



PREPARED: 16 June 2025

8 HOLMES ROAD, READING NOISE IMPACT ASSESSMENT

CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	INTRODUCTION	1
3.0	SITE DESCRIPTION AND PROPOSALS	1
4.0	LOCAL AUTHORITY REQUIREMENTS & RELEVANT GUIDANCE	3
5.0	ENVIRONMENTAL NOISE SURVEY	4
6.0	NOISE IMPACT ASSESSMENT	5
7.0	CONCLUSION	8

LIST OF ATTACHMENTS

AS14124/SP1	Indicative Site Plan
AS14124/TH1-TH6	Environmental Noise Time Histories
APPENDIX A	Acoustic Terminology

Project Ref:	AS14124	Project Name:	8 Holmes Road Reading
Report Ref:	AS14124.250605.R1	Report Title:	Noise Impact Assessment
Client Name:	Mr James Talfourd Cook		
Project Manager:	Andrew Nesbitt		
Report Author:	Andrew Nesbitt		
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 An existing dance studio at Webbs Court, 8 Holmes Road, Reading, RG6 7BH, is proposed to undergo a change of use to a residential dwelling. The proposed change of use has been submitted to Reading Borough Council under planning application reference PL/24/1161.
- 1.2 Clarke Saunders Acoustics (CSA) has undertaken an environmental noise survey and an external building fabric review, to determine whether resultant internal ambient noise levels can be made suitable for residential use.
- 1.3 Reading Borough Council (RBC) has requested that the acoustic design review determines whether the internal ambient noise levels will achieve the desirable ranges given in BS8233:2014¹ and the WHO GCN². Due consideration has been given to the relevant ventilation and cooling strategies.
- 1.4 The measured environmental noise levels are generally low. The targeted internal ambient noise levels (IANL) can, therefore, be maintained with relatively low performing external building fabric elements such as standard thermal double glazing with non-acoustically rated trickle vents.
- 1.5 Consideration has also been given to thermal comfort and the ability of the proposed dwelling to maintain appropriate noise conditions whilst expelling hot air. Noise levels are sufficiently low such that the targeted IANL can be maintained with a partially open window. The first floor bedroom is subject to slightly higher noise levels due to its elevated position, however, it benefits from a window on a quieter façade, as well as the ability to cross ventilate due to the openable Juliet balcony doors.
- 1.6 The building can be made suitable for residential use in the proposed form.

2.0 INTRODUCTION

- 2.1 A proposal has been submitted by the Applicant to RBC, under planning application reference PL/24/1161, to convert Webbs Court, 8 Holmes Road, Reading, RG6 7BH, which currently functions as a dance studio, into a single residential dwelling.
- 2.2 Following submission of the planning documentation, RBC requested further information in the form of an acoustic appraisal of the site, to determine whether suitable internal ambient noise levels can be achieved for residential use, as detailed further in Section 4.0.
- 2.3 CSA has been appointed by the Applicant to conduct this appraisal.
- 2.4 A summary of the acoustic terminology used throughout this report is provided at Appendix A.

3.0 SITE DESCRIPTION AND PROPOSALS

- 3.1 The site is located in a suburban area of Reading, with the building set back from Holmes Road by approximately 25m. The surrounding area primarily consists of residential dwellings.

¹ BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*

² World Health Organisation Guidelines for Community Noise (2000)

- 3.2 The site is currently operating as The Lodge School of Theatre Dance, which provides after-school dance lessons. The applicant proposes to convert the property into a single dwelling with three bedrooms, a study and an open plan kitchen/dining/living room (KDL). The proposal would change the use of this space from a noise generating use, to a noise sensitive use.
- 3.3 The property is part single-storey and part two-storey, where the two-storey part is adjacent to the Wokingham Road Fire Station to the east.
- 3.4 The two-storey part of the building will feature a bedroom and en-suite at both ground floor and first floor levels, as well as a dressing room at first floor level. The existing building and proposal do not have windows situated on the eastern elevation overlooking the fire station, and the façade is comprised of full height masonry. The first-floor bedroom has a south facing Juliet balcony and a window on the west façade. The ground floor bedroom window has a south facing bay window. Existing windows are single glazed and will be replaced by thermal double glazing.
- 3.5 The single storey part of the building will contain the third bedroom, a study and the KDL. Existing windows will also be replaced with thermal double glazed windows, and a new bi-fold door will be installed, fronting into the KDL. New rooflights will also be installed within the KDL.
- 3.6 A natural ventilation strategy will be implemented for the dwelling, primarily via window mounted trickle vents.
- 3.7 No air conditioning or comfort cooling is proposed, however, the Applicant and architectural team has considered the potential overheating scenario. The first-floor bedroom and KDL are expected to have the highest solar gains due to larger areas of south facing windows and shared area with the exposed roof above. These rooms have multiple aspects, allowing cross ventilation within the room. Cross ventilation can be achieved in the remaining rooms by opening corridor doors to these spaces. The entrance gates will provide additional security, should it be desired to open ground floor windows to expel hot air.
- 3.8 The predominant noise source at site is road traffic using the A329 (Wokingham Road). The A329 is located around 40 metres to the east of the site, with Wokingham Road Fire Station in between. The fire station has a fire training tower circa 15m from the property, however, the primary activity in the fire station yard is likely to be cars and vans parking, where fire engines will exit directly onto Wokingham Road, away from the Webbs Court. Training exercises using the fire training tower are unlikely to be undertaken in the more sensitive night-time periods, as there are other existing residential properties nearby, such as 288 Wokingham Road, circa 8m from the training tower. The conversion of the site to residential use does should not, therefore, impose new or tighter constraints on the Fire Station.
- 3.9 The attached site plan AS14124/SP1 shows the site and its surrounding area.

4.0 LOCAL AUTHORITY REQUIREMENTS & RELEVANT GUIDANCE

4.1 PLANNING CONDITION

- 4.1.1 RBC has requested an acoustic appraisal to form part of the planning application to determine whether the following condition would be achieved:

“No development shall commence on site until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014 and the [sic] and that the individual noise events do not exceed 45 dB $L_{A,max,F}$ more than 10 times a night. Appropriate penalties shall be applied for non-anonymous noise sources. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded.

Thereafter, the development shall not be carried out other than in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is occupied, unless the Local Planning Authority otherwise agrees in writing.

REASON: These details are required due to insufficient information being contained within this submission and in order to safeguard the amenity of occupants in accordance with Policy CC8 of the Reading Borough Local Plan 2019.”

- 4.1.2 It is noted that the condition of individual noise events not exceeding 45 dB L_{AFmax} more than 10 times per night aligns with guidance from *Guidelines for Community Noise (1999)* published by The World Health Organisation (WHO).

4.2 BS8233:2014

- 4.2.1 BS8233 provides guidance on desirable internal ambient noise levels for various types of buildings.

- 4.2.2 Table 4 of BS8233 (reproduced as Table 4.1 below) provides recommended levels for steady external noise sources in dwellings, such as those due to road traffic.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 4.1: Desirable indoor ambient noise levels for dwellings

5.0 ENVIRONMENTAL NOISE SURVEY

5.1 PROCEDURE AND EQUIPMENT

- 5.1.1 A survey of the existing ambient noise levels was undertaken externally at two positions. The monitoring positions are shown in the attached site plan, AS14124/SP1 as LT1 and LT2.
- 5.1.2 The sound level meter at Position LT1 was installed on the 1st floor Juliet balcony at a height of approximately 5m above ground level and is representative of noise levels at the future first-floor bedroom. The microphone position had line of sight to the fire station yard to capture relevant activity.
- 5.1.3 The sound level meter at Position LT2 is installed at a height of 3 metres above ground level, representative of noise levels incident on the rooflights and ground floor receptors.
- 5.1.4 The monitors were set to record measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels between the hours of 12:00 on Monday 9th June and 16:00 on Wednesday 11th June 2025.
- 5.1.5 The site was operating as a dance studio at the time of survey. Periods in which dance classes occurred have been excluded from the measured dataset.
- 5.1.6 The following equipment was used during the survey:
- 1 no. Rion Class 1 sound level meter type NA28 (LT1);
 - 1 no. Rion Class 1 sound level meter type NL53 (LT2);
 - 1 no. Rion sound level calibrator type NC74.
- 5.1.7 All equipment has current certified traceable laboratory calibration, which is available for inspection on request.
- 5.1.8 The field calibration of the sound level meters was verified before and after use. The calibration drift was within the limits defined in the Association of Noise Consultants (ANC) Green Book: Environmental Sound Measurement Guide. Noise measurements are, therefore, suitably representative of those experienced at the site.
- 5.1.9 Measurements were made following procedures in BS7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2-Acquisition of data pertinent to land use*.
- 5.1.10 The weather during the survey period was typically calm with light winds, and as such is suitable for the measurement of environmental noise.

5.2 RESULTS

- 5.2.1 Figures AS14124/TH1-TH6 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at each of the external measurement positions.
- 5.2.2 The average external noise levels for daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods are shown in Table 5.1.

Position	Monitoring Period	Ambient $L_{Aeq,T}$	Typical Highest L_{AFmax} *
LT1	Daytime T = (07:00 – 23:00)	54dB	-
	Night-time T = (23:00 – 07:00)	47dB	64dB
LT2	Daytime T = (07:00 – 23:00)	51dB	-
	Night-time T = (23:00 – 07:00)	45dB	64dB

Table 5.1: Environmental noise survey results

[dB ref. 20 μ Pa]

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

5.2.3 The measured noise levels given in Table 5.1 are generally low, for a suburban environment, likely due to the property being set back from nearby roads.

5.2.4 Ambient noise levels at monitoring position LT1 are slightly higher than those at position LT2. This is likely due to the east boundary wall providing position LT2 with a level of acoustic screening to Wokingham Road.

5.2.5 Measured noise levels at position LT1 indicated that noise contributions from activity at the Wokingham Road Fire Station was negligible across the survey period. Whilst training activity may occur in the yard, which could result in elevated noise levels, training is unlikely to occur during the more sensitive night-time period, nor for extended durations across the day given the siting of the station in a suburban area near to existing dwellings.

6.0 NOISE IMPACT ASSESSMENT

6.1 PRIMARY NOISE SOURCE

6.1.1 The principal source of noise impact on the site is from road traffic on Wokingham Road and Holmes Road. Road traffic noise is, however, generally controlled to low levels at the site. Road traffic noise is considered an anonymous noise source, and so no penalties have been applied to the design range from BS8233:2014.

6.1.2 As the proposal involves the replacement of existing single glazed windows, and changes to the positioning of some of the windows, CSA has undertaken noise break-in calculations on the basis of the proposed rooms layouts and elevations provided by the project architect. The noise intrusion calculations will be used to determine whether the noise conditions requested by RBC are likely to be achieved.

6.1.3 The following assessment assumes that all non-glazed elements, i.e. masonry walls/facings and the roof systems, will provide the following minimum sound insulation performance of R_w 51dB, when tested in accordance with ISO 10140-2:2021, which is typically achievable with a traditional insulated brick and block external cavity wall. The assessment also assumes that standard thermal double glazing and non-acoustically rated trickle vents will be installed, as per the proposal, which typically offer acoustic performances around R_w 30dB and $D_{n,e,w}$ 27dB, respectively. The assumed ventilation

performance is calculated on the basis of a single vent offering an equivalent area of circa 20000mm².

- 6.1.4 The noise intrusion calculations have determined that IANLs should be controlled to around L_{Aeq} 30dB in the bedrooms and KDL during the daytime period. Noise intrusion calculations during the night-time period have found that IANLs in the bedrooms should be controlled to below L_{Aeq} 25dB and L_{AFmax} 40dB. Noise levels are sufficiently below the desired targets, such that multiple trickle vents could be used in each room whilst maintaining appropriate noise conditions.

6.2 FURTHER CONSIDERATIONS

- 6.2.1 As given in Section 4.1.1, the internal noise conditions requested by RBC also address the ability of the scheme to maintain appropriate internal noise levels with the windows open. The condition wording continues to discuss this with respect to ventilation and cooling. It is understood, therefore, that the intent of the condition is to achieve appropriate IANLs whilst maintaining suitable levels of air transfer for ventilation, and separately; whilst expelling hot air during the overheating condition. As discussed in Section 6.1.3 and 6.1.4, the targeted IANLs can readily be achieved with standard non-acoustically rated trickle vents. Consideration to the overheating scenario is given in Section 6.2.2 and 6.2.3.
- 6.2.2 The proposed dwellings will not have air conditioning or comfort cooling, where hot air will be expelled by openable windows. As discussed in Section 3.7, rooms expected to have the highest solar gains will have windows on multiple façades/roofs, allowing cross ventilation within the room. Other rooms can achieve cross ventilation throughout the house by opening doors onto the connected corridors. Given the access to cross ventilation, it is, therefore, assumed that hot air will be expelled through partially open windows. For the purposes of this assessment, a partially open window is assumed to provide an outside-to-inside level difference of 13dB, in accordance with the guidance in *Acoustics Ventilation and Overheating Residential Design Guided v1.1* (Jan 2020).
- 6.2.3 Allowing a 5dB relaxation over the target levels in BS8233:2014, as per the condition, appropriate noise conditions could be achieved with partially open windows to expel hot air during the overheating condition. The proposed passive ventilation and overheating strategy is therefore acceptable with regards to noise intrusion.
- 6.2.4 In line with The Building Regulations 2010 *Approved Document O: Overheating*, the building's overheating risk category is 'Moderate' as determined by its location. External noise levels are, however, sufficiently low, such that the simplified method could be used to demonstrate compliance with this building regulation, as detailed in the Association of Noise Consultants (ANC) *Approved Document O Noise Guide v1.1*.

Fire Station

- 6.2.5 Consideration is also given to potential impact from Wokingham Road Fire Station. The time histories indicate that there was little activity at the fire station during the course of the survey. It is understood that the primary external activity is vehicles moving in the yard, training exercising in the yard, and fire engines entering/exiting the facility.

- 6.2.6 The most affected room by fire station noise is the first-floor bedroom. This room is most likely to be occupied during the night-time period and has no sensitive windows overlooking the fire station. It is a dual aspect room with windows on its south and west elevations, allowing residents to open windows on the quieter façade.
- 6.2.7 The boundary wall shared between 8 Holmes Road and the fire station is partially concrete and partially masonry, where a good level of acoustic screening is provided to ground floor rooms. The screening provided by the wall would be expected to control car park activity in the yard to those commensurate with other nearby existing receptors.
- 6.2.8 The main training facilities for the Royal Berkshire Fire and Rescue Services (RBFRS) is at a dedicated training centre in Whitley Wood. Firefighters also partake in 'drill night' that can be held in other facilities, such as the station. RBFRS drill nights are generally held on a Monday evening, typically for a period of around three hours. The training exercises may be theoretical or practical. When practical training exercises are undertaken in the yard, elevated noise levels could be experienced for this duration. As 8 Holmes Road benefits from acoustic screening at lower levels and has no sensitive windows overlooking the fire station yard, the resultant impact would likely be commensurate with surrounding existing residential properties, that are further away but have line of sight to the yard. Within the context of future residents knowingly living beside a fire station and noise levels being acceptable at nearby residential receptors, occasional training exercises in the yard that occur during the daytime period are not expected to result in adverse impact.
- 6.2.9 Emergency response vehicles leaving the Fire Station would exit directly onto Wokingham Road, where there are many existing residential properties. Drivers of emergency vehicles are expected to use their professional judgment to decide when and where the use of sirens and blue lights is appropriate. Drivers should be aware that sirens must be used with restraint, particularly at night, so as not to cause a nuisance to residents or other road users. In the context of the existing residential area, noise from emergency response teams is expected to be acceptable.

7.0 CONCLUSION

- 7.1 Clarke Saunders Acoustics have undertaken an environmental noise survey and acoustic appraisal of key external building fabric elements to assess the suitability of Webbs Court, 8 Holmes Road, Reading, RG6 7BH, for residential use.
- 7.2 Noise levels have been assessed in line with the requirements of Reading Borough Council, BS8233:2014 and WHO *Guidelines for Community Noise*.
- 7.3 The desired internal ambient noise levels can be achieved within the building with the inclusion of standard thermal double glazing and non-acoustically rated trickle vents.
- 7.4 The design of the property allows cross-ventilation throughout, and there are means for future occupants to expel hot air whilst maintaining appropriate noise conditions internally. There is, therefore, no acoustic requirement for mechanical ventilation or mechanical cooling systems.



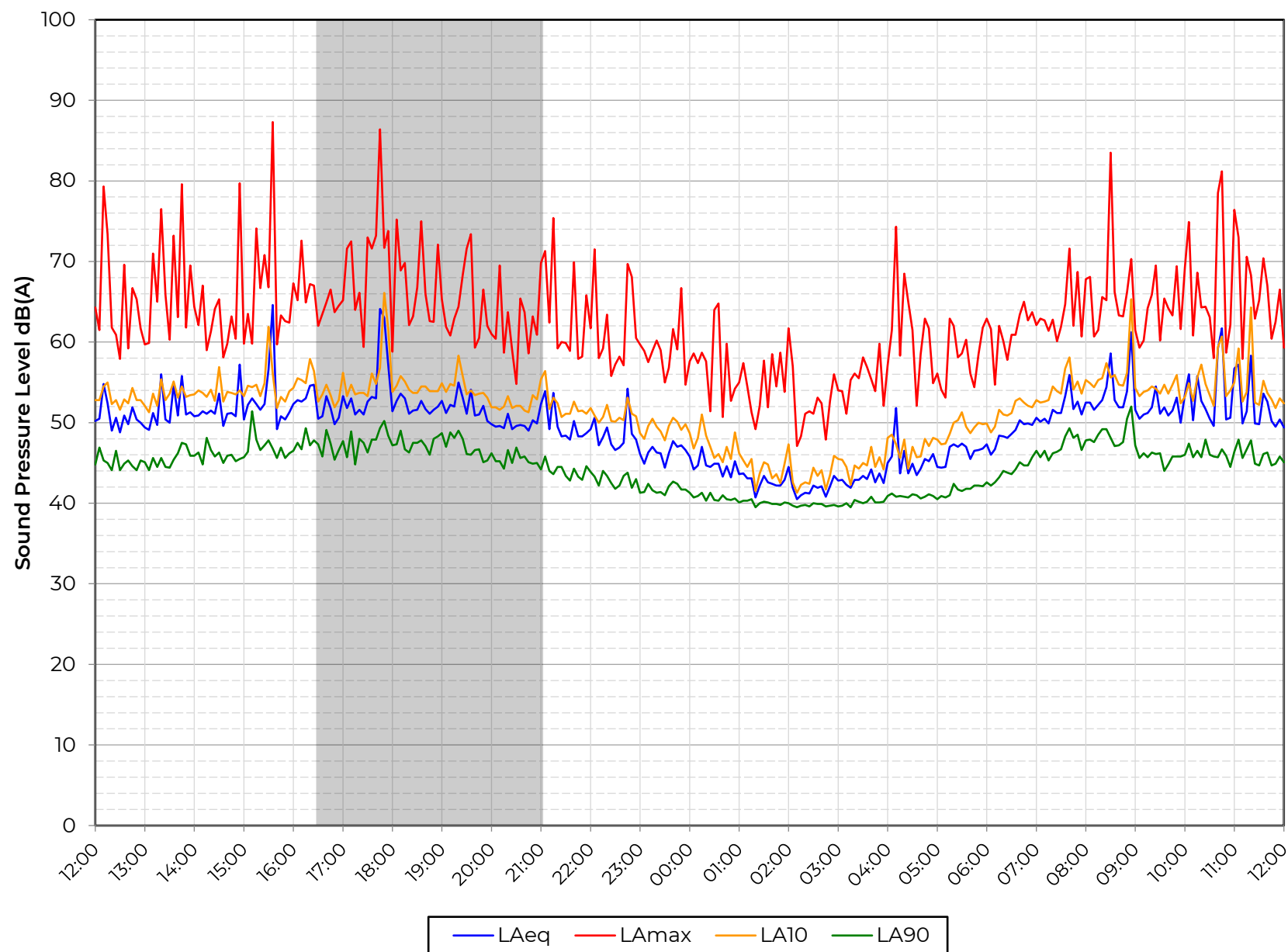
Andrew Nesbitt MIOA
CLARKE SAUNDERS ACOUSTICS



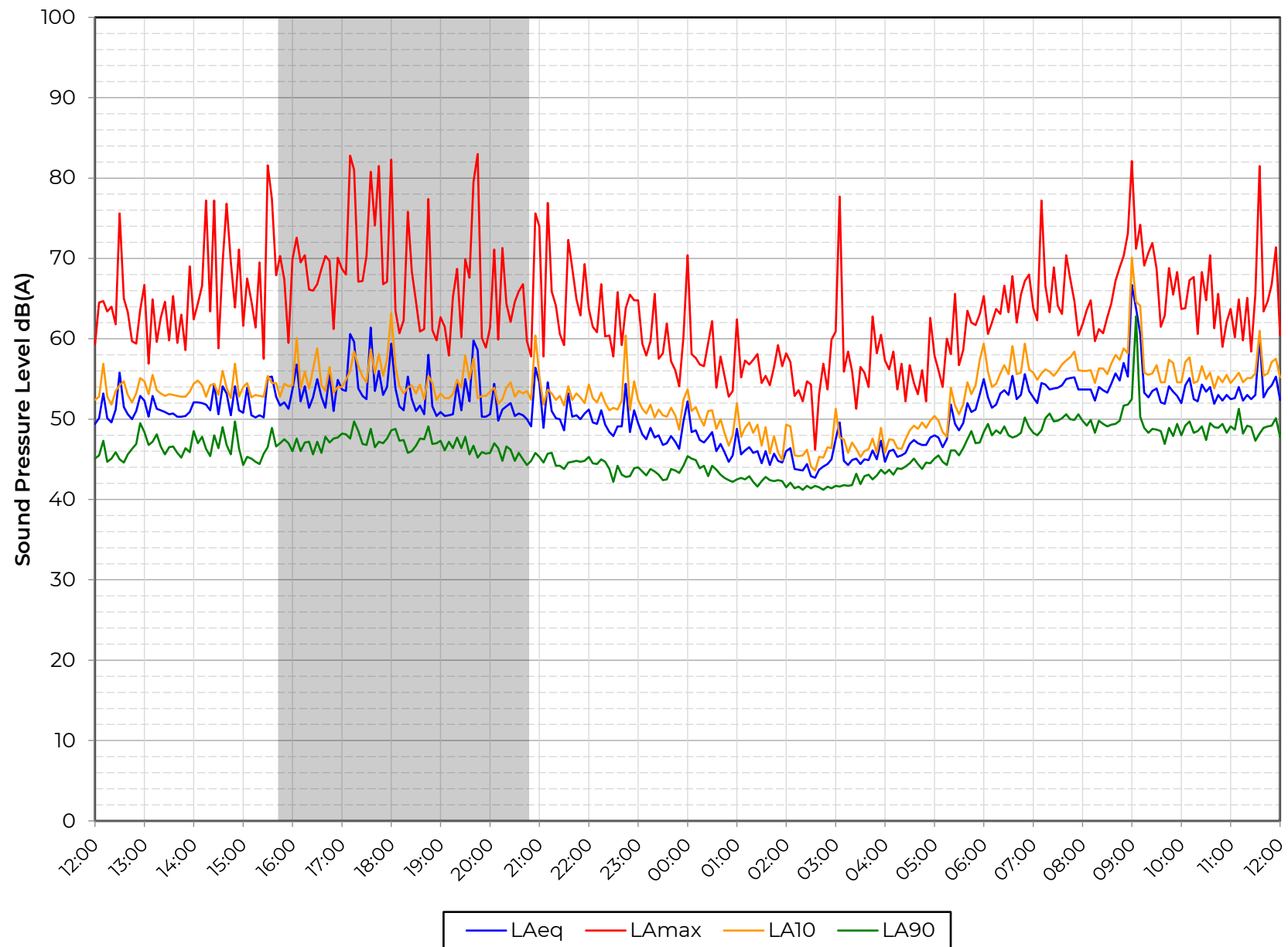
Indicative Site Plan

Figure AS14124/SP1

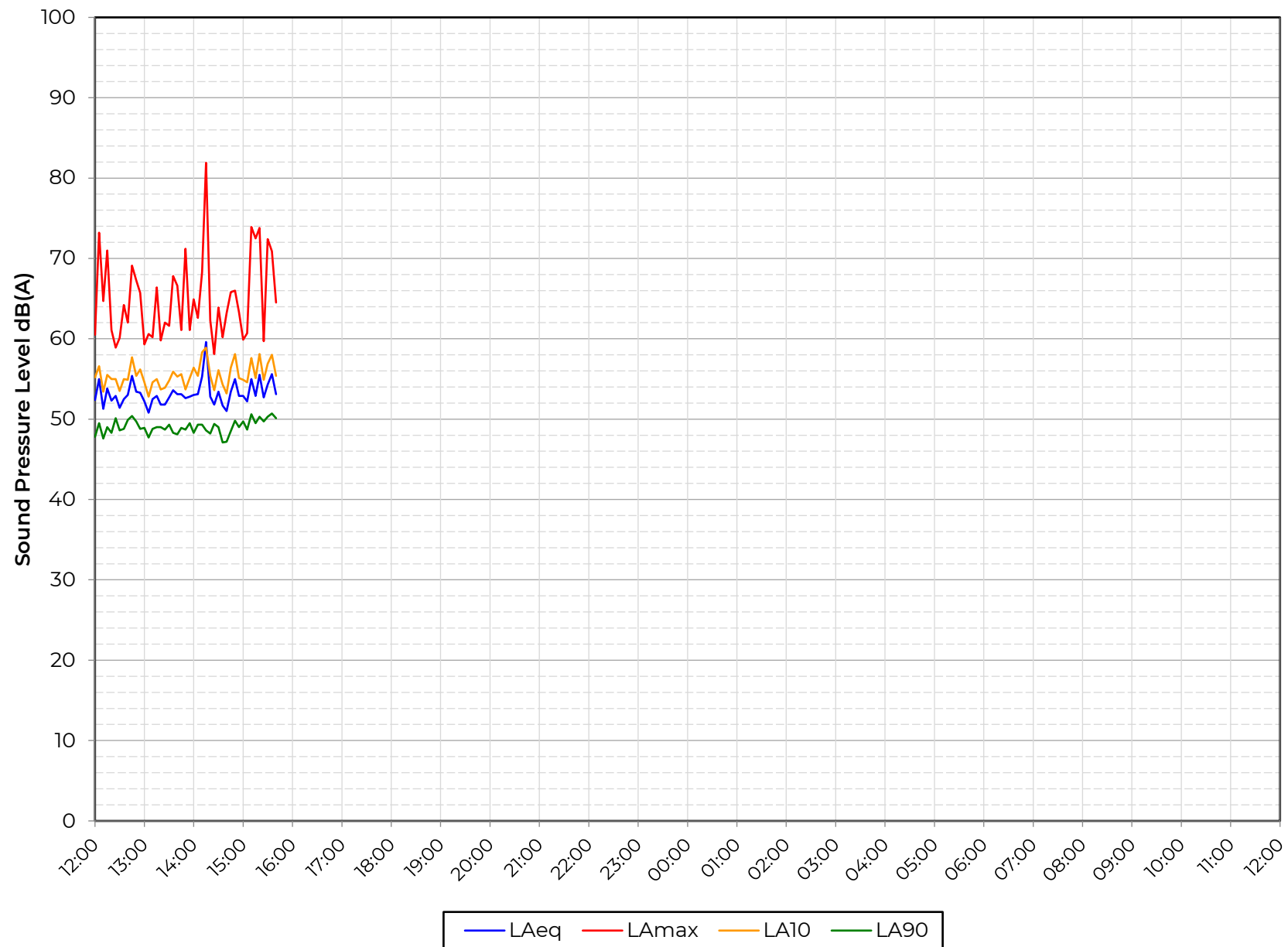
Position LT1



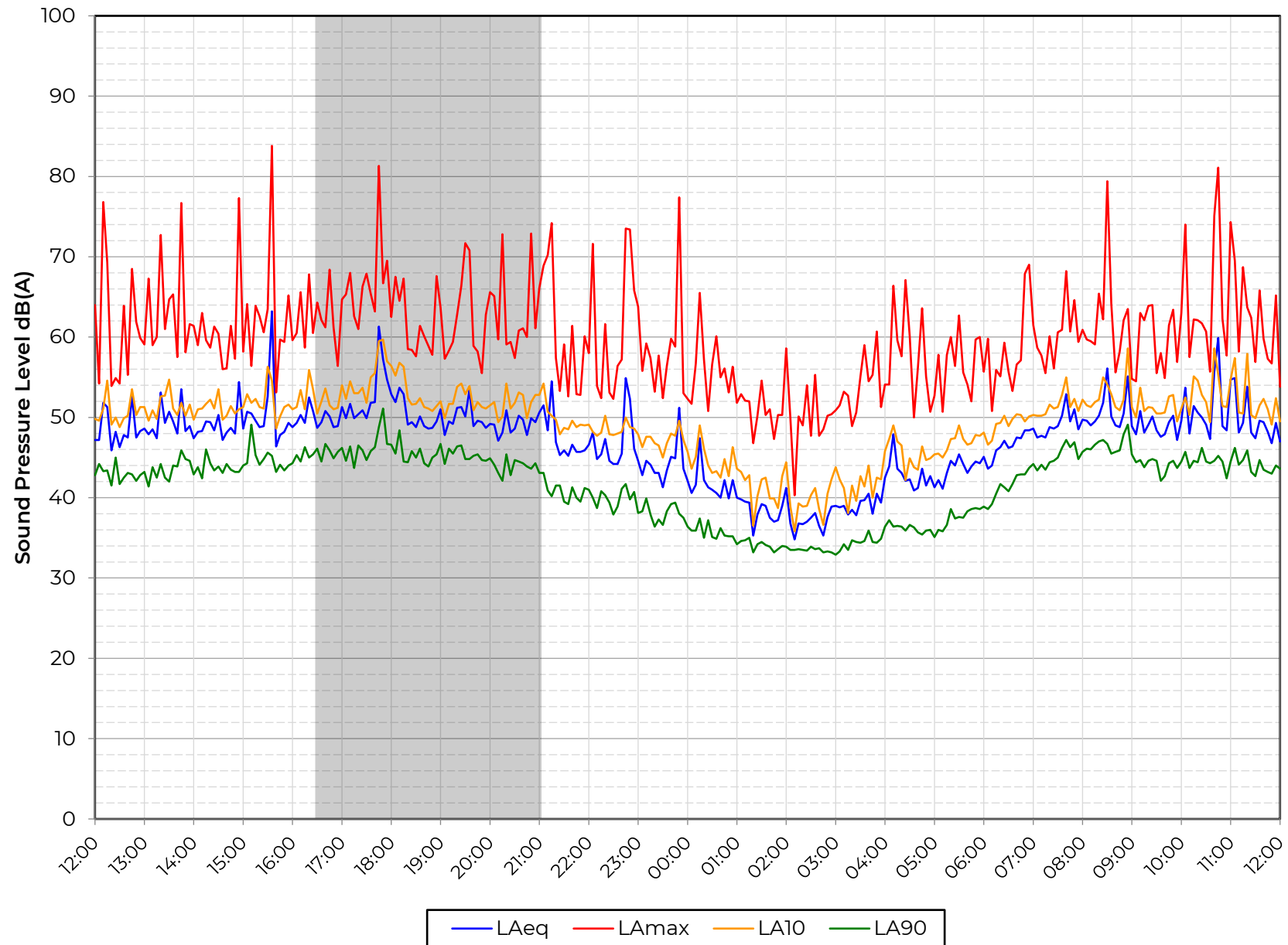
Position LT1



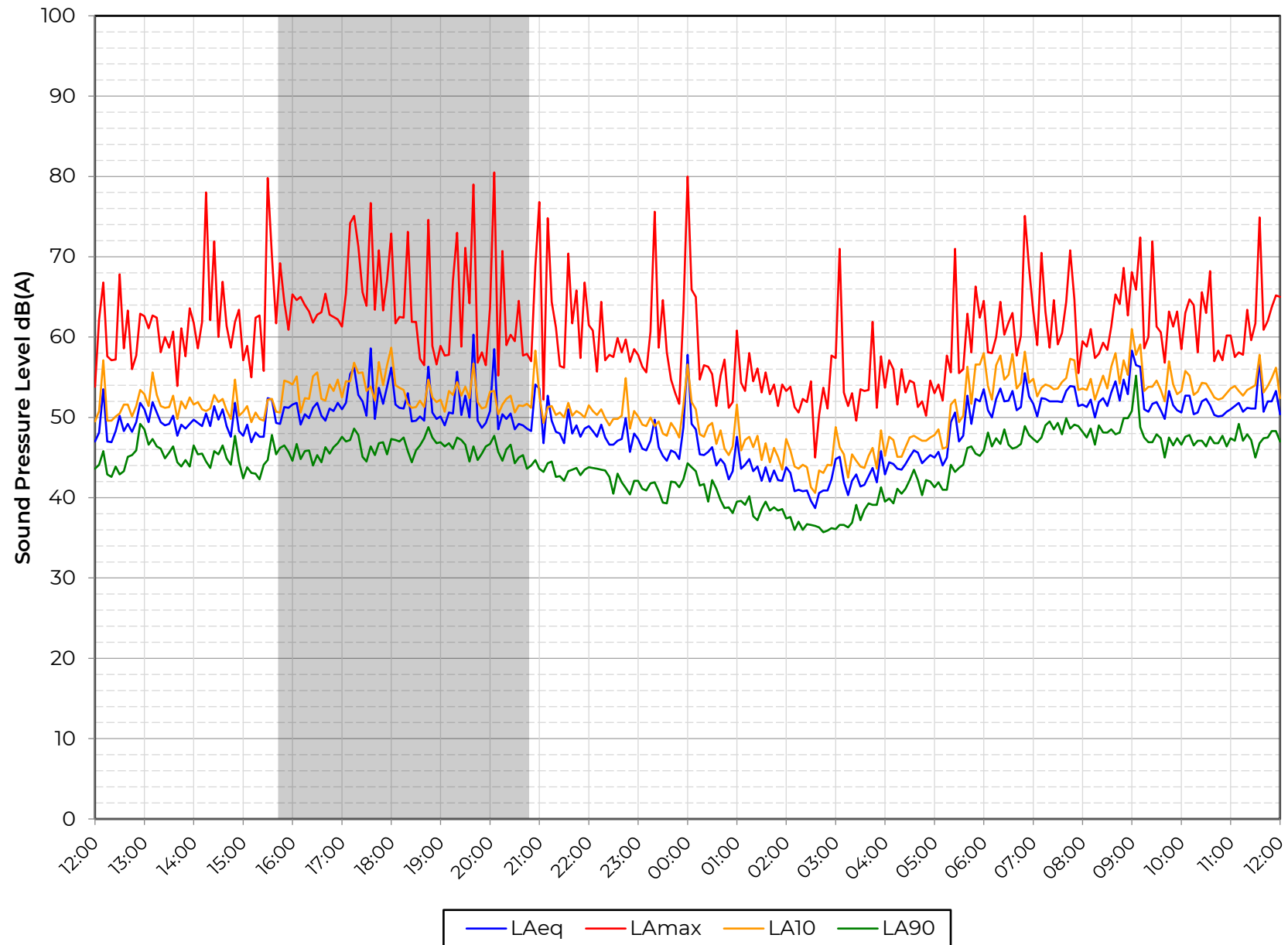
Position LT1



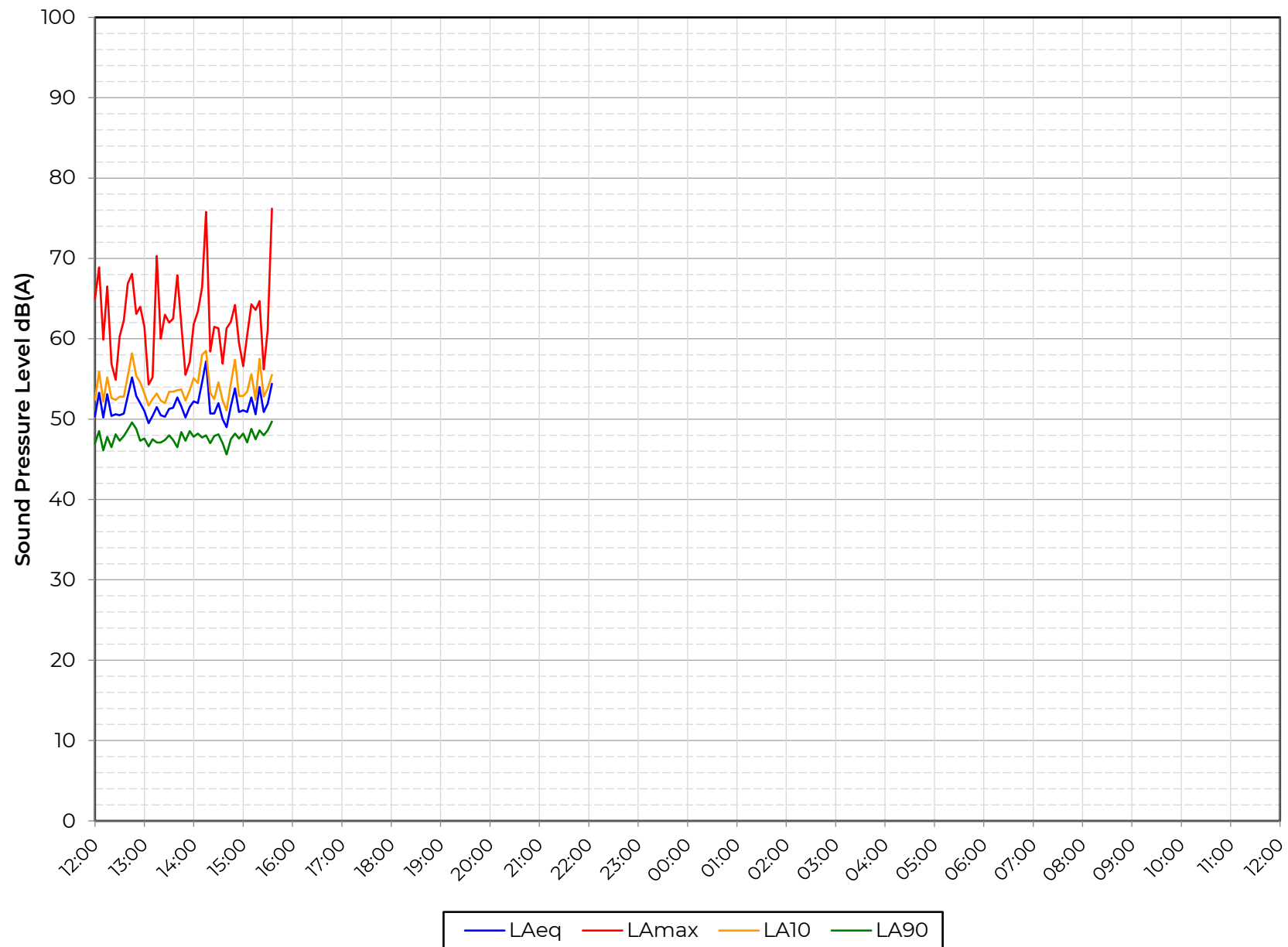
Position LT2



Position LT2



Position LT2



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
------------------------------------	----	-----	-----	-----	------	------	------	------

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.