



PREPARED: 25 July 2025

78 READING ROAD, EVERSLEY

NOISE IMPACT ASSESSMENT

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Project Ref:	AS10797	Project Name:	78 Reading Road, Eversley
Report Ref:	AS10797.250602.R2	Report Title:	Noise Impact Assessment
Client Name:	Robert Collard		
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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 Planning consent is sought to regularise the use of land to the rear of 78 Reading Road, Eversley, under Use Classes B8 and E(g)(iii).
- 1.2 An equivalent application for the site, planning reference 193059, was previously granted consent in 2020 but lapsed due to the timeframes involved.
- 1.3 CSA has liaised with Wokingham Borough Council who has confirmed that it would be appropriate to undertake an updated environmental noise survey as the residual soundscape may have changed in the interim. The Council's environmental health team have also requested that reversing alarms be considered in the assessment of noise from goods vehicles.
- 1.4 Clarke Saunders Acoustics (CSA) has undertaken an updated baseline survey to establish the existing background and ambient sound levels. The measured noise data has been used to assess the noise impact from revised transport figures and determine the anticipated impact at the most affected noise sensitive receptors.
- 1.5 On the basis of a BS4142 numerical assessment and consideration to the associated context, the proposed change of use is not expected to give rise to adverse sound impact at nearby sensitive receptors.

2.0 INTRODUCTION

- 2.1 Prior to the amendments of planning use classes in September 2020, the land to the rear of 78 Reading Road, Eversley had previous conditional planning consent for use as Class B1 – *Light Industrial* and Class B8 - *Storage and Distribution*. This was approved under planning application reference 193059 submitted to Wokingham Borough Council. CSA prepared a noise impact assessment to accompany this application, report reference AS10797.190902.R1.
- 2.2 Following a lapse of the planning permission granted in 2020 due to time constraints, planning consent is now sought to regularise the use of the site under Use Classes B8 – *Storage and Distribution* and E(g)(iii) – *Industrial processes which can be carried out in a residential area without detriment to its amenity*. The proposals and intended uses are understood to be identical to the previous application, but reflect the change in naming convention introduced in Town and Country Planning (Use Classes) (Amendment) (England) Regulations 2020 .
- 2.3 Clarke Saunders Acoustics has been appointed to conduct a baseline environmental noise survey and an acoustic assessment to determine the likelihood of adverse sound impact from the proposal to nearby sensitive dwellings.
- 2.4 A revised trip generation statement has been provided by the project transportation consultant and an assessment of noise contributions from commercial vehicle movements has been undertaken. Noise data for commercial vehicle movements is inclusive of tonal reversing/beeping alarms as requested by the environmental health department at Wokingham Borough Council (WBC).
- 2.5 A summary of the acoustic terminology used throughout this report is provided at Appendix A.

3.0 SITE DESCRIPTION & PROPOSALS

Site Description

- 3.1 The site lies in a mixed residential and agricultural area with multiple commercial premises nearby as well. It is located to the east of the single carriageway A327 (Reading Road).
- 3.2 The site is accessed from an unnamed road off the A327, passing between detached dwellings no. 78 (owned by the applicant), no. 82 and, further up the access road, no. 80a Reading Road. These receptors are expected to be those most affected by noise from activity associated with the proposals.
- 3.3 The site has two existing commercial buildings that are currently vacant. Most recently, the site was used by a roofing contractor's business and for minibus storage.
- 3.4 There is a telephone exchange (80 Reading Road) and residential dwelling (No. 80a Reading Road) to the west of the site and a commercial timber and building supplies business, T.S Renovations, to the south. The site is bounded by agricultural fields to the north and east.

Proposals

- 3.5 Consent is sought for Use Class B8 – *Storage and Distribution*; and E(g)(iii) – *Industrial processes which can be carried out in a residential area without detriment to its amenity*.
- 3.6 Whilst there is currently no targeted tenant or business type associated with the proposed E(g)(iii) use, by definition, industrial uses falling under this use class can be carried out in any residential area without detriment to the amenity. This includes noise, vibration, smell, fumes, soot, ash, dust and grit.
- 3.7 There is currently no targeted tenant for the proposed B8 use class which covers both storage and distribution uses. The proposal does, however, not include any variation of the existing relatively small building structures on site. It is therefore likely that the primary use will be open-air storage. The primary noise source from future use is anticipated to be commercial vehicles accessing the site and vehicle movements within the confines of the site.
- 3.8 Proposed operating hours for the site are 07:00 – 19:00 hours Monday to Friday and 08:00 – 13:00 hours on Saturdays.
- 3.9 The site and surroundings are shown in the appended site plan AS10797/SP1.

Soundscape

- 3.10 The existing sound climate in and around the site is primarily determined by passing road traffic on the A327, with a contribution from aircraft flyovers and occasional vehicular movements to and from T.S Renovations.
- 3.11 No external activity was noted from T.S Renovations during the two short site visits by CSA, however, a previous survey undertaken at the site in 2018 as part of the former planning application noted significant noise contributions from commercial activity externally in the T.S Renovations yard. This included the use of a wood chipper as well as vehicles and tractor movements within the yard.

- 3.12 Commercial activity associated with the proposed use classes will therefore not occur in isolation, where nearby residential receptors already experience higher levels of commercial noise from time to time.

4.0 RELEVANT GUIDANCE

4.1 LOCAL AUTHORITY REQUIREMENTS

- 4.1.1 CSA liaised with the Environmental Health Department at Wokingham Borough Council to confirm assessment methodology and discuss the context of the application.
- 4.1.2 It was agreed that the methodology followed in the previous acoustic report, reference AS10797.190202.R1, submitted to planning for B1/B8 use was appropriate. As E(g)(iii) is restricted to uses that can be carried out in a residential area without detriment to its amenity, including with respect to noise, the assessment will focus on the proposed B8 Use. As discussed with the environmental health officer, assessment of proposed commercial vehicle movements associated with B8 use will include the use of reversing alarms.
- 4.1.3 A revised transport statement has been prepared which will be used to assess commercial vehicle contributions associated with the proposed B8 use. The assessment will follow methodology in BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound*.

4.2 BS4142:2014+A.1:2019

- 4.2.1 BS4142 provides a methodology to assess the likelihood of adverse impact arising from sound generated by industrial and commercial sound sources. Context forms an important part of the Standard.
- 4.2.2 A summary of the BS4142 assessment methodology is provided at Appendix B.

5.0 COMPETENCE

- 5.1 This noise impact assessment has been carried out by Andrew Nesbitt, a Consultant at Clarke Saunders Acoustics. Andrew has more than 7 years' acoustics consultancy experience, holding an MEng (Hons) degree in Acoustical Engineering from the University of Southampton and is a Corporate Member of the Institute of Acoustics (MIOA).
- 5.2 The report adheres with the principles required by the Institute of Acoustics in its Code of Conduct, and the work is within the author's own area of knowledge and expertise. Where opinions have been expressed these represent true and complete professional opinions on the matters to which they refer.
- 5.3 Uncertainty is minimised where possible and deviations from relevant standards and guidance are clearly stated and discussed within the technical report.
- 5.4 CSA is a full member of the Association of Noise Consultants (ANC).

6.0 ENVIRONMENTAL SOUND SURVEY

6.1 PROCEDURES & EQUIPMENT

- 6.1.1 A survey of the existing background and ambient sound levels was conducted at the positions shown in site plan AS13689/SP1.
- 6.1.2 Measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels were taken between 12:00 hours on Friday 30th May and 08:30 hours on Tuesday 3rd June 2025, following procedures in BS7445:1991 (ISO 1996 2:1987) *Description and measurement of environmental noise Part 2: Acquisition of data pertinent to land use* and BS4142.
- 6.1.3 The following equipment was used during the course of the survey:
- 1 no. NTi data logging sound level meter type XL2;
 - 1 no. Svantek data logging sound & vibration level meter type 958;
 - 1 no. Norsonic sound level field calibrator type 1251.
- 6.1.4 Calibration of the sound level meters was verified before and after use. The calibration drift was within the accepted limits given in the Association of Noise Consultants (ANC) Green Book: Environmental Sound Measurement Guide and BS4142:2014+A.1:2019.
- 6.1.5 The weather during the survey was generally dry with light winds. These meteorological conditions are suitable for the measurement of environmental sound.

6.2 SURVEY RESULTS

- 6.2.1 Figures AS10797/TH1-4 and AS10797/TH5-8 present the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at monitoring location MP1 and MP2 respectively.
- 6.2.2 Measurement data at position MP1 is representative of 80A Reading Road, whilst that at position MP2 is representative of the dwellings at 78 and 82 Reading Road.
- 6.2.3 Table 6.1 presents the ambient, background and typical maximum sound pressure levels during daytime and typical operating hours. No night-time operation is proposed, although night-time noise levels are provided for reference.

MONITORING LOCATION	MONITORING PERIOD	TYPICAL LOWEST BACKGROUND* L_{A90}	AMBIENT $L_{Aeq,T}$	TYPICAL MAXIMUM** L_{AFmax}
MP1: 80a Reading Road	Daytime 07:00–23:00	36 dB	53 dB	71 dB
	Night-time 23:00–07:00	26 dB	51 dB	69 dB
	Typical operating hours 07:00–19:00	38 dB	54 dB	74 dB
MP2: 78 and 82 Reading Road	Daytime 07:00–23:00	36 dB	54 dB	72 dB
	Night-time 23:00–07:00	23 dB	49 dB	67 dB
	Typical operating hours 07:00–19:00	38 dB	56 dB	74 dB

Table 6.1: Environmental sound survey results

[dB ref. 20µPa]

* derived as the 10th percentile of the L_{A90} dataset

** derived as the 90th percentile of the L_{AFmax} dataset

6.2.4 Noise levels at both monitoring positions were found to be generally similar.

6.2.5 Whilst no significant activity was noted in the external yard at T.S Renovations, the previous noise survey undertaken as part of planning application 193059, found that noise from this premise can be clearly perceptible at 80a Reading Road, with a lower impact at the residential receptors further away. Previous activity noted at T.S Renovations yard included use of a woodchipper and vehicles entering and leaving the yard. A tractor with a tonal reversing alarm was also noted. Previous discussions with the Applicant indicated that use of bench saws and small excavators may also occur in the T.S Renovations yard.

7.0 NOISE IMPACT ASSESSMENT

7.1 Consent is sought for the application site to operate under use classes B8 and E(g)(iii), as follows:

- **B8 – Storage and Distribution:** Premises used for storage and/or distribution, including warehousing and open-air storage.
- **E(g)(iii) – Commercial, Business and Service:** Industrial uses that can be carried out in any residential area without detriment to the amenity of that area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit.

7.2 As discussed in Section 4.0, assessment of the E(g)(iii) is excluded where the definition of the use class protects the amenity of nearby dwellings with respect to noise. If future occupying E(g)(iii) tenants were to generate noise levels that would result in the loss of amenity, Wokingham Borough Council would pursue the tenant to cease the noise generating activity.

7.3 DISCUSSION ON B8 – STORAGE AND DISTRIBUTION USE

Proposed Use

7.3.1 The scale of activity permitted under use class B8 can be wide, where and can range from low numbers of storage lockers to large scale warehouses and distribution centres.

- 7.3.2 The existing buildings will not be altered and no new buildings are to be constructed as part of the application. As the existing buildings are relatively small, the functional use of the application site is likely to be largely restricted to open air storage.
- 7.3.3 The primary activity is therefore anticipated to be vehicle movements and loading/unloading activity.
- 7.3.4 According to the transport statement, the site has the capacity for an articulated lorry to turn, but where no significant distribution use is anticipated, the majority of vehicles visiting the site are expected to be Cars, Light Goods Vehicles (LGV) and Other Goods Vehicles 1 (OGV1).

Historical Uses

- 7.3.5 The existing 'main farm building' on this site was previously approved for Class B8 use in May 1993 (application ref. 40783).
- 7.3.6 Similarly, a change of use from Class B1 to B8 was permitted retrospectively, for the storage of eight minibuses in November 2008 (application ref. F/2008/2064).
- 7.3.7 Based on the planning history, there is a precedent for usage of the land and buildings for Class B8 Storage and Distribution.

7.4 COMMERCIAL VEHICLE ASSESSMENT

- 7.4.1 CSA has reviewed trip generation data provided by the project transport consultant, Paul Basham Associates. Whilst tenants are still to be confirmed, it is understood that the trip generation data has been undertaken on the basis of the proposed use classes.
- 7.4.2 The Transport Statement, reference 028.0055/TS/3, indicates that use of the application site, as intended, will have a negligible impact on highway road traffic levels (i.e the A327 / Reading Road). It follows that, where negligible impact from the proposals is expected on the local highway network, no notable change in highway road traffic noise levels will occur due to operation of the application site.
- 7.4.3 CSA has undertaken an assessment based upon the transport consultant's TRICS data for the proposed use. The TRICS data indicated a daily total of 19 vehicle movements (either arrivals or departures), with 2 movements predicted in a peak hour. Typical vehicles accessing the site are expected to be a mixture of cars and light commercial vehicles, with occasional OGV access. To provide a robust assessment, and in light of local authority comments, it has been assumed that all OGV's accessing site will have a tonal reversing alarm.
- 7.4.4 The peak hour has been assessed against the background sound levels determined across the proposed operating hours.
- 7.4.5 The noise impact predictions are based upon library data for the typical sound sources expected for the proposed operation, such as passenger cars and OGV's manoeuvring and reversing, as well as periods of loading/unloading.
- 7.4.6 It is acknowledged that vehicle movements can cover a wide range of sound levels. To enable a robust evaluation, values at the upper end of CSA's measurement data library have been used for the assessment.
- 7.4.7 A summary of the library sound levels used in the assessment is given in Table 7.1.

SOUND SOURCE	SOUND PRESSURE LEVEL	REFERENCE DISTANCE
Loading/Unloading (with Forklift)	57 dBA	10 m
Loading/Unloading (with Forklift and reversing alarm)	64 dBA	10 m
Passenger Car / Small Vehicle Movements	67 dBA	1 m
OGV Movements (Forwards)	69 dBA	5 m
OGV Movements (Reversing with tonal alarm)	86 dBA	5 m

Table 7.1: Summary of library data used in commercial vehicle assessment [dB ref. 20µPa]

7.4.8 The assessment has been undertaken to the nearest sound sensitive receptor, No. 80a Reading Road. Noise levels and potential impact will be lower at other receptors due to increased distance and screening losses.

7.4.9 The assessment has been based upon a peak hour, with two vehicle movements on site; a car and an OGV. The following assumptions are made for a single one-hour daytime BS4142 assessment period:

- The car movement lasts approximately 2 minutes and is afforded line of site screening to the nearest sound sensitive receptor. This is assumed due to the positioning of the proposed car parking area.
- The OGV movement is longer, lasting approximately 5 minutes. The assessment is based upon the OGV maneuvering forwards for 4 minutes into the site and reversing for 1 minute. Reversing activity is inclusive of tonal reversing alarms. As much of the open storage area would be situated to the rear of the site, and the OGVs would be more likely to access this area, more significant acoustic screening will be present due to the building massing on site.
- A robust assessment of loading/unloading activity is provided on the basis that the activity is being undertaken by forklifts, fitted with reversing alarms. Based on previous observations and surveys, the assessment assumes that the 1-hour period includes 6 minutes of forklift reversing activity and 20 minutes of loading and unloading activity in a forward direction, without the contributions of the alarm. Much of the loading/unloading activity is expected to occur to the rear of the site, and benefit from significant acoustic screening.

7.4.10 BS4142 assessments account for acoustic features which can make sound sources more distinguishable at the receptor. Upon the request of the environmental health department at Wokingham Borough Council, the assessment assumes the use of tonal reversing alarms. Given the significant distance and acoustic screening effects between the vehicle movements and nearest sensitive receptor, tonal reversal alarms are anticipated to be “just perceptible” within the ambient soundscape. A tonal character correction of +2 dB has therefore been applied in the calculation of commercial vehicle noise emissions within the open-air storage space to the receptors.

7.4.11 No further acoustic features as set out in BS4142 are expected to be readily distinguishable at the receptor against the ambient soundscape.

7.4.12 A summary of the sound impact predictions is provided in the following Table 7.2.

PARAMETER	LEVELS AT 80A READING ROAD
Specific Sound Level	$L_{Aeq,1hr}$ 38 dB
Acoustic Feature Correction	+2 dB
Rating Sound Level	L_R 40 dB
Background Sound Level (T = 07:00 – 19:00)	L_{A90} 38 dB
BS4142 Numerical Assessment Level	+ 2 dB

Table 7.2: Summary of BS4142 noise impact predictions of commercial vehicle activity

7.4.13 BS4142 states that “the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”. Initial numerical assessment therefore tends towards a low impact, depending on the context.

7.4.14 Contextually, commercial activity forms part of the existing daytime soundscape, and the proposal is expected to result in a relatively low level of activity within the site. The anticipated activities associated with the proposed use classes are expected to result in lower noise levels, or similar, to those experienced from the adjacent commercial premises. Whilst variable, noise levels are expected to be generally low at nearby noise sensitive receptors, due to distance propagation effects and acoustic screening owed to the site layout and boundary wall.

7.4.15 On the basis of the numerical and contextual assessment above, the proposed change of use application is not anticipated to give rise to adverse impact at nearby receptors.

8.0 UNCERTAINTY

- 8.1 As per the requirements of BS4142:2014+A1:2019, the uncertainty in the assessment is considered and reported. This is not an indication of error, but an acknowledgement of possible variability of the factors contributing to this assessment.
- 8.2 Use of a calibrated type 1 sound level meter reduces measurement instrumentation error to insignificant levels as compared to environmental variations.
- 8.3 Sound levels associated with the typical operation of the proposed uses has been based on CSA measured/library data. To ensure a robust assessment, values at the upper end of CSA's measurement data library have been used for the assessment.
- 8.4 Background sound levels are variable throughout the day. Use of the typical lowest background level has reduced uncertainty in relation to the outcome of the assessment. Background noise levels would typically be higher, with resultant impacts significantly lower.

- 8.5 CSA has contacted the Environmental Health department at Wokingham Borough Council in advance of the assessment for the planning application to minimise uncertainty with regards to methodology and data.
- 8.6 It has been necessary to make several assumptions on the nature of the proposed uses operation. As the variation of sound levels experienced within the proposed commercial units is very wide, a contextual discussion with regards to existing uses and sound sources has been undertaken.

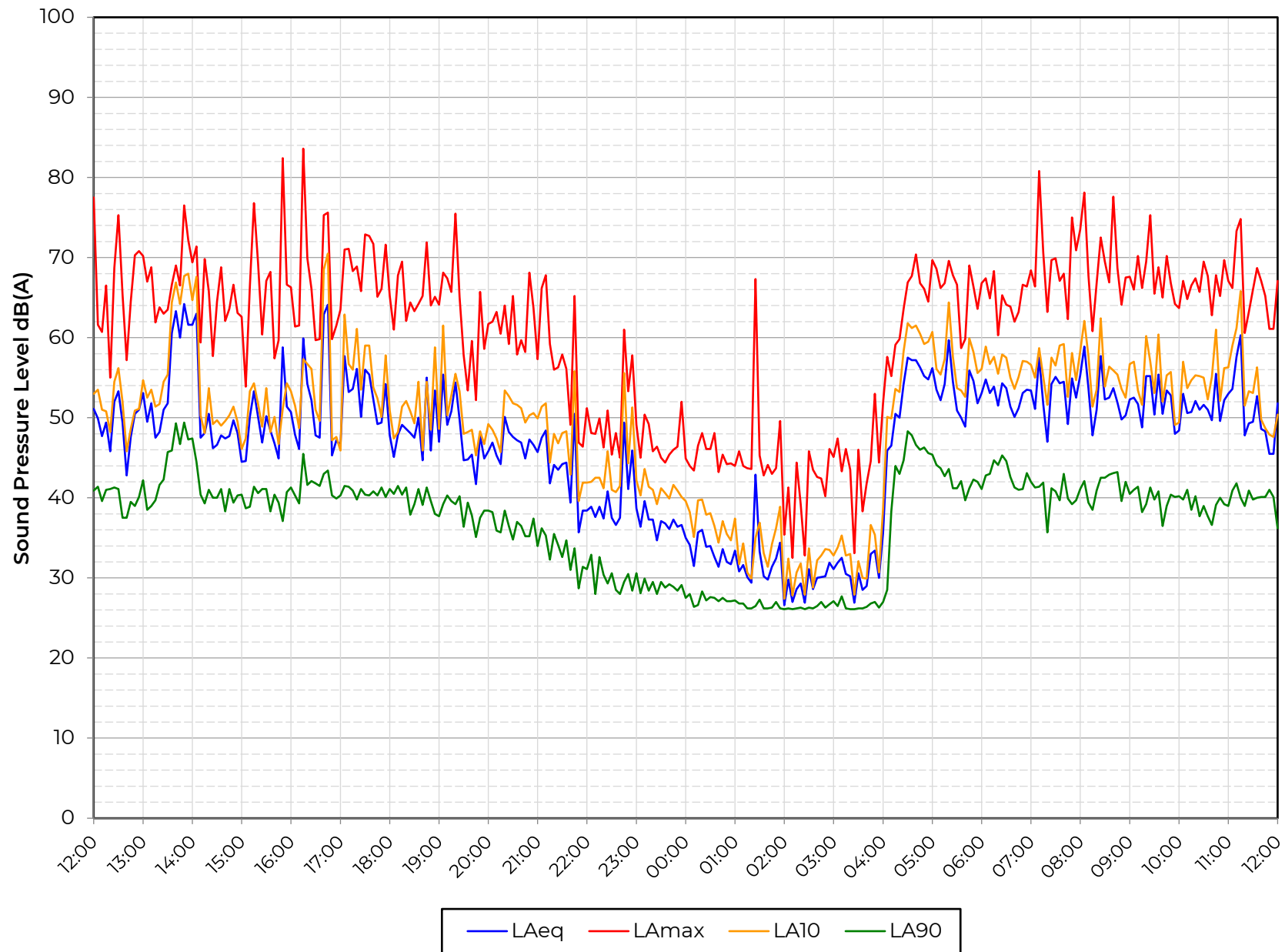
9.0 CONCLUSION

- 9.1 Planning consent is sought to regularise the use of land to the rear of 78 Reading Road, Eversley, under Use Classes B8 and E(g)(iii).
- 9.2 A previous application for the site, covering the equivalent planning use classes (B8 and B1 (now E(g)(iii))), gained planning permission in 2020. Permission has lapsed for the site due to time constraints, where the local planning authority require an updated noise survey and assessment as part of the new application.
- 9.3 Clarke Saunders Acoustics has undertaken an updated baseline survey to establish the background and ambient sound levels at the site and nearby receptors. The measured noise data has been used to assess the noise impact from revised transport figures and determine the anticipated impact at the nearest affected sound sensitive receptors.
- 9.4 On the basis of a BS4142 numerical assessment and associated context, the proposed change of use is not expected to give rise to adverse sound impact at nearby sensitive receptors.

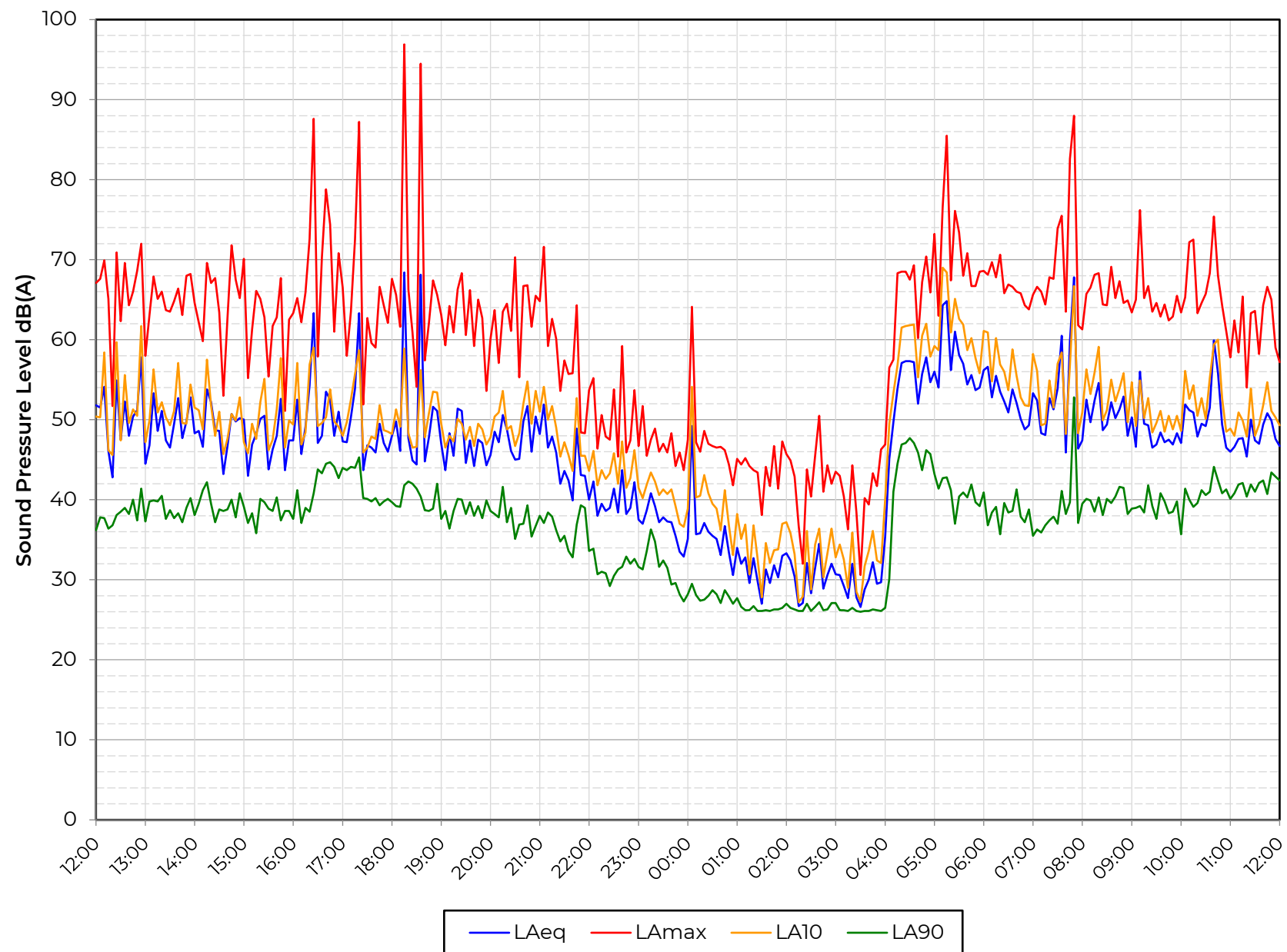
Andrew Nesbitt MIOA
CLARKE SAUNDERS ACOUSTICS



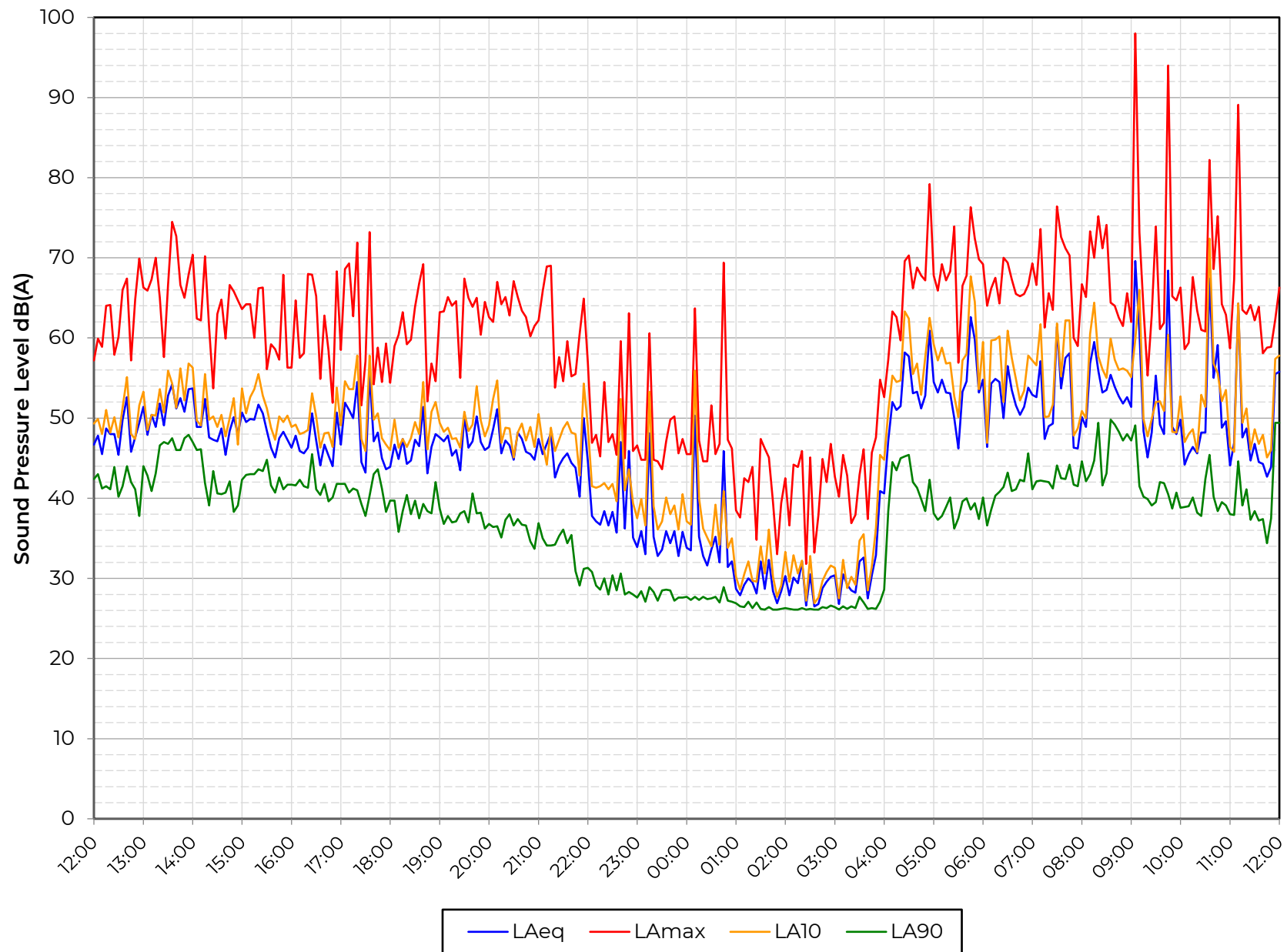
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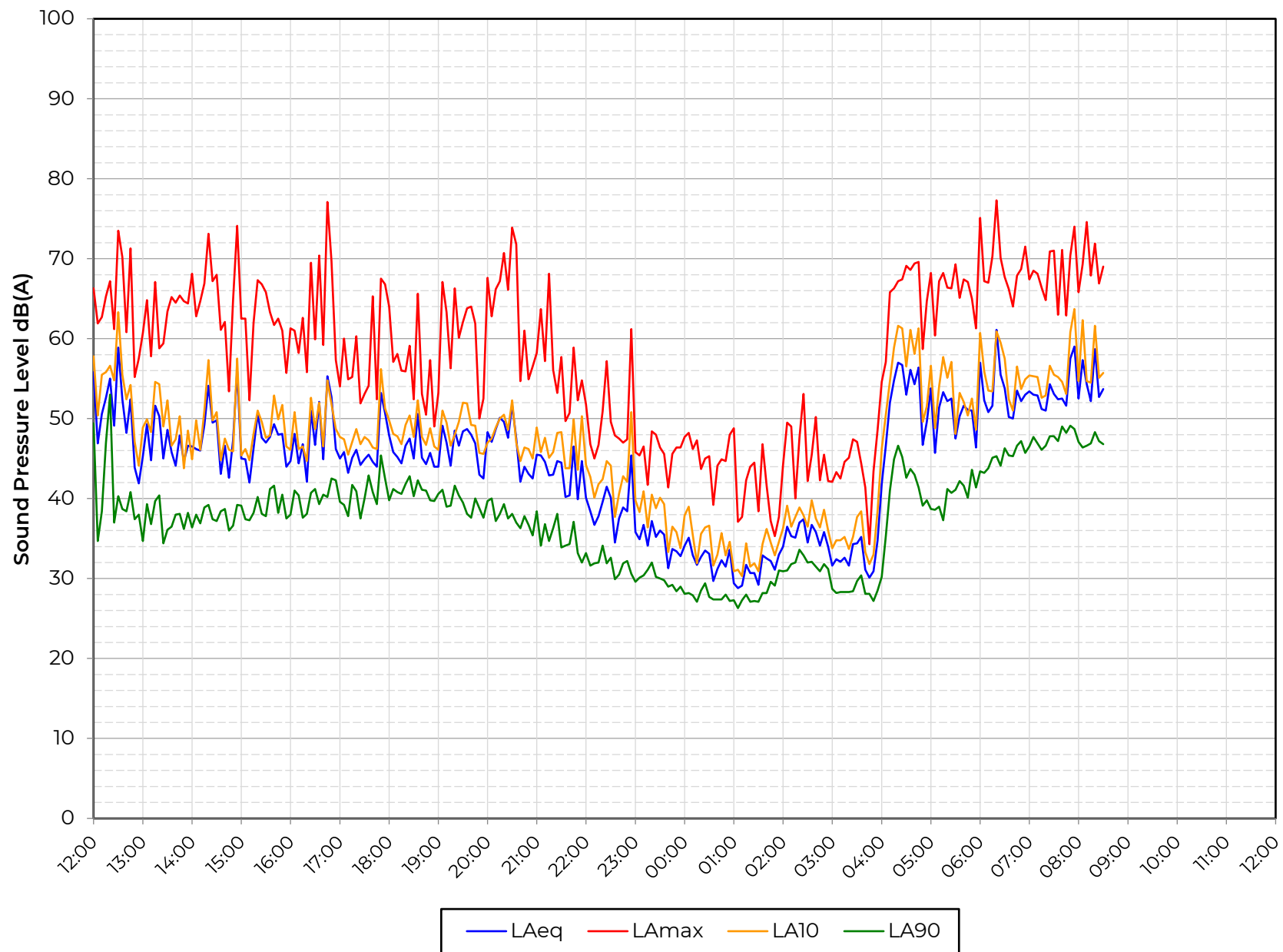
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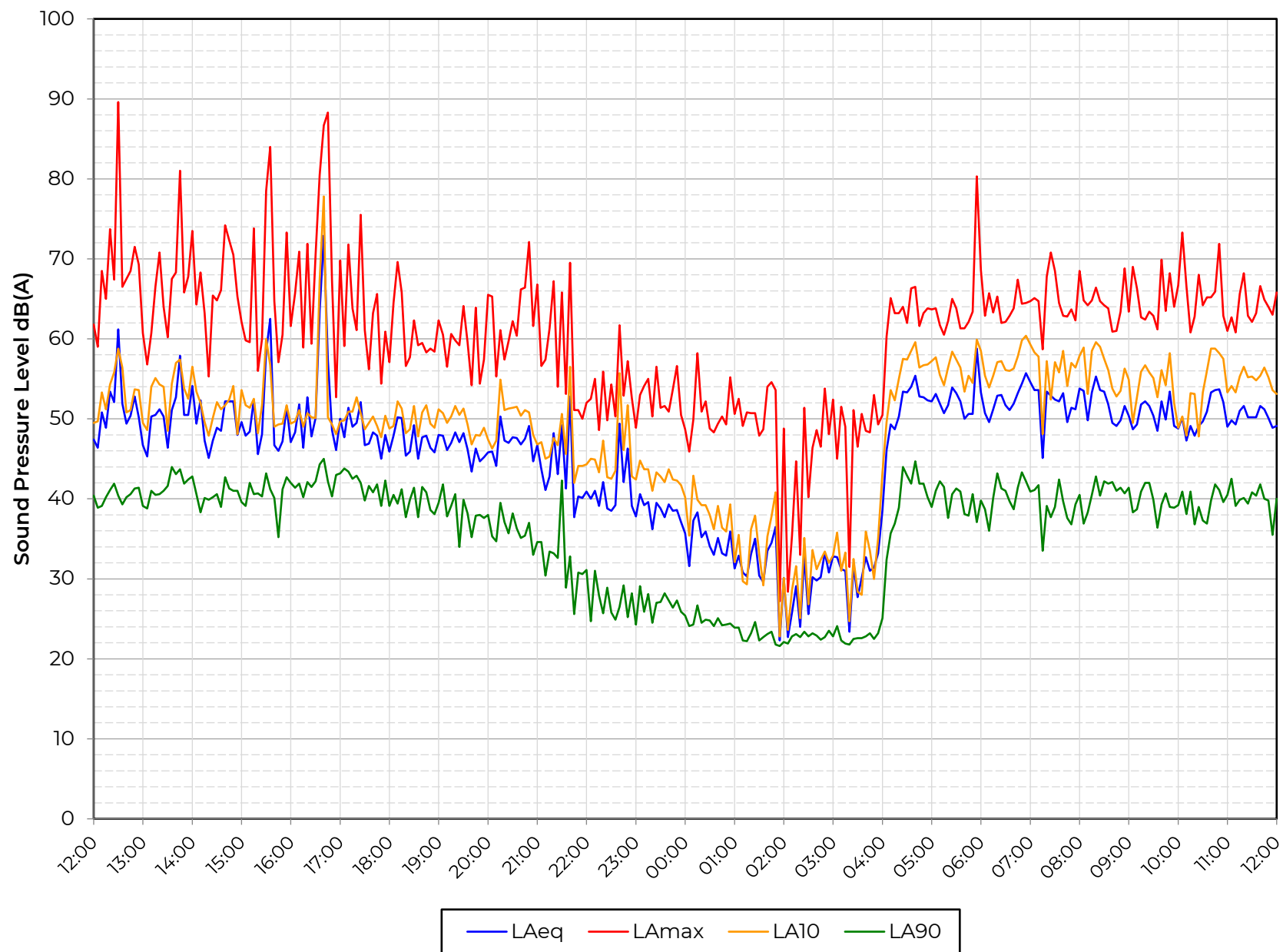
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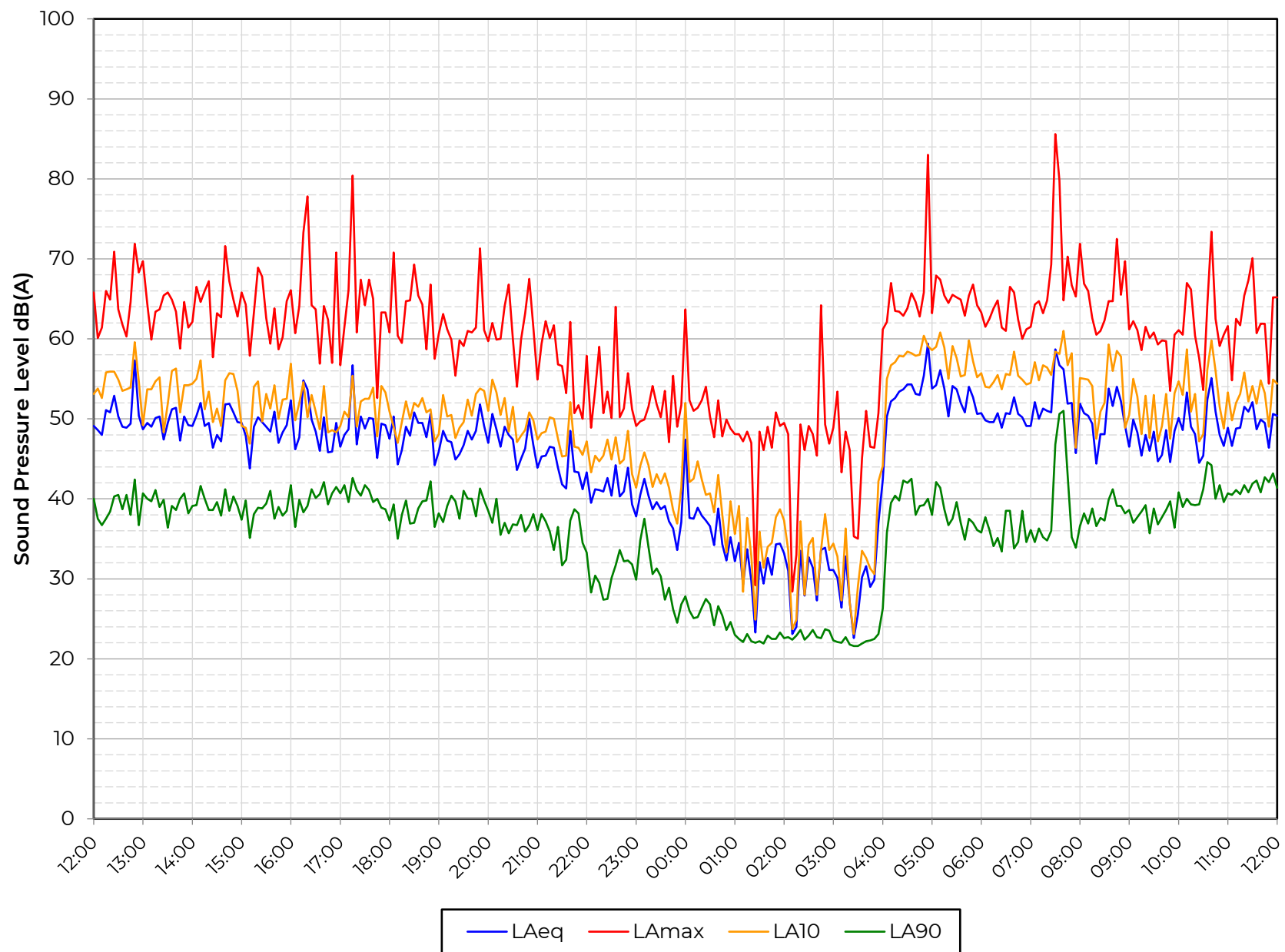


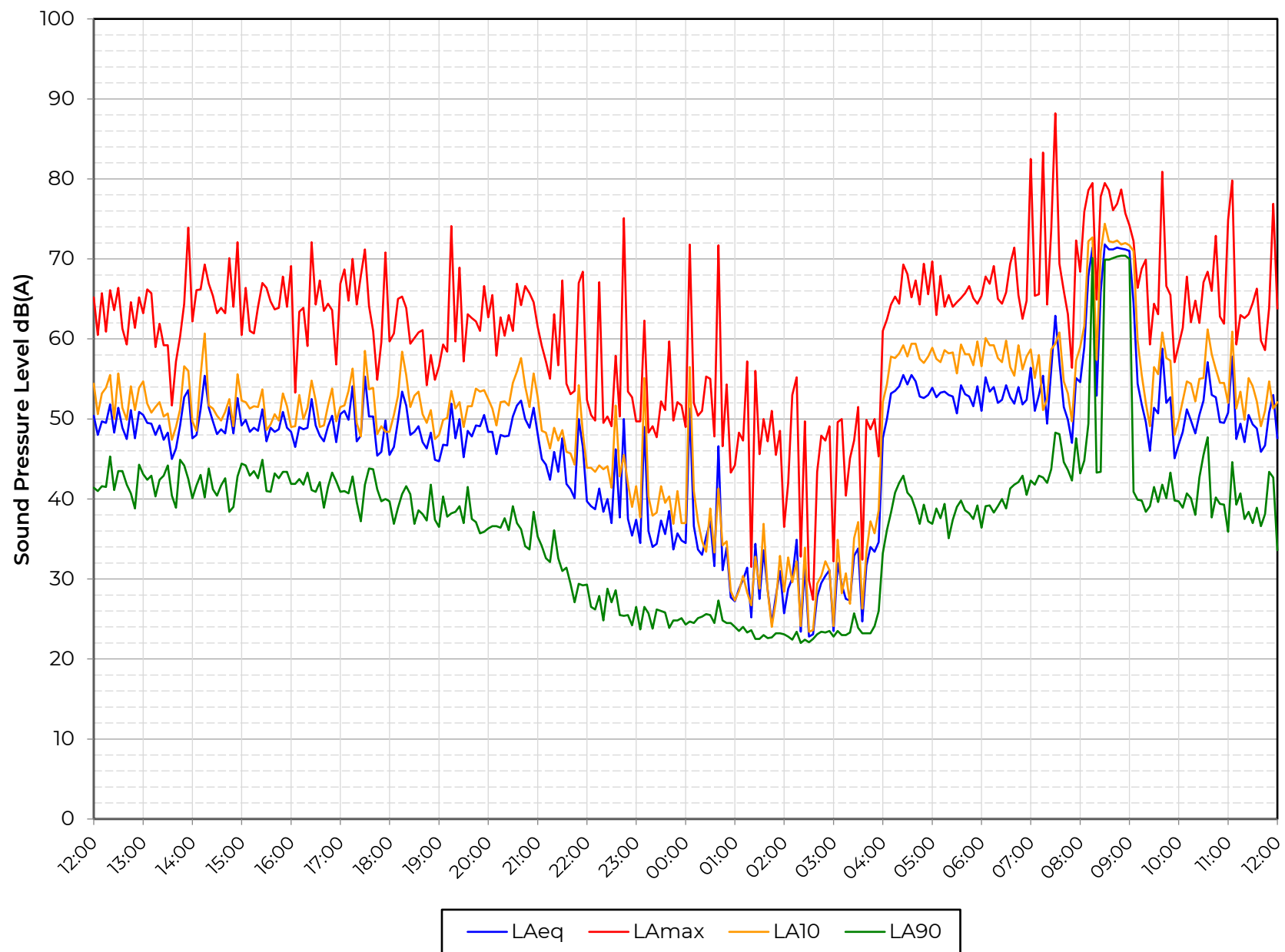
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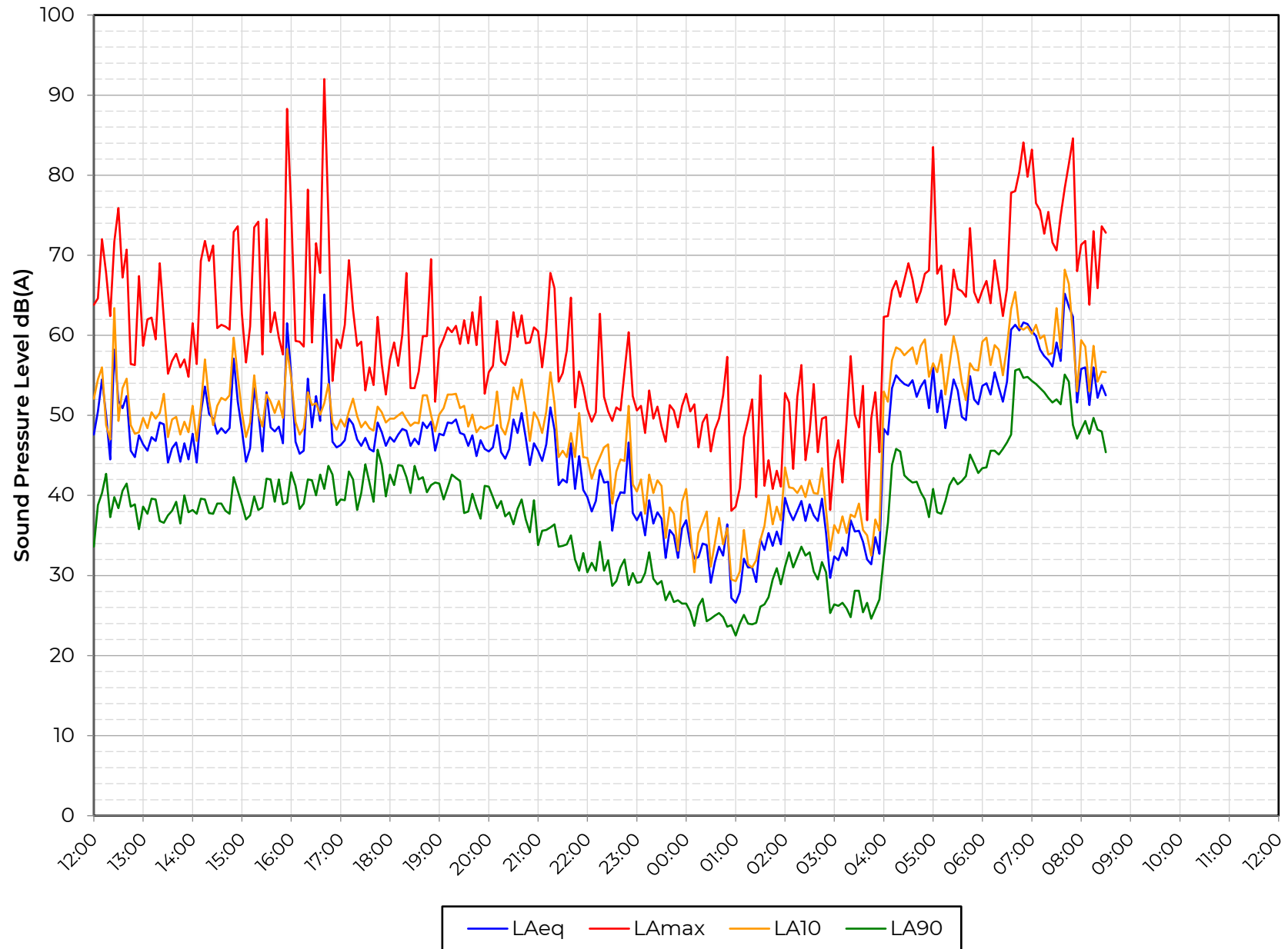
Position MP2 - No. 78/82







Position MP2 - No. 78/82



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.
NR	<i>Noise Rating</i> . A single figure noise level rating that takes into account the frequency content of an acoustic environment.
R	<i>Sound Reduction Index</i> . Effectively the Level Difference of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.
D	The sound insulation performance of a construction is described in terms of the difference in sound level on either side of the construction in the presence of a sound source on one side and the reverberant characteristics of the adjoining 'receive' space. D is the arithmetic Level Difference in decibels between the

source and receive sound levels when filtered into frequency bands.

D_{nT}	<i>Weighted Standardised Level Difference.</i> As defined in BS EN ISO 717-1, representing the Weighted Level Difference, when standardised for reference receiving room reverberant characteristics.
$D_{n,e}$	Normalised sound insulation of small building elements of fixed dimensions, such as vents, measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010.
$D_{n,f}$	Flanking sound insulation of lightweight elements, such as curtain wall mullions, measured in an accredited laboratory test suite in accordance with the procedures laid down in ISO 10848-2:2006
R_w D_w $D_{nT,w}$ $D_{n,e,w}$ $D_{n,f,w}$	Value of parameter, determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1 to provide a single-figure value.
C, C_{tr}	Spectral adaptation terms to be added to a single number quantity such as $D_{nT,w}$, to take account of the sound insulation within frequency ranges of particular interest.
$L'_{nT,w}$	<i>Weighted Standardised Impact Sound Pressure Level</i> as defined in BS EN ISO 717-2, representing the level of sound pressure when measured within a space where the floor above is under excitation from a calibrated tapping machine, standardised for the receiving room reverberant characteristics.
ΔL_w	Change in impact sound pressure level when a floor is fitted with a 'soft' or resilient covering, as measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-3:2010.

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

APPENDIX A

ACOUSTIC TERMINOLOGY AND HUMAN RESPONSE TO BROADBAND SOUND

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.

BS4142 is designed to allow contextual assessment of impact from commercial, or industrial sound on sensitive receptors. Examples covered by the Standard include:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

In brief, the assessment procedure involves establishing sound levels from the items or processes of interest, (the specific sound source(s)), corrected for any acoustic features to derive the Rating Level, (L_{Ar,T_r}), at the relevant assessment position(s). The Rating Level is compared against the existing Background Sound Level, ($L_{A90,T}$), to provide an initial estimate of impact. The Standard offers the following guidance with regard to the significance of estimated impact:

- Typically, the greater this difference, the greater the magnitude of the impact;*
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- A difference of around +5dB could be an indication of an adverse impact, depending on the context;*
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context. The lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.*

Where relevant, the initial estimate should then be modified by accounting for contextual aspects of the operation of the specific sound source and / or the context of the character of the area.

Other Assessment Parameters and Guidance on Character Corrections

The Specific Sound Level (L_s) is expressed in terms of an L_{Aeq} for a reference time interval, (T_r) of one-hour during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours). The Rating Level is also expressed in terms of the reference time interval, T_r .

The Specific Sound Level can be determined by various means, which can include prediction based on manufacturer's data and accompanying propagation calculations to the assessment position(s). This method could be used, for instance, where the specific sound source is not yet in-situ, or is in-situ but not yet operational.

Where the specific sound source is already operational and in-situ, measurements of the sound climate resulting from both the specific sound source and all other contributing sources, (known as the Ambient Sound Level, $L_a = L_{Aeq,T}$) should be measured over a representative time period, ideally at the assessment position(s).

Depending on the relative contribution of other sources not related to the specific sound, (known as the residual sound), the Specific Sound Level can be derived by logarithmically subtracting the Residual Sound Level, $L_r = L_{Aeq,T_r}$, from the Ambient Sound Level.

With justification, representative proxy locations can be used for the measurement of the ambient and/or residual sound climate. Where these measurement locations are not fully representative of the assessment position(s), measurement can be supplemented with calculation.

The Background Sound Level should ideally also be measured at the assessment position(s) but can be measured at representative proxy locations where suitable reasons can be provided. The Background Sound Level should be measured over a period which is suitable to characterise the background sound climate during the period of interest and should normally be at least 15 minutes.

When deriving the Rating Level from the Specific Sound Level, consideration is given to the character of the sound. The Standard provides several methods for deriving appropriate character corrections, offering the following advice for subjective assessment:

Tonality

For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be allocated as a penalty of 2 dB for a tone which is just perceptible at the sound receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9dB can be applied for sound that is highly impulsive considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be allocated as a penalty of 3dB for impulsivity which is just perceptible at the receiver, 6dB where it is clearly perceptible and 9dB where it is highly perceptible.

Other sound characteristics

Where the specific sound contains characteristics that are neither tonal nor impulsive, but are otherwise startling, disturbing or incongruous with the residual acoustic environment, a penalty of +3dB can be applied.

Intermittency

When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied.