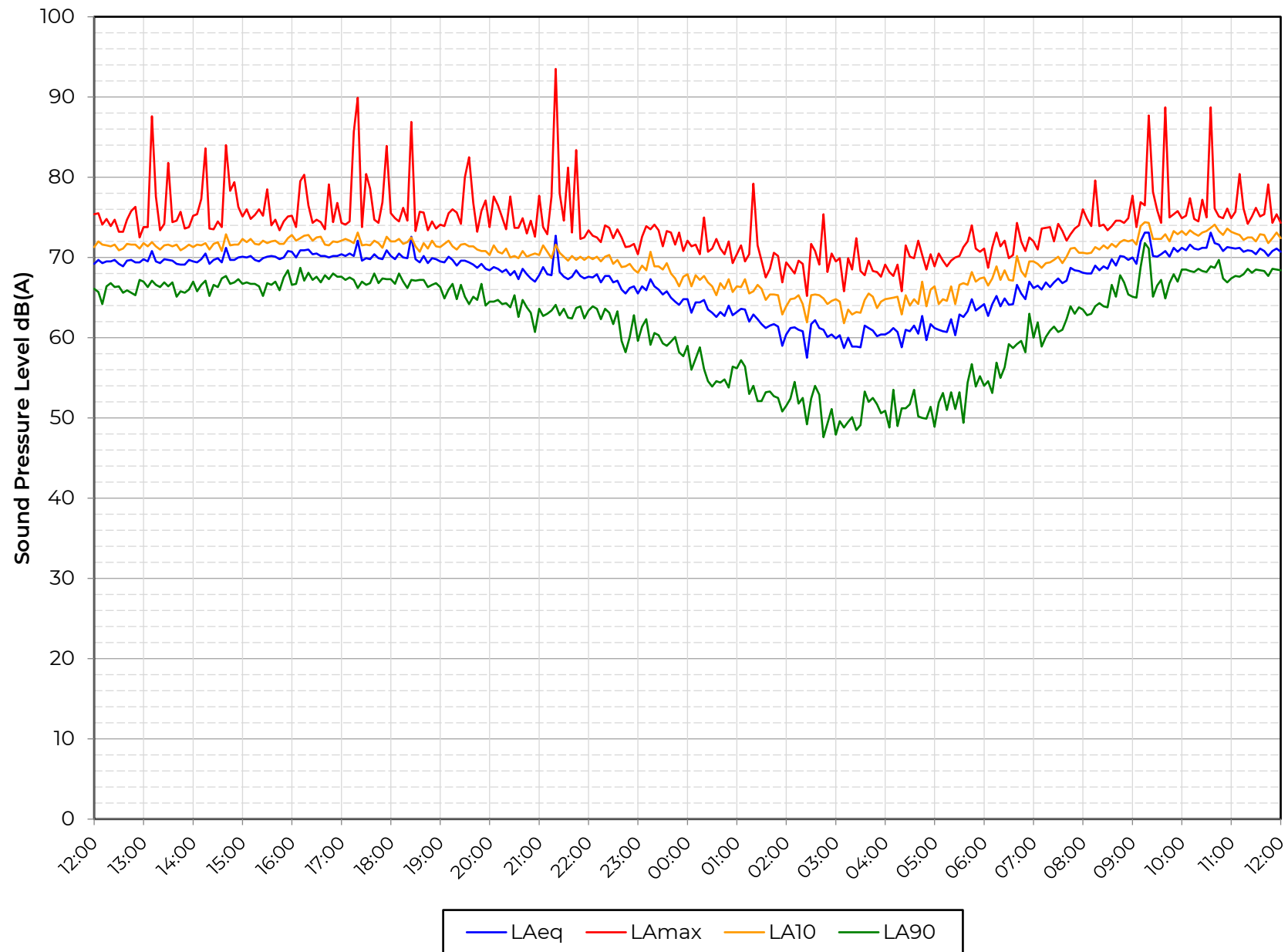
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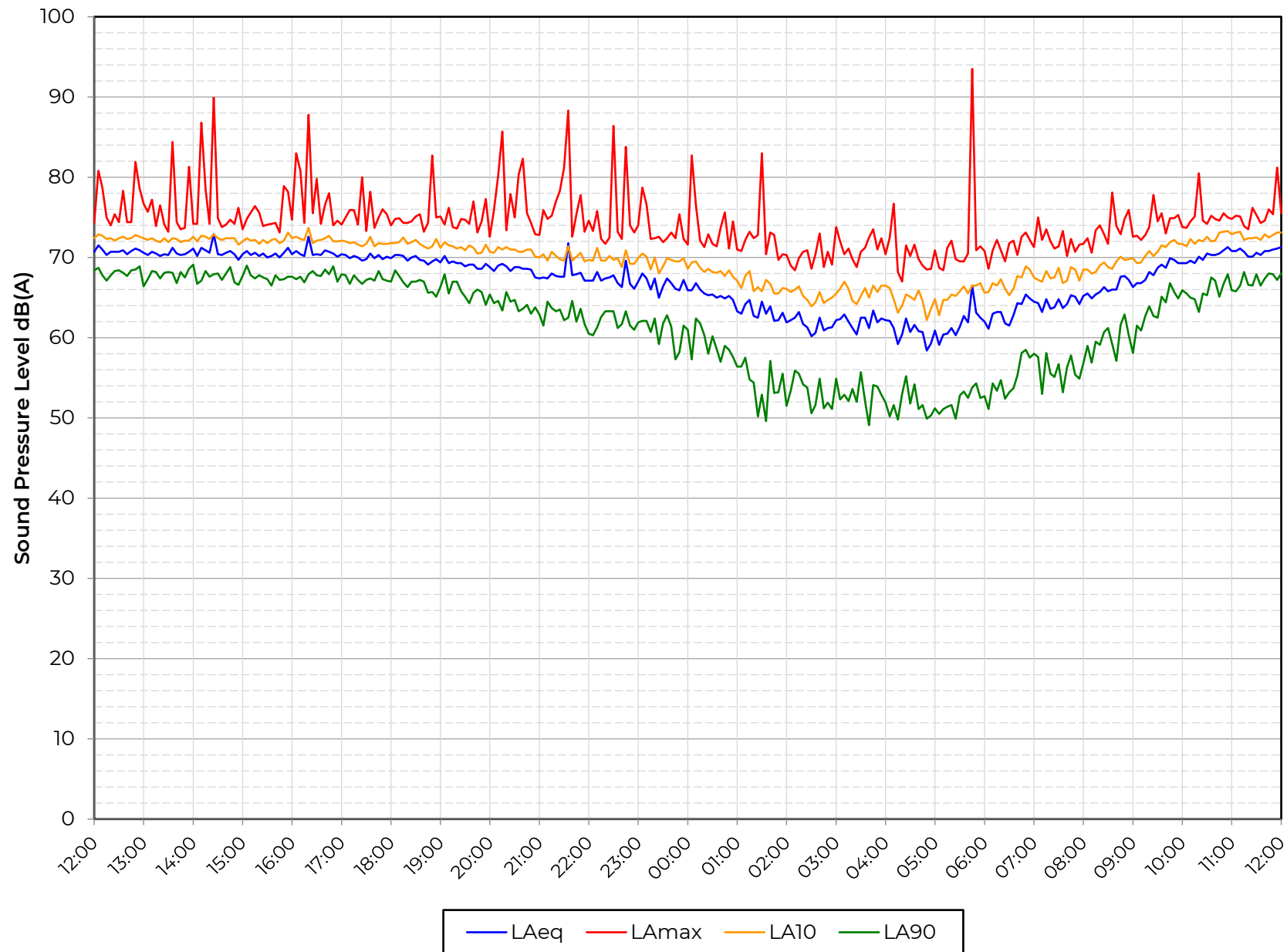
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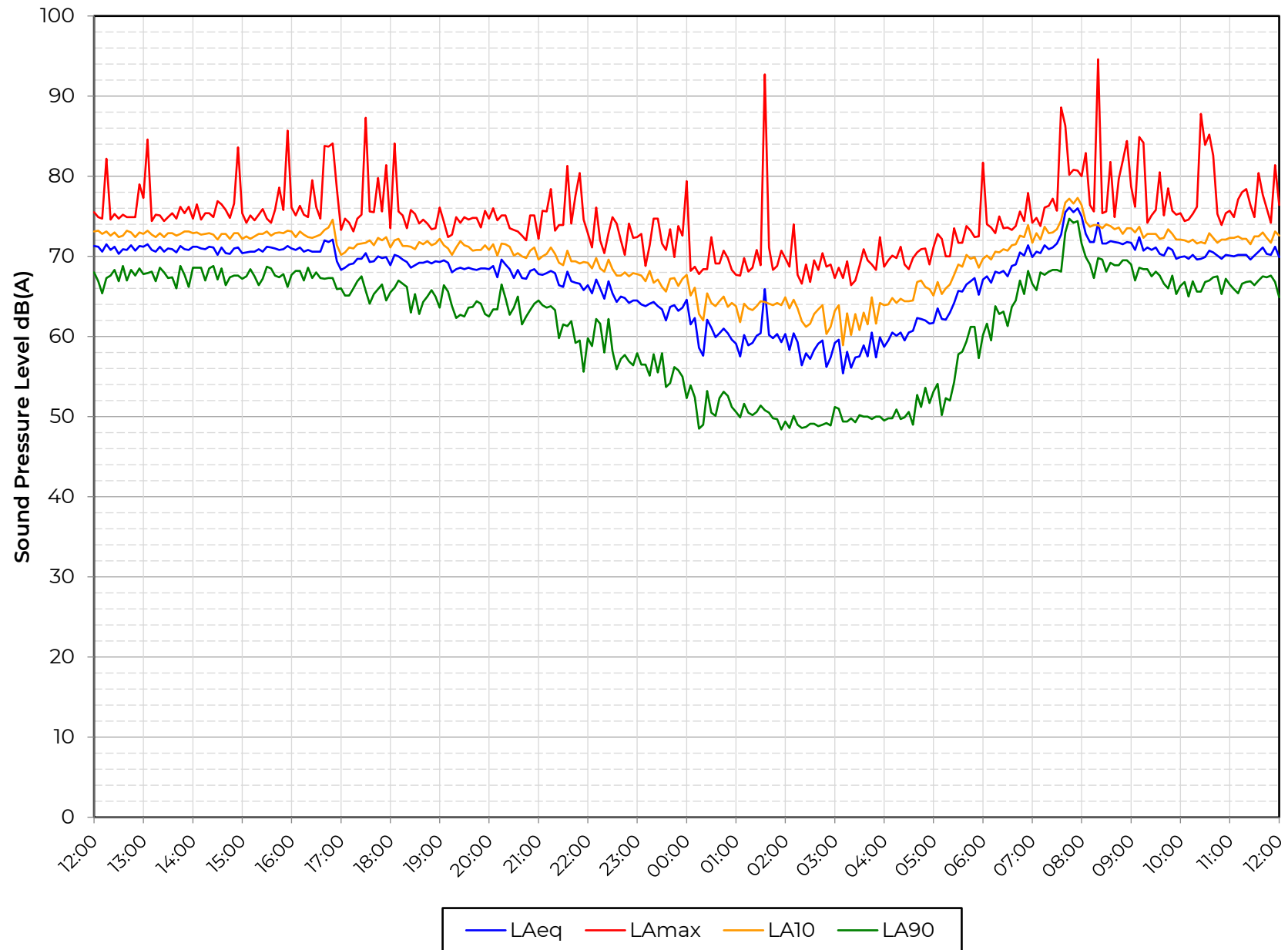
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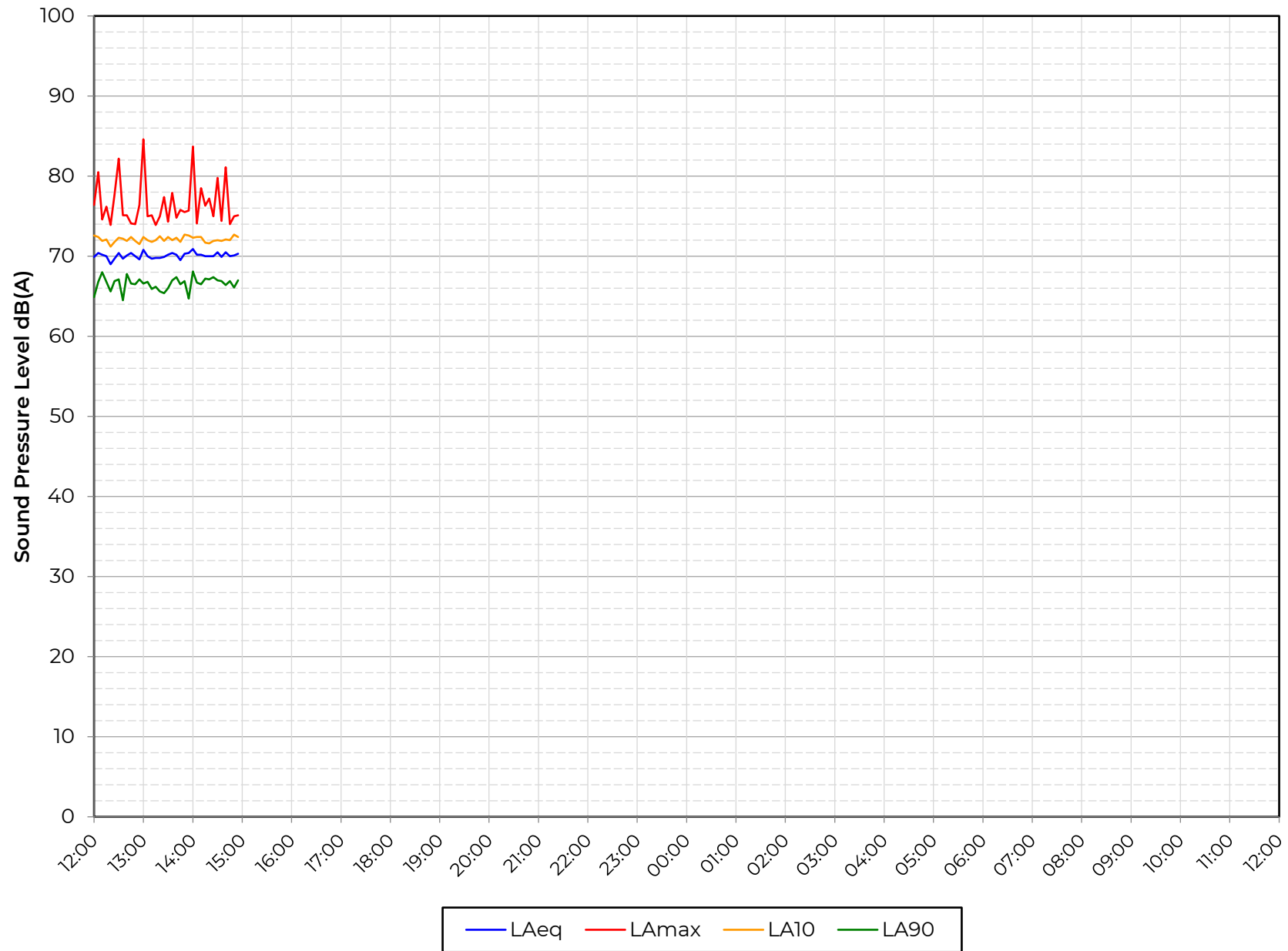
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Position 1



Position 1



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.

APPENDIX B

AS12906 - 101 Oxford Road, Reading
SUMMARY OF PLANT SOUND CALCULATIONS

PLANT SOUND TO 2 HOWARD STREET		63Hz 125Hz 250Hz 500Hz 1kHz 2kHz 4kHz 8kHz	dB(A)
AUX ACHP-H04/4R2HA-M		No spectral data available	56
Reflection off wall			3
Screening Loss	Inf - 12 Howard Street		-7
Distance Loss	9m		-19
	Subtotal		33
Specific sound level at receptor	$L_{eq} 1hr$		33