

ASHP Noise Impact Assessment

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BRIEF FOR CONSULTANCY

This report has been prepared by Acoustics & Noise Limited, Newport, South Wales, for Mr M Woolford, Mill Studio, Old Hollow Lane, Crawley, under the instruction of Mr P Griffiths.

Purchase Order No: N/A

OBJECTIVES

To investigate the potential noise impact of an Air Source Heat Pump (ASHP) on the dwellings adjacent to Mill Studio and to provide evidence to support the retrospective application to retain the ASHP.

NON TECHNICAL SUMMARY

Mill Studio is set as a part of a group of buildings associated with Rowfant Mill located in a rural position outside Copthorne. The group of buildings include Rowfant Mill Cottage which is Grade II listed.

A full description of the site and buildings is included in a separate Heritage Statement submitted as part of the application to retain a Mitsubishi PUZ-HWM 140 VHA air source heat pump (ASHP) which has been installed to the rear (northwest) elevation of The Studio.

Mid Sussex District Council have requested a noise impact assessment to indicate that the installation can be considered as having permitted development rights.

A simplified set of planning standards is provided by the Microgeneration Certification Scheme in document MCS 020. The noise emissions calculation method unfortunately requires data in format that proved impossible to get from Mitsubishi, the ASHP manufacturer, also the protocol does not allow for the use of acoustic enclosures.

This report uses conventional acoustics calculation methods to assess the potential impact on the nearest noise sensitive property and concludes that this will be worst case minimal.

1.0 DESCRIPTION OF SITE

- 1.1 The site is located at Mill Studio, Old Hollow Lane, Crawley and is currently an occupied two storey dwelling
- 1.2 The site is bounded by number of other dwellings, the nearest for the purpose of this assessment, being 9.5m to the ASHP, is Rowfant Mill.
- 1.3 A plan of the site is presented in Appendix 1. Figure 1

2.0 DISCUSSION

2.1 This report is to accompany a retrospective application which provides full details of the proposed development.

2.2 Acoustics and Noise Ltd were engaged by Mr M Woolford to undertake a noise impact assessment for the above proposal to satisfy the response from Ms Tracie Axford, Planning Officer, Mid Sussex District Council.

2.3 DESCRIPTION OF PROPOSED DEVELOPMENT

2.3.1 The development proposal seeks retrospective planning permission for the installation of an AHSP.

2.3.2 The development is in an urban environment and could potentially create noise that may have an adverse effect on the amenity and health and wellbeing of the adjacent occupants.

2.3.3 An initial assessment of the noise emissions from the ASHP revealed that the noise levels at the nearest window located in Rowfant Mill were likely to cause adverse comment from the occupants.

2.3.4 A suitable bespoke noise enclosure was sourced, and the noise emissions reevaluated. Unfortunately, the accepted industry protocol, MCS020a, does not contain a methodology that includes a noise enclosure, also noise data is required in a format was not available from Mitsubishi, the manufactures of the ASHP.

2.3.5 The data derived and used for the calculations is shown in Appendix 2. As this was the only data available from the manufactures, the octave band noise levels were determined by inspection of the graph [Figure 5]. These levels were used in the calculation of the level at Rowfant Mill to include the data provided by the acoustic enclosure manufacturer and the loss correction for the perpendicular distance to the nearest window at Rowfant Mill. The final step was to convert the octave band levels to an A weighted broadband level.

3.0 IMPACT ASSESSMENT

3.1 RELEVANT GUIDANCE

- 3.1.1 As a matter of best practice, this assessment has been undertaken with reference to relevant guidance on noise. Summary descriptions of the guidance referenced, MCS020a are presented in Appendix 5.

4.0 CONCLUSIONS

- 4.1 The estimated free field noise level at the nearest window of Rowfant Mill is 14dBA and
- is likely to be significantly below the background level
 - potentially inaudible at Rowfant Mill. [See Appendix 4 Figure 8]
 - is significantly below the permitted development level specified in MCS 020a of 37 dBA.

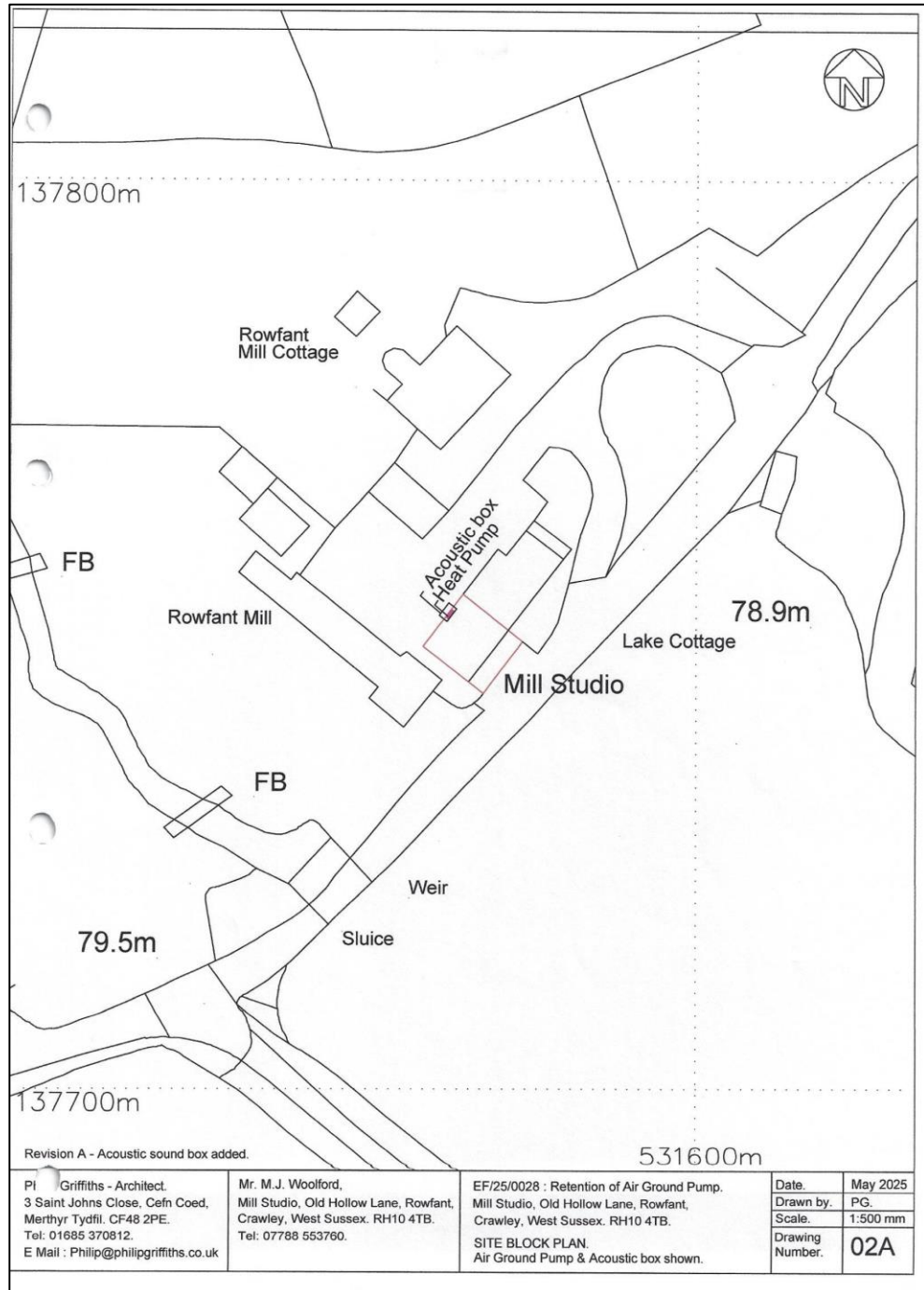
P.A.T. 21/04/2026

**M.Sc., I.Eng., M.I.O.A.,
M.Inst.SCE., M.A.E.S.**

Appendix 1 Plan of site showing ASHP and location

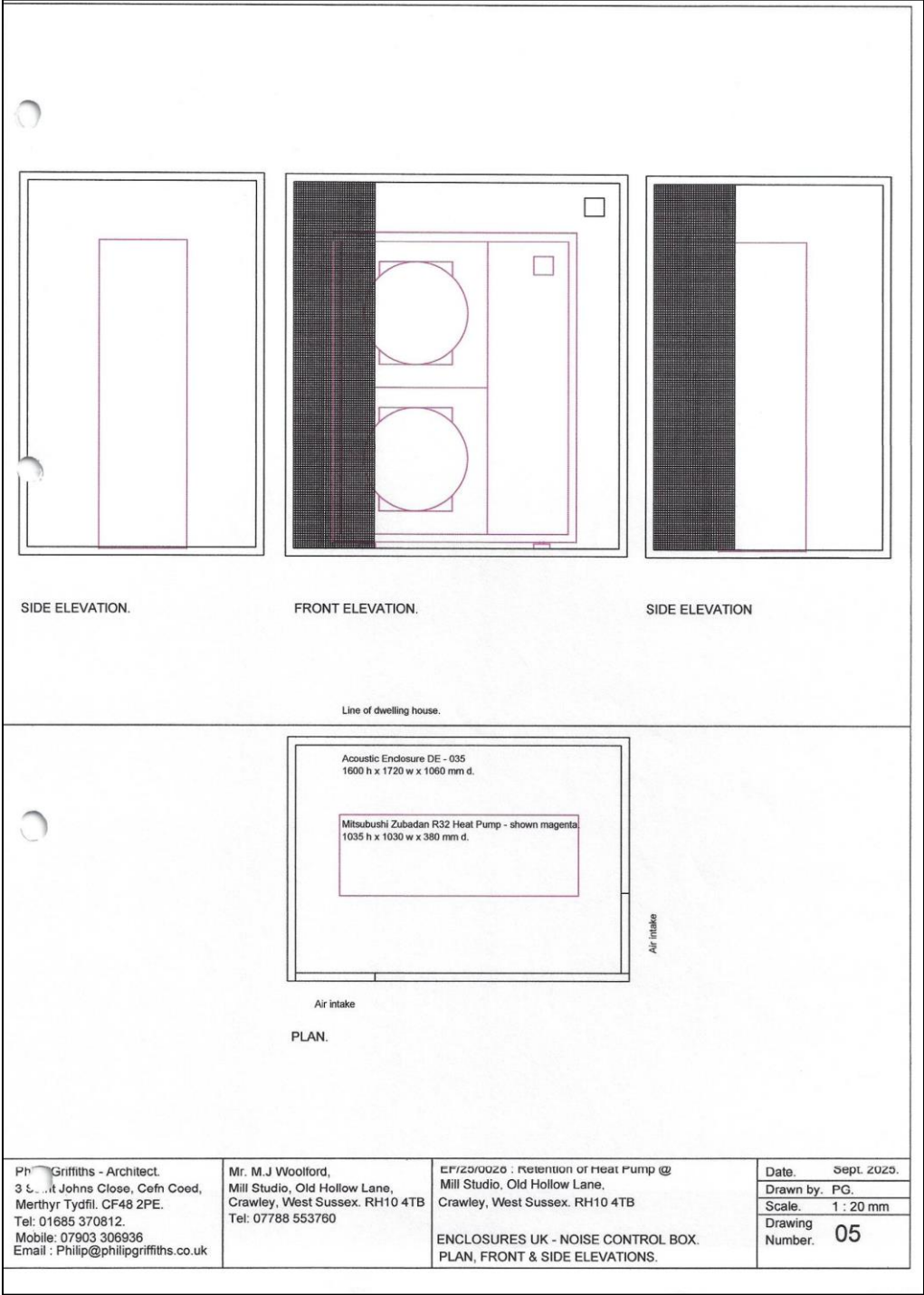
A1.0 PLAN OF SITE SHOWING EQUIPMENT LOCATION

Figure 1 – Site Plan



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Figure 2 – Acoustic Enclosure details



Mike Woolford

Figure 3 - View of ASHP installation



Figure 4 - View of nearest window



Appendix 2 Detailed Calculations

A2.0 DETAILED CALCULATIONS

Figure 5 – AHSP Noise data extracted from specification.

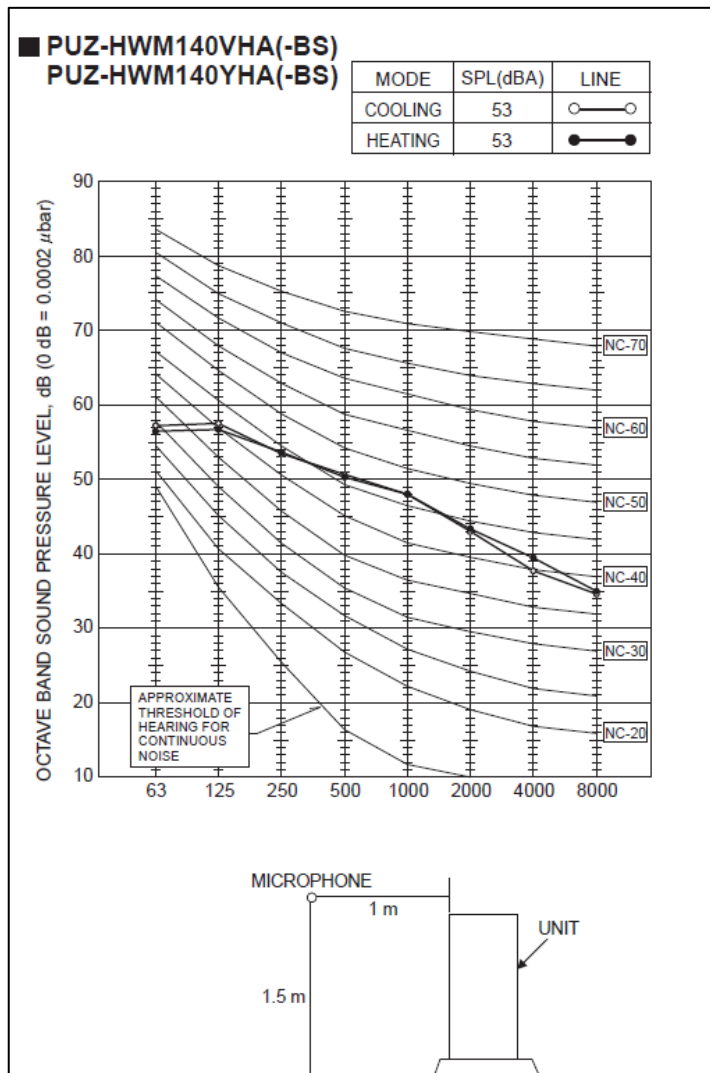


Figure 6 - Octave band linear noise levels

		Freq Hz								Total dB
		63	125	250	500	1k	2k	4k	8k	
Free Field Noise level @ 1m	dB	57	58	54	51	48	44	40	35	62

Figure 7 – Calculated Noise levels at Rowfant Mill

		Freq Hz								Total dB
		63	125	250	500	1k	2k	4k	8k	
Free Field Noise level @ 1m (r1)	L_p dB	57	58	54	51	48	44	40	35	62
Enclosure insertion loss	dB	10	12	17	22	33	36	35	34	
Enclosed Noise level @ 1m	L_p dB	47	46	37	29	15	8	5	1	50
Distance to Rowfant Mill (r2)	9.5 m									
Correction for distance to NSP	$20\lg(r2/r1)$	-19.6	-19.6	-19.6	-19.6	-19.6	-19.6	-19.6	-19.6	
SPL @ Receiver	L_p dB	27.4	26.4	17.4	9.4	-4.6	-11.6	-14.6	-18.6	30
A weight correction		-26.2	-16.1	-8.6	-3.2	0	1.2	1	1.1	
Free Field A weighted @ Rowfant Mill	L_A dB	1.2	10.3	8.8	6.2	-4.6	-10.4	-13.6	-17.5	14

Appendix 3 Relevant Guidance

A3.0 RELEVANT GUIDANCE

A3.1 MCS 020 a) ISSUE 1.0 Air Source Heat Pump Sound Calculation

A3.1.1 This document provides a method for applying permitted development rights under The Town and Country Planning (General Permitted Development) (England) Order 2015.

A3.1.2 However, the use of the protocols contained in the document requires the sound data to be in Octave Band Sound power levels and does not include a method for inclusion of the insertion losses due to an acoustic enclosure.

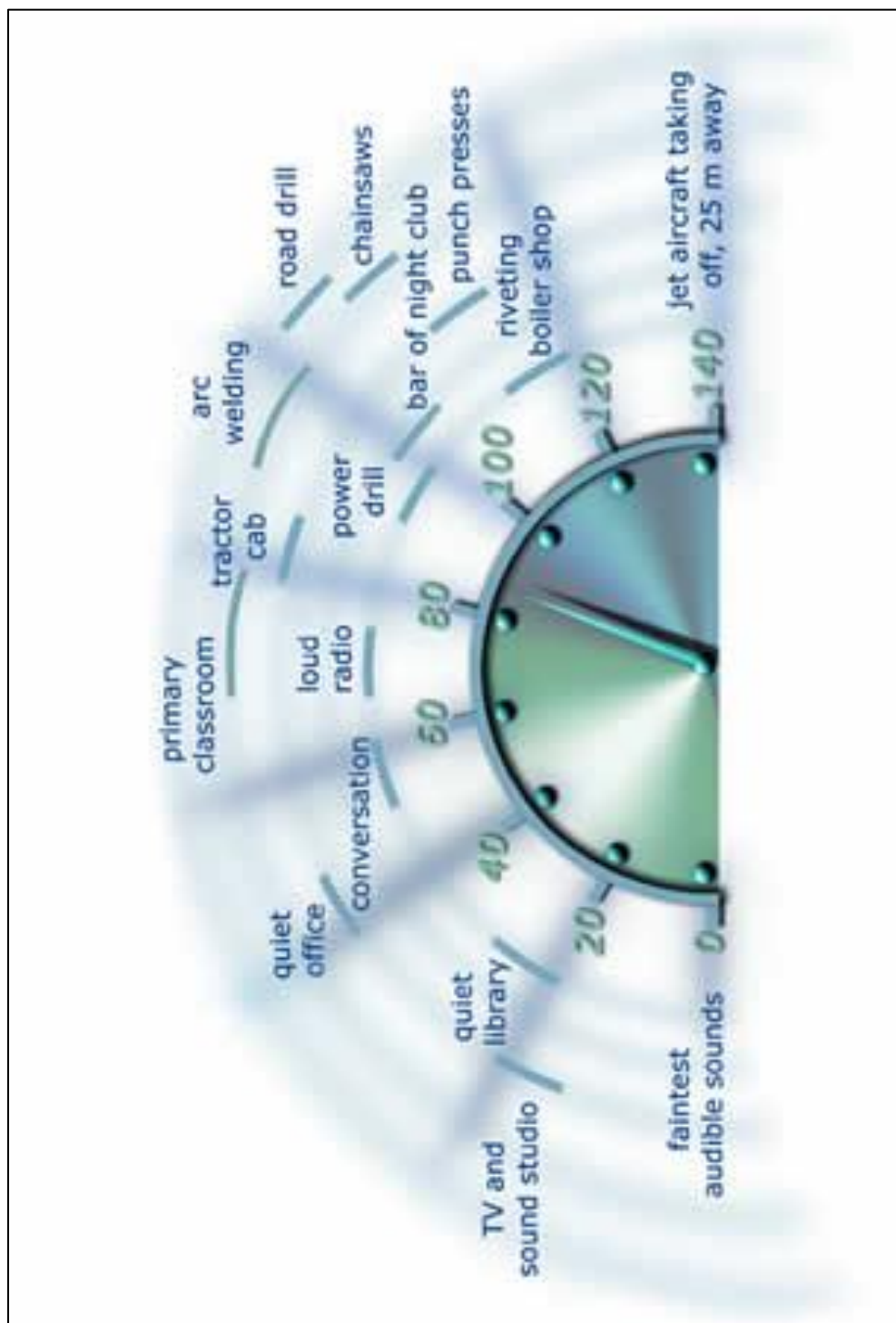
A3.1.3 The manufactures data was only available as Octave band linear sound pressure levels.

A3.1.4 We have however used the permitted development noise limit of 37 dBL_{Aeq,5mins} at the assessment position ignoring the effect of the façade as a reference in the assessment of impact.

Appendix 4 Range of Typical Noise Levels

A4.0 RANGE OF TYPICAL NOISE LEVELS

Figure 8 – Range of Typical Noise Levels



Appendix 5 Glossary of Acoustic Terms

A5.0 GLOSSARY OF ACOUSTIC TERMS

A5.1 Acoustic environment:

Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013]

A5.2 Ambient sound:

Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far

NOTE The ambient sound comprises the residual sound and the specific sound when present.

A5.3 Ambient sound level, $L_A = L_{Aeq,T}$:

The equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T

NOTE the ambient sound level is a measure of the residual sound and the specific sound when present.

A5.4 Background sound level, $L_{A90,T}$:

A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using time weighting F and quoted to the nearest whole number of decibels

A5.5 Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$:

The value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \lg \left\{ (1/T) \int_{t_1}^{t_2} \left[\frac{p_A(t)^2}{p_0^2} \right] dt \right\}$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

A5.6 Measurement time interval, T_m :

Total time over which measurements are taken

NOTE This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.

A5.7 Rating level, L_{A,T_r} :

Specific sound level plus any adjustment for the characteristic features of the sound

A5.8 Reference time interval, T_r :

Specified interval over which the specific sound level is determined

NOTE this is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.

A5.9 Residual sound:

Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound

A5.10 Residual sound level, $L_r = L_{Aeq,T}$:

Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T

A5.11 Specific sound level, $L_s = L_{Aeq,T_r}$:

Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r

A5.12 Specific sound source:

Sound source being assessed

- A5.13 A-weighting:**
Normal hearing covers the frequency (pitch) range from about 20 Hz to 20,000 Hz but sensitivity is greatest between about 500 Hz and 5,000 Hz. The 'A-weighting' is an electrical circuit built into noise meters to approximate this characteristic of human hearing.
- A5.14 Decibel (dB):**
The logarithmic measure of sound level. 0dB (A) is the threshold of normal hearing. 140 dB (A) is the level at which instantaneous damage to hearing is caused. A change of 1 dB is detectable only under laboratory conditions.
- A5.15 dB(A):**
Decibels measured on a sound level meter incorporating a frequency weighting (A-weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with an individual's assessment of loudness. A change of 3 dB (A) is the minimum perceptible under normal conditions and a change of 10 dB(A) corresponds roughly to doubling or halving the loudness of a sound.
- A5.16 Free Field:**
A sound field in which no significant sound reflections occur .
- A5.17 L_{Amax} :**
The maximum 'A-weighted' level of sound recorded during a sound event. The time weighting used (fast or Slow) should be stated.
- A5.18 Tonality:**
The degree to which a sound contains audible pure tones. Broadband sound (across a wider range of frequencies) is generally less annoying than sound with identifiable tones.
- A5.19 Frequency:**
The number of cycles per second of a vibration usually expressed in units of Hertz, Hz

A5.20

Hertz:

Unit of frequency, equal to one cycle per second. Frequency determines the pitch of a sound.