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PREPARED: Friday, 27 September 2024

MULBERRY HOUSE, STORRINGTON

SOUND IMPACT ASSESSMENT

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Project Ref:	AS13725	**Project Name:**	Mulberry House, Storrington
Report Ref:	AS13725.240920.NIA	**Report Title:**	Sound Impact Assessment
Client Name:	Henry Adams Estate Agents		
Project Manager:	Alec Korchev		
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 Henry Adams Estate Agents propose to install air conditioning at their office at Mulberry House, 8 The Square, Storrington, RH20 4DJ. Air conditioning would be provided during business operational hours only.

1.2 Clarke Saunders Acoustics (CSA) has been appointed to undertake a sound impact assessment of sound emissions from the two associated external condenser units.

1.3 An environmental sound survey has been undertaken at the site to establish the baseline sound levels at the nearest affected dwellings.

1.4 Due to the acoustically complex propagation path presented by the locations of the proposed external condensers, CSA has used loudspeakers in-situ to simulate and determine the level difference between the condenser locations and the nearest affected dwellings.

1.5 A sound impact assessment has been undertaken following procedures in BS4142:2014+A.1:2019[1]. Based upon the mechanical plant operating during business operational hours only, an assessment level of -14 dB and -18 dB has been calculated at the nearest affected dwellings to the north and east respectively.

1.6 The assessment levels calculated are indicative of "a low impact, depending on the context" at the nearest affected receptors. No further mitigation is therefore necessary, where sound emissions are compliant with the requirements of Horsham District Council, as agreed through discussions with their Environmental Health Department.

2.0 INTRODUCTION

2.1 As part of planning application reference DC/24/0942 submitted to Horsham District Council, Henry Adams Estate Agents propose to install two external condensers to service their office at Mulberry House with air conditioning.

2.2 Air conditioning would be provided during business operational hours only. The current opening hours are given below:

- Monday to Friday: 09:00 – 18:00 hours;
- Saturday: 09:00 – 16:00 hours;
- No Sundays or Bank Holidays.

2.3 CSA has been commissioned by Henry Adams Estate Agents to undertake an environmental sound survey and subsequent sound impact assessment to determine whether proposed mechanical plant sound emissions are compliant with the planning requirements of Horsham District Council [HDC].

2.4 A glossary of the acoustic terminology used throughout this report is provided in Appendix A.

[1] BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound*

3.0 SITE DESCRIPTION & SOUNDSCAPE

3.1 Mulberry House is located in Storrington town centre and is largely surrounded by residential dwellings, smaller retail shops and restaurants.

3.2 The site engineers noted that the predominant sound source during the daytime site visit was road traffic using the A283 (High Street), as well as local traffic movements on the surrounding roads. Traffic on the A283 was generally continuous in nature.

3.3 The two external condensers units will be positioned in separate locations at Mulberry House, one within the rear yard to the north of the building, and the other in an existing refuse alcove to the east of the building. These locations are shown in the appended site plan, AS13725/SP1, alongside the nearest affected residential dwellings, 2a North Street and 19 Brewers Yard (Connie's Cottage) to the north and east respectively.

3.4 The positioning of the condensers results in acoustically complex propagation paths due to reflections within the alcoves in which they are situated.

4.0 COMPETENCE

4.1 The sound survey, sound predictions and assessment were carried out by Andrew Nesbitt, a Consultant at Clarke Saunders Acoustics. Andrew has more than 5 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).

4.2 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.

4.3 Uncertainty is minimised where possible and deviations from relevant standards and guidance are clearly stated and discussed within the technical report.

4.4 CSA is a full member of the Association of Noise Consultants (ANC).

5.0 LOCAL AUTHORITY CONSULTATION

5.1 CSA contacted Mr Mark Nicholls, an Environmental Health Officer at Horsham District Council (HDC) on 23rd September 2024 to discuss the assessment methodology and targeted sound emissions criterion.

5.2 Where the location of the external condenser units within alcoves results in an acoustically complex propagation path to nearby residential receptors, it was agreed that propagation calculations would carry an inherent level of uncertainty. It was therefore agreed that CSA would simulate the propagation path by placing loudspeakers in the location of the proposed condensers and measuring the level difference experienced at the nearby affected dwellings.

5.3 Mr Nicholls also confirmed that the subsequent assessment should be undertaken following procedures in BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound* targeting a low impact during the operational period.

5.4 It was agreed that additional mitigation measures would be explored, as necessary, where the outcome of the assessment indicated an '*adverse impact depending upon context*'.

6.0 ASSESSMENT CRITERIA

6.1 NATIONAL PLANNING POLICY FRAMEWORK

6.1.1 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. In its current form, as revised December 2023, Paragraph 191 and 193 of the NPPF states:

191.
"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation*."

193.
"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

6.2 BS4142:2014 + A.1:2019 ASSESSMENT CRITERIA

6.2.1 British Standard BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- 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.

6.2.2 The purpose of this standard is to determine the magnitude of potential impact on nearby sensitive receptors from industrial or commercial sound, with respect to the existing background sound levels and relevant character penalties owing to distinguishable sound features.

6.2.3 The numerical impact assessment may then be modified by taking consideration of the context in which the sound occurs.

7.0 ENVIRONMENTAL SOUND SURVEY

7.1 An environmental sound survey was undertaken to determine existing ambient and background sound levels at positions LT1 and LT2, representative of the current sound climate at the nearest dwellings to the north and east respectively. The monitoring locations are shown in the appended site plan AS13725/SP1, in relation to the proposed plant locations and nearby dwellings.

7.2 Automated sound level monitoring equipment was set to record measurements of consecutive 5-minute L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels. The monitor measured sound levels between 12:30 hours on Thursday 19th September 2024 and 14:50 hours on Tuesday 24th September 2024.

7.3 Both sound level meters were located in free field positions at least 1.5m above ground level.

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

- 1 no. Rion sound level meter type NL32 (LT1);
- 1 no. Rion sound level meter type NA28 (LT2);
- 1 no. Rion sound level calibrator type NC-74.

7.5 The calibration of the sound level meters was verified before and after use, where no significant calibration drift was detected. All equipment has current certified traceable laboratory calibration which is available on request.

7.6 The weather during the survey was mixed. Wind speeds remained low, however several periods of heavier rainfall were noted, mostly during the night-time period. These periods have been identified within the subsequent datasets and excluded from subsequent data analysis.

7.7 Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use* and BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

7.8 SOUND SURVEY RESULTS

7.8.1 Figures AS13725/TH1-TH5 and TH6-TH7 show the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels as time histories at monitoring positions LT1 and LT2, respectively.

7.8.2 The duration of monitoring at position LT2 was truncated due to a battery power failure. Around 48 hours of measurement have been obtained, however, where the dataset is considered suitably robust and representative.

7.8.3 The soundscape at both monitoring positions is primarily determined by road traffic contributions from High Street (A283), with further contributions from the surrounding local road network.

7.8.4 The overall ambient and background sound levels measured during operational hours I summarised in Table 7.1 below.

7.8.5 Measured typical background and average sound levels are shown in the table below:

MONITORING LOCATION	OPERATIONAL HOURS (09:00 – 18:00)	
	TYPICAL* $L_{A90,\ 5MIN}$	AVERAGE $L_{Aeq,T}$
Position LT1	44 dB	53 dB
Position LT2	47 dB	56 dB

Table 7.1 - Typical background and average sound levels *[dB ref. 20µPa]*

**Typical is derived from the 10th percentile of the L_{A90} dataset*

8.0 PREDICTED SOUND IMPACT

8.1 PROPOSED PLANT

8.1.1 The selected mechanical plant has been confirmed as:

- 2 no. Fujitsu AOYG18KMTA condenser units.

8.1.2 The manufacturer's laboratory measured sound pressure level data is given in Table 8.1 below.

FREQUENCY (HZ)	63	125	250	500	1K	2K	4K	8K	dB(A)
Fujitsu AOYG18KMTA	66	61	55	46	45	35	33	21	51

Table 8.1 – Sound pressure level at 1m from the front of the condenser *[dB ref. 20µPa]*

8.2 SOUND PROPOGATION PATH

8.2.1 As agreed with the Environmental Health Officer at Horsham District Council, CSA undertook a simulation test to minimise uncertainty with regards to the sound propagation path.

8.2.2 To determine a level difference representative of mechanical plant sound emissions in-situ, a loudspeaker was placed at the plant location producing high volume pink noise. Source measurements were undertaken within the plant alcove at one metre from the loudspeaker and subsequent receive measurements were undertaken at a one metre from the ground floor level window of the nearest sensitive dwelling, as identified in site plan AS13725/SP1. The level difference is therefore representative of the plant conditions in-situ, accounting reflection effects, acoustic screening and distance propagation losses. The measured level differences are given in Table 8.2.

MEASURED LEVEL DIFFERENCE								
FREQUENCY (HZ)	63	125	250	500	1K	2K	4K	8K
To 2a North Street	19	23	19	28	29	30	33	36
To 19 Brewers Yard (Connie's Cottage)	14	23	24	23	26	32	31	35

Table 8.2 – Measured level difference from 1m in front of condenser/ loudspeaker position to 1m from nearest sensitive window of affected dwellings. [dB ref. 20µPa]

8.2.3 The level difference will be used in conjunction with the manufacturer's plant sound emissions data, also measured at one metre from the sound source, to determine the subsequent impact at the receptors.

8.3 PREDICTED SOUND LEVELS

8.3.1 The nearest residential receptors have been identified as 2a North Street and 19 Brewers Yard (Connie's Cottage), around 15m north and 10m east of Mulberry House respectively.

8.3.2 The measured level differences in Table 8.2 have been used to determine the specific sound level at the respective receptors. The specific sound level and measured background sound level are presented in Table 8.3, where the calculations are summarised in Appendix B

LOCATION	SPECIFIC SOUND LEVEL AT RECEPTOR, $L_{Aeq,T}$	TYPICAL $L_{A90,\ 5MIN}$ (OPERATIONAL HOURS)
2a North Street	30 dB	44 dB
Brewers Yard (Connie's Cottage)	29 dB	47 dB

Table 8.3 – Summary of specific sound level and background levels [dB ref. 20µPa]

BS4142:2014 Assessment

8.3.3 An assessment has been undertaken following procedures in BS4142:2014+A.1:2019.

8.3.4 Based upon the manufacturer's sound pressure level data, it is not expected that tonal characteristics will be generated by the proposed plant unit.

8.3.5 The proposed external plant is expected to provide continuous air conditioning during hot days. Intermittent and impulsive characteristics are therefore not anticipated to be readily distinguishable within the residual acoustic environment. No acoustic character corrections have therefore been applied.

8.3.6 The BS4142 assessment levels at the nearest affected dwellings is summarised in Table 8.4.

BS4142:2014+A.1:2019 ASSESSMENT	RECEPTOR LOCATION	
	2a NORTH STREET	19 BREWERS YARD (CONNIE'S COTTAGE)
Specific Sound Level	30 dB	29 dB
Acoustic Feature Corrections	0	0
Rating Level	30 dB	29 dB
Background Sound Level (L_{A90})	44 dB	47 dB
BS 4142 Assessment Level	-14 dB	-18 dB
BS 4142 Initial Assessment	*'Indication of a low impact, depending on the context.'*	*'Indication of a low impact, depending on the context.'*

Table 8.4 – Summary of BS4142:2014+A.1:2019 assessment of proposed plant to most affected residential receptors.

8.3.7 BS4142:2014+A.1:2019 states that 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. The context is discussed in more detail below.

Contextual Discussion

8.3.8 The context forms a key part of any BS 4142 assessment and should be considered with as much regard as the numerical assessment.

8.3.9 A '*worst case scenario*' has been undertaken assuming that the mechanical plant is operating at full duty. Whilst sound from the external condensers is considered continuous in nature, in likelihood, it will have periods of lower duty and could operate intermittently.

8.3.10 The air conditioning units are to be used during business hours only, where the mechanical plant will only be operational during the daytime and when road traffic levels, which form the predominant sound source, are at their highest.

8.3.11 Where the primary purpose of the air conditioning is for cooling, it is anticipated that the mechanical plant is unlikely to operate throughout the entirety of the year.

8.3.12 The siting of the condensers has been split to minimise impact on any one receptor.

8.3.13 The outcomes of the BS4142 numerical assessment are considered appropriate, where the resultant impact at the nearest residential dwelling is expected to be low. The level of impact predicted is compliant with both National Policy and the requirements agreed with Horsham District Council, where no further mitigation is required.

9.0 UNCERTAINTY

9.1 As per BS4142:2014+A.1:2019, the uncertainty in the assessment is considered and reported. This is not an indication of error but an acknowledgment of possible variability of the factors contributing to the assessment.

9.2 Use of a calibrated type 1 sound level meter is considered to reduce measurement instrument error to insignificant levels as compared with environmental variations.

9.3 It was possible to locate the monitoring positions for the background sound climate close to the BS4142 Assessment Positions, which reduces uncertainty in respect of the '*acoustically equivalent*' monitoring location.

9.4 A typical background sound level has been used for the assessment, i.e. the 10th percentile of the L_{A90} dataset, in order to provide a robust background sound level.

9.5 It has been possible to obtain the manufacturer's measured spectral sound level data, rather than single figure only. This reduces the uncertainty within the assessment, allowing accurate predictions of the Specific Sound Level at the nearby receptor.

9.6 Where the mechanical plant siting is acoustically complex, measurements have been undertaken in-situ to obtain the level difference to the receptor, reducing the inherent uncertainty regarding any propagation calculations.

9.7 The Rating Level is sufficiently low to render risk of an adverse impact arising highly unlikely due to any variations in the assessment level related to the above uncertainty.

10.0 CONCLUSION

10.1 Clarke Saunders Acoustics has undertaken an environmental sound survey and sound impact assessment for two proposed external condensers, to provide air conditioning to Mulberry House, Storrington.

10.2 The assessment has been undertaken following procedures in BS4142:2014+A.1:2019, using measured level differences to determine propagation losses in-situ, due to the acoustically complex siting of the mechanical plant.

10.3 Where the plant will operate during daytime business hours only, an assessment level of -14 dB and -18 dB has been calculated at the nearest affected dwellings to the north and east respectively.

10.4 The assessment levels calculated are indicative of "*a low impact, depending on the context*". No further mitigation is therefore necessary, where sound emissions are compliant with the requirements of Horsham District Council, as agreed through discussions with their Environmental Health Department.

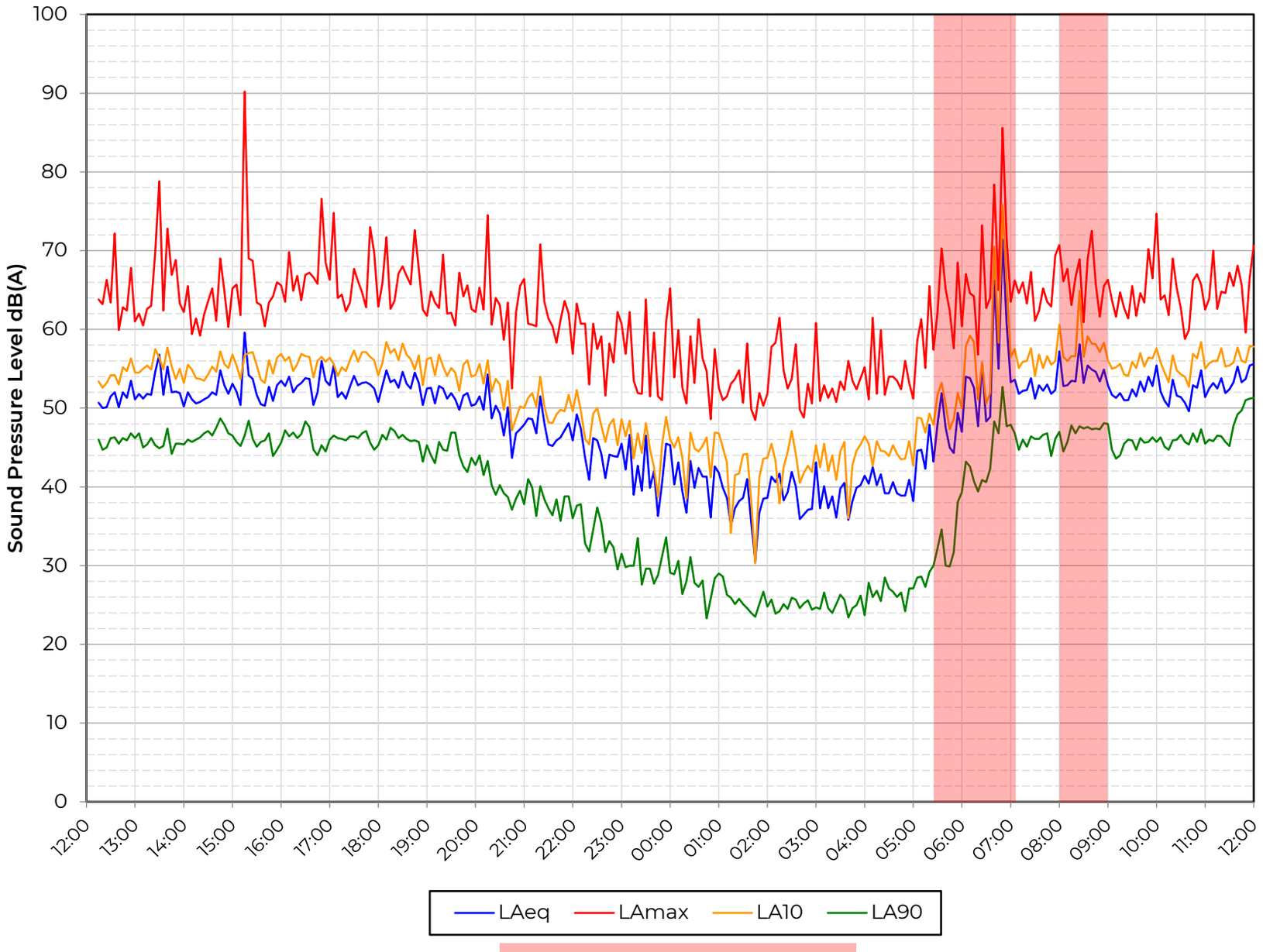


Andrew Nesbitt MIOA
CLARKE SAUNDERS ACOUSTICS


N
2a North Street
Monitoring Location LT1
Condenser 1 (North)
Monitoring Location LT2
Condenser 2 (East)
19 Brewers Yard (Connie's Cottage)
Site Boundary
North Street
Brewers Yard
High Street (A283)

Mulberry House, 8 The Square, Storrington

Position LT1

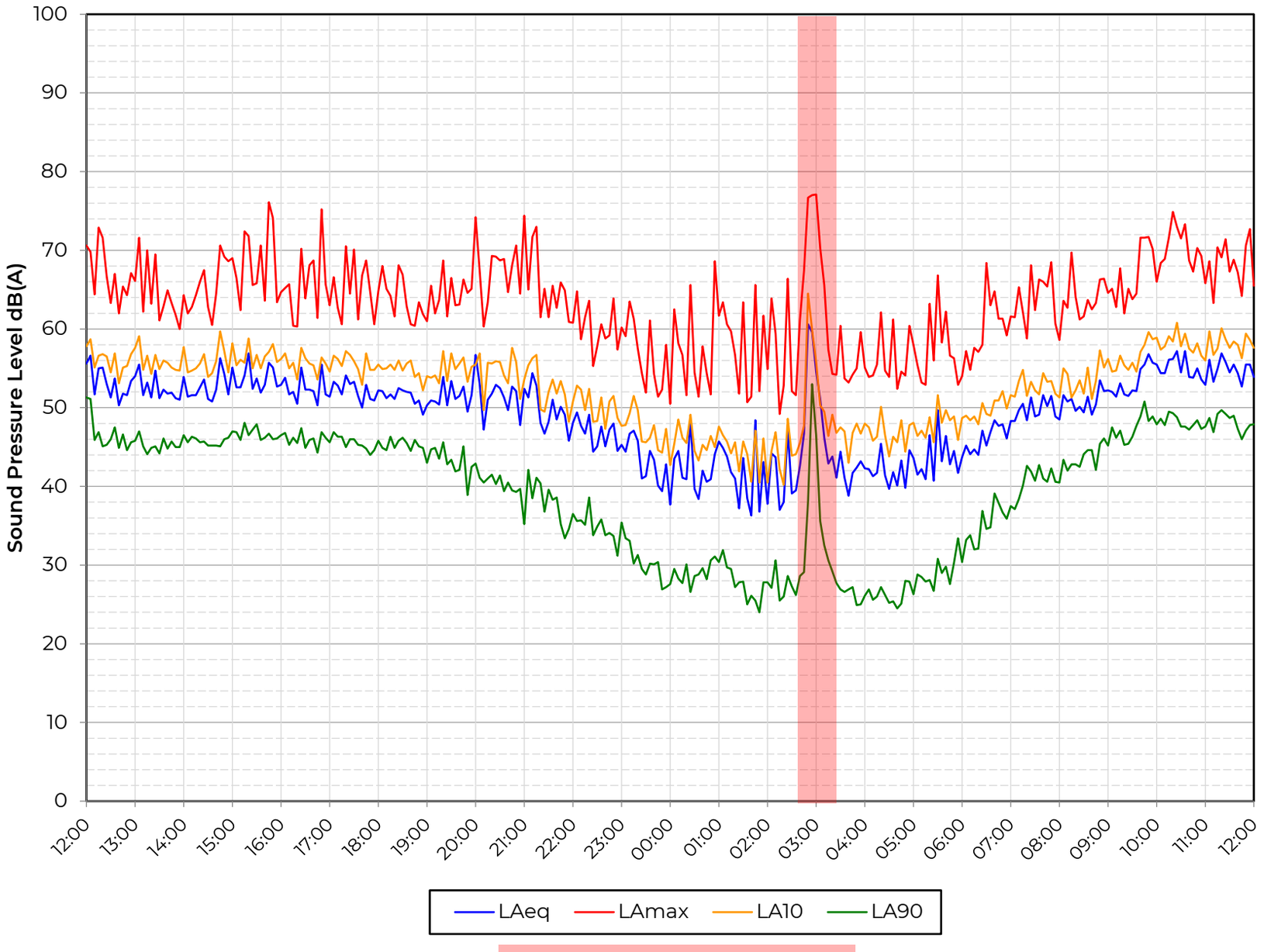


Thu 19 Sep to Fri 20 Sep

Figure AS13725/TH1

Mulberry House, 8 The Square, Storrington

Position LT1

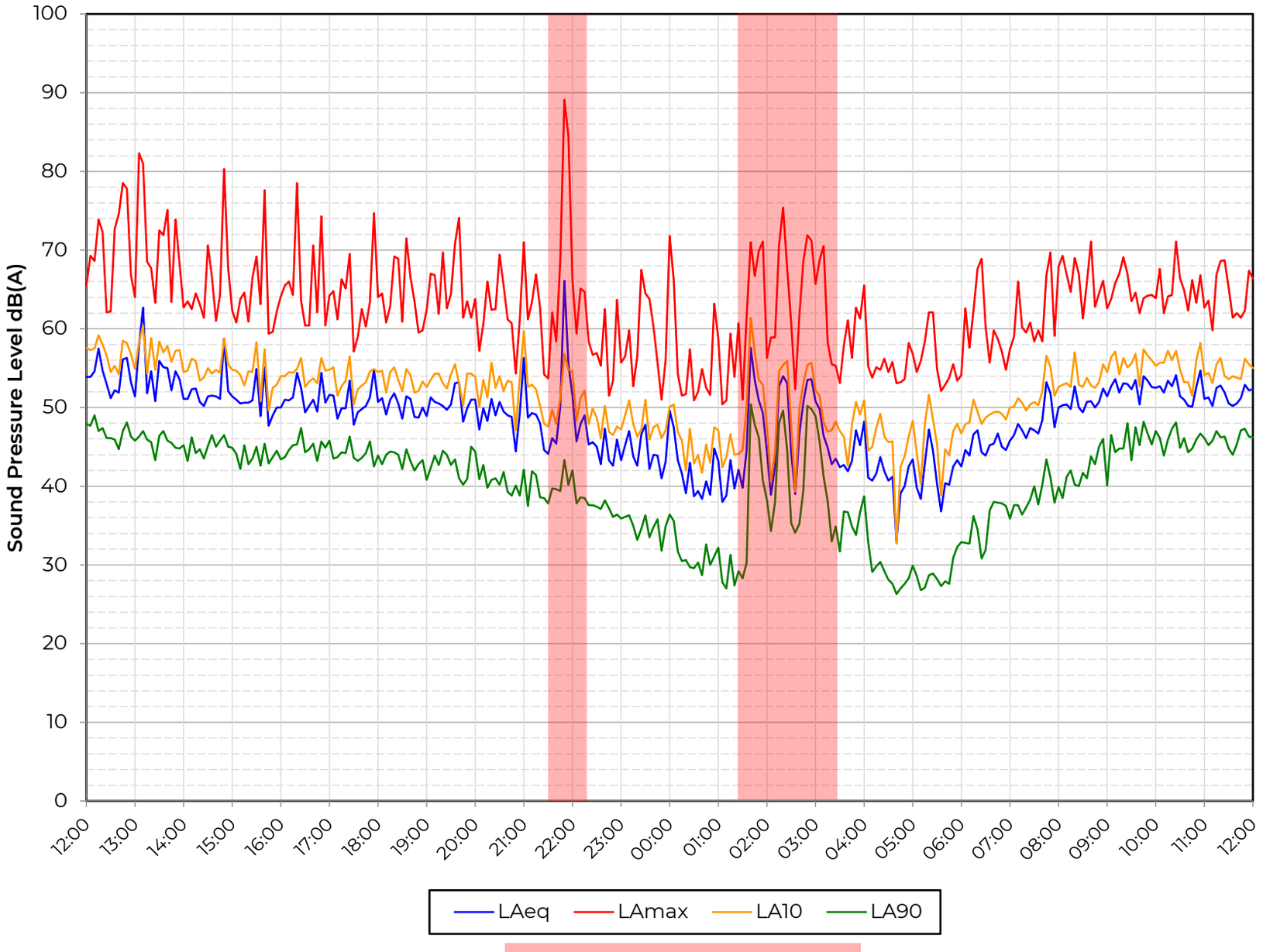


Fri 20 Sep to Sat 21 Sep

Figure AS13725/TH2

Mulberry House, 8 The Square, Storrington

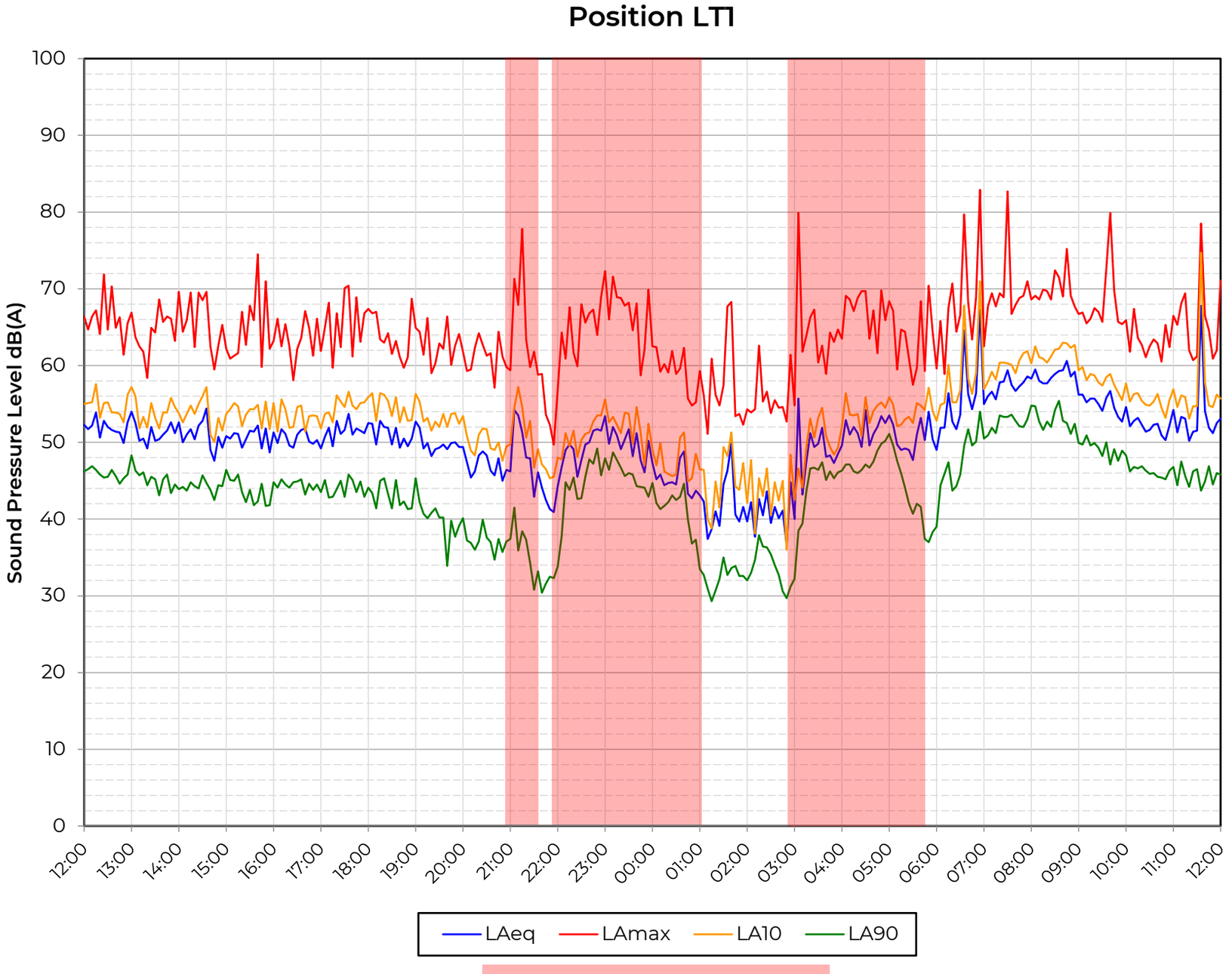
Position LT1



Sat 21 Sep to Sun 22 Sep

Figure AS13725/TH3

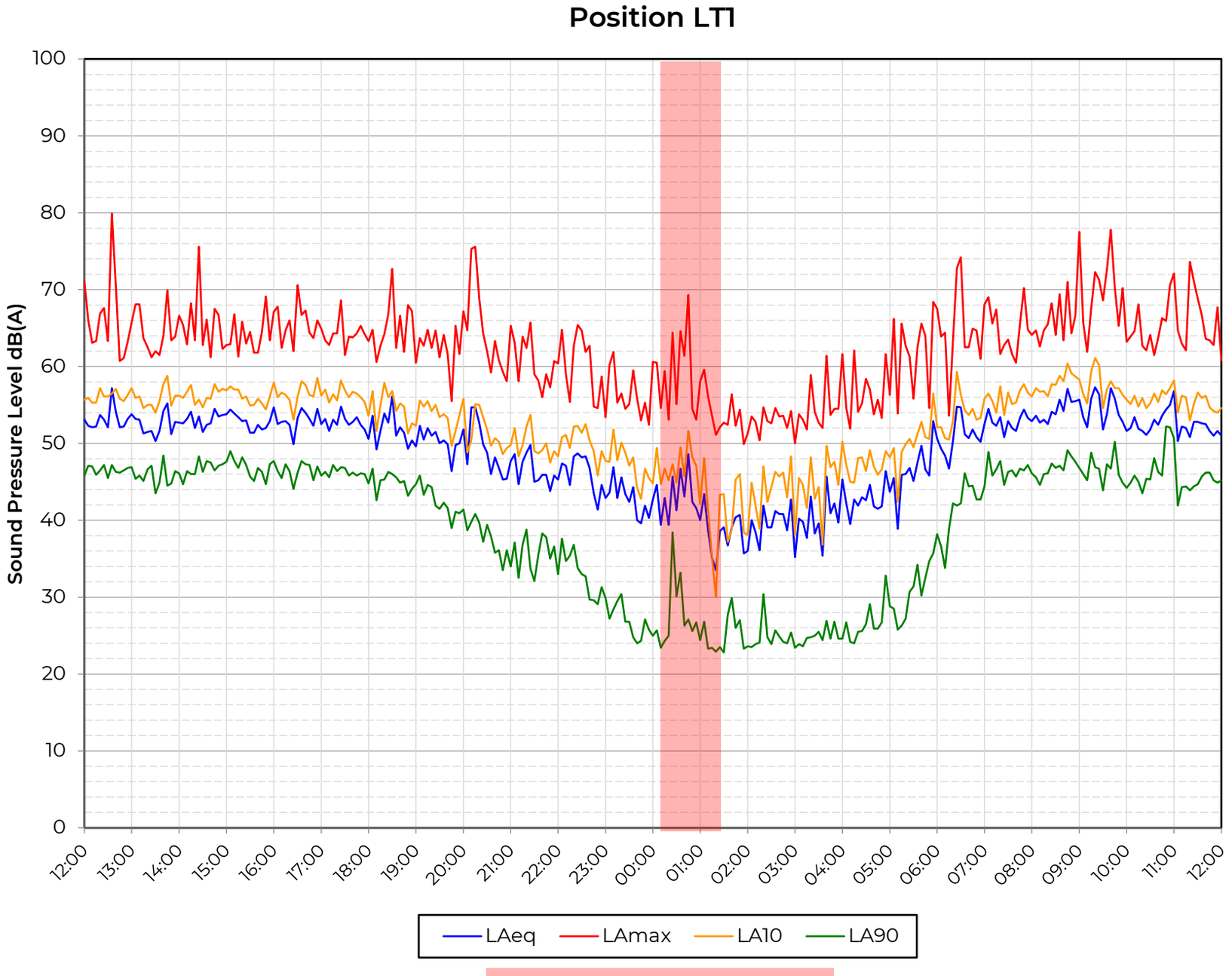
Mulberry House, 8 The Square, Storrington



Sun 22 Sep to Mon 23 Sep

Figure AS13725/TH4

Mulberry House, 8 The Square, Storrington



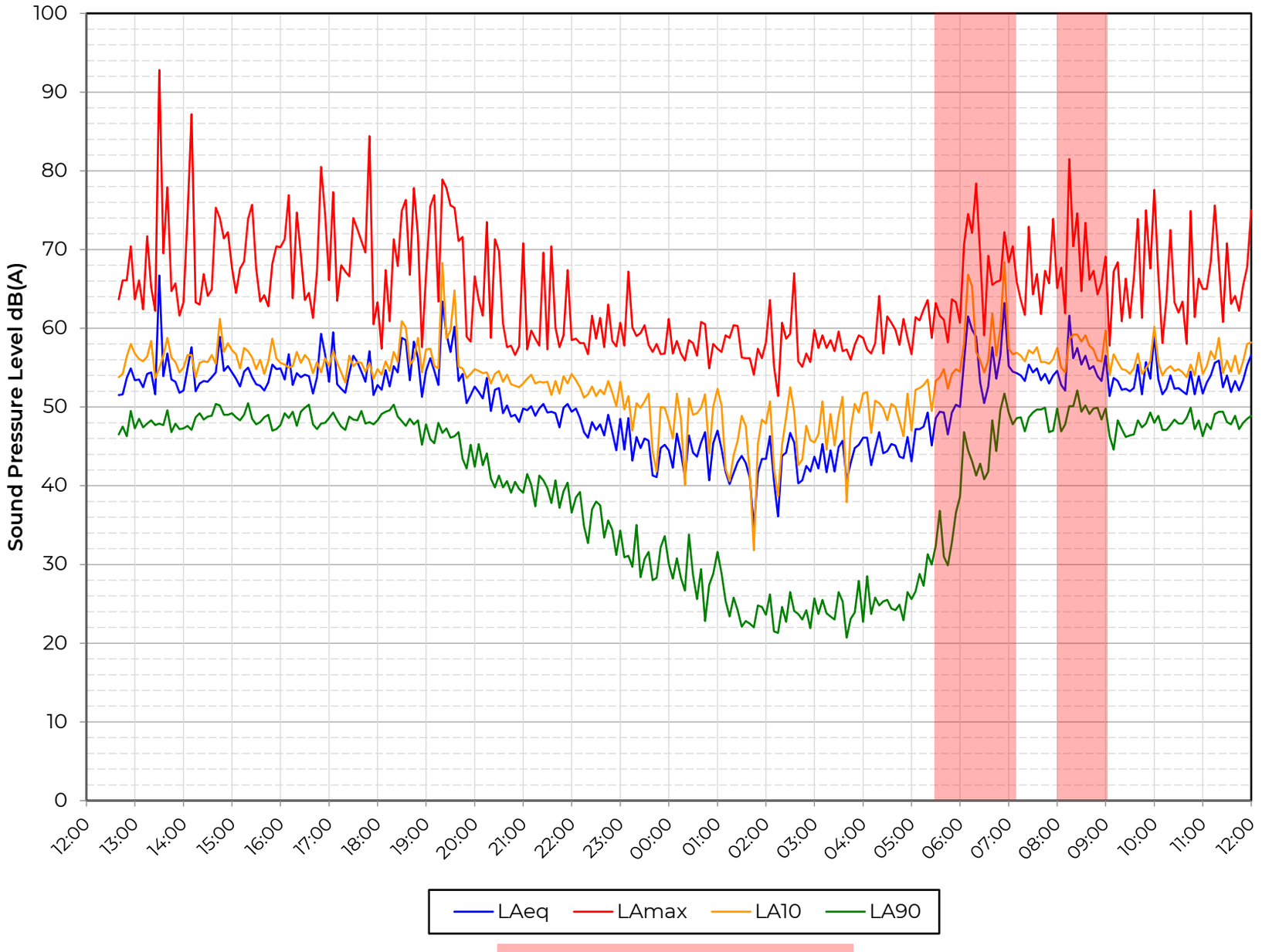
Mon 23 Sep to Tue 24 Sep

Figure AS13725/TH5

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Mulberry House, 8 The Square, Storrington

Position LT2



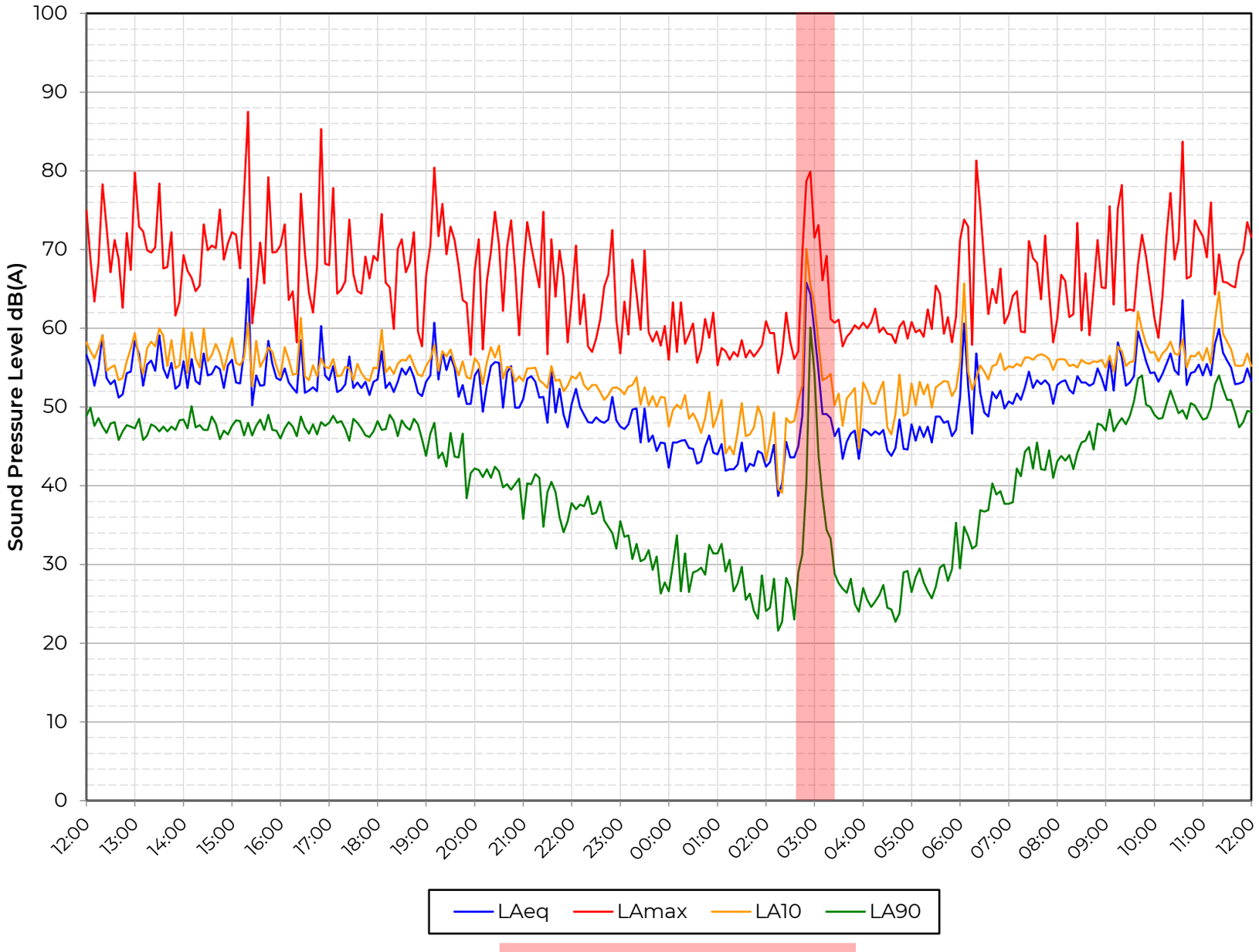
Thu 19 Sep to Fri 20 Sep

Figure AS13725/TH6

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Mulberry House, 8 The Square, Storrington

Position LT2



Fri 20 Sep to Sat 21 Sep

Figure AS13725/TH7

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 *Noise Rating*. A single figure noise level rating that takes into account the frequency content of an acoustic environment.

R *Sound Reduction Index*. 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}	*Weighted Standardised Level Difference*. 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 DnT,w, to take account of the sound insulation within frequency ranges of particular interest.
$L'_{nT,w}$	*Weighted Standardised Impact Sound Pressure Level* 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

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

Sound Emissions To 19 Brewers Yard (Connie's Cottage)		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Condenser in East Alcove Fujitsu A0YG18KMTA Measured Level Difference*	Lp @ 1m	66 14	61 23	55 24	46 23	45 26	35 32	33 31	21 35	51
Specific sound level at receptor	**$L_{eq\ 1hr}$**	**52**	**38**	**31**	**23**	**19**	**3**	**2**	**-14**	**29**

*Measured level difference in-situ using a loudspeaker in the condenser location. Source measurement at 1m from loudspeaker. Receive measurement at 1m from nearest sensitive window.

Sound Emissions To 2a North Street		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Condenser in North Alcove Fujitsu A0YG18KMTA Measured Level Difference*	Lp @ 1m	66 19	61 23	55 19	46 28	45 29	35 30	33 33	21 36	51
Specific sound level at receptor	**$L_{eq\ 1hr}$**	**47**	**38**	**36**	**18**	**16**	**5**	**0**	**-15**	**30**

*Measured level difference in-situ using a loudspeaker in the condenser location. Source measurement at 1m from loudspeaker. Receive measurement at 1m from nearest sensitive window.

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, ($L_{Ar,Tr}$), 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:

a) Typically, the greater this difference, the greater the magnitude of the impact;

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;

c) A difference of around +5dB could be an indication of an adverse impact, depending on the context;

d) 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, (knows 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, $L_r = L_{Aeq,T}$, 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.