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AAD
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JULIUS BAER

8 BLEEDING HEART YARD

LONDON

PLANT NOISE EMISSIONS ASSESSMENT

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1.0 Introduction

1.1 This report sets out an acoustic assessment regarding noise emissions from the proposed mechanical building services plant associated with 8 Bleeding Heat Yard, London (20-23 Greville Street). The assessment will determine whether the plant proposals comply with local authority noise emission criteria and criteria established as part of the Planning Condition 15 (Application ref. 2018/0910/P).

1.2 The local authority is the London Borough of Camden.

2.0 Site Description

2.1 The development at 8 Bleeding Heat Yard (20-23 Greville Street) is surrounded by commercial and residential buildings. Noise sensitive receivers have been identified as the residential units located at 30 Greville Street to the north, 25-27 Farringdon Street to the east and 7 Bleeding Heart Yard to the south.

2.2 The worst affected noise sensitive receivers have been identified as the residential units located at 30 Greville Street, approximately 17m away from 8 Bleeding Heat Yard (20-23 Greville Street). See Appendix 1 for site plan and location of worst affected noise sensitive receivers.

2.3 The mechanical building services plant proposed as part of the tenant fit out at 8 Bleeding Heat Yard (20-23 Greville Street) are located at roof level. See Appendix 2 for roof plant location.

3.0 Plant Noise Criteria

3.1 Planning Condition 15

3.1.1 The planning approval associated with the development (2018/0910/P) sets out the following condition with regard to plant noise emissions:

"15 Plant and equipment

Prior to the installation of any items of fixed plant associated with the operation of the development, details of plant machinery and a noise report shall be submitted to and approved in writing by the Local Planning Authority. The measures shall ensure that the external noise level emitted from plant/machinery/equipment will be lower than the lowest existing background noise level by at least 10dBA, by 15dBA where the source is tonal, as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity. The report should reference the proposed noise limits included in Table 2 of the planning noise survey report dated 12 January 2018. A post installation noise assessment shall be carried out to confirm compliance with the noise criteria and additional steps to mitigate noise shall be taken, as necessary. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained.

Reason: To ensure that the amenity of occupiers of the development site/ surrounding premises is not adversely affected by noise from plant/mechanical installations/ equipment in accordance with Policy A4 of the London Borough of Camden Local Plan 2017. "

3.2 Plant Noise Emission Criteria

3.2.1 With reference to the noise limits set out in Sandy Brown report 17483-R03-A *Planning noise survey report* (dated 12 January 20118) referred to in Planning Condition 15, the following noise criteria are understood to be applicable to the development.

Table 1 – Plant Noise Emission Criteria

	External Plant Noise Limit during Plant Operating Period	
	(07:00 – 23:00 hours)	**(23:00 – 07:00 hours)**
Weekday	44 dB $L_{Ar,Tr}$	40 dB $L_{Ar,Tr}$
Weekend	42 dB $L_{Ar,Tr}$	39 dB $L_{Ar,Tr}$
Weekday emergency testing: (07:00 – 17:00 hours)	64 dB $L_{Ar,Tr}$	
Weekend emergency testing: (07:00 – 17:00 hours)	62 dB $L_{Ar,Tr}$	

3.2.2 The above plant noise limits are given as BS 4142 (2014) rating levels ($L_{Ar,Tr}$). If the source sound contains tones or will be intermittent sufficient to attract attention then an appropriate penalty (typically +5 dB) should be included when calculating the rating level from the specific noise level ($L_{Aeq,Tr}$).

3.2.3 It is understood that the proposed mechanical building services plant will operate during the daytime from 07:00 to 23:00 hours, during weekdays and weekends. Therefore the appliable plant noise emission limit is 42 dB $L_{Aeq,Tr}$ when assessed to a location 1m from the worst affected window of the nearest noise sensitive receiver.

4.0 Proposed Mechanical Building Services Plant

4.1 Plant noise data

4.1.1 The following section details the proposed equipment manufacturers' noise level data for all non-emergency plant items. See Appendix 2 for plant locations.

4.1.2 The manufacturer has provided sound power data for the proposed AHU unit, as detailed below.

Table 2 – AHU Unit Manufacturer's Sound Power Level Data

	A weighted octave band centre frequency (Hz)								**dBA**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
	sound power level, dB re 10^{-12} W/m^2								
Outlet room side	71	70	79	76	78	77	70	66	83
Inlet room side	66	61	68	64	57	51	44	41	65
Outlet Exhaust	74	75	80	77	77	75	71	70	82
Inlet Exhaust	72	69	69	65	57	49	42	43	65
Breakout	48	41	42	33	26	24	18	17	36

4.1.3 Sound pressure level data for the proposed condenser units are detailed below.

Table 3 – Condenser Manufacturer's Sound Pressure Level Data

Unit ref	Model number	Broadband sound pressure level (dBA)
AC/01/01	PUZ-ZM100YKAR1	51 dB
AC/01/02	PUZ-ZM100YKAR1	51 dB
AC/03/01	PUZ-ZM100YKAR1	51 dB
AC/03/02	PUZ-ZM100YKAR1	51 dB
AC/03/03	PUZ-ZM100YKAR1	51 dB
AC/03/04	PUZ-ZM100YKAR1	51 dB
AC/04/01	PUZ-ZM100YKAR1	51 dB
AC/04/02	PUZ-ZM100YKAR1	51 dB
AC/05/01	PUMY-SP112VKMR2	52 dB
Unit serving AHU 1	RAV-SM2246AT8-E	60 dB
Unit serving AHU 2	RAV-SM2246AT8-E	60 dB

4.2 Acoustic mitigation

4.2.1 The following section details the manufacturers' data for acoustic attenuators. Insertion loss data for the proposed attenuators are as follows.

Table 4 –Acoustic Attenuator Manufacturer's Insertion Loss Data

	Insertion loss data per octave band centre frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
AHU 01								
Exhaust (Atmos)	0	7	24	29	34	36	34	32
Fresh air intake (Atmos)	0	0	19	24	26	27	27	24

5.0 Plant Noise Emissions Assessment

5.1 Calculations have been performed, based upon the information provided, in order to determine the likely plant sound rating level 1m from the worst affected window of the nearest noise sensitive receiver. The plant data has been reviewed and no corrections for tonality or intermittent acoustic features have been deemed necessary.

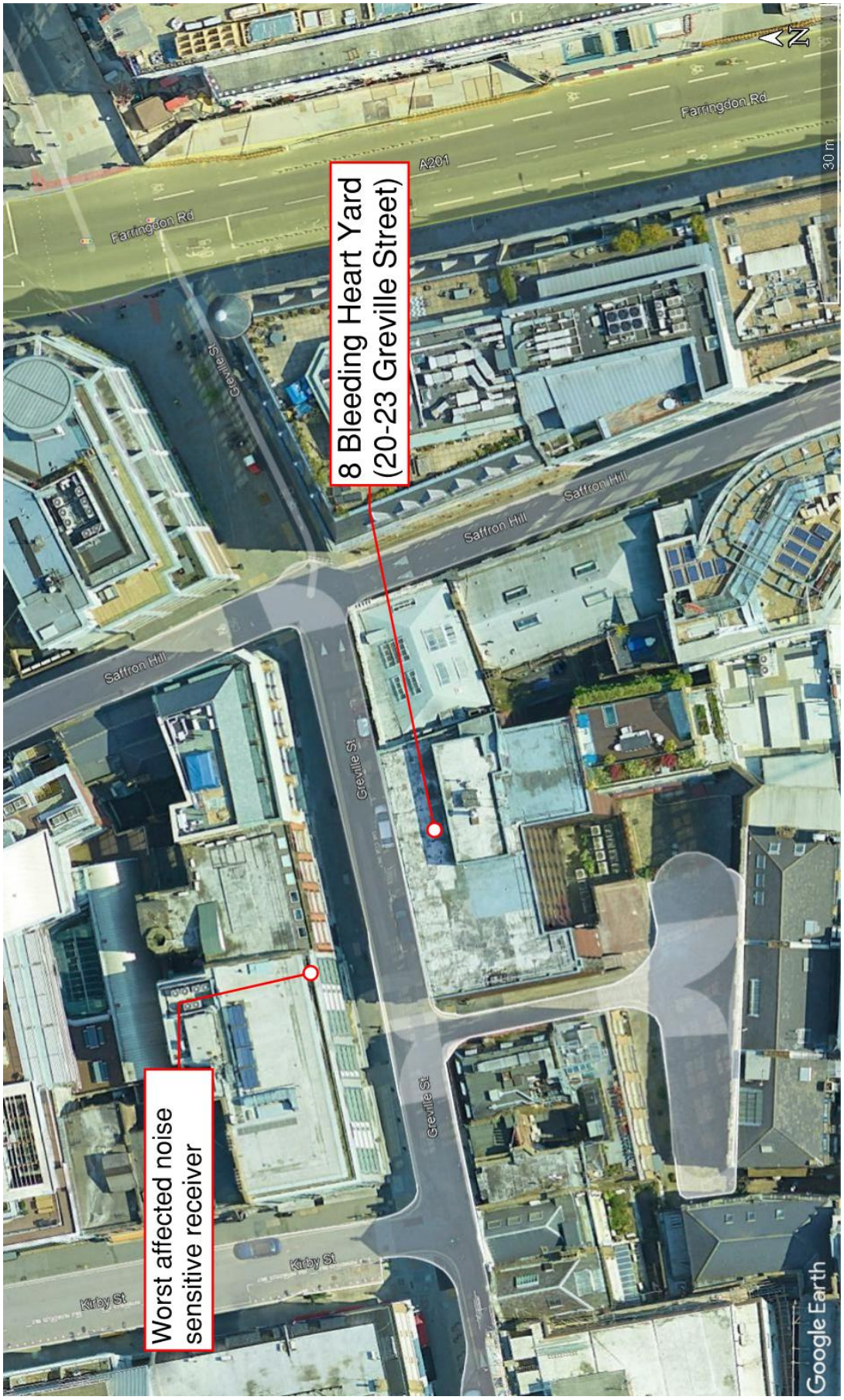
5.2 The calculated rating level 1m from the worst affected window of the nearest noise sensitive receiver is 39 dB $L_{Aeq,Tr,}$ which complies with the weekend daytime and night time operation noise limits of 42 dB $L_{Aeq,Tr}$ and 39 dB $L_{Aeq,Tr}$ as set out in Table 1. The noise emanating from the proposed mechanical building services plant therefore complies with Camden Council's noise emissions criteria and Planning Condition 15 (2018/0910/P).

6.0 Conclusion

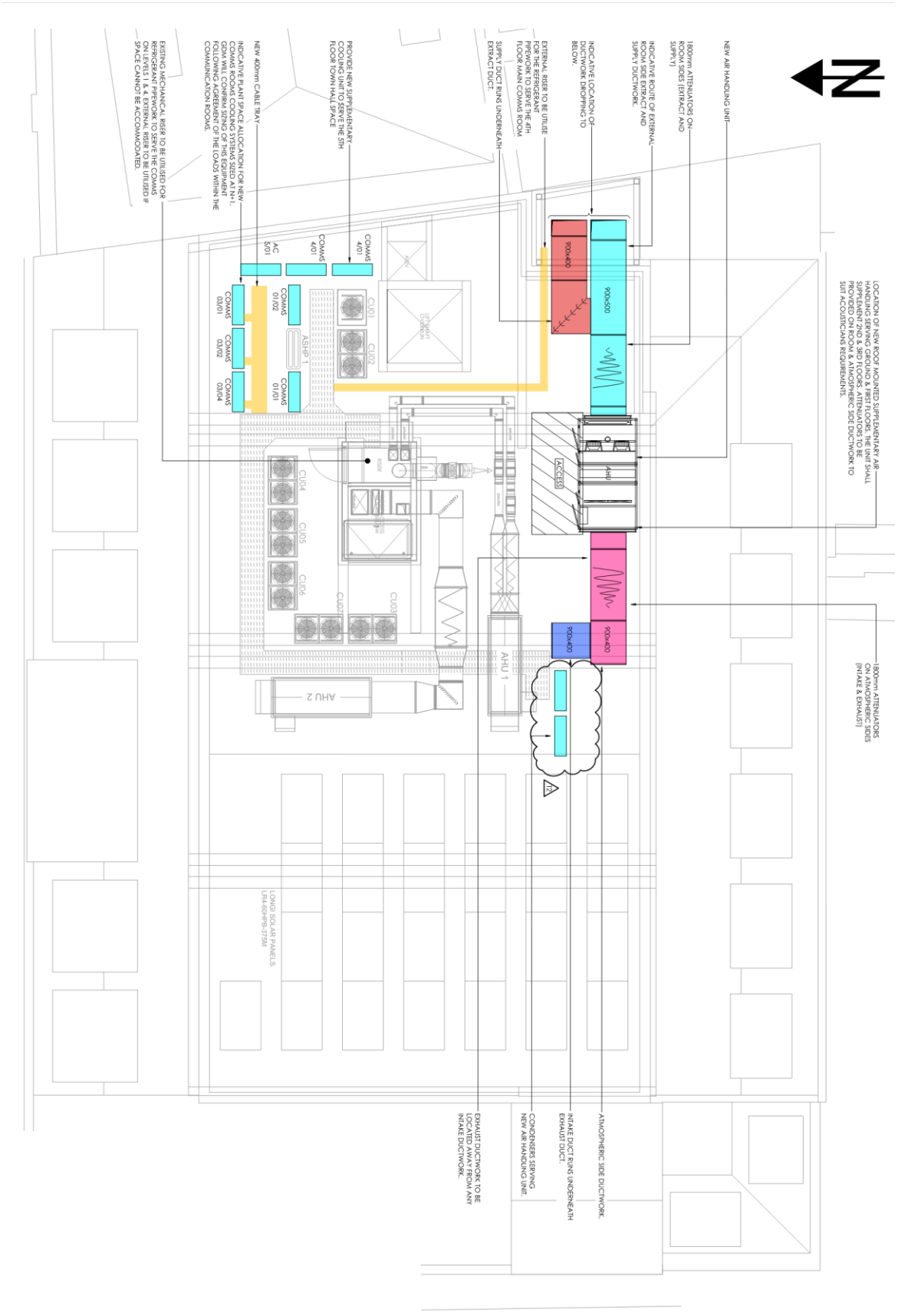
6.1 An assessment has been undertaken to determine if the proposed mechanical building services plant associated with Julius Baer, 8 Bleeding Heart Yard (20-23 Greville Street) achieves the noise emissions requirements of Camden Council and Planning Condition 15 (2018/0910/P).

6.2 The assessment demonstrates that noise emissions from the proposed mechanical building services plant are expected to be at least 10 dB below the prevailing background sound level 1m from the worst affected window of the nearest noise sensitive property. The development proposal therefore satisfies the requirements of Planning Condition 15 and Camden Council's requirements regarding noise emissions from mechanical building services plant.

Appendix 1: Site Plan



Appendix 2: Roof Plant Location



Appendix 3: Glossary of Terms

Term	Description	Explanation
	Noise	Unwanted sound. In the explanation given below the words 'sound' and 'noise' can often be used interchangeably, depending on context.
dB	The decibel scale	The decibel (or dB) scale is the scale on which sound pressure levels are commonly measured. It is a logarithmic scale and is used for convenience to compress the audible range of sound pressures into a manageable range, from 0 dB to 140 dB. The zero of the scale, 0 dB, corresponds to the threshold of hearing, 0.00002 Pa, and the upper limit, 140 dB, corresponds to 20 Pa, the threshold of pain.
	Sound pressure	Sound is a disturbance or fluctuation in air pressure, and sound pressure, measured in pascals (Pa), is used as a measure of the magnitude of the sound. The human ear can detect sound pressures in the range from 0.00002 Pa to 20 Pa. This is an enormously wide range and so for convenience sound pressures are commonly measured on a decibel (dB) scale.
Lp	Sound pressure level	Instantaneous value of Sound Pressure Level (Lp).
	Sound power	The sound energy radiated per unit time by a sound source, measured in watts (W)
L_W	Sound power level	Sound power measured on a decibel scale: $L_W = 10\log(W/W_0)$, where W_0 is the reference value of sound power, 10^{-12} W.
f	Frequency	The frequency of a musical note is what gives it its pitch. It is the number of cycles of the fluctuating sound pressure which occur each second, and is measured in cycles per second, or Hertz (Hz). The human ear can detect frequencies in the range 20 to 20 000 Hz. Most sounds and sounds are a mixture of all frequencies, called broad-band sound.
	Octave bands Octave band spectra	In order investigate the frequency content of broad band sounds, called its frequency spectrum, measurements of sound pressure are carried out over a range of frequency bands. The most common method is to split the audio frequency range into 8 or 9 octave bands. An octave is a frequency range from one particular frequency to double that frequency.
	Free-field	A free field sound level measurement is one which is unaffected by the presence of any sound reflecting surfaces. In an outdoor situation this is usually taken to mean with no sound reflecting surfaces within 3 m. of the source.
	Facade correction Factor	The difference between the façade level and the free field level (in the absence of the façade) is called the façade correction factor.
A	A-weighting	One of the three frequency weightings (A, C and Z) used in sound level meters, and defined in BS EN ISO 61672-1; a very widely used method of producing a single figure measure of a broad band sound which takes into account, in an approximate way at least, the frequency response of the human hearing system. The idea is that sound levels measured in this way should give an indication of the loudness of the sound.
L_A (dBA)	A- weighted sound pressure level	The value of the sound pressure level, in decibels, measured using an A-weighting electronic circuit built into the sound level meter. The vast majority of sound measurements are carried out in this way.
$L_{Aeq,T}$	Equivalent continuous sound level	It represents a measure of the 'average' sound level over the measurement period. It corresponds to the steady level of sound which, over the same period of time, T, would contain the same amount of (A-weighted) sound energy as the time varying sound. Also known as the Average sound level. This is the most common method of measuring time varying sound, and within certain limits gives the best correlation with human response to sound, for example with annoyance.

$L_{AN,T}$	Statistical percentile sound levels	$L_{AN,T}$ is the sound level, usually A-weighted, which is exceeded for N% of the measurement period, T. The most commonly used values are $L_{A10,T}$ used for the measurement and assessment of traffic sound, and $L_{A90,T}$, commonly used as a measure of background sound. $L_{A1,T}$ and $L_{A99,T}$ are also occasionally used to give an indication of the highest and lowest sound levels occurring during the measurement time interval.
	Background sound	Ambient sound which remains at a given site when occasional and transient bursts of higher level ambient sound levels have subsided to typically low levels; it is the sound normally present for most of the time at a given site. It is usually described by the L_{A90} value.
$L_{A90,T}$	Background sound level	Defined in BS 4142 as the value of the A-weighted residual sound at the assessment position that is exceeded for 90 % of a given time interval, T, (i.e. $L_{A90,T)}$ measured using time weighting, F, and quoted to the nearest whole number of decibels. (Also see under residual sound). Background sound itself often varies with time and so the $L_{A90,T}$ is almost universally used as the best measure of the 'more or less always present' sound level which underlies short term variations from other sources of sound.
	Specific Sound Source	The sound source under consideration when assessing the likelihood of adverse impact using BS4142:2014.
	Specific Sound Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific sound source, ref. BS4142:2014.
$L_{ar,Tr}$	Rating Level	The specific sound level, corrected to account for any characteristic features of the sound, by adding a rating penalty for any tonal, impulsive or irregular qualities, ref. BS4142:2014.
T_r	Reference time interval	Specified interval over which the specific sound level is determined, ref. BS4142:2014.
	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, ref. BS4142:2014.
$L_r = L_{Aeq,T}$	Residual Sound Level	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T, ref. BS4142:2014.