11 LYMINGTON ROAD, LONDON NW6

Plant Noise Assessment

Reference: 14283.RP01.PNA.0
Prepared: 24 February 2025
Revision Number: 0

Hayhurst & Co.
26 Fournier Street
London
E1 6QE

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	24 February 2025	Robert Barlow	Pritham Dsouza

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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.

RBA ACOUSTICS

LONDON
44 Borough Road
London, SE1 0AJ
T. +44 (0) 20 7620 1950

MANCHESTER
Bloc, 17 Marble Street
Manchester, M2 3AW
T. +44 (0) 161 661 4504

Contents

1. INTRODUCTION

It is proposed to locate a new air source heat pump (ASHP) to serve the Ground Floor Flat at 11 Lymington Road, London NW6. As part of the planning application, the London Borough of Camden (LBC) requires consideration be given to atmospheric noise emissions from the proposed equipment to the nearest noise-sensitive receptors.

RBA Acoustics has been commissioned by the project architects to measure the existing noise levels at the site, at locations representative of the nearest noise-sensitive receptors; the aim is to assess the impact of the proposed plant's operation on these receptors and ensure compliance with LBC requirements.

This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2. SITE DESCRIPTION

The property at 11 Lymington Road is located on a residential street in West Hampstead. The building comprises four individual apartments with the property relative to this planning application being the Ground Floor flat. The buildings either side are typical residential properties. To the rear are further residential properties located on Fawley Road, with the rear gardens of Lymington Road adjoining the gardens of these properties.

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

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 13 February to 11:00 Friday 14 February 2025

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 at the nearest noise sensitive receptors, measurements were undertaken at ground level in the rear garden of the building. The measurement position is considered to be indicative of the noise climate at the nearest noise sensitive receptors (1st floor residential windows belonging to the same building).

The measurement position is also illustrated on the site plan attached in Figure 1 & 3 (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).

Fo the purposes of this plant noise assessment, it would be necessary to determine a representative background sound level for the site and specifically the nearest noise sensitive receptors. 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."

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	
	Representative Background Noise Level $L_{A90,15min}$ (dB)	Period-Averaged Noise Level $L_{Aeq,T}$ (dB)
Daytime (07:00 – 23:00)	33	46
Night-time (23:00 – 07:00)	28	38

4. PLANT NOISE CRITERIA

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

"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)."

In line with the above requirements, we 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 NSRs

Assessment Period	Plant Noise Criteria to be achieved at 1m outside the window of the nearest Noise-Sensitive Receptors (NSR)
Daytime (07:00 – 23:00)	23
Night-time (23:00 – 07:00)	18

It should be noted that the above requirements are extremely stringent and it is likely that levels 5dB higher than the above are likely to be acceptable in practice,

5. PLANT NOISE ASSESSMENT

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

5.1 Proposed Plant Item

The following plant is proposed for the scheme:

Table 3 – Proposed Plant Items

Ref.	Manufacturer/Model/Duty	Plant Type
ASHP	Vaillant aroTHERM plus ASHP 5kW	Air Source Heat Pump

5.2 Plant Location

The ASHP is proposed to be located in the rear garden of the 11 Lymington Road, London NW6. The equipment positions are indicated on the site plan in Figure 2 of Appendix E.

5.3 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the units.

- Heating Mode 54dBA (sound power level)

Octave band data for the proposed unit is not available. However, based on previous experience working with similar units, it is considered unlikely for there to be any tonal noise components with the proposed items of plant

5.4 Noise-Sensitive Receptor

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 the first floor flat of the same property, approximately 5m from the ASHP location and completely screened by the future building massing.

5.5 Predicted Noise Levels at NSR

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 SWL
- Radiation Losses
- Distance Attenuation
- Screening by Building Massing

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 Plant Noise Levels

Operating Period	Noise Level (dB) at NSR	
	Prediction	Criterion
Daytime (07:00 – 23:00)	18	23
Night-time (23:00 – 07:00)	18	18

Noise from the proposed plant installations is within the criteria required by the Local Authority,

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 the ASHP unit be isolated from the supporting structure with rubber footings.

The manufacturers guidelines should be followed to avoid short circuits of the isolators and supporting structures stiffened where necessary.

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 11 Lymington Road, London NW6. 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 ASHP installation is within the criteria required by London Borough of Camden and, as such, can 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 acoustic measurements.

Table B1 - Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1406262	U44036	18 April 2025
Norsonic Pre Amplifier	1209	20487		
Norsonic ½“ Microphone	1225	469005	44035	18 April 2025
Norsonic Sound Calibrator	1251	34429	U44034	18 April 2025

Appendix C - Plant Calculations

Table C1 – Plant Noise Emissions - Calculation

Details	63	125	250	500	1k	2k	4k	8k	dBA
SWL (spectral data based on typical spectra for similar units)	60	55	50	50	50	45	40	35	54
Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance (5m)	-14	-14	-14	-14	-14	-14	-14	-14	
Screening	-7	-8	-10	-13	-16	-19	-20	-20	
Total	**31**	**25**	**18**	**15**	**12**	**4**	**-2**	**-7**	**18**

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
Attenuators/ Acoustic Lagging	Strain of neck, limbs or back.	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4

L: Likelihood S: Severity R: Rating

Appendix E - Graphs and Site Plans

11 Lymington Road, London NW6

L_{Aeq} Time History

Thursday 13 February to Friday 14 February 2025

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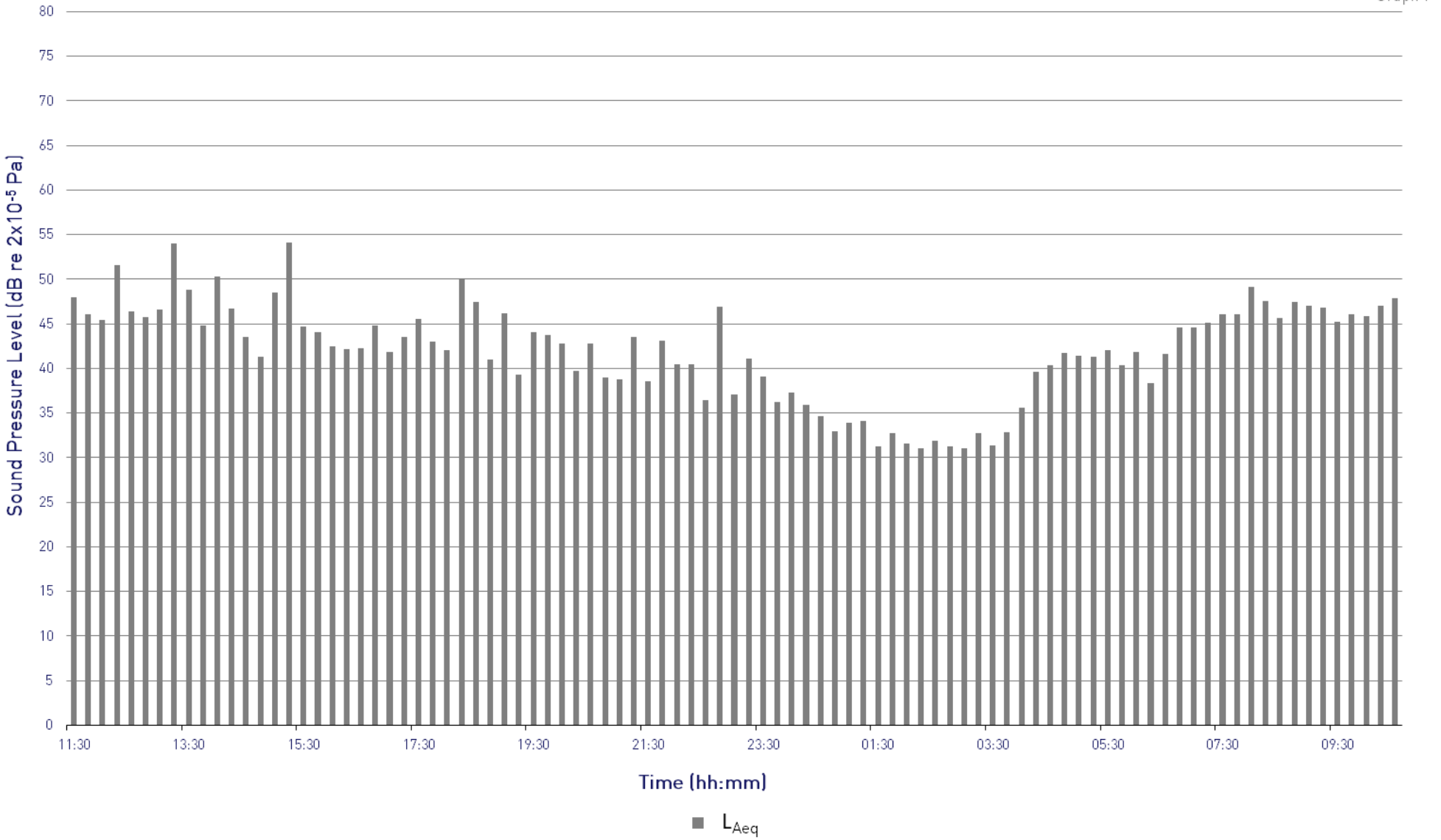
Graph 1



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

Thursday 13 February to Friday 14 February 2025

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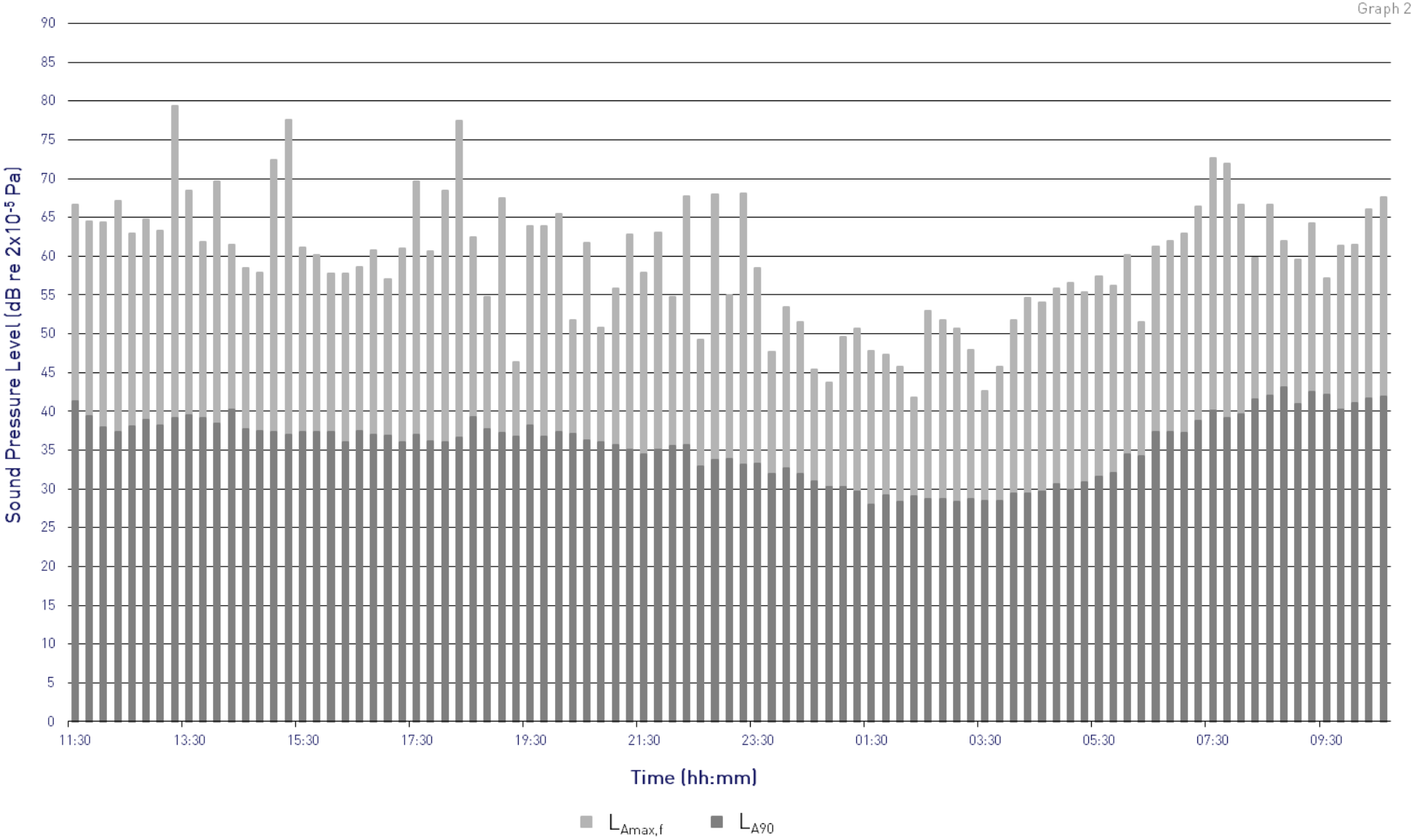
Graph 2



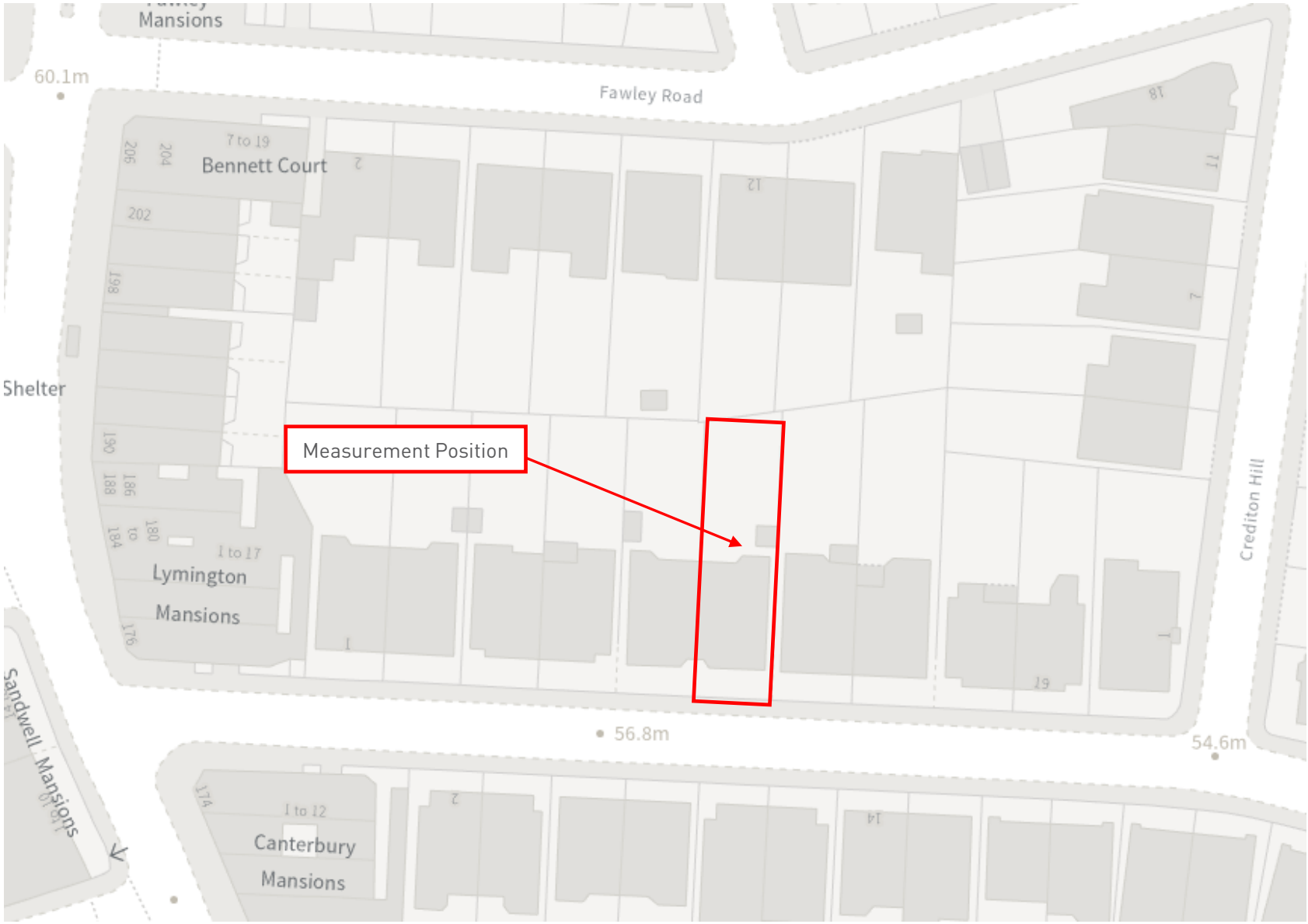


FIGURE 1 – SITE PLAN SHOWING SITE LOCATION

11 LYMINGTON ROAD, LONDON NW6

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Not to Scale

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FIGURE 2 – GROUND FLOOR PLAN

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Not to Scale

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FIGURE 3 – PHOTOGRAPH OF THE REAR OF THE SITE

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Project 14283

24 February 2025

Not to Scale

RBA ACOUSTICS

RBA ACOUSTICS
W. www.rba-acoustics.co.uk
E. info@rba-acoustics.co.uk

London:
44 Borough Road
London, SE1 0AJ
T. +44 (0) 20 7620 1950

Manchester:
Bloc, 17 Marble Street
Manchester, M2 3AW
T. +44 (0) 161 661 4504