

163-203 EVERS HOLT
STREET, LONDON

Plant Noise Assessment

Reference: 12308.RP01.PNA.1
Prepared: 9 December 2022
Revision Number: 1

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	11 November 2022	Struan Carmichael	Andrew Heath
1	Revised to include latest plant information	9 December 2022	Struan Carmichael	Andrew Heath

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 12308.SW01.0 dated 21 October 2022. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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1. INTRODUCTION

It is proposed to locate new items of plant at 163-203 Eversholt Street, London. As part of the planning application, London Borough of Camden requires consideration be given to atmospheric noise emissions from the proposed equipment to the nearest noise-sensitive receptors.

RBA Acoustics has been commissioned to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emission limits in accordance with London Borough of Camden's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

A summary of acoustic terminology is included in Appendix A.

2. SITE DESCRIPTION

The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix E).

The site is located on Eversholt Street and has residential properties to the North, East, South and West. The noise climate consists of general road traffic along Eversholt Street and the other surrounding road network and also railway noise from trains arriving and departing Euston Station.

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following 24-hour period:

11:00 Thursday 27 October 11:00 Friday 28 October 2022.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Measurements were made of the L_{A90} , L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes.

3.2 Measurement Locations

To determine the existing noise climate around the site measurements were undertaken at the following locations:

Measurement Position 1 – Rear of 203 Eversholt Street

Measurements were undertaken with the microphone positioned on the flat roof, 1.5m above the flat roof. This measurement position was considered as being representative of the noise climate as experienced at the closest residential receptors to the proposed plant to the rear of 203 Eversholt Street. The prevailing noise climate was noted to consist of noise from the surrounding traffic network.

Measurement Position 2 – Front of 203 Eversholt Street

Measurements were undertaken with the microphone positioned on the flat roof, 1.5m above the flat roof. This measurement position was considered as being representative of the noise climate as experienced at the closest residential receptors to the proposed plant to the front of 203 Eversholt Street. The prevailing noise climate was noted to consist of noise from the surrounding traffic network.

Measurement Position 3 – Rear of 163 Eversholt Street

Measurements were undertaken with the microphone positioned on the flat roof, 1.5m above the flat roof. This measurement position was considered as being representative of the noise climate as experienced at the closest residential receptors to the proposed plant to the rear of 163 Eversholt Street. The prevailing noise climate was noted to consist of noise from the surrounding traffic network.

The measurement positions are also illustrated on the site plan attached in Figure 1 and photos in Figure 2 and 3 (Appendix E).

3.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix B.

The sound level meters were calibrated both prior to and on completion of the survey with no significant calibration drifts observed.

3.4 Results

The noise levels measured are shown as time-histories on the attached Graphs 1-6 (Appendix E).

The lowest L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1.

Table 1 – Measured Levels

Measurement Period	Position 1 – Rear of 203 Eversholt Street		Position 2 – Front of 203 Eversholt Street		Position 3 – Rear of 163 Eversholt Street	
	Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)	Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)	Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)
Daytime (07:00 – 23:00)	51	58	50	56	51	59
Night-time (23:00 – 07:00)	48	53	47	51	47	54

4. PLANT NOISE CRITERIA

The requirements of the London Borough of Camden Environmental Health Department regarding new building services plant are outlined in the 2017 Camden Local Plan as summarised below.

Policy A1 states:

Where uses sensitive to noise are proposed close to an existing source of noise or when development that is likely to generate noise is proposed, the Council will require an acoustic report to accompany the application.

Policy A4 states:

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

- a. development likely to generate unacceptable noise and vibration impacts; or*
- b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

Appendix 3 of the plan outlines the appropriate assessment methods as follows:

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).

Table C of Appendix 3 is reproduced below:

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}}

Appendix 3 outlines further guidance for smaller pieces of equipment in low noise areas as follows:

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.

In line with the above requirements we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following LOAEL levels when assessed at the nearest noise sensitive location:

- Daytime 40 dB
- Night-time 37 dB

As the plant is in a relatively quiet background noise area, noise from the commercial unit should not exceed the following when assessed at 1m from the façade of the affected premises.

- NR35 $L_{eq, 5 mins}$

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further 5dB penalty should be subtracted from any of the above proposed noise emission limits.

5. PLANT NOISE ASSESSMENT

This assessment has been based on the information provided to RBA by Beadmans and is described in the following sections.

5.1 Proposed Plant Items

The following plant is proposed for the scheme:

Table 2 – Plant Types

No. of Units	Manufacturer/Model/Duty	Plant Type
203 Eversholt Street - Roof Plant Area		
3No.	Mitsubishi PURY-P650YSJM-A	Condenser Unit
2No.	Mitsubishi PURY-EP400YNW-A2	Condenser Unit
1No.	Mitsubishi PURY-EP350YNW-A2	Condenser Unit
163 Eversholt Street - Ground Floor Plant Area		
2No.	Mitsubishi CAHV-P500YA-HPB-BS	Condenser Unit

5.2 Plant Locations

The proposed plant serving 203 Eversholt Street is to be located within the existing roof top plant area of 203 Eversholt Street. The plant serving 163 Eversholt Street is to be located within the existing lightwell at ground floor level to the rear of 163 Eversholt Street. The equipment positions are indicated on the site plan in Figure 1 and the drawings in Figure 4 and 5 in Appendix E.

5.3 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The associated plant noise levels are detailed as follows:

Table 3 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
PURY-P650YSJM-A	Lp at 1m	73	68	65	60	57	53	49	45
PURY-EP400YNW-A2	Lp at 1m	81	70	70	68	62	59	54	49
PURY-EP350YNW-A2	Lp at 1m	72	71	64	62	57	54	52	48
CAHV-P500YA-HPB-BS	Lp at 1m	70	65	60	57	52	47	49	45

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

5.4 Location of the Nearest Noise-Sensitive Receptors

Based on observations made on site, we understand the nearest noise-sensitive receptors to the proposed plant serving 203 Eversholt Street are to the north-west of site, belonging to the residential block of 211 Eversholt Street which is approximately 20m from the centre of the existing plant area.

Based on observations made on site, we understand the nearest noise-sensitive receptors to the proposed plant serving 163 Eversholt Street are to the west of site, belonging to the residential block of Beckfoot, Ampthill Square which is approximately 14m from the plant area.

The receptors are shown in the site plan in Figure 1 in Appendix E.

5.5 Calculation of Noise Levels at Nearest Noise-Sensitive Receptors

Our calculation method for predicting noise levels from the proposed plant at the nearest noise-sensitive receptors, based on the information above, is summarised below.

- Source Term SPL / SWL
- Reflections
- Distance Attenuation
- Screening

Calculation sheets are attached for further information in Appendix C.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 4 – Predicted Noise Levels

Operating Period	Prediction (dBA)	Criterion (dBA)	Prediction (NR _{Leq, 5 mins})	Criterion (NR _{Leq, 5 mins})
Receptor 1 – 211 Eversholt Street				
Daytime (07:00 – 23:00)	35	40	32	35
Night-time (23:00 – 07:00)	35	37	32	35
Receptor 2 – Beckfoot, Ampthill Square				
Daytime (07:00 – 23:00)	33	40	28	35
Night-time (23:00 – 07:00)	33	37	28	35

Predicted noise levels from the proposed units to the nearest residential premises are below the target criteria and therefore no further mitigation measures are recommended.

In addition all predicted values are below NR35 – Full octave band comparisons can be seen in Appendix C.

6. VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that condensing units be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not “short-circuited” by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

7. CONCLUSION

RBA Acoustics has undertaken noise monitoring at 163-203 Eversholt Street, London. The measured noise levels are presented within this report. The resultant noise levels have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installations.

The results of the assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by London Borough of Camden. As such, the proposed plant installations should be considered acceptable in terms of noise.

Appendix A – Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
L_{eq}	The level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10} , L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
$L_{Amax,T}$	The instantaneous maximum A-weighted sound pressure level which occurred during the measurement period, T . It is commonly used to measure the effect of very short duration bursts of noise, e.g. sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the ambient level.
NR	Noise Rating – A single figure term to describe a measured noise level which considers the frequency content of the noise, generally used for internal noise level measurements (particularly mechanical services plant).

Appendix B – Instrumentation

The following equipment was used for the measurements.

Table B1– Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
Norsonic Type 1 Sound Level Meter	Nor140	1407794	4712332270	9 December 2023
Norsonic Pre Amplifier	1209	23229		
Norsonic ½" Microphone	1225	468970		3 December 2023
Norsonic Sound Calibrator	1255	125525795	Cal 022-2021-14778	8 December 2023
Norsonic Type 1 Sound Level Meter	Nor140	1407792	4712332262	9 December 2023
Norsonic Pre Amplifier	1209	23227		
Norsonic ½" Microphone	1225	469028		3 December 2023
Norsonic Sound Calibrator	1255	125525797	Cal 022-2021-14780	8 December 2023
Norsonic Type 1 Sound Level Meter	Nor140	1407795	4712332213	9 December 2023
Norsonic Pre Amplifier	1209	23230		
Norsonic ½" Microphone	1225	468969		3 December 2023
Norsonic Sound Calibrator	1255	125525755	Cal 022-2021-14548	20 October 2023

Appendix C – Example Plant Calculations

Table C1 – Example Calculation for 163 Eversholt Street Plant

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Mitsubishi CAHV-P500YA Lp at 1m	70	65	60	57	52	47	49	45	59
2No. Units	3	3	3	3	3	3	3	3	
Reflections from rear wall	3	3	3	3	3	3	3	3	
Distance attenuation (23m)	-27	-27	-27	-27	-27	-27	-27	-27	
Line of sight screening	-5	-5	-5	-5	-5	-5	-5	-5	
Noise level 1m outside Beckfoot building window	44	39	34	31	26	21	23	19	33

Table C2 – Comparison with NR35 Curve for 163 Eversholt Street Plant

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								NR
	63	125	250	500	1000	2000	4000	8000	
NR35 Curve	63	52	46	39	35	31	30	28	35
Noise level 1m outside Beckfoot building window	44	39	34	31	26	21	23	19	28
Difference	-19	-13	-11	-8	-9	-11	-7	-9	

Table C3 – Example Calculation for 203 Eversholt Street Plant

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Cumulative Level of Plant Lp at 1m	85	78	76	75	69	66	62	57	76
Distance attenuation (20m)	-26	-26	-26	-26	-26	-26	-26	-26	
Roof Edge Screening	-7	-8	-11	-13	-16	-19	-20	-20	
Noise level 1m outside 211 Eversholt Street window	52	43	40	36	27	21	16	11	37

Table C4 – Comparison with NR35 Curve for 203 Eversholt Street Plant

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								NR
	63	125	250	500	1000	2000	4000	8000	
NR35 Curve	63	52	45	39	35	32	30	28	35
Noise level 1m outside 211 Eversholt Street window	52	43	40	36	27	21	16	11	32
Difference	-11	-9	-5	-3	-8	-11	-14	-17	

Appendix D – CDM Considerations

The likelihood the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Remote (almost never)
- 2 – Unlikely (occurs rarely)
- 3 – Possible (could occur, but uncommon)
- 4 – Likely (recurrent but not frequent)
- 5 – Very likely (occurs frequently)

The severity of harm can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
- 2 – Minor (e.g. small cut, abrasion, basic first aid need)
- 3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
- 4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
- 5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table D1 – Risk Ratings

Rating Bands (Severity x Likelihood)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Table D2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3

L: Likelihood S: Severity R: Rating

Appendix E – Graphs and Site Plans

163-203 Eversholt Street, London

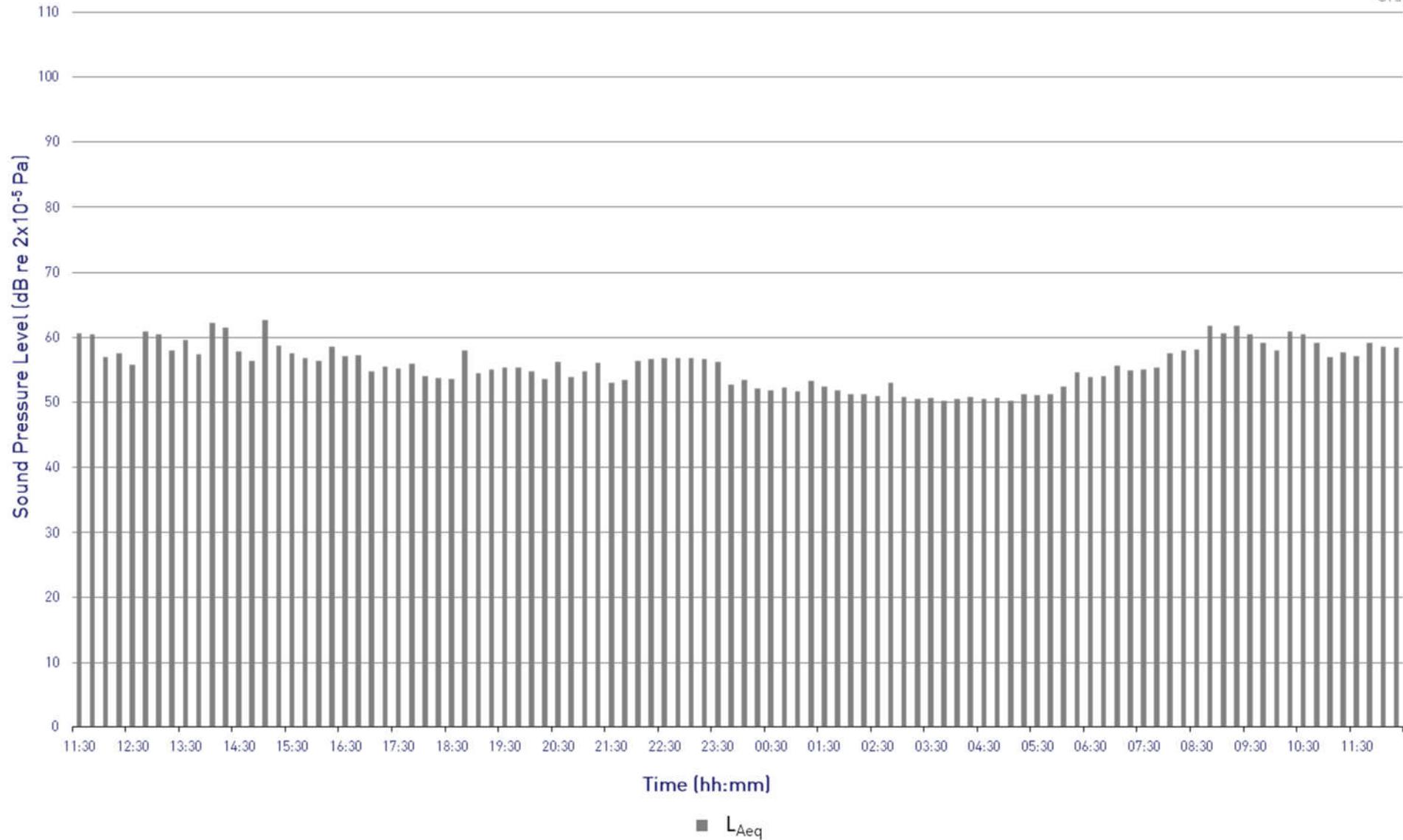
L_{Aeq} Time History

Measurement Position 1 - Rear of 203 Eversholt Street, Thursday 27th to Friday 28th October 2022



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Graph 1



163-203 Eversholt Street, London

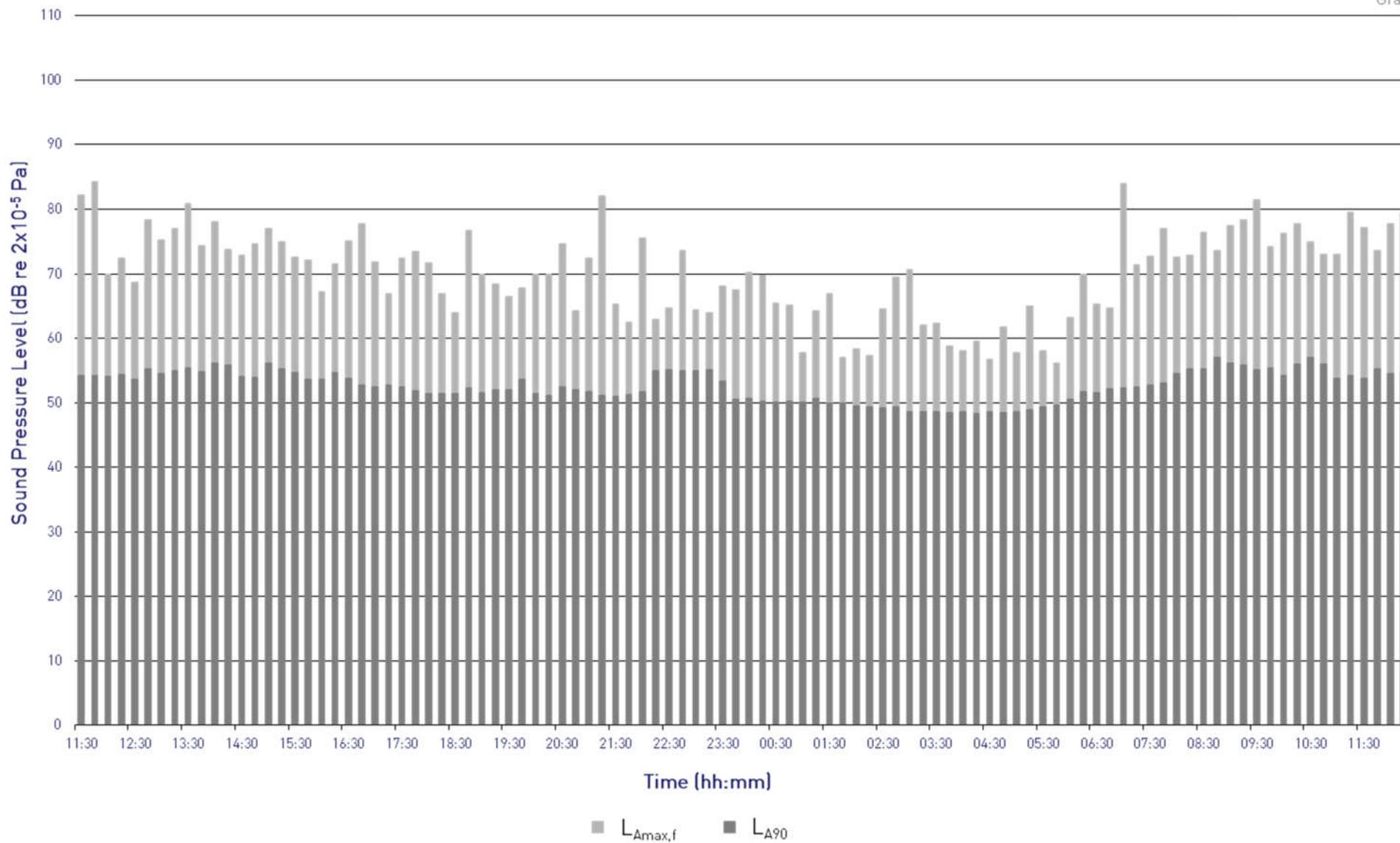
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1 - Rear of 203 Eversholt Street, Thursday 27th to Friday 28th October 2022



Project: 12308

Graph 2



163-203 Eversholt Street, London

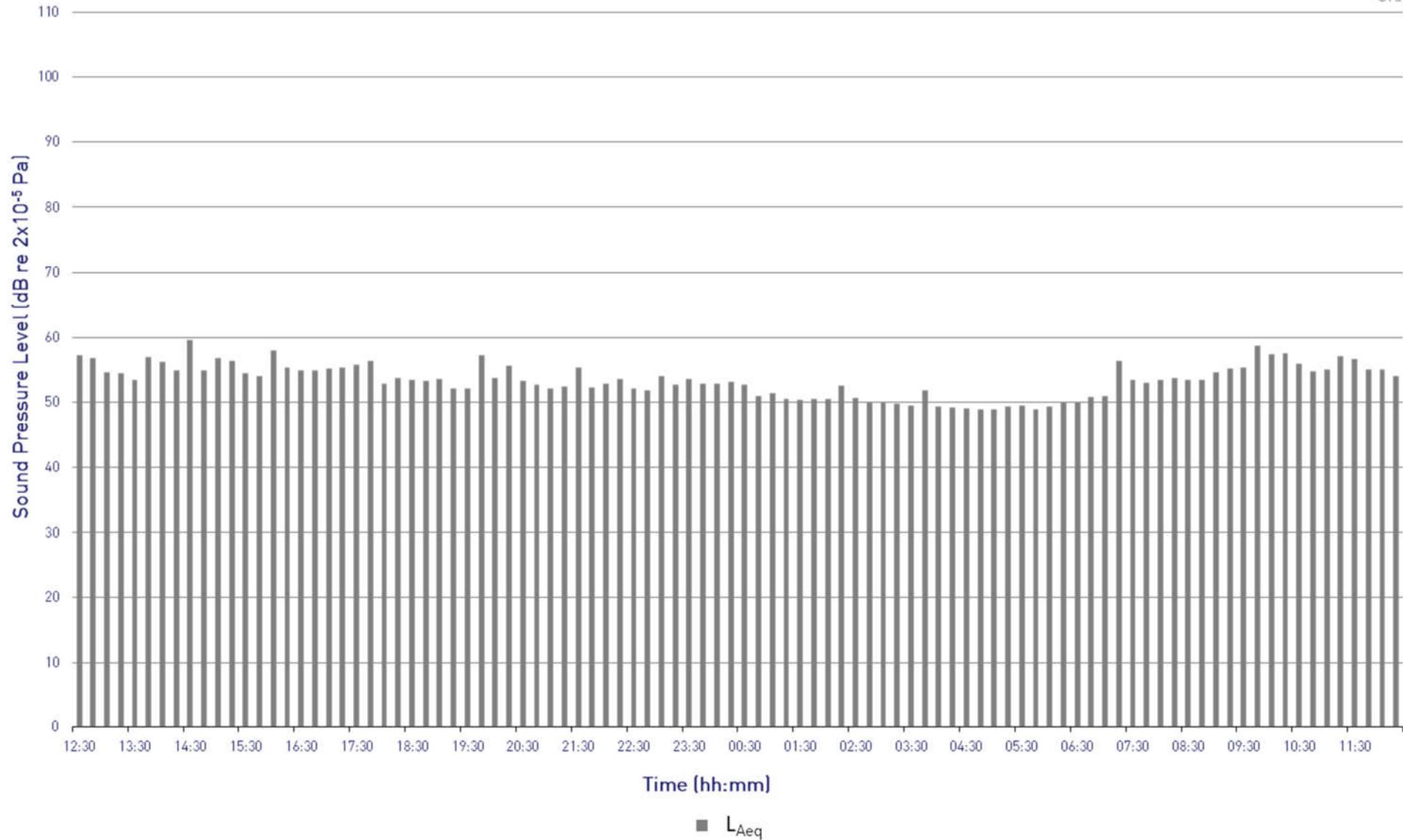
L_{Aeq} Time History

Measurement Position 2 - Front of 203 Eversholt Street, Thursday 27th to Friday 28th October 2022



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Graph 3



163-203 Eversholt Street, London

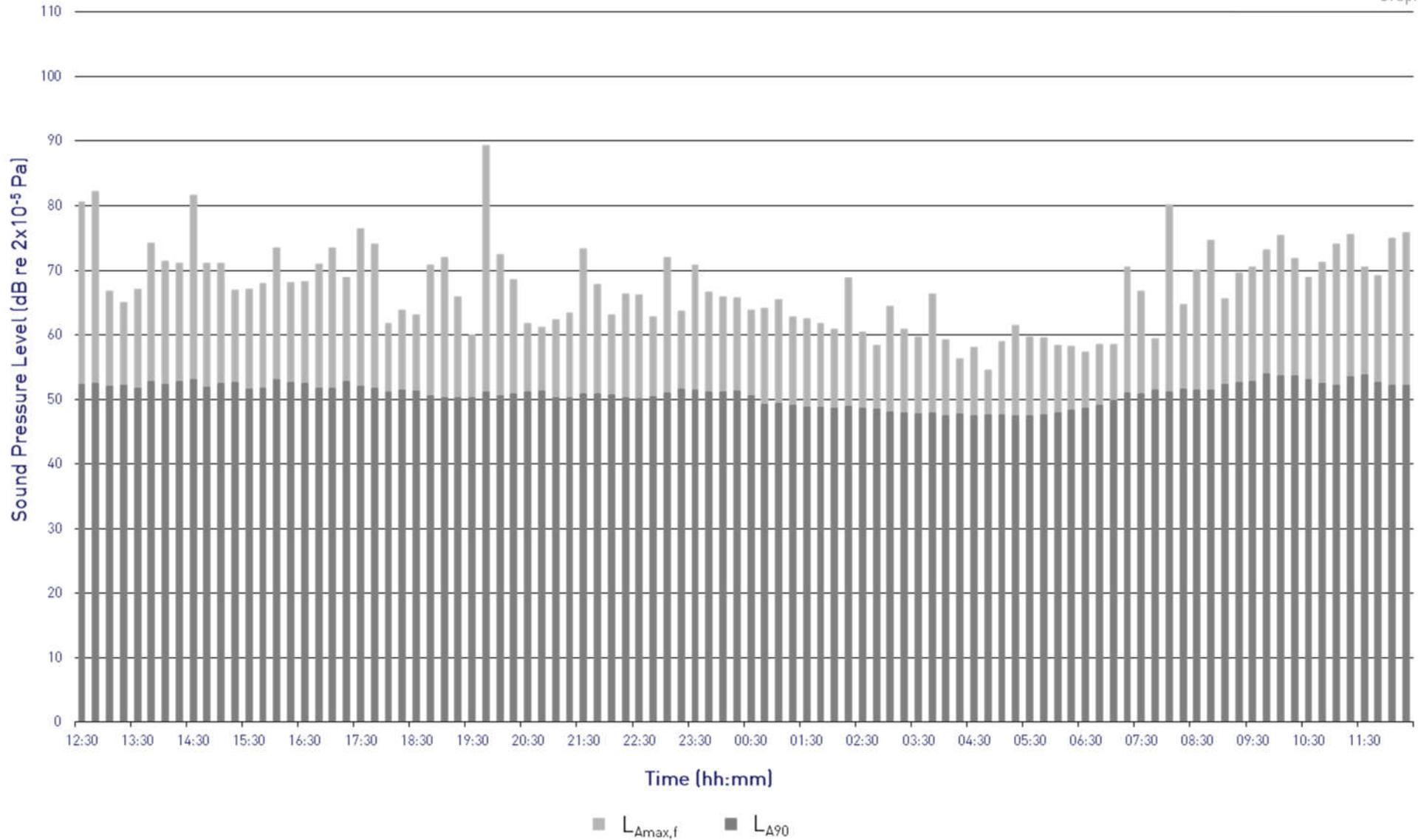
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 2 - Front of 203 Eversholt Street, Thursday 27th to Friday 28th October 2022



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Graph 4



163-203 Eversholt Street, London

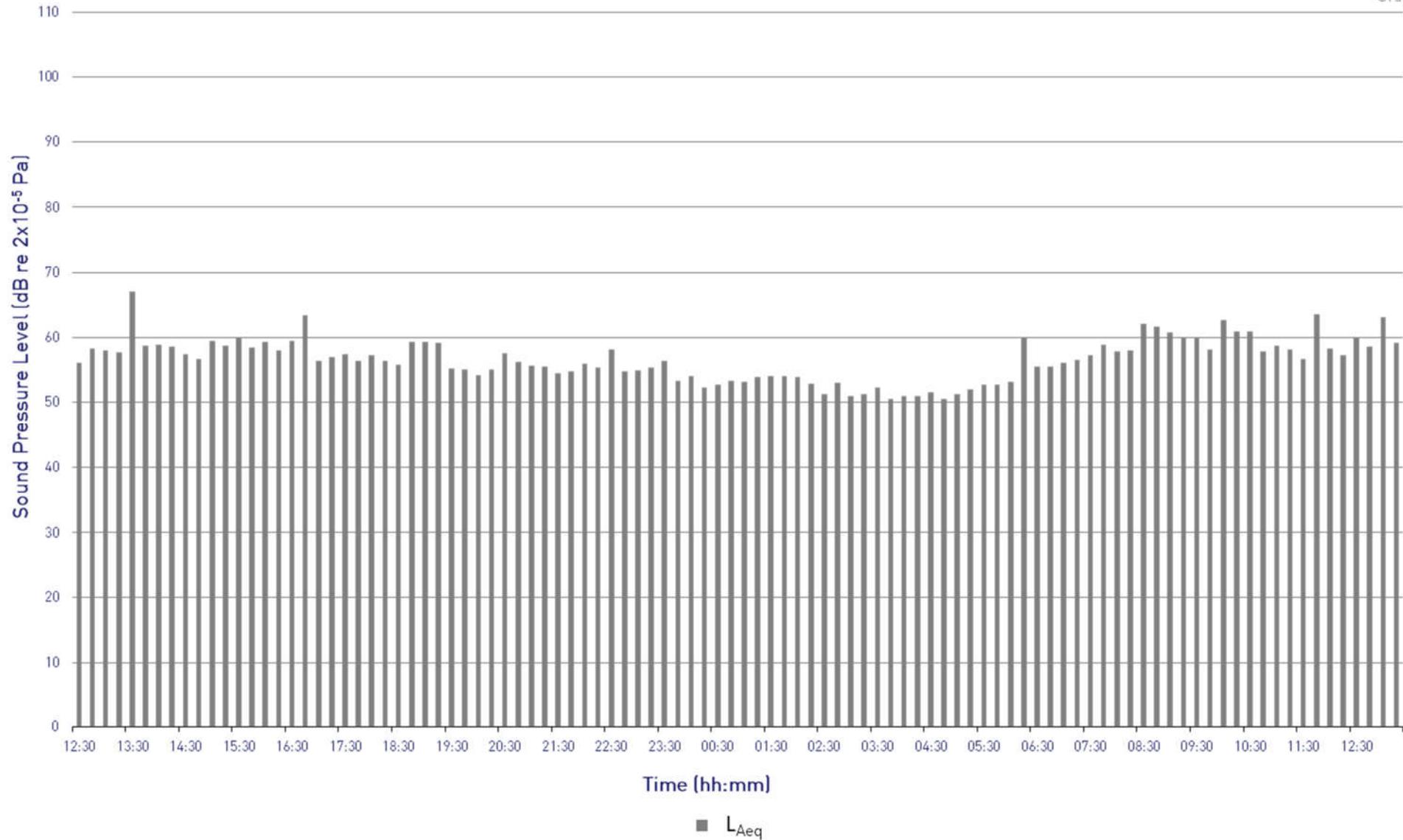
L_{Aeq} Time History

Measurement Position 3 - Rear of 163 Eversholt Street, Thursday 27th to Friday 28th October 2022



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Graph 5



163-203 Eversholt Street, London

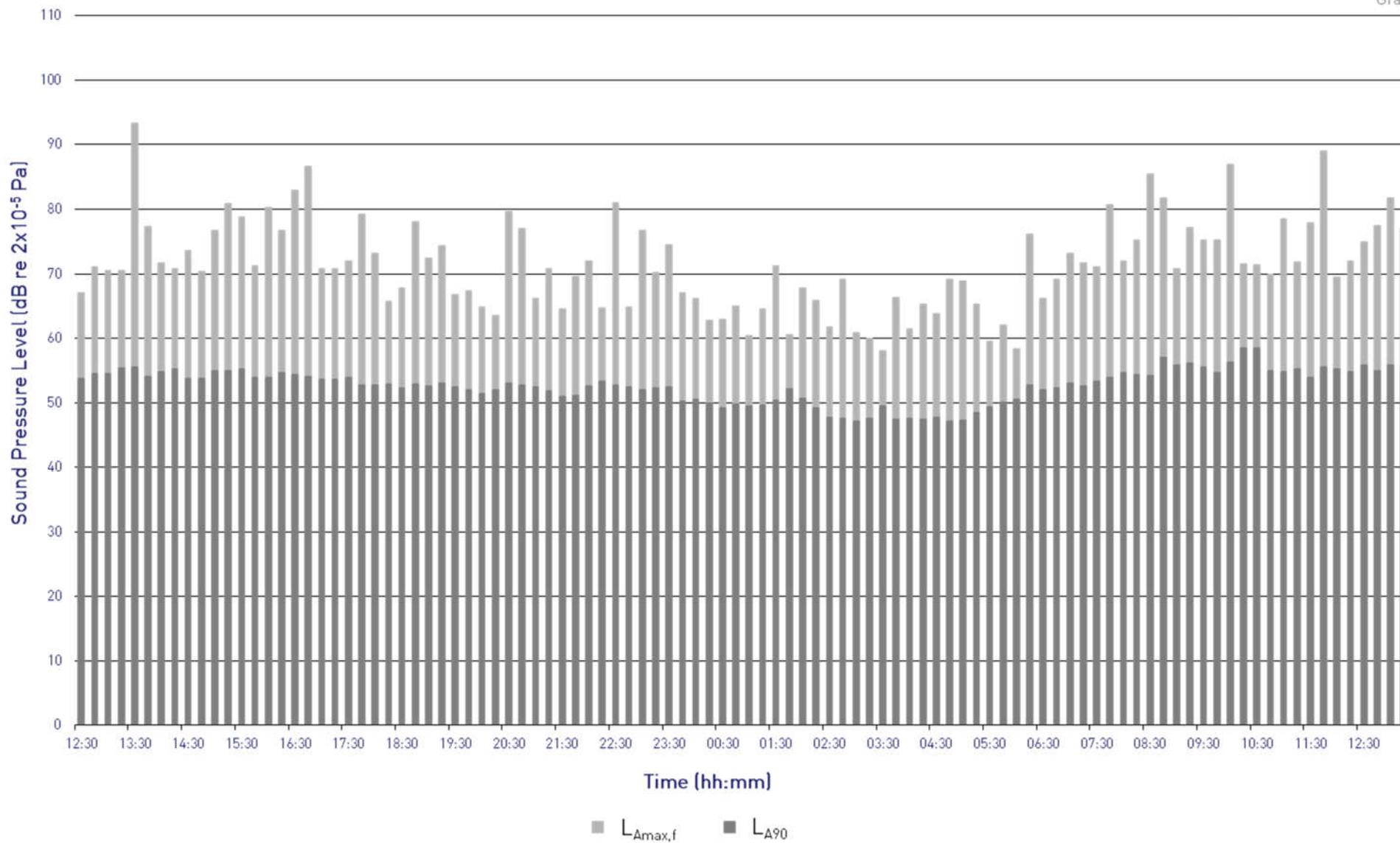
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 3 - Rear of 163 Eversholt Street, Thursday 27th to Friday 28th October 2022



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Graph 6





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163-203 Eversholt Street, London
 Site Plan showing Measurement Locations
 Project 12308

Figure 1
 9 December 2022
 Not to Scale

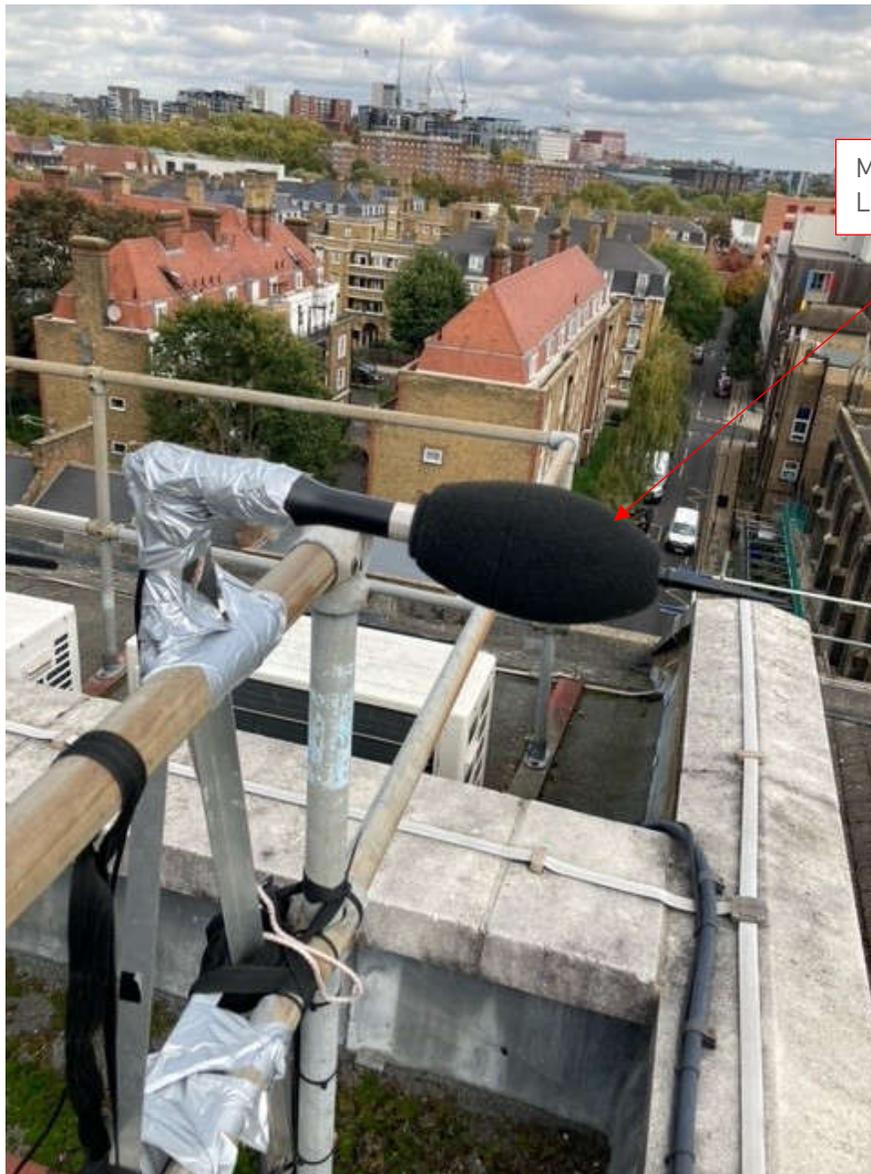




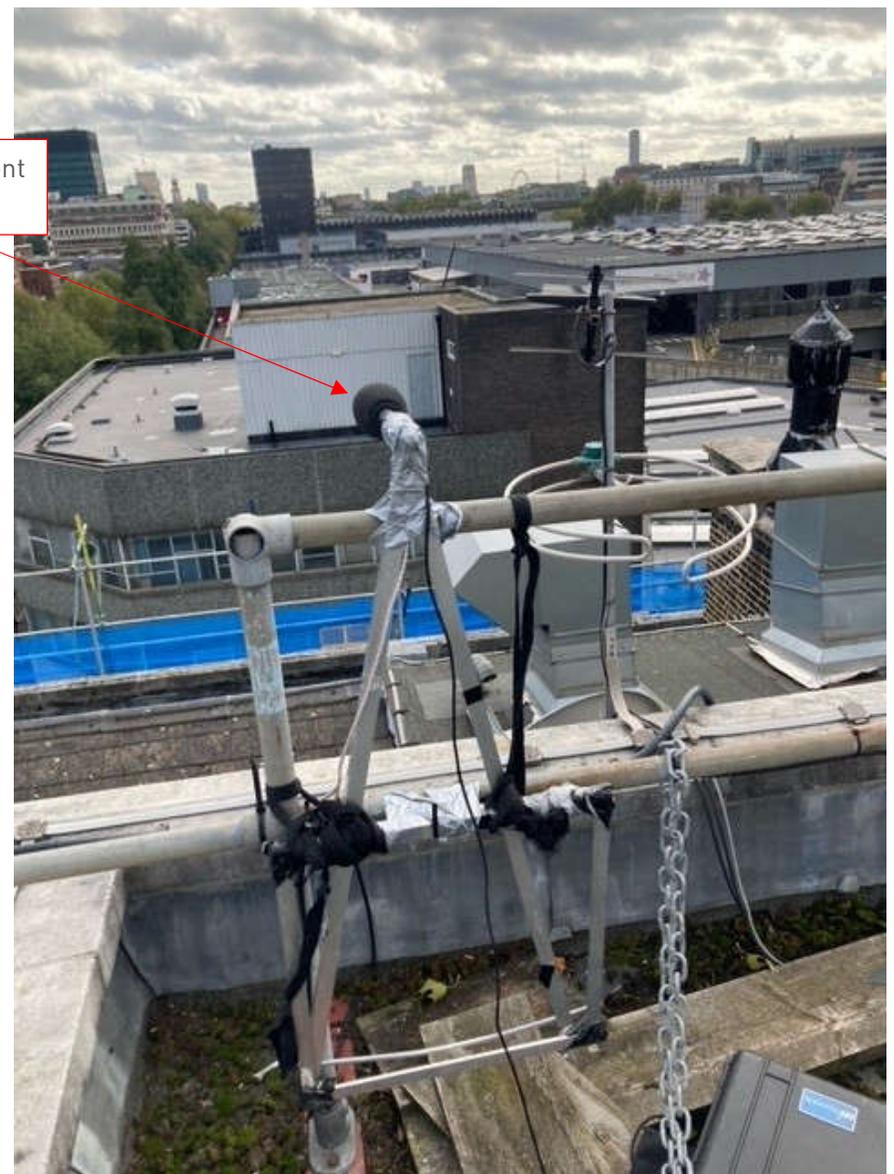
163-203 Eversholt Street, London
Photograph of Measurement Positions 1 and 2
Project 12308

Figure 2
9 December 2022
Not to Scale





Measurement
Location 3



163-203 Eversholt Street, London
Photograph of Measurement Position 3
Project 12308

Figure 3
9 December 2022
Not to Scale

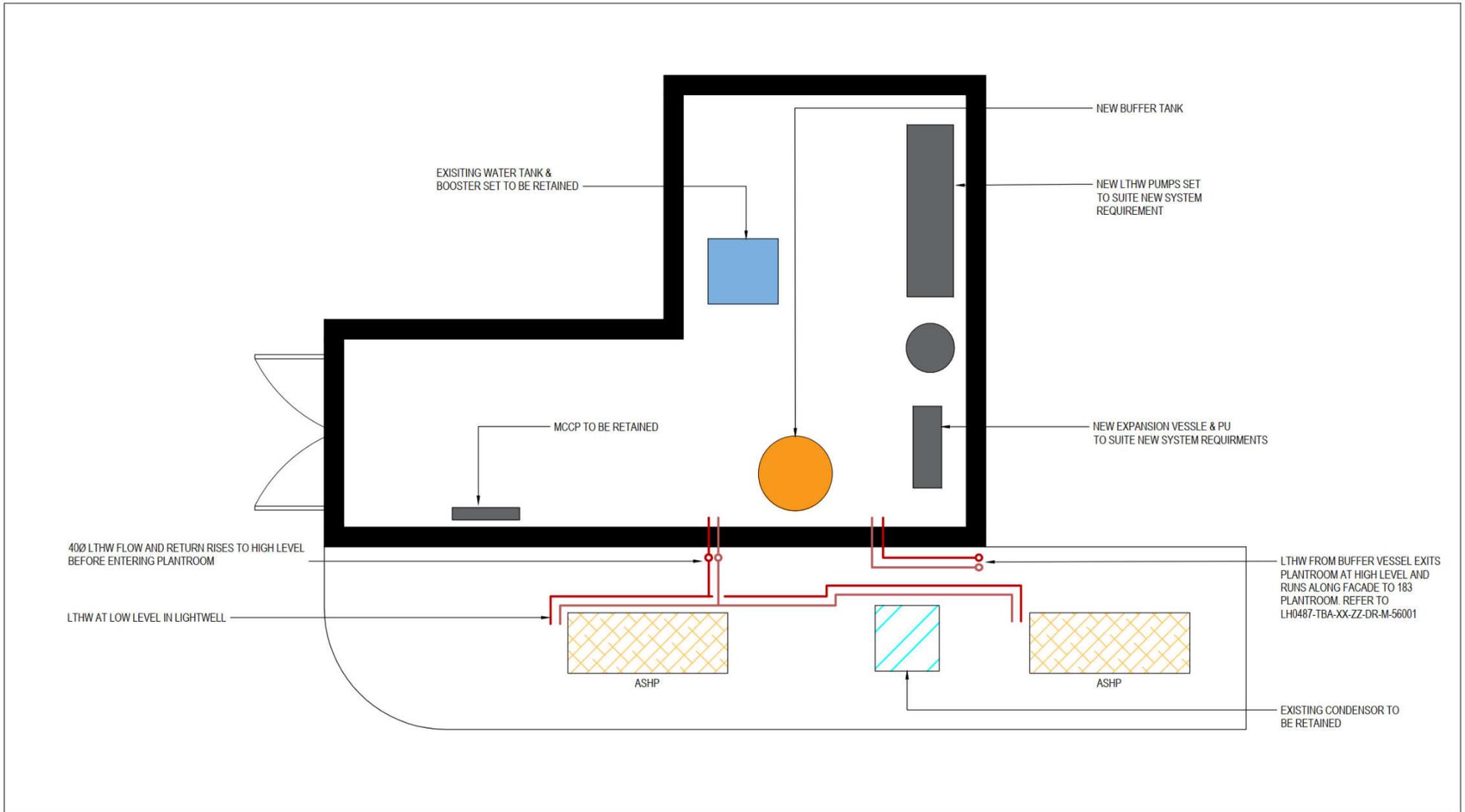




163-203 Eversholt Street, London
 Drawings showing Plant Locations at 203 Eversholt Street
 Project 12308

Figure 4
 9 December 2022
 Not to Scale





163 BOILER PLANT ROOM (PROPOSED)

163-203 Eversholt Street, London
 Drawings showing Plant Locations at 163 Eversholt Street
 Project 12308

Figure 5
 9 December 2022
 Not to Scale



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