20 MURRAY MEWS, LONDON NW1

Plant Noise Assessment

Reference: 14174.RP01.PNA.0
Prepared: 31 January 2025
Revision Number: 0

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0	First issue of report	31 January 2025	Robert Gurney	Helen Sheldon

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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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Contents

1. INTRODUCTION

It is proposed to locate new items of plant at 20 Murray Mews, London NW1. As part of the planning application, Camden London Borough Council (CLBC) 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 CLBC's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

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 a quiet Mews, sandwiched between Camden square and Saint Augustine's Road, and makes up part of a row of architecturally unique terraced houses. The surrounding area is predominately residential with a train line located approximately 65m southwest of the site. The noise climate was noted to be quiet while on site, with birds, traffic noise and trains crossing a joint in the track heard faintly in the distance.

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

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

- 12:00 Tuesday 14 January to 14:00 Wednesday 15 January 2024.

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 15-minute sample periods. A summary of acoustic terminology is included in Appendix A.

3.2 Measurement Position

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

- *Measurement Position 1 – Roof*
  The microphone was mounted on a tripod approximately 1.5m from roof level. The noise climate at this location is considered reflective of that at the nearest noise sensitive receptors.

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

3.3 Instrumentation

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

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

3.4 Survey Noise Levels

The noise levels measured are shown as time-histories on the attached Graphs 1-2 (Appendix E).

Selection of an appropriately representative background sound level is discussed in BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound* as follows:

> *"In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.*
>
> *[...] A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value."*

Graph 3 in Appendix E presents the range of background sound levels measured and, on this occasion, the 'typical-lowest' level has been chosen as representative for all periods. The 'typical-lowest' level can be determined statistically as the lowest $L_{A90,\,15mins}$ level which is exceeded for 90% of the assessment period, or alternatively termed the 10th percentile of the measured $L_{A90,\,15mins}$ levels.

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

Table 1 - Measured Baseline Noise Levels

Measurement Period	Measurement Position 1 (MP1) – Roof	
	Representative Background Noise Level $L_{A90,15min}$ (dB)	Period-Averaged Noise Level $L_{Aeq,T}$ (dB)
Daytime (07:00 – 23:00)	39	49
Night-time (23:00 – 07:00)	33	42

4. PLANT NOISE CRITERIA

The requirements of CLBC's Environmental Health Department regarding new building services plant are understood to be as follows.

> *"[...] 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)."*

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 levels when assessed at the nearest noise sensitive location:

Table 2 – Plant Noise Limits at NSR

Assessment Period	Plant Noise Criteria to be achieved at 1m outside the window of the nearest Noise-Sensitive Receptor (NSR), L_{Aeq} (dB)
	NSRs
Daytime (07:00 – 23:00)	29
Night-time (23:00 – 07:00)	23

It should be noted that the above requirements are applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the proposed plant installations.

5. PLANT NOISE ASSESSMENT

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

5.1 Proposed Plant Items

The following plant is proposed for the scheme:

Table 3 – Proposed Plant Items

Ref.	Manufacturer/Model/Duty	Plant Type
ASHP1	Vaillant aroTHERM plus 7kW	Air Source Heat Pump - Option 1
ASHP2	Vaillant aroTHERM plus 5kW	Air Source Heat Pump - Option 2

5.2 Plant Locations

The ASHP unit is to be located on the northeast side of proposed rooftop terrace at a distance of approximately 6m from the nearest noise sensitive receptor

The equipment positions are indicated on the site plan in Figure 1 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. It should be noted that only an overall dBA value was provided as octave band noise data was not available. To counter this a typical ASHP octave band spectrum has been scaled to provide the same overall dBA level.

The assumed plant noise levels are detailed as follows:

Table 4 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
ASHP1	L_P at 1m	50	51	49	46	41	35	32	25	**47**
ASHP2	L_P at 1m	49	50	48	45	40	34	31	24	**46**

It should be noted that only one ASHP option will be selected in the final design. ASHP1 has been used for the assessment to ensure it is worst case. If the installation of ASHP1 meets the criteria, the same is true of ASHP2.

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

5.4 Noise-Sensitive Receptors (NSRs)

Based on observations made on site and discussions with the design team we understand the nearest noise-sensitive receptors to the proposed plant to be as follows:

- *NSR1 – 18 Murray Mews*
  This receptor is the adjacent property to the southwest of the site. It is located approximately 8m from the proposed plant and will experience moderate screening losses.

- *NSR2 – 21 Murray Mews*
  This receptor is located across Murray Mews from the site, approximately 12m from the proposed plant. It will experience line of site screening losses.

- *NSR3 – 22 Murray Mews*
  This receptor is the adjacent property to the northeast the site. It is located approximately 6m from the proposed plant and will experience slight screening losses and moderate directivity losses.

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

5.5 Predicted Noise Levels at NSRs

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

- Source Term SPL / SWL
- Distance Attenuation
- Directivity
- 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 5 – Predicted Plant Noise Levels

Operating Period	Noise Level (dB) at NSR1 – 18 Murray Mews		Noise Level (dB) at NSR2 – 21 Murray Mews		Noise Level (dB) at NSR3 – 22 Murray Mews	
	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion
Daytime (07:00 – 23:00)	21	29	20	29	21	29
Night-time (23:00 – 07:00)	21	23	20	23	21	23

Noise from the proposed plant installations is within the local authority criteria. As such, no further mitigation is required.

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 ASHPs 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 have undertaken noise monitoring at 20 Murray Mews, Lond NW1. 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 CLBC. 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.
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 acoustic measurements.

Table B1 - Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1407962	UCRT24/1149	24 January 2026
Norsonic Pre Amplifier	1209	23790		
Norsonic ½“ Microphone	1225	496129		
Norsonic Sound Calibrator	1255	125526426	UCRT24/1140	24 January 2026

Appendix C - Plant Calculations

Table C1 - Example Calculation – ASHP1 at NSR1

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Lp at 1m	50	51	49	46	41	35	32	25	**47**
Distance losses @ 8m	-18	-18	-18	-18	-18	-18	-18	-18	-
Screening Losses	-5	-6	-6	-7	-9	-11	-14	-17	
Noise level at receiver	26	27	25	21	14	6	0	0	**21**

Table C2 - Summary Noise Levels

Unit	Received noise level (dB) at 1m from NSR1	Received noise level (dB) at 1m from NSR2	Received noise level (dB) at 1m from NSR3
ASHP1	21	20	21
Total Received Level	21	20	21

Appendix D - CDM Considerations

The Likelihood (**L**) 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 (**S**) 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 (Likelihood x Severity)		
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

20 Murray Mews, London NW1

L_{Aeq} Time History

Roof - Tuesday 14 January to Wednesday 15 January 2025

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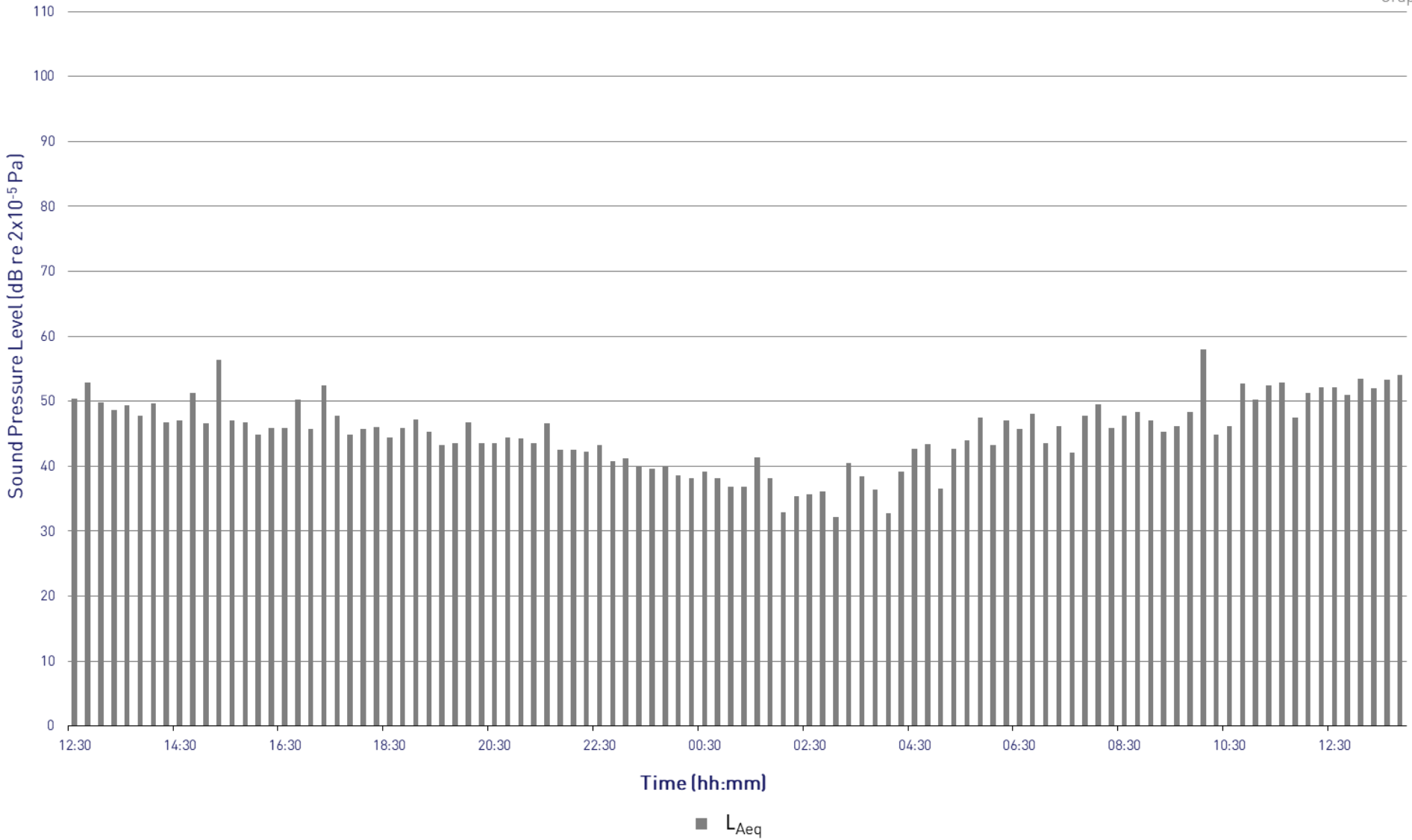
Graph 1



20 Murray Mews, London NW1

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

Roof - Tuesday 14 January to Wednesday 15 January 2025

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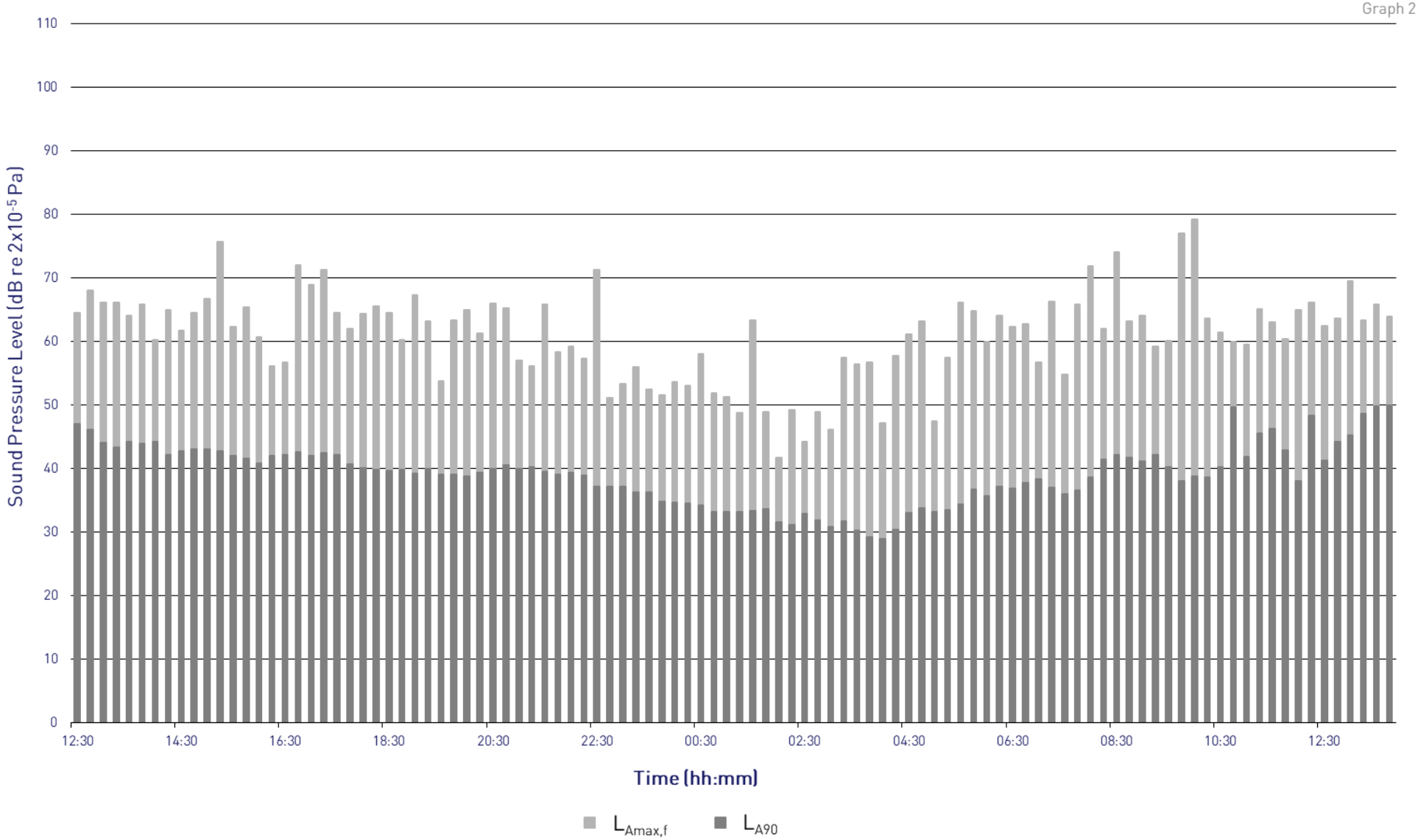
Graph 2



20 Murray Mews, London NW1

$L_{A90,15\,minutes}$ Histogram

Roof - Tuesday 14 January to Wednesday 15 January 2025

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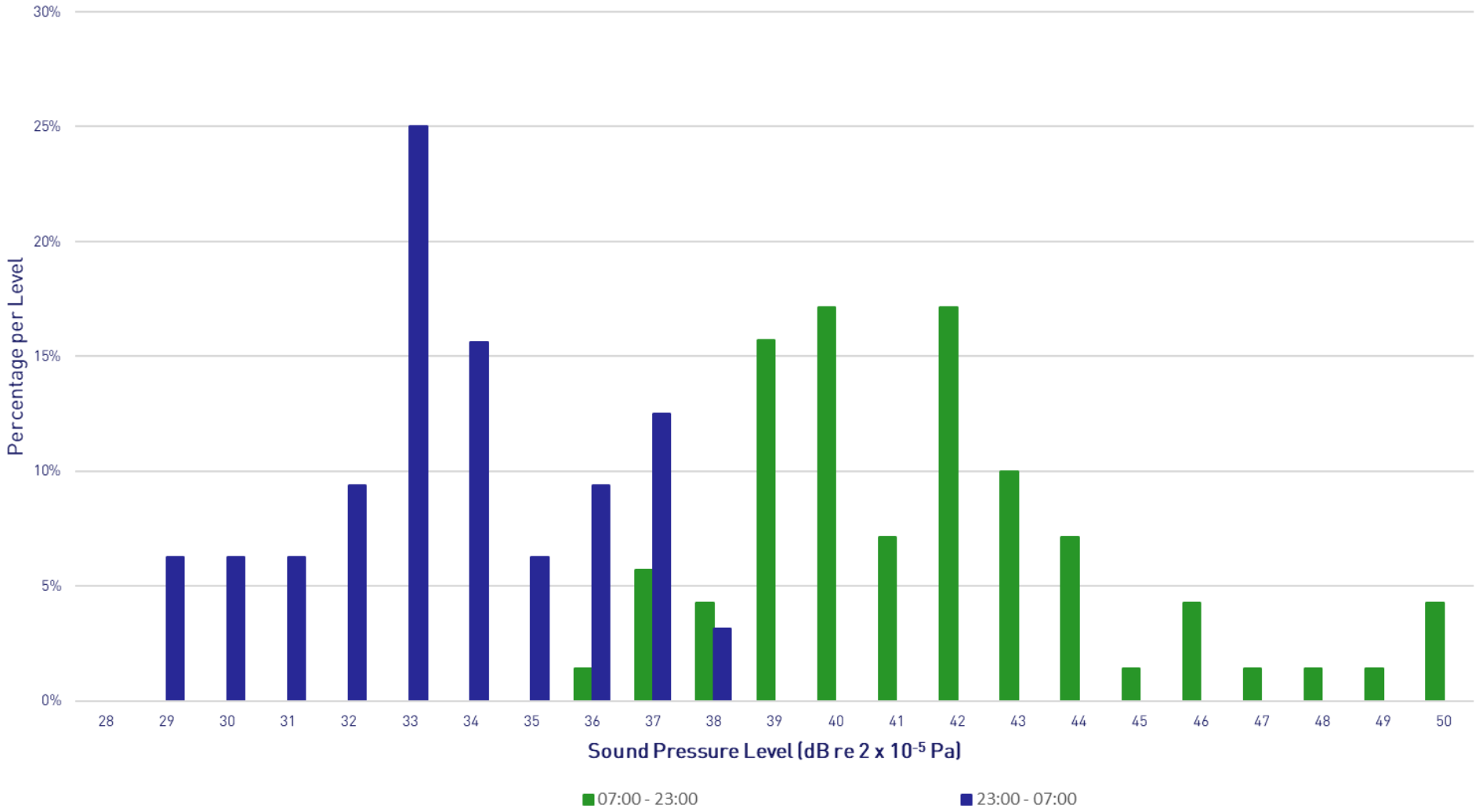
Graph 3



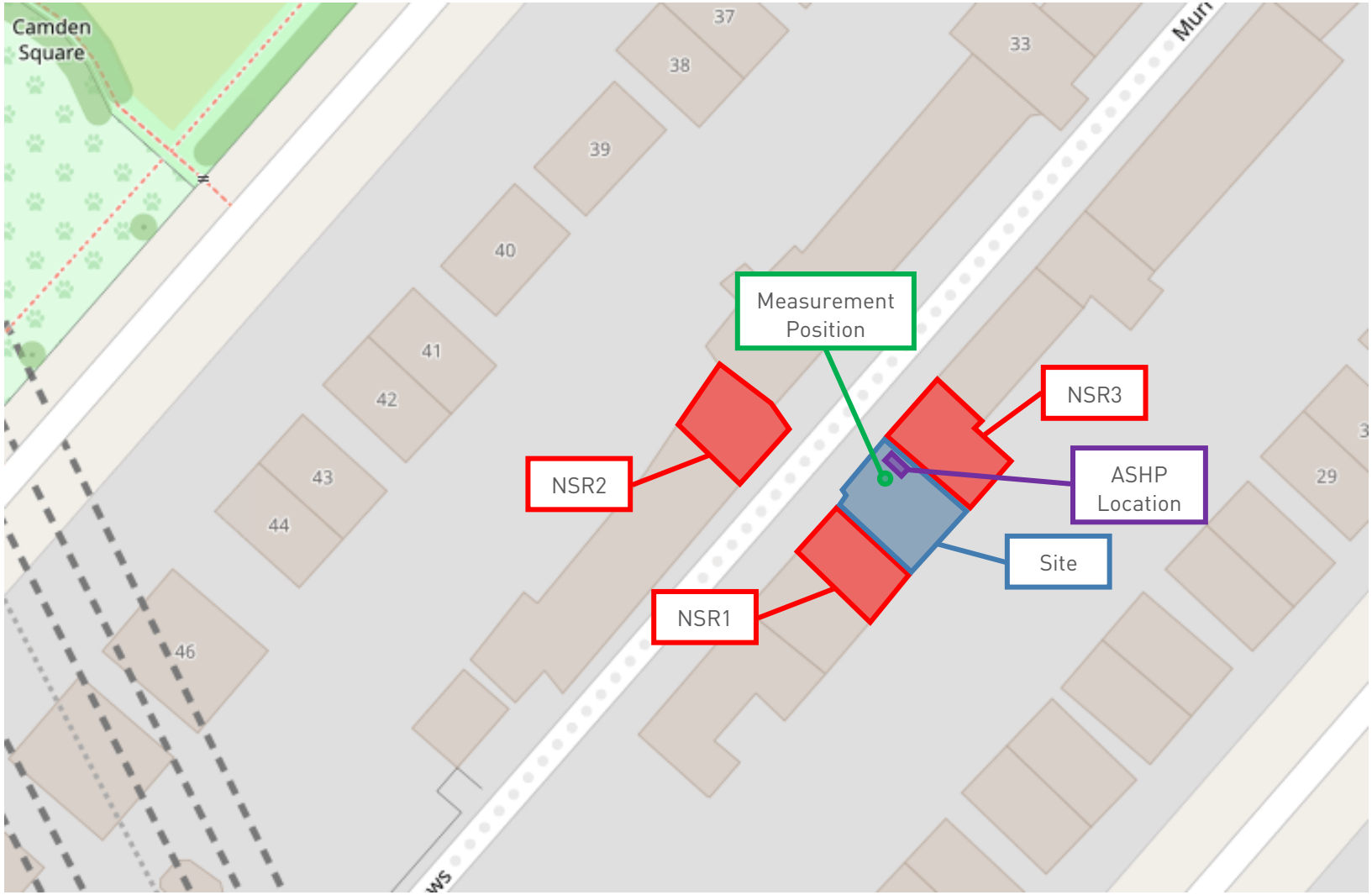


Figure 1 - Site Plan

20 Murray Mews, London NW1

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Not to Scale

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Figure 2 - Photos

20 Murray Mews, London NW1

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Not to Scale

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