Date: 14th September 2023

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AAD
applied
acoustic
design

IMPERIAL LONDON HOTEL

61-66 RUSSEL SQUARE

LONDON

WC1B 5BB

ENVIRONMENTAL SOUND SURVEY AND PLANT SOUND ASSESSMENT REPORT

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CONTENTS

1.0 Introduction

1.1 An environmental sound survey has been undertaken to determine the prevailing levels of ambient and background sound at Imperial London Hotel 61-66 Russell Square, London.

1.2 The measured levels of ambient, background and maximum sound recorded are documented within this report. The data will be used to assess the Stage 3 design proposals regarding plant noise emission.

1.3 Refer to Appendix 3 for a glossary of terms.

2.0 Site Description

2.1 The Imperial Hotel is located at 61-66 Russell Square, London. The president Hotel is directly adjacent to the north of the site. Various commercial buildings are located to the south. The local noise climate is generally dominated by continuous road traffic movements on Russell Square, which directly affects the southwest façade of the building. The other façades are exposed to noise arising from plant operation associated with existing surrounding buildings.

2.2 An aerial view of the site, together with the noise survey locations are presented in Appendix 1.

3.0 Site Sound Survey

3.1 Instrumentation: 3no. NTI XL2 Class 1 sound level meters (Serial No. A2A-08108-EO, A2A-13312-EO and AZA-10121-EO). The instruments were powered by an external battery and stored in a weatherproof cases. The instruments were checked for calibration before and after use with a Larson Davis type CAL 250 calibrator whereupon no calibration drift was recorded. The instruments were used in accordance with manufacturer's instructions.

3.2 Location: Sound Level meter A2A-08108-EO was deployed in Room 305, Level 5, overlooking the Hotel courtyard, approximately 1m from the building façade.

Sound level meter A2A-13312-EO was deployed on Level 1, overlooking Russel Square, approximately 1m from the building façade.

Sound level meter AZA-10121-EO was deployed at roof level on the East façade of the Hotel, overlooking the UCL Institute of Cognitive Neuroscience building, and with a direct line of site to Queens Square road.

3.3 Periods: Sound level monitoring was continuous from approximately 13:00 hours on Wednesday 14th June 2023 to approximately 14:00 hours on Wednesday 21st June 2023. The sound level meter was configured to monitor sound levels continuously in five-minute intervals.

3.4 Weather: The prevailing weather conditions over the survey period were mild with no recorded rain. Local weather stations reported wind speeds of less than 5 m/s throughout the survey period.

3.5 Site Sound Characteristics: The ambient noise level for each façade are characterized below:

North Façade – Plant noise at ground level
East Façade – Traffic noise and construction work
South Façade – Construction work
West Façade – Traffic noise

3.6 Surveyor: Jay Butler (AMIOA)

3.7 Results: The results of the survey are summarised in the tables below, which show the recorded values of ambient sound (L_{Aeq} dB), background sound (L_{A90} dB), and maximum sound levels (L_{AFmax} dB). The survey data is available on request (see Appendix 2 for the survey data in graph form).

3.8 Please see the markup showing monitor deployment locations below:

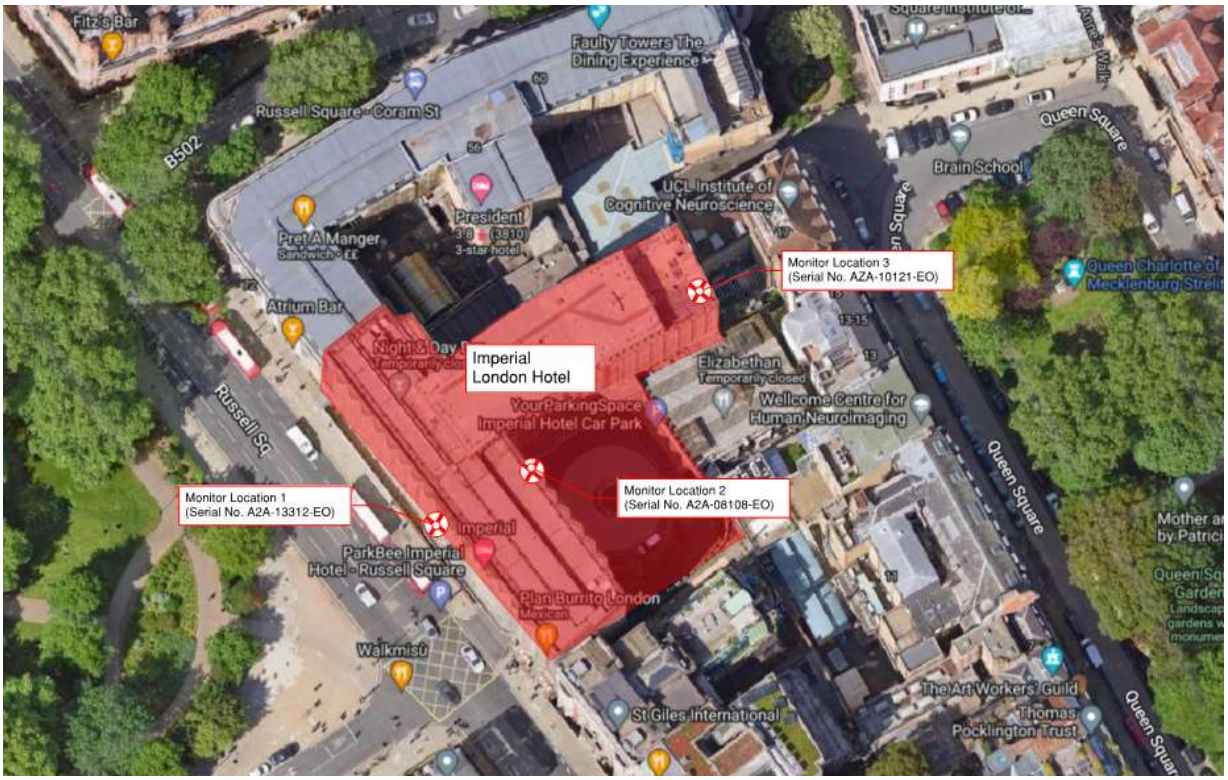


Table 1: Ambient Sound Measurement Results $L_{Aeq,T}$ dB (Monitor Location 1)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	68
Thursday 15th June 2023	70	68
Friday 16th June 2023	71	67
Saturday 17th June 2023	69	69
Sunday 18th June 2023	70	67
Monday 19th June 2023	70	68
Tuesday 20th June 2023	70	67
Wednesday 21st June 2023	-	-
Logarithmic Average $L_{Aeq,T}$ dB	**70**	**68**

Table 2: Lowest Background Sound Measurement Results $L_{A90,T}$ dB (Monitor Location 1)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	42
Thursday 15th June 2023	51	42
Friday 16th June 2023	52	42
Saturday 17th June 2023	52	42
Sunday 18th June 2023	48	44
Monday 19th June 2023	52	39
Tuesday 20th June 2023	52	45
Wednesday 21st June 2023	-	-
Typical $L_{A90,T}$ dB	**52**	**42**

Table 3: Sound Measurement Results in $L_{Amax,T}$ dB (Monitor Location 1)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Highest Maximum on 14th June 2023	99	96
Highest Maximum on 15th June 2023	108	103
Highest Maximum on 16th June 2023	103	96
Highest Maximum on 17th June 2023	104	102
Highest Maximum on 18th June 2023	107	98
Highest Maximum on 19th June 2023	103	103
Highest Maximum on 20th June 2023	106	99
Highest Maximum on 21st June 2023	104	-
Arithmetic Average $L_{Amax,T}$ dB	**83**	**80**
Median $L_{Amax,T}$ dB	**82**	**79**
Mode $L_{Amax,T}$ dB	**80**	**79**

Table 4: Ambient Sound Measurement Results $L_{Aeq,T}$ dB (Monitor Location 2)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	55
Thursday 15th June 2023	61	55
Friday 16th June 2023	60	55
Saturday 17th June 2023	58	56
Sunday 18th June 2023	57	55
Monday 19th June 2023	60	56
Tuesday 20th June 2023	60	-
Wednesday 21st June 2023	-	-
Logarithmic Average $L_{Aeq,T}$ dB	**60**	**55**

Table 5: Lowest Background Sound Measurement Results $L_{A90,T}$ dB (Monitor Location 2)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	50
Thursday 15th June 2023	51	50
Friday 16th June 2023	51	50
Saturday 17th June 2023	51	51
Sunday 18th June 2023	51	50
Monday 19th June 2023	51	50
Tuesday 20th June 2023	52	50
Wednesday 21st June 2023	-	-
Typical $L_{A90,T}$ dB	**51**	**50**

Table 6: Sound Measurement Results in $L_{Amax,T}$ dB (Monitor Location 2)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Highest Maximum on 14th June 2023	94	80
Highest Maximum on 15th June 2023	93	83
Highest Maximum on 16th June 2023	91	78
Highest Maximum on 17th June 2023	85	85
Highest Maximum on 18th June 2023	82	77
Highest Maximum on 19th June 2023	90	83
Highest Maximum on 20th June 2023	87	78
Highest Maximum on 21st June 2023	-	-
Average $L_{Amax,T}$ dB	**71**	**63**
Median $L_{Amax,T}$ dB	**69**	**62**
Mode $L_{Amax,T}$ dB	**64**	**60**

Table 7: Ambient Sound Measurement Results $L_{Aeq,T}$ dB (Monitor Location 3)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	69
Thursday 15th June 2023	74	65
Friday 16th June 2023	73	69
Saturday 17th June 2023	74	68
Sunday 18th June 2023	79	77
Monday 19th June 2023	82	62
Tuesday 20th June 2023	82	77
Wednesday 21st June 2023	-	-
Logarithmic Average $L_{Aeq,T}$ dB	**79**	**71**

Table 8: Lowest Background Sound Measurement Results $L_{A90,T}$ dB (Monitor Location 3)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Wednesday 14th June 2023	-	53
Thursday 15th June 2023	54	53
Friday 16th June 2023	54	53
Saturday 17th June 2023	54	53
Sunday 18th June 2023	53	53
Monday 19th June 2023	53	52
Tuesday 20th June 2023	54	53
Wednesday 21st June 2023	-	-
Typical $L_{A90,T}$ dB	**54**	**53**

Table 9: Sound Measurement Results in $L_{Amax,T}$ dB (Monitor Location 3)

Date	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Highest Maximum on 14th June 2023	107	96
Highest Maximum on 15th June 2023	105	96
Highest Maximum on 16th June 2023	105	95
Highest Maximum on 17th June 2023	105	95
Highest Maximum on 18th June 2023	107	99
Highest Maximum on 19th June 2023	101	92
Highest Maximum on 20th June 2023	101	98
Highest Maximum on 21st June 2023	-	-
Average $L_{Amax,T}$ dB	**92**	**87**
Median $L_{Amax,T}$ dB	**93**	**88**
Mode $L_{Amax,T}$ dB	**94**	**86**

Table 10: Short-term Measurement Results (Level 7)

Time	Ambient Sound $L_{Aeq,T}$	Lowest Background Sound $L_{A90,T}$	Highest Maximum Sound $L_{Amax,T}$
North Façade			
13:50 – 13:55 hrs	62 dB	61 dB	68 dB
13:55 – 14:00 hrs	62 dB	61 dB	70 dB
South Façade			
13:30 – 13:05 hrs	65 dB	57 dB	82 dB
13:05 – 13:10 hrs	66 dB	55 dB	82 dB

4.0 Plant Sound Emission Criteria

4.1 Local authority criteria

4.1.1 The below tables are extracts from the *Camden Local Plan 2017*, which set out Camden Council's mechanical building services plant noise emission requirements. Table B is used to determine the site sound level e.g. LOAEL (Green), LOAEL to SOAEL (Amber) or SOAEL (Red) area. Table C sets out the required mechanical building services plant noise rating level for industrial and commercial developments.

Table B: Noise levels applicable to noise sensitive residential development proposed in areas of existing noise

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic and rail traffic ~	Noise at 1 metre from noise sensitive façade/free field	Day	<50dB$L_{Aeq,16hr}$*	50dB to 72dB$L_{Aeq,6hr}$*	>72dB$L_{Aeq,16hr}$*
		Night	<45dB$L_{Aeq,8hr3}$ <40 dB$L_{Aeq,8hr}$**	45dB to 62dB$L_{Aeq,8hr}$* >40dBL_{night}**	>62dB$L_{Aeq,8hrs}$*
	Inside a bedroom	Day	<35dB$L_{Aeq,16hr}$	35dB to 45dB$L_{Aeq,16hr}$	>45dB$L_{Aeq,16hr}$
		Night	<30dB$L_{Aeq,8hr}$ 42dB$L_{Amax,fast}$	30dB to 40dB$L_{Aeq,16hr}$ 40dB to 73dB$L_{Amax,fast}$	>40dB$L_{Aeq,8hr}$ >73dB$L_{Amax,fast}$
	Outdoor living space (free field)	Day	<50dB$L_{Aeq,16hr}$	50dB to 55dB$L_{Aeq,6hr}$	>55dB$L_{Aeq,16hr}$
Non-anonymous noise	See guidance note on non-anonymous noise				

*LAeq, T values specified for outside a bedroom window are façade levels
**Lnight values specified for outside a bedroom window are free field levels

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

**10dB should be increased to 15 dB if the noise contains audible tonal elements (day and night)*

4.1.2 Camden Council also set out the following condition wording regarding external plant noise emission:

'There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted L_{eq}, 5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area'

4.1.3 The table below provides an assessment of the site sound categorisation and sets out the corresponding mechanical building services plant 'rating level' noise criteria.

4.1.4 The measured survey data indicates that the site falls under the LOAEL to SOAEL (Amber) category and SOAEL (Red) category. Therefore, the assessment requirements detailed in Section 4.1.2 for 'quiet background areas' are not relevant. Mechanical building services plant should therefore be designed to achieve a noise rating level between 9 dBA below and 5 dBA above the typical background sound level at the site, when calculated to 1m away from the worst affected residential receiver.

Table 11: Camden Local Plan: Site sound categorisation and plant sound criteria

Assessment location	Assessment period	L_{Aeq}	Site sound categorisation	Plant rating level limiting criteria
Monitor 1, representing NSR[1] to the northeast and northwest of Imperial Hotel	Daytime 07:00 to 23:00	70 dB	LOAEL to SOAEL (Amber)	Between 9 dB below and 5 dB above typical background
	Night time 23:00 to 07:00	68 dB	SOAEL (Red)	'Rating level' greater than 5 dB above background

Assessment location	Assessment period	L_{Aeq}	Site sound categorisation	Plant rating level limiting criteria
Monitor 2, representing NSR[1] to the southeast of Imperial Hotel	Daytime 07:00 to 23:00	60 dB	LOAEL to SOAEL (Amber)	Between 9 dB below and 5 dB above typical background
	Night time 23:00 to 07:00	55 dB	LOAEL to SOAEL (Amber)	Between 9 dB below and 5 dB above typical background
Monitor 3 representing NSR[1] to the southwest of Imperial Hotel	Daytime 07:00 to 23:00	79 dB	SOAEL (Red)	'Rating level' greater than 5 dB above background
	Night time 23:00 to 07:00	71 dB	SOAEL (Red)	'Rating level' greater than 5 dB above background

Note [1] : NSR – Noise Sensitive Receiver

Table 12: Camden Local Plan: Site sound categorisation and plant sound criteria

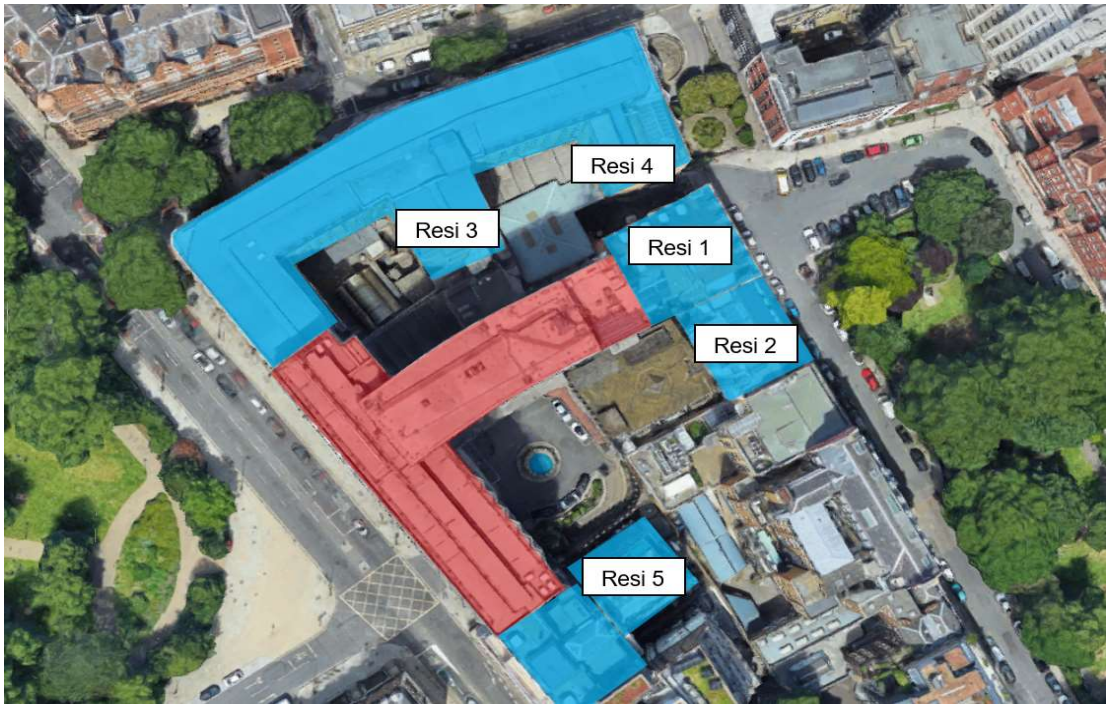
Assessment location	Assessment period	Plant limiting criteria	Typical background $L_{A90,T}$	Plant rating level $L_{Ar,Tr}$
Monitor 1, representing NSR[1] to the northeast and northwest of Imperial Hotel	Daytime 07:00 to 23:00	Between 9 dB below and 5 dB above typical background	52 dB	43 to 57 dB
	Night time 23:00 to 07:00	'Rating level' greater than 5 dB above background	42 dB	47 dB
Monitor 2, representing NSR[1] to the southeast of Imperial Hotel	Daytime 07:00 to 23:00	Between 9 dB below and 5 dB above typical background	51 dB	42 to 56 dB
	Night time 23:00 to 07:00	Between 9 dB below and 5 dB above typical background	50 dB	41 to 55 dB
Monitor 3 representing NSR[1] to the southwest of Imperial Hotel	Daytime 07:00 to 23:00	'Rating level' greater than 5 dB above background	54 dB	59 dB
	Night time 23:00 to 07:00	'Rating level' greater than 5 dB above background	53 dB	58 dB

Note [1] : NSR – Noise Sensitive Receiver

5.0 Plant Sound Assessment

5.1 Noise Sensitive Receivers

5.1.1 The nearest noise sensitive receivers (NSRs) likely to be affected by the plant serving Imperial Hotel are identified as the neighbouring residential buildings and hotel, as shown in the following figure.



5.2 Main Sound Sources Affecting the Noise Sensitive Receivers

5.2.1 The main sound sources affecting the NSRs include the external condensers on the roof at L10 and on the deck at L1 to the northeast end of the building. The locations and sound data of the proposed condensers are shown in Appendix 3.

5.3 Predicted Sound Levels arising from Condensers on Roof

5.3.1 The predicted sound levels at the top floors of NSRs due to condenser operation are presented in the following table. The prediction results show that the sound emission from the condensers can achieve the rating level criteria and therefore not require any noise mitigation measures.

Table 13: Predicted sound levels at NSR due to condensers on roof

NSR	Assessment period	Plant rating level criterion, $L_{Ar,Tr}$	Predicted rating level at NSR, $L_{Ar,Tr}$	Comment
Resi 1	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	31 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level

NSR	Assessment period	Plant rating level criterion, $L_{Ar,Tr}$	Predicted rating level at NSR, $L_{Ar,Tr}$	Comment
Resi 2	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	34 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level
Resi 3	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	39 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level
Resi 4	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	37 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level
Resi 5	Daytime/ Evening 07:00 to 23:00	42 to 56 dB	35 dB	Achieves rating level
	Night-time 23:00 to 07:00	41 to 55 dB		Achieves rating level

5.4 Predicted Sound Levels arising from Condensers on First Floor

5.4.1 The predicted sound levels at the lowest floors of the NSRs due to the operation of condensers located at first floor level are presented in the following table. The prediction results show that the sound emission from condensers can achieve the rating level criteria and therefore do not require any sound mitigation measures.

Table 14: Predicted sound levels at NSR due to condensers on First Floor

NSR	Assessment period	Plant rating level, $L_{Ar,Tr}$	Predicted rating level at NSR, $L_{Ar,Tr}$	Comment
Resi 1	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	46 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level
Resi 3	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	45 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level
Resi 4	Daytime/ Evening 07:00 to 23:00	43 to 57 dB	44 dB	Achieves rating level
	Night-time 23:00 to 07:00	47 dB		Achieves rating level

5.5 Sound emission from Internal Plant

5.5.1 Sound emission to exterior areas due to any duct-borne noise from internal plant, including AHUs, MVHRs and fans, etc., shall be controlled by suitable attenuators and

it is not anticipated to have any significant impact to the NSRs. Further review will be required as the design progresses.

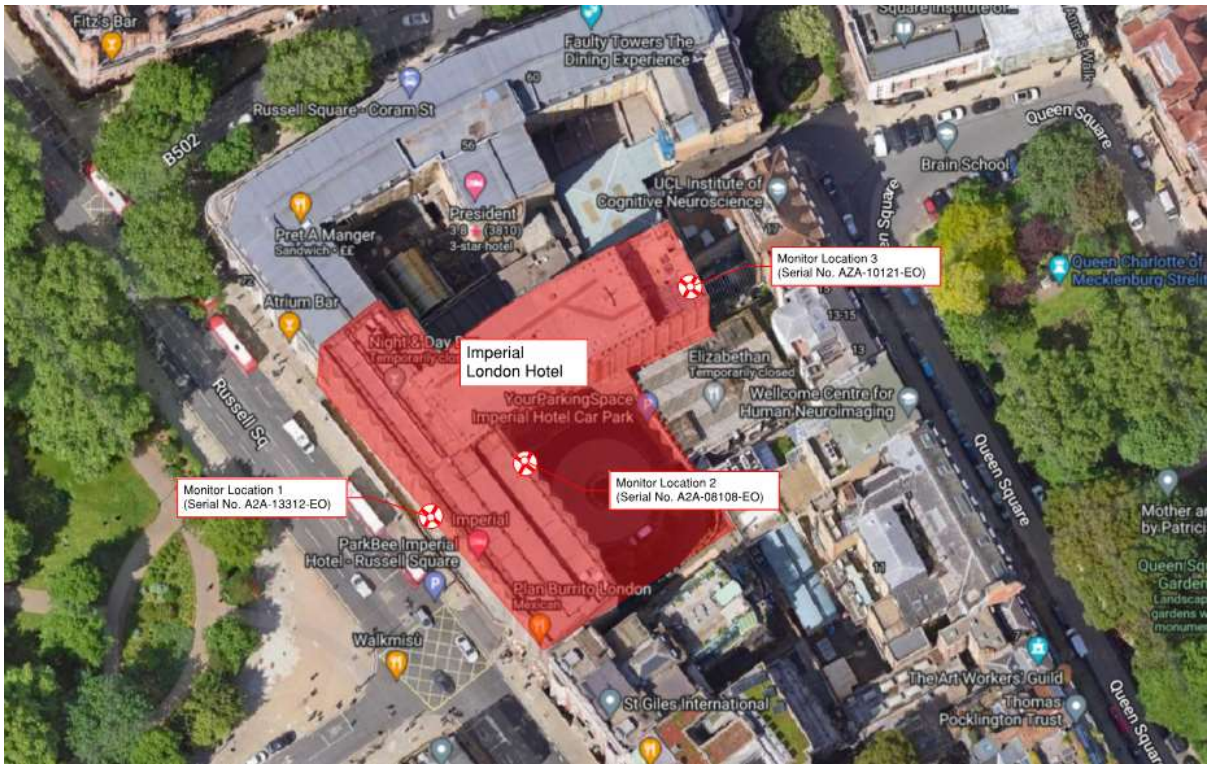
6.0 Conclusion

6.1 An environmental sound survey has been undertaken at Imperial London Hotel, London to determine the prevailing sound climate in proximity of the site.

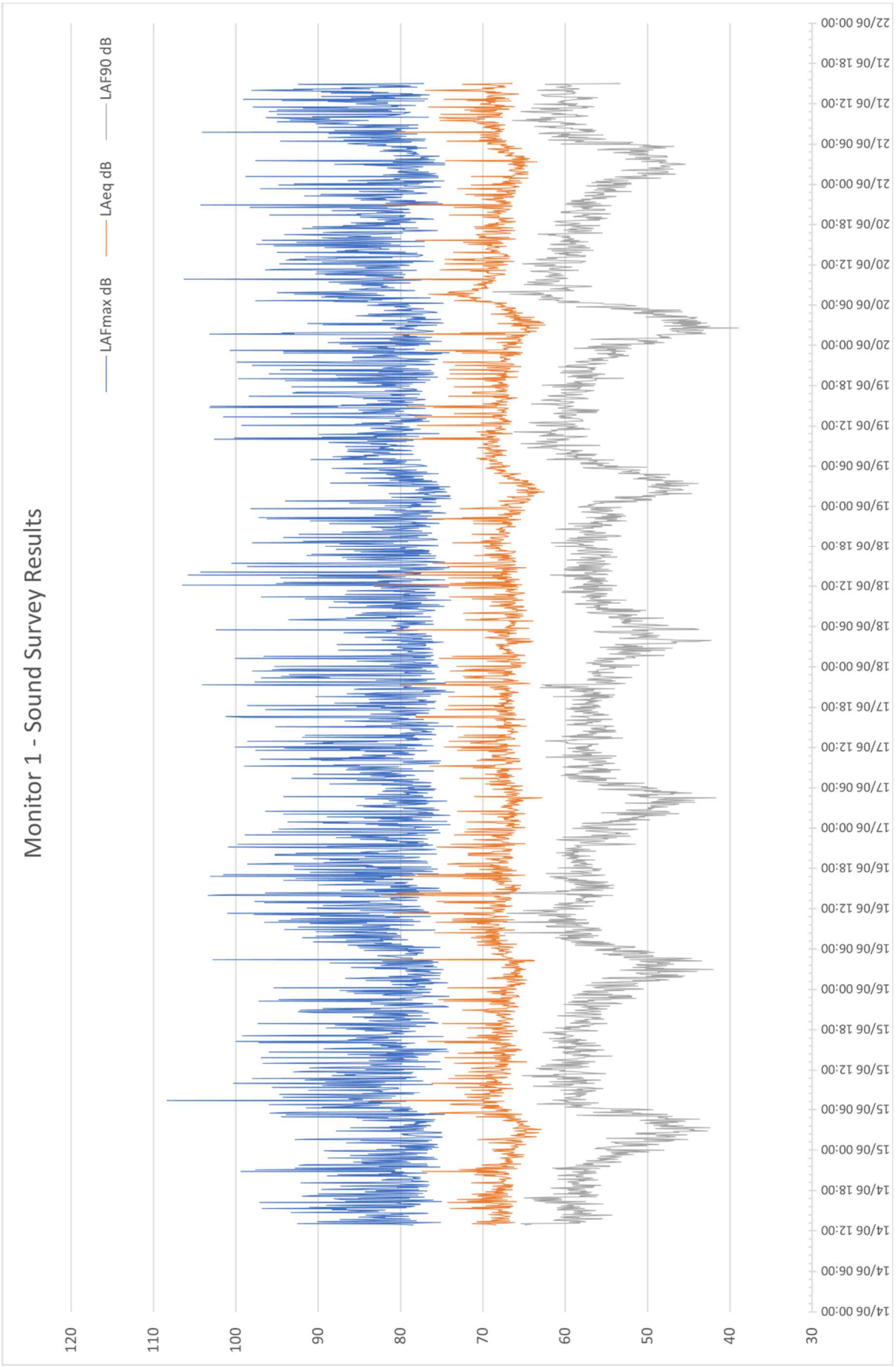
6.2 The measured levels of ambient, background and maximum sound levels are recorded in the tables above. The data may be used to inform the ongoing acoustic design of the building with regard to external noise intrusion and building services plant sound emissions.

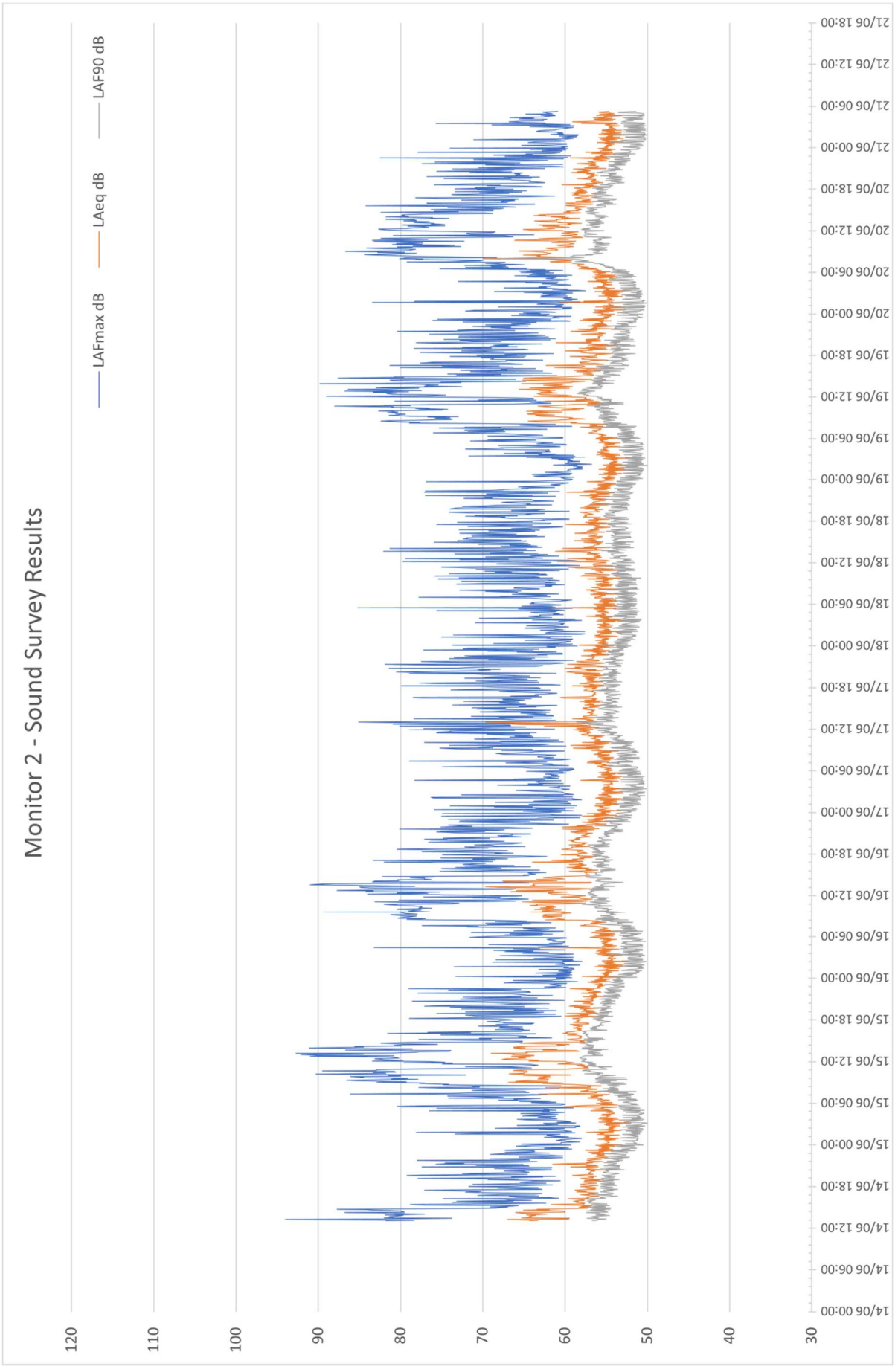
6.3 Sound arising from operation of the proposed items of external plant has been assessed with regard to local authority planning policy. The predicted sound levels are expected to be within the adopted limiting criteria at the nearest identified noise sensitive receivers. Further assessment will be required to see that any internal plant items that discharge/intake to the atmosphere are suitably attenuated in line with the assessment set out above.

Appendix 1: Measurement Locations



Appendix 2: Survey Data




Monitor 2 - Sound Survey Results
LAFmax dB
LAeq dB
LAF90 dB
120
110
100
90
80
70
60
50
40
30
21/06 18:00
21/06 12:00
21/06 06:00
21/06 00:00
20/06 18:00
20/06 12:00
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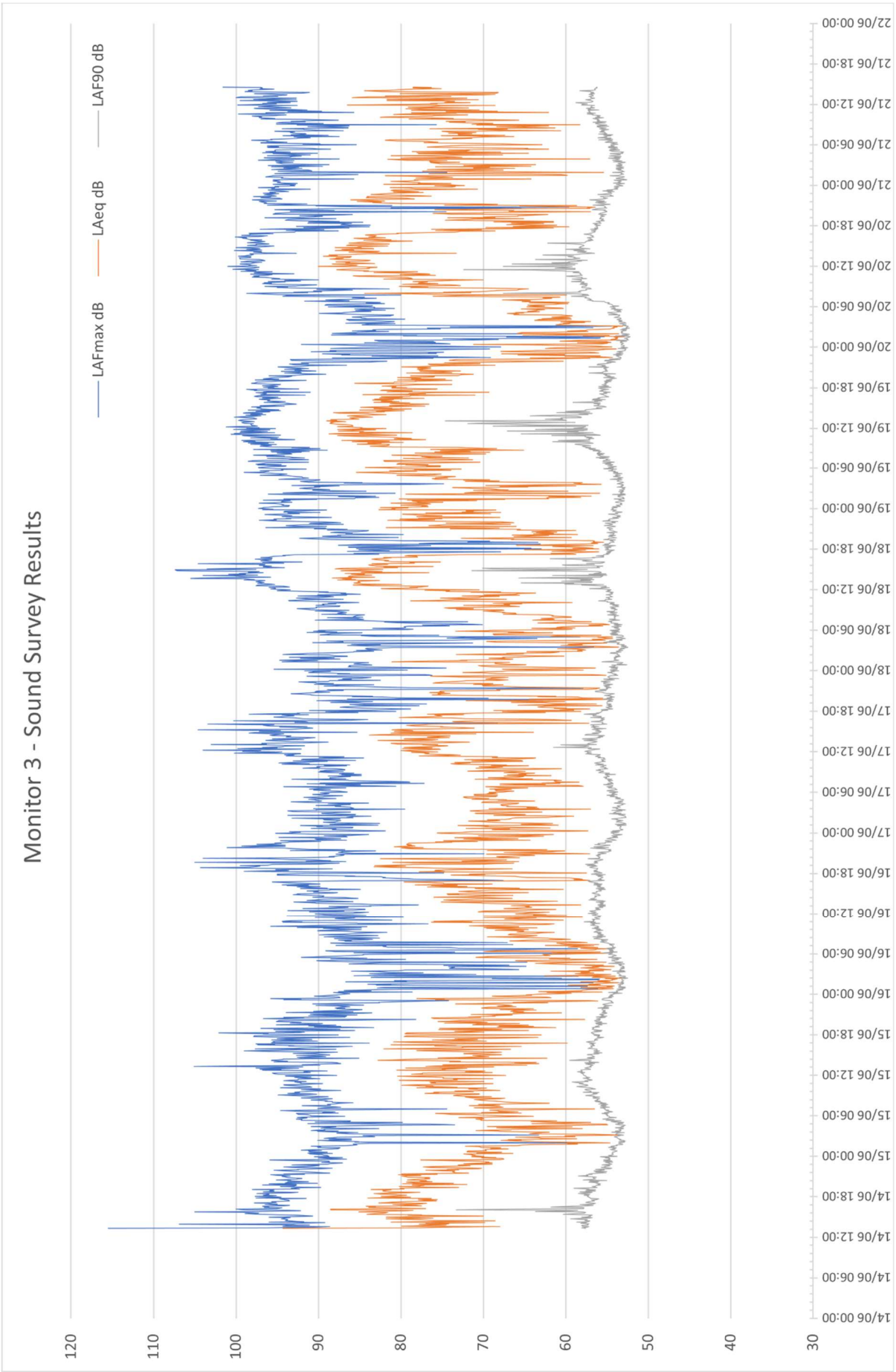
Monitor 3 - Sound Survey Results
LAFmax dB
LAeq dB
LAF90 dB
120
110
100
90
80
70
60
50
40
30
22/06 00:00
21/06 18:00
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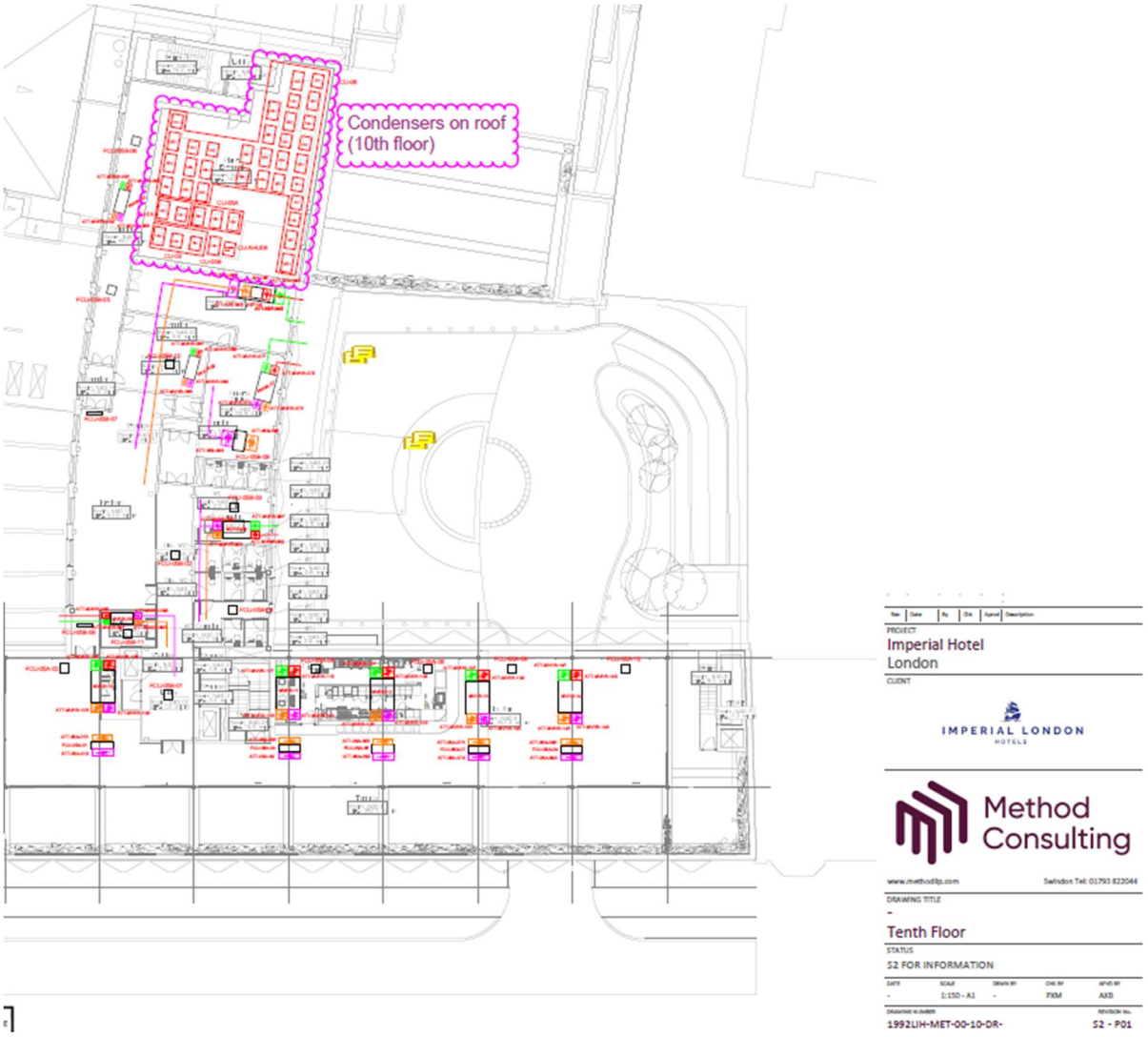
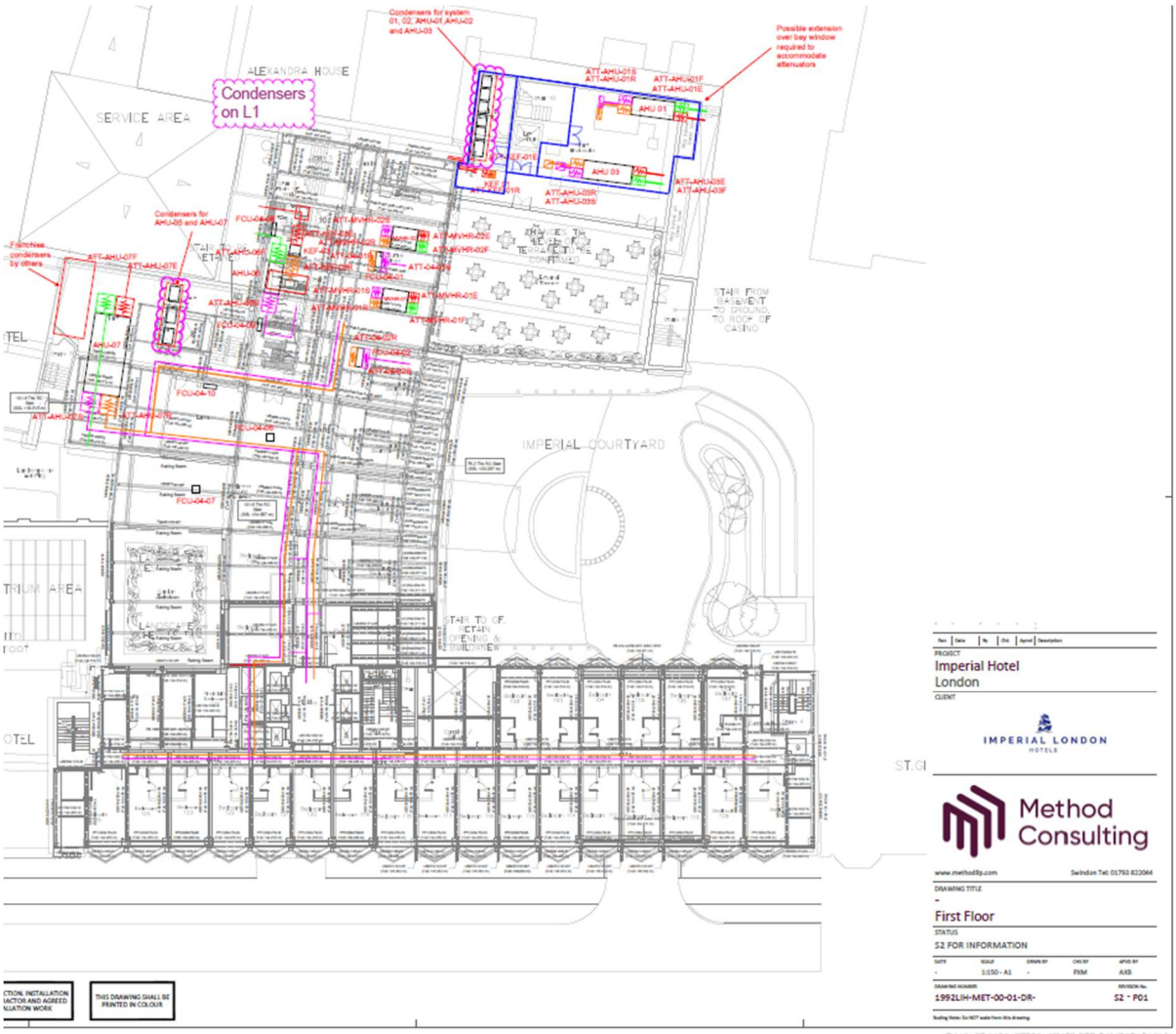
Appendix 3: Condenser Locations and Sound Data

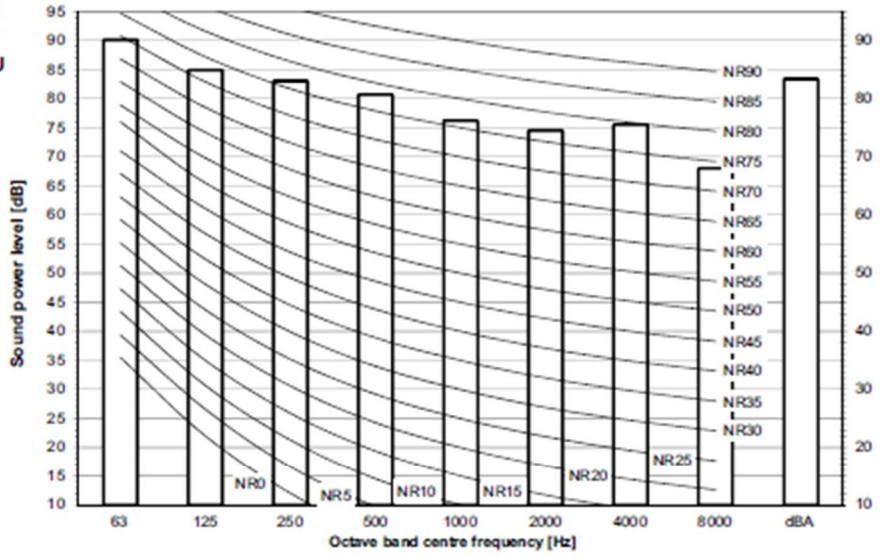



Condensers on L1
ALEXANDRA HOUSE
SERVICE AREA
IMPERIAL COURTYARD
Possible extension over bay window required to accommodate attenuators
Imperial Hotel
London
IMPERIAL LONDON HOTELS
Method Consulting
First Floor
S2 FOR INFORMATION
1992LIH-MET-00-01-DR-
S2 - P01

11 Sound data

11 - 1 Sound Power Spectrum

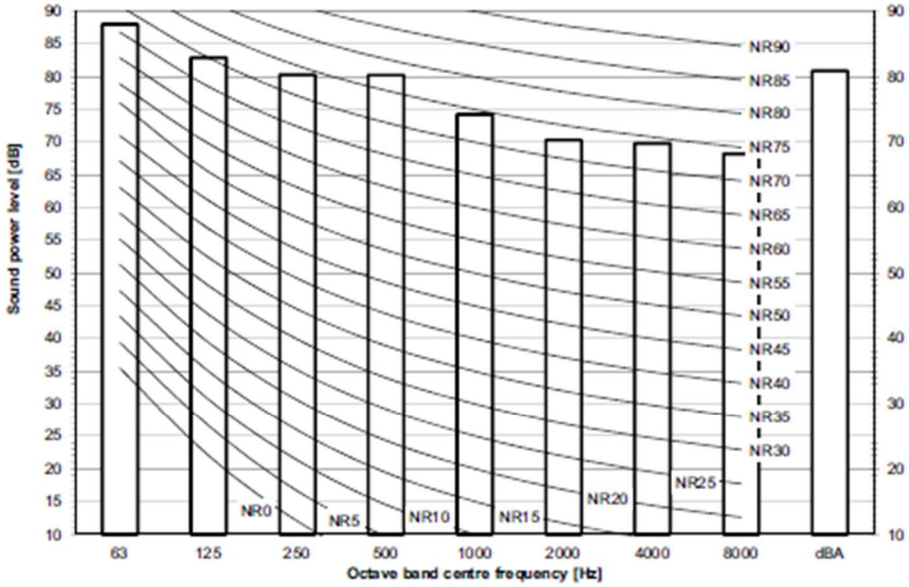
REYQ12U
RXYQQ12U
RXYQ12U
RYYQ12U
RYMQ12U



Notes
dBA = A-weighted sound power level (A scale according to IEC).
Reference acoustic intensity 0dB = 10E-6µW/m²
Measured according to ISO 3744

3D119530

REYQ14U
RXYQQ14U
RXYQ14U
RYYQ14U
RYMQ14U



Notes
dBA = A-weighted sound power level (A scale according to IEC).
Reference acoustic intensity 0dB = 10E-6µW/m²
Measured according to ISO 3744

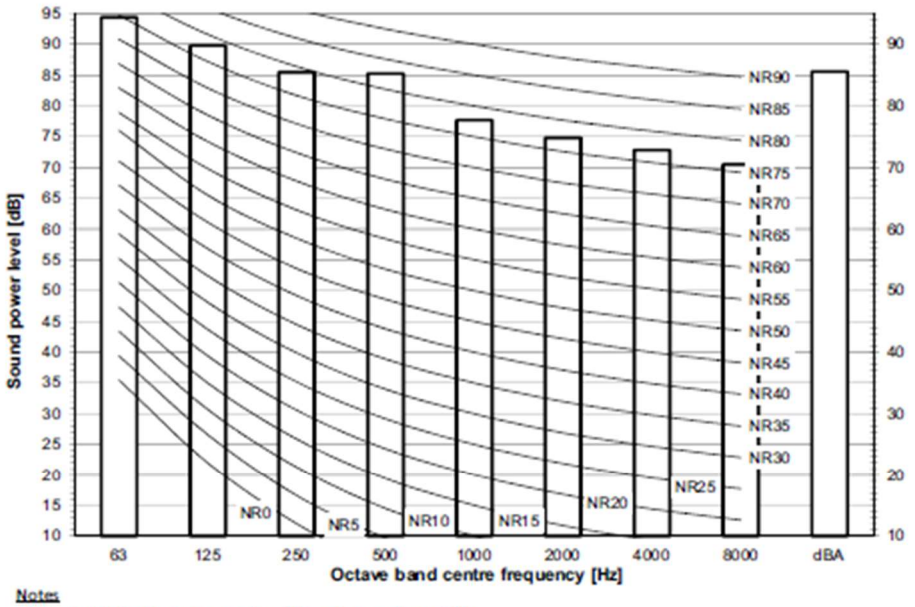
3D119531

11 Sound data

11 - 1 Sound Power Spectrum

11

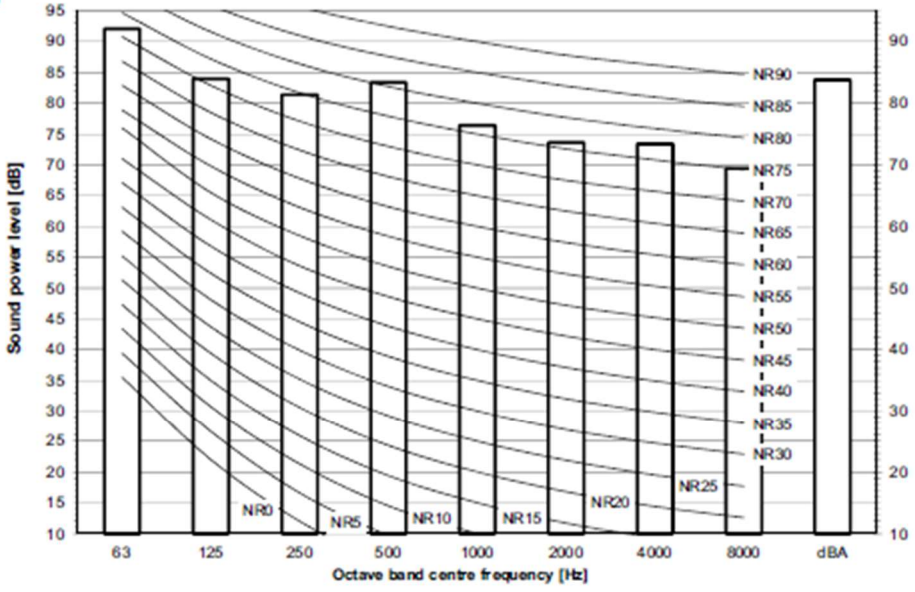
REYQ16U
RXYQQ16U
RXYQ16U
RYYQ16U
RYMQ16U



Notes
dBA = A-weighted sound power level (A scale according to IEC).
Reference acoustic intensity 0dB = 10E-6µW/m²
Measured according to ISO 3744

3D119532

REYQ18U
RXYQQ18U
RXYQ18U
RYYQ18U
RYMQ18U



Notes
dBA = A-weighted sound power level (A scale according to IEC).
Reference acoustic intensity 0dB = 10E-6µW/m²
Measured according to ISO 3744

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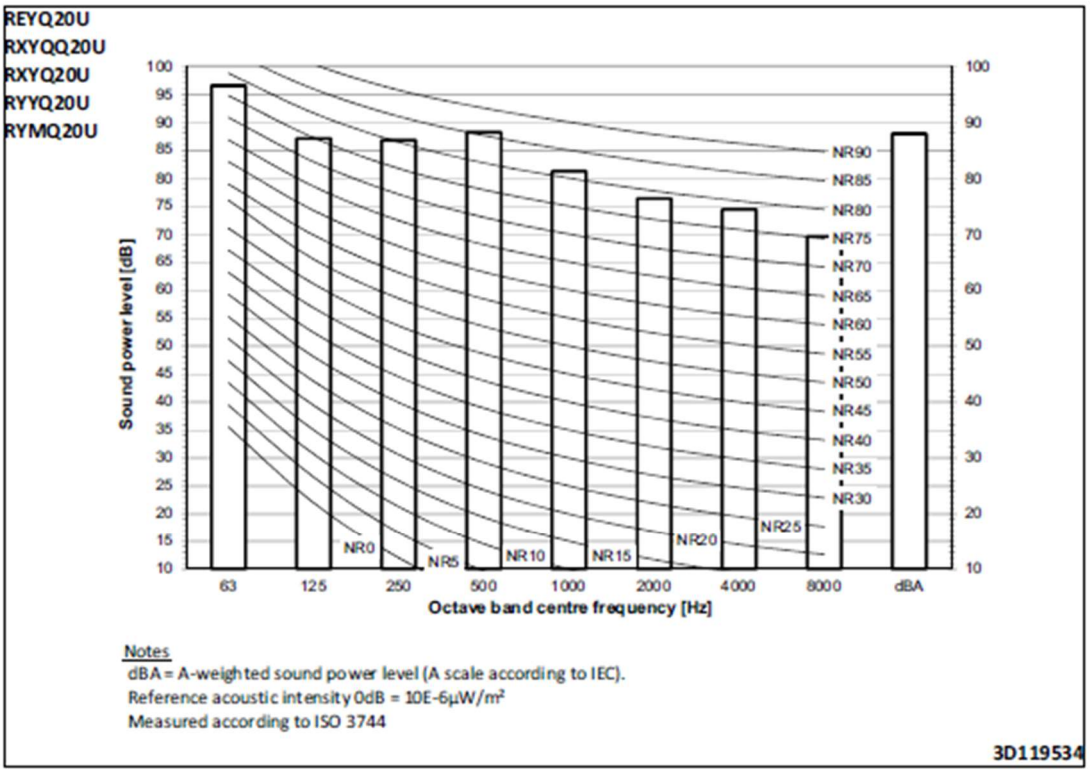
11 Sound data

11 - 1 Sound Power Spectrum



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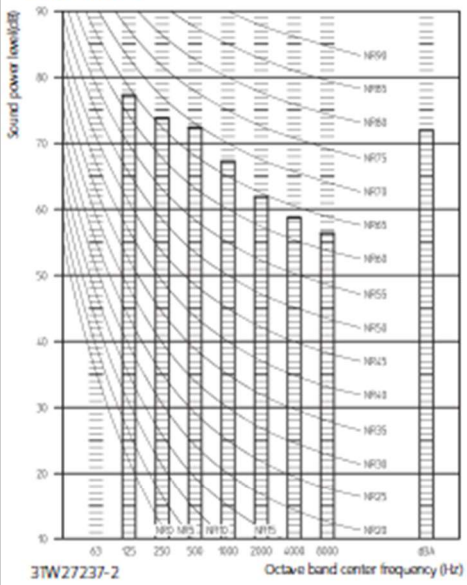
11 Sound data

11 - 1 Sound Power Spectrum

11

ERQ125AW1

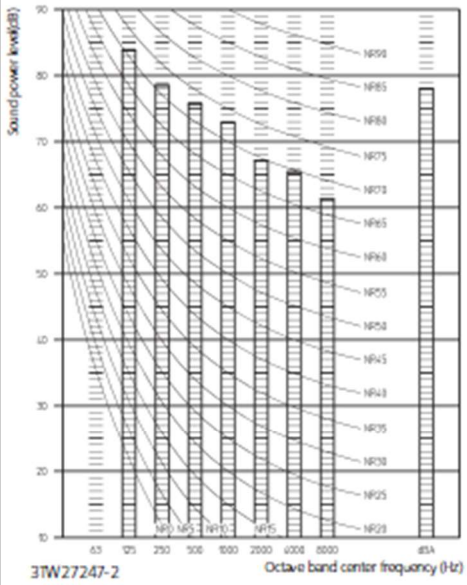


3TW27237-2

NOTES

1 dBA = A-weighted sound power level (A-scale according to IEC)
2 Reference acoustic intensity 0dB = 10E-6μW/m²
3 Measured according to ISO 3744

ERQ200AW1



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NOTES

1 dBA = A-weighted sound power level (A-scale according to IEC)
2 Reference acoustic intensity 0dB = 10E-6μW/m²
3 Measured according to ISO 3744

Appendix A: 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 noises are a mixture of all frequencies, called broad-band noise.
	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.

Term	Description	Explanation
$L_{AN,T}$	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.