Space House
London

Environmental Noise Survey Report

25748/ENS Rev3

12 July 2019

For:
SLQR Trustee No.1 & SLQR Trustee No.2 Ltd as Co-Trustees of
SLQR Unit Trust No. 3
3rd Floor
37 Esplanade
St Helier
Jersey
JE1 1AD

Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

Hann Tucker Associates

Environmental Noise Survey Report
25748/ENS Rev3

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	30/01/2019	-	Ben Phipps Assistant Consultant BSc(Hons)	Nick Russell Principal Consultant MIOA
1	17/05/2019	Draft For Review	Ben Phipps Assistant Consultant BSc(Hons)	Nick Russell Principal Consultant MIOA
2	21/05/2019	Comments included	Ben Phipps Assistant Consultant BSc(Hons)	Nick Russell Principal Consultant MIOA
3	12/07/2019	Tenants plant included	 Nick Russell Principal Consultant MIOA	

Hann Tucker Associates

Environmental Noise Survey Report
25748/ENS Rev3

Contents

Attachments

1.0 Introduction

New items of building services are to be installed at the proposed development at Space House, 1 Kemble Street, WC2B 4AN in London. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey to provide a basis for assessment of the environmental plant noise emissions to support the applications for planning permission and listed buildings consent for the following description of development:

"Removal of existing roof plant equipment at 1 Kemble Street and erection of a single storey facsimile floor plus one setback floor; removal of roof plant from 43-59 Kingsway and erection of a single storey set-back extension; enclosure of the southern external stair at ground floor level on Kingsway with slimline glazing replacement windows and new glazing at ground floor level across the site; enclosing the redundant petrol filling station area with slimline glazing; façade cleaning; new landscaping and public realm works and internal alterations to both buildings in connection with their refurbishment and change of use from Class B1 offices to Class A1/A3 and flexible Class B1/B1 and events space (sui generis) at part ground and basement levels."

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings and to identify a suitable accessible location for environmental noise measurements.

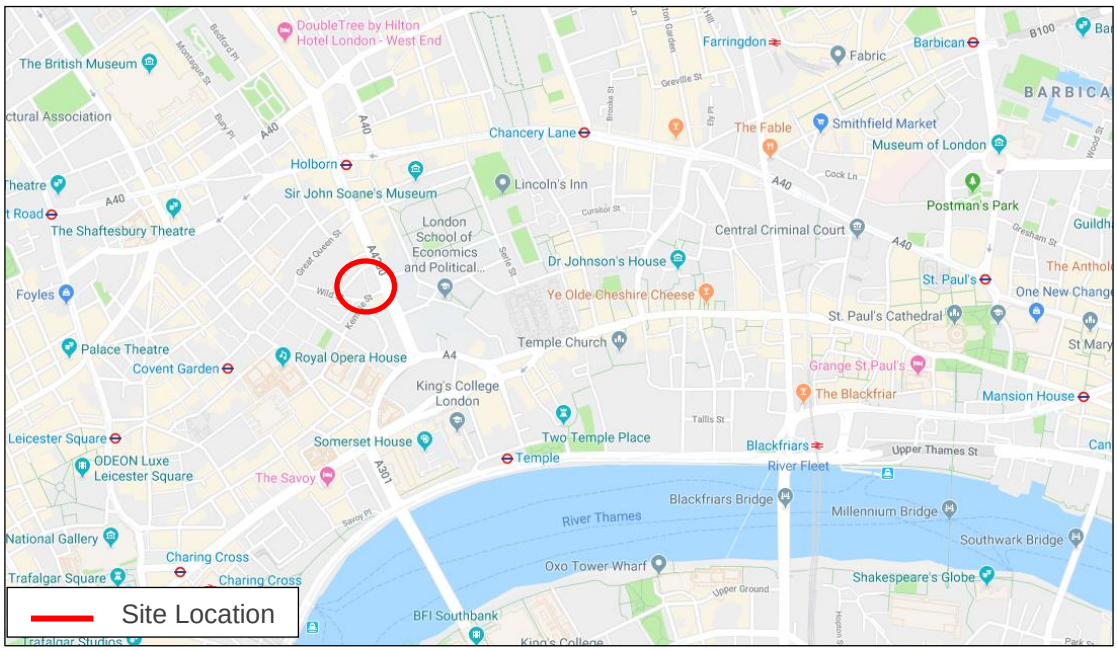
To undertake noise level measurements during the quietest daytime and night-time periods on a typical weekday in general accordance with BS 7445. To record the A-weighted (dBA) L_{eq} and L_{90} environmental noise levels.

To recommend suitable plant noise emission criteria based on the requirements of the Local Authority and BS 4142:2014 so as to avoid causing a statutory noise nuisance.

3.0 Site Description

3.1 Location

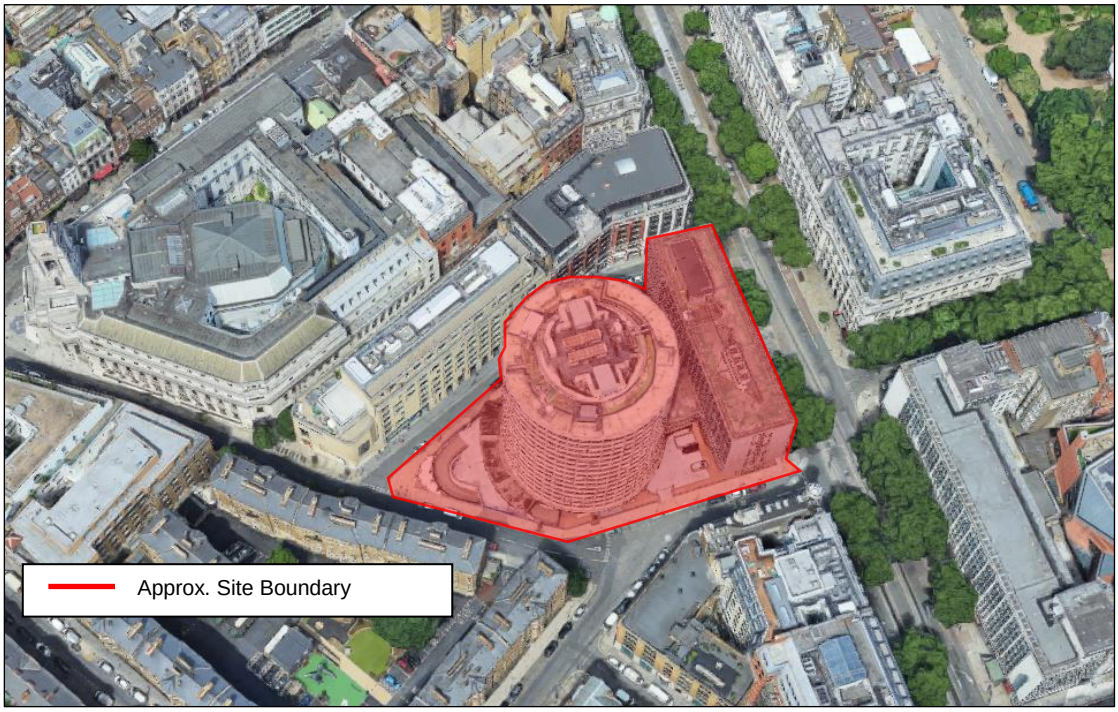
The site is located on Kemble Street, Kingsway in London as shown on the Location Map below.



Location Map (maps.google.co.uk)

3.2 Description

The site is bounded by Keeley Street to the north and west, Kemble Street to the South and Kingsway to the east. There are a number of commercial and residential noise sensitive properties around the site.



Site Plan (Imagery 2019 Copyright Google, Map Data Copyright Google)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Survey Methodology

The survey was undertaken by Nick Russell MIOA.

5.1 Procedure

A fully automated noise survey was undertaken from approximately 11:00 hours Wednesday 23 January 2019 to 11:00 hours on Thursday 24 January 2019.

During the survey period the wind conditions were calm. The sky was overcast with no rain. We understand that throughout the survey period conditions were generally similar to this. These conditions are considered suitable for obtaining representative measurement results.

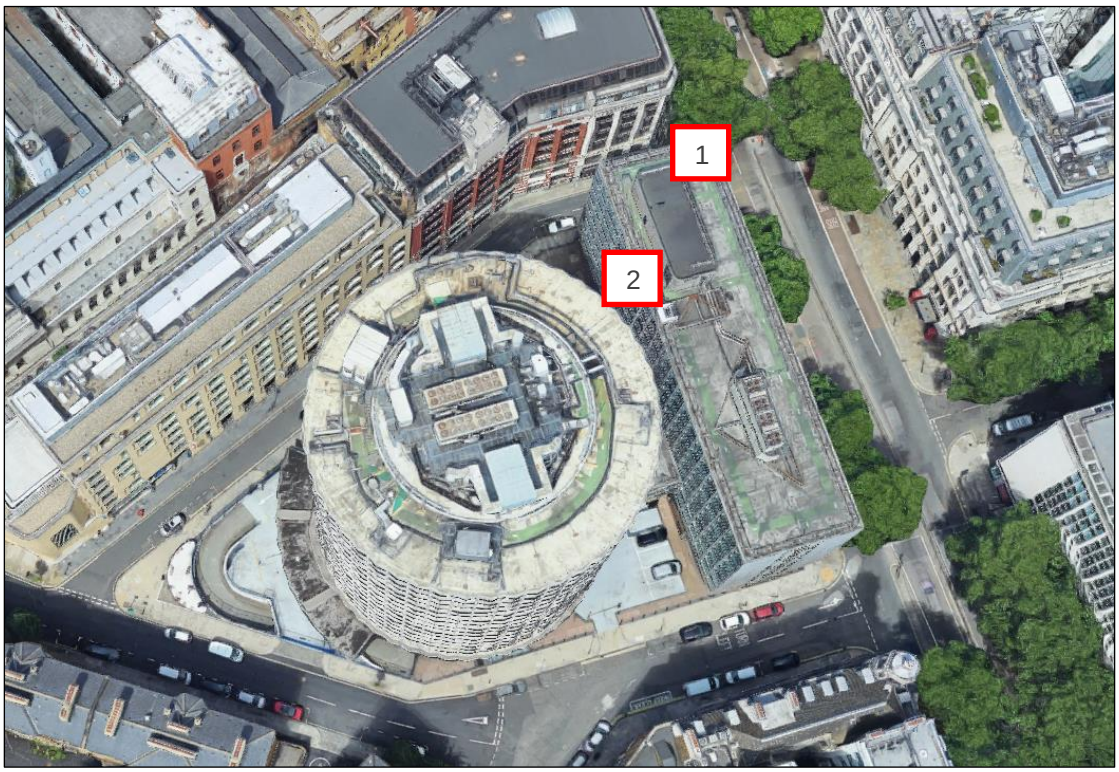
Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{max} and L_{eq} sound pressure levels over 15 minute periods.

5.2 Measurement Positions

The noise level measurements were undertaken at two positions as described in the table below.

Position No	Description
1	The microphone was installed on a safety rail approximately 1.5 metres above the roof and at least 1 metre from any reflective surfaces.
2	The microphone was installed on a safety rail approximately 1.5 metres above the roof and at least 1 metre from any reflective surfaces.

The approximate location of these positions are shown on the plan below.



Plan Showing Unmanned Measurement Positions ((Imagery 2019 Copyright Google, Map Data Copyright Google)

5.3 Instrumentation

The instrumentation used during the survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3444	Calibration on 09/07/2018
Position 1 Type 1 ½" Condenser Microphone	PCB	377B02	122885	Calibration on 09/07/2018
Position 1 Type 1 Preamp	Larson Davis	PRM902	3692	Calibration on 09/07/2018
Position 2 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3443	Calibration on 20/06/2018
Position 2 Type 1 ½" Condenser Microphone	PCB	377B02	139312	Calibration on 20/06/2018
Position 2 Type 1 Preamp	Larson Davis	PRM902	5161	Calibration on 20/06/2018

Type 1 Calibrator	Larson Davis	CAL200	3082	Calibration on 03/07/2017

The sound level meters, including their extension cables, were calibrated prior to and on completion of the survey. No significant changes were found to have occurred (no more than 0.1 dB).

6.0 Results

The results have been plotted on Time History Graph 25748/TH1 and TH2 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} levels at the measurement position throughout the duration of the survey.

The following table presents the lowest measured typical L_{A90} background noise levels during the survey:

Position	Lowest Measured Typical L_{A90} Background Noise Level (dB re 2 x 10^{-5} Pa)		
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours	24 Hours
1	61	58	58
2	60	57	57

7.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic from the surrounding road network and nearby building services plant.

8.0 Plant Noise Emission Criteria

8.1 Local Authority Criteria

The site lies within London Borough of Camden's jurisdiction. Their advice regarding criteria for atmospheric noise emissions from building services plant is contained within Table C of their Local Plan, version June 2017 as follows:

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 57dB L_{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 88dB L_{Amax}

Industrial and Commercial Noise Sources

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

**levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

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 Leq,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.

Based on the above and the measured typical background noise levels summarised in Section 6.0, we therefore propose the following plant rating noise emission criteria to be met at 1m outside the nearest neighbouring property.

Position	Plant Rating Noise Emission Criteria (dBA re 2x10-5 Pa)	
	Daytime (07:00–23:00 hours)	Night time (23:00–07:00 hours)
1	51	48
2	50	47

It should be noted that the above criteria are subject to approval by The London Borough of Camden.

8.2 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014.

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds*

the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

• *"Typically, the greater this difference, the greater the magnitude of the impact."*

• *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*

• *"A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."*

• *"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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 determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England.

8.3 Emergency Plant

We understand from Section 6.100 of Camden's Local Plan dated June 2017 that the following plant noise emission criteria should apply to building services plant that only operates in an emergency:

"Emergency equipment such as generators which are only to be used for short periods of time will be required to meet the noise criteria of no more than 10dB above the background level (L90 15 minutes). During standby periods, emergency equipment will be required to meet the usual criteria for plant and machinery".

9.0 Plant Noise Impact Assessment

We understand the proposed plant comprises the equipment listed in the table below:

Plant Description	Location	Qty	Plant Make	Model Number
Chillers	Tower Roof Level 17	2	Carrier	30KAV 1100
Smoke Extract Fan		1	Be Safe Direct Ltd	FAS 710
Toilet Supply Fan		1	Nuaire	ESBHS4-E
Toilet Extract Fan		1	Nuaire	EST20HA-X
Teapoint Extract Fan		1	Nuaire	DE5A-ES
Tenants Condensers		18	Mitsubishi	PUZ-ZM100YKA
		12	Mitsubishi	PUMY-P112YKA
		1	Mitsubishi	PURY-P600YSNW-A
Tenants Kitchen Extract Fan 1		1	Nuaire	SGFA44ES
Tenants Kitchen Extract Fan 2		1	Nuaire	SQFA46ES
Chillers	Kingsway Roof Level 8	2	Carrier	30KAV 0650
Smoke Extract Fan		1	Be Safe Direct Ltd	FAS 630
Toilet Supply Fan		1	Nuaire	ESBHS2-L
Toilet Extract Fan		1	Nuaire	AVT6
Teapoint Extract Fan		1	Nuaire	DE4A-ES
Tenants Condensers		8	Mitsubishi	PUZ-ZM100YKA
Sui Generis & Retail Condensers		1	Mitsubishi	PURY-P1050YSNW-A
		1	Mitsubishi	PURY-P750YSNW-A
		1	Mitsubishi	PURY-P500YNW-A
		3	Mitsubishi	PURY-P350YNW-A

9.1 Plant Noise Data

We understand the manufacturer's noise data for the equipment to be as follows:

Plant Model Number	Sound Power Level (dB re 1 pW) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
30KAV 1100	93	94	93	93	95	89	89	84
FAS 710*	101	99	101	104	105	105	101	99
ESBHS4-E*	91	85	82	82	75	72	66	61
EST20HA-X*	88	81	79	76	73	69	63	58
DE5A-ES*	85	86	73	70	66	62	57	51
PUZ-ZM100YKA	70	70	69	65	62	57	52	45
PUMY-P112YKA	80	68	67	65	62	57	51	46
PURY-P600YSNW-A	95	82	82	79	73	69	64	59
SGFA44ES*	83	86	84	85	78	79	79	65

SQFA46ES*	91	91	89	90	88	86	86	80
30KAV 0650	92	91	88	97	88	87	81	78
FAS 630*	97	106	94	94	93	93	87	85
ESBHS2-L*	76	71	64	60	55	55	49	39
AVT6*	79	81	73	72	66	65	62	55
DE4A-ES*	81	81	65	59	57	58	52	53
PUZ-ZM100YKA	70	70	69	65	62	57	52	45
PURY-P1050YSNW-A	97	87	87	73	77	74	70	66
PURY-P750YSNW-A	91	83	84	82	77	72	67	62
PURY-P500YNW-A	93	84	82	77	72	70	67	60
PURY-P350YNW-A	85	80	80	78	73	68	62	56

*The noise data for the various fans in the table above are for the “in duct” atmospheric connection.

9.2 Location of Plant

The above plant is located in two separate areas namely the roofs of the Tower and the Kingsway Building as detailed on the attached drawings from Long and Partners. The two plant areas on each building will be enclosed with a screen for aesthetics and the nearest noise sensitive receptors are different to each area.

9.3 Nearest Noise Sensitive Receptors

9.3.1 Tower Building

The proposed plant on the Tower building is significantly above any other adjacent buildings at Level 17. The nearest noise sensitive building is part of Keeley Street to the north and is at a distance of approximately 50m in a straight line from the proposed plant location. The building on Keeley Street is ground plus 5 storeys high. The proposed plant is significantly shielded acoustically by the screen and also the building edge.

9.3.2 Kingsway Building

The proposed plant on the Kingsway Building is above any other adjacent buildings at Level 8. The nearest noise sensitive building is opposite on Kingsway to the east. This building is ground plus 7 storeys high and is at a distance of approximately 38m from the proposed plant location. The proposed plant is shielded acoustically by the screen and also, to a lesser effect, the building edge.

9.4 Plant Noise Impact Assessment

We understand that the proposed plant could operate continuously. We have assessed the

continuously operating plant and emergency plant in each location separately as follows:

9.4.1 Tower Roof Plant

The following table details our assessment for the proposed Tower Roof plant that could operate continuously:

	Sound Power Level (dB re 1 pW) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Chillers (2 No.)	96	97	96	96	98	92	92	87	
Toilet Supply Fan	91	85	82	82	75	72	66	61	
Toilet Extract Fan	88	81	79	76	73	69	63	58	
Teapoint Extract Fan	85	86	73	70	66	62	57	51	
Tenants Condensers (18 No.)	83	83	82	78	75	70	65	58	
Tenants Condensers (12 No.)	91	79	78	76	73	68	62	57	
Tenants Condensers (1 No.)	95	82	82	79	73	69	64	59	
Tenants Kitchen Extract Fan 1	83	86	84	85	78	79	79	65	
Tenants Kitchen Extract Fan 2	91	91	89	90	88	86	86	80	
Cumulative Noise Level	101	99	98	98	99	93	93	88	
Distance Correction 50m /-45dB	-45	-45	-45	-45	-45	-45	-45	-45	
Barrier Correction	-14	-15	-18	-22	-24	-24	-24	-24	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	45	42	38	34	33	27	27	22	38

9.4.2 Kingsway Roof Plant

The following table details our assessment for the proposed Kingsway Roof plant that could operate continuously:

	Sound Power Level (dB re 1 pW) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Chillers	95	94	91	100	91	90	84	81	
Toilet Supply Fan	76	71	64	60	55	55	49	39	
Toilet Extract Fan	79	81	73	72	66	65	62	55	
Teapoint Extract Fan	81	81	65	59	57	58	52	53	
Tenants Condensers (8 No.)	79	79	78	74	71	66	61	54	
Sui Generis & Retail Condensers (1 No.)	97	87	87	73	77	74	70	66	

Sui Generis & Retail Condensers (1 No.)	91	83	84	82	77	72	67	62	
Sui Generis & Retail Condensers (1 No.)	93	84	82	77	72	70	67	60	
Sui Generis & Retail Condensers (3 No.)	90	85	85	83	78	73	67	61	
Cumulative Noise Level	101	96	94	100	92	90	85	81	
Distance Correction 38m/-43dB	-43	-43	-43	-43	-43	-43	-43	-43	
Barrier Correction	-9	-10	-12	-15	-18	-21	-23	-24	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	52	46	42	45	34	29	22	17	44

9.4.3 Tower Roof Emergency Plant

The following table details our assessment for the proposed Tower Roof plant that only operates in an emergency:

	Sound Power Level (dB re 1 pW) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Smoke Extract Fan	101	99	101	104	105	105	101	99	
Distance Correction 50m /-42dB	-45	-45	-45	-45	-45	-45	-45	-45	
Barrier Correction	-14	-15	-18	-22	-24	-24	-24	-24	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	45	42	41	40	39	39	35	33	45

9.4.4 Kingsway Roof Emergency Plant

The following table details our assessment for the proposed Kingsway Roof plant that only operates in an emergency:

	Sound Power Level (dB re 1 pW) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Smoke Extract Fan	97	106	94	94	93	93	87	85	
Distance Correction 38m/-43dB	-43	-43	-43	-43	-43	-43	-43	-43	
Barrier Correction	-9	-10	-12	-15	-18	-21	-23	-24	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	48	56	42	39	45	32	24	21	47

9.5 BS4142:2014 Assessment

As discussed in Section 8.1 the Local Authority require that assessments of environmental plant

noise be carried out in accordance with the methodology in BS 4142:2014. From our discussions with the manufacturers of the building services plant we understand that there are no tonal qualities to the equipment. We do not normally associate these units with having any intermittency but have added a correction for this as a worst case acoustically.

We have assessed the continuously operating plant in accordance with BS4142 as follows.

9.5.1 Tower Roof Plant

	Daytime Plant Sound Level (dBA)	Night-Time Plant Sound Level (dBA)
Specific Sound Level	38	38
Acoustic feature correction(s)	+3 (Intermittency)	+3 (Intermittency)
Rating Level	41	41
Rating Level Limit*	51	48
Compliance note	✓	✓

* The Rating Level Limit is the typical background LA90 noise level recorded during our survey minus 10dB.

9.5.2 Kingsway Roof Plant

	Daytime Plant Sound Level (dBA)	Night-Time Plant Sound Level (dBA)
Specific Sound Level	44	44
Acoustic feature correction(s)	+3 (Intermittency)	+3 (Intermittency)
Rating Level	47	47
Rating Level Limit*	48	47
Compliance note	✓	✓

*The Rating Level Limit is the typical background LA90 noise level recorded during our survey minus 10dB.

In order to simplify our calculations we have considered that the plant is all operating together and has the same shielding from the screens. In reality this is unlikely and we can see no reason why the predicted noise levels should not be lower than our assessment indicates.

9.5.3 Tower Roof Emergency Plant

	Daytime Plant Sound Level (dBA)	Night-Time Plant Sound Level (dBA)
Specific Sound Level	45	45
Acoustic feature correction(s)	+3 (Intermittency)	+3 (Intermittency)
Rating Level	48	48
Rating Level Limit*	61	58

Compliance note	✓	✓

9.5.4 Kingsway Roof Emergency Plant

	Daytime Plant Sound Level (dBA)	Night-Time Plant Sound Level (dBA)
Specific Sound Level	47	47
Acoustic feature correction(s)	+3 (Intermittency)	+3 (Intermittency)
Rating Level	50	50
Rating Level Limit*	60	57
Compliance note	✓	✓

9.5.5 Summary of Assessments

It can be seen from the above tables that our calculations therefore indicate that noise rating levels from the proposed plant should achieve the London Borough of Camden's plant noise criteria presented in Section 8.1

10.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate.

Environmental plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the requirements of the Local Authority and BS 4142 so as to avoid causing statutory noise nuisance.

An assessment has been carried out to determine the likely plant noise emissions to the nearest noise sensitive windows based on the proposed plant equipment and layout at the site. Our assessment indicates the proposed building services plant should achieve the proposed environmental noise criteria and we can see no acoustic reason why the proposed plant should not be granted planning permission

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

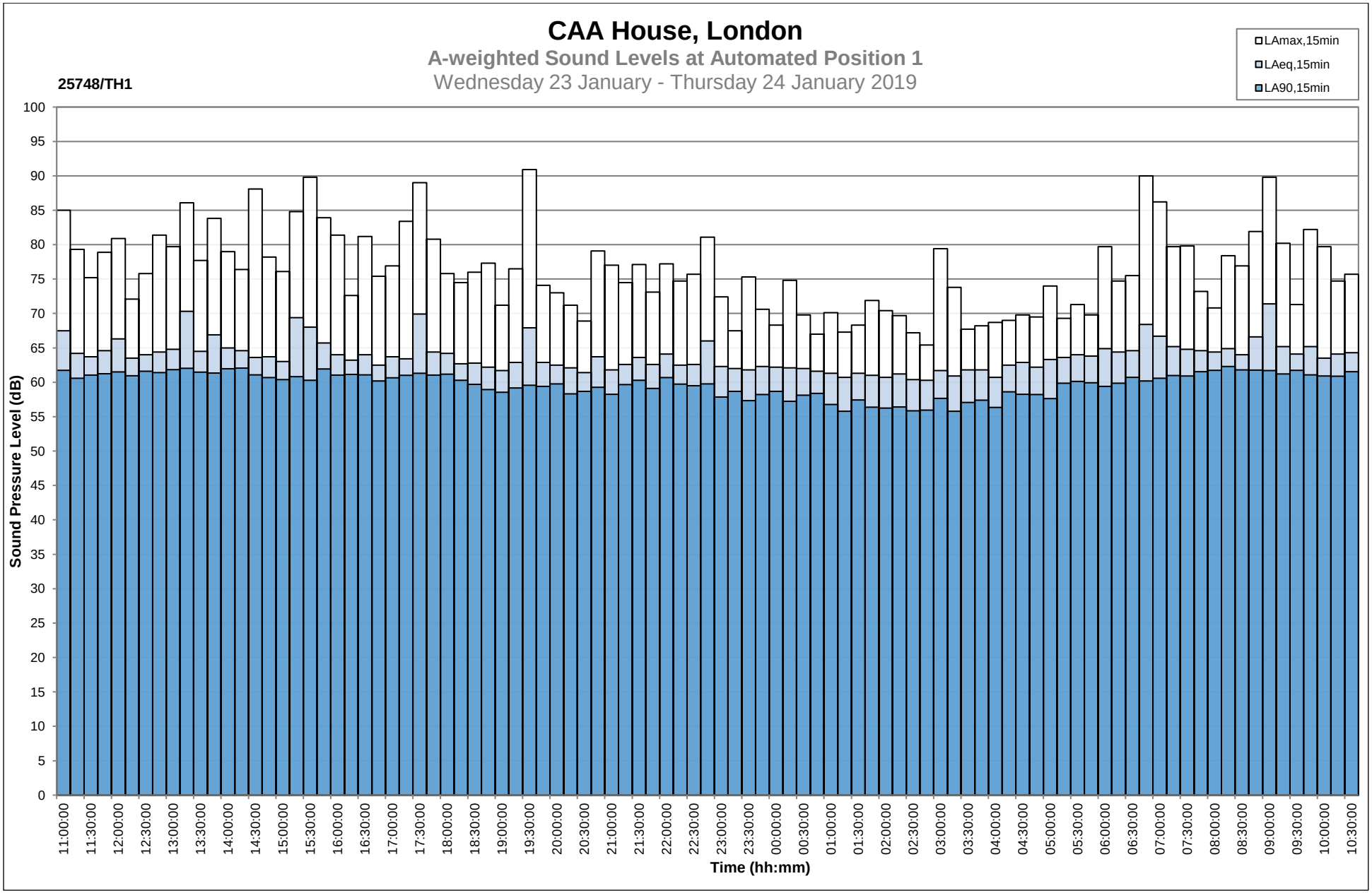
$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

CAA House, London

A-weighted Sound Levels at Automated Position 1

Wednesday 23 January - Thursday 24 January 2019

25748/TH1



CAA House, London

A-weighted Sound Levels at Automated Position 2

Wednesday 23 January- Thursday 24 January 2019

25748/TH2