251 GOLDHURST TERRACE, KILBURN NW6 3EP

Plant Noise Assessment

Reference: 11624.RP01.PNA.0
Prepared: 24 January 2022
Revision Number: 0

Marin Jakisic
251 Goldhurst Terrace
Kilburn
London
NW6 3EP

Plant Noise Assessment

251 GOLDHURST TERRACE, KILBURN NW6 3EP

Reference: 11624.RP01.PNA.0
Prepared: 24 January 2022

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	24 January 2022	Maxim Billingham	Robert Barlow

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 11624/SW01.0 dated 13 January 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.

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 1

2. SITE DESCRIPTION 1

3. ENVIRONMENTAL NOISE SURVEY 1

4. PLANT NOISE CRITERIA 3

5. PLANT NOISE ASSESSMENT 3

6. VIBRATION CONTROL 5

7. CONCLUSION 5

APPENDIX A – ACOUSTIC TERMINOLOGY

APPENDIX B – SITE PLANS

APPENDIX C – GRAPHS

APPENDIX D – INSTRUMENTATION

APPENDIX E – PLANT CALCULATIONS

APPENDIX F – CDM CONSIDERATIONS

1. INTRODUCTION

RBA Acoustics has been commissioned to undertake a noise impact assessment in relation to the proposed installation of 2No. air heat source pump units at 251 Goldhurst Terrace, Kilburn NW6. The assessment is required in order to support a planning application for the proposed items of plant to demonstrate compliance with Local Authority noise control requirements at the nearby noise-sensitive receptors.

Measurements of the prevailing noise conditions have been undertaken at the rear of the property and used to determine atmospheric noise emission limits in accordance with London Borough of Camden requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2. SITE DESCRIPTION

The property at 251 Goldhurst Terrace is a private, residential house, which is located in a residential area. The site is a three-storey building, approximately 9 metres in height, and is bordered by Goldhurst Street to the north, and residential properties to the east and west, 249 Goldhurst Terrace and 253 Goldhurst Terrace, respectively. To the south of the site is located private residential garden, followed by a nine-storey, mixed-use building, accommodating commercial properties on the ground level and residential flats on the subsequent upper levels; which is then bordered by Abbey Road.

The nearest, noise-sensitive residential receptors are detailed in Section 5.4. The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix B).

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

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

12:45 hours, Monday 17th January to 12:00 hours, Tuesday 18th of January 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. Continuous measurements were made of the L_{A90}, L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes. A summary of acoustic terminology is included in Appendix A.

3.2 Measurement Location

To determine the existing noise climate around the site measurements were undertaken at the rear garden of the private house at 251 Goldhurst Terrace. Measurements were undertaken with the microphone positioned on a tripod, which was located on the external, rear terrace of the house at the ground floor level, such that the microphone was approximately 3 metres above the lower ground level and in free field conditions, overlooking the rear garden of 251 Goldhurst Terrace.

The prevailing noise climate at this position was noted to be dominated by the traffic and pedestrian activity along Goldhurst Terrace and Abbey Road, as well as occasional train noise from the overground services travelling to and from South Hampstead station. Distant construction noise was also noted to be present in the area.

The measurement position is also illustrated on the site plan in Figure 1 and photos in Figure 3 in Appendix B. The measurements of sound at this position were considered to be representative of the noise climate as experienced at the nearest noise-sensitive receptors.

3.3 Instrumentation

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

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

3.4 Results

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

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

Table 1 – Measured Levels

Measurement Period	Sound Pressure Level	
	Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)
Daytime (07:00 – 23:00)	40	52
Night-time (23:00 – 07:00)	36	45

4. PLANT NOISE CRITERIA

The requirements of Camden Council Environmental Health Department regarding new building services plant are understood to be 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 criteria"*

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 levels in Table 2 when assessed at the nearest noise sensitive locations:

Table 2 – Plant Noise Criteria

Operating Period	Plant Noise Criteria
Daytime (07:00 – 23:00)	30
Night-time (23:00 – 07:00)	26

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent, tonal or other attention-grabbing characteristics, further penalties should be subtracted from any of the above proposed noise emission limits in line with BS 4142 methodology

5. PLANT NOISE ASSESSMENT

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

5.1 Proposed Plant Items

The following plant is proposed for the scheme:

Table 3 – Plant Types

Ref.	Manufacturer/Model/Duty	Plant Type
ASHP.01	Stiebel Eltron WPL 25 ACS	Air Heat Source Pump
ASHP.02	Stiebel Eltron WPL 25 ACS	Air Heat Source Pump

5.2 Plant Locations

2No. ASHP units are to be located within the rear garden to the south of the building at 251 Goldhurst Terrace.

The equipment positions are indicated on the site plan in Figures 1-2 in Appendix B.

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 4 – Plant Noise Levels

Unit	Parameter	Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
ASHP.01	Lp at 5m	--								32
ASHP.02	Lp at 5m	--								32

Octave band data is not available for the units, so we have provided an example spectrum based on a similar unit.

Table 5 – Assumed Spectrum at 1m

Sound Level (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
45	45	47	45	40	37	33	25

Review of the typical octave band data provides no indication of any tonal characteristics associated with the proposed plant. On this basis, it is not considered necessary or appropriate to apply any rating corrections in accordance with BS 4142 methodology.

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 to be as follows:

Receptor A – 249 Goldhurst Terrace

The closest residential window to the proposed plant location is understood to be the ground-floor level window belonging to 249 Goldhurst Terrace, which is located approximately 33 metres to the north-east of the proposed plant location.

Receptor B – 253 Goldhurst Terrace

The second closest residential window to the proposed plant location is understood to be the first-floor level window belonging to 253 Goldhurst Terrace, which is located approximately 42 metres to the north-west of the proposed plant location.

Our assessment of the potential noise impact has predicted noise due to the items of plant at the above receptors as the nearest, and therefore worst affected, residential receptors. Noise levels at other receptors will be lower than those at Receptor A and Receptor B, and hence, the potential impact will be further reduced. The receptors are also shown in the site plan in Figure 1 in Appendix B.

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
- Distance Attenuation
- Reflection

Calculation sheets are attached for further information in Appendix E.

Table 6 – Predicted Noise Levels

Operating Period	Noise Level (dBA) at Receptor A		Noise Level (dBA) at Receptor B	
	Prediction	Criterion	Prediction	Criterion
Daytime (07:00 – 23:00)	22	30	20	30
Night-time (23:00 – 07:00)	22	26	20	26

Noise from the proposed plant installations is within the Camden Council's criteria for all hours, and 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 the ASHP units be isolated from the supporting structure by means of rubber footings.

7. CONCLUSION

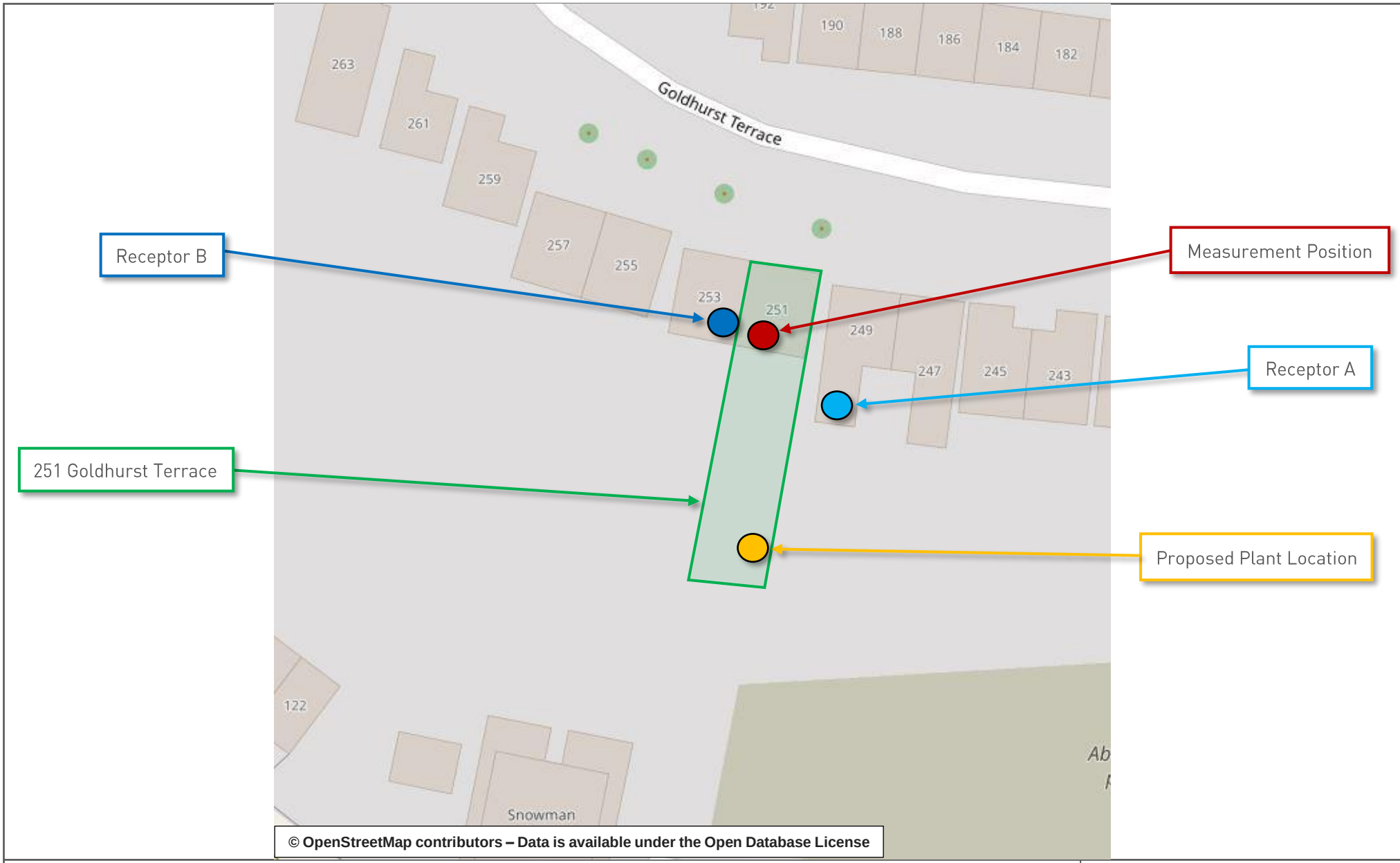
RBA Acoustics has undertaken noise monitoring at 251 Goldhurst Terrace, Kilburn NW6 3EP. The measured noise levels are presented within this report. The resultant noise levels have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installations.

The results of the assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by London Borough of Camden and no further mitigation is required. 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.

Appendix B – Site Plans



251 Goldhurst Terrace, Kilburn NW6 3EP

Site Plan showing Measurement Position, Plant Location, and the Nearest Receptors

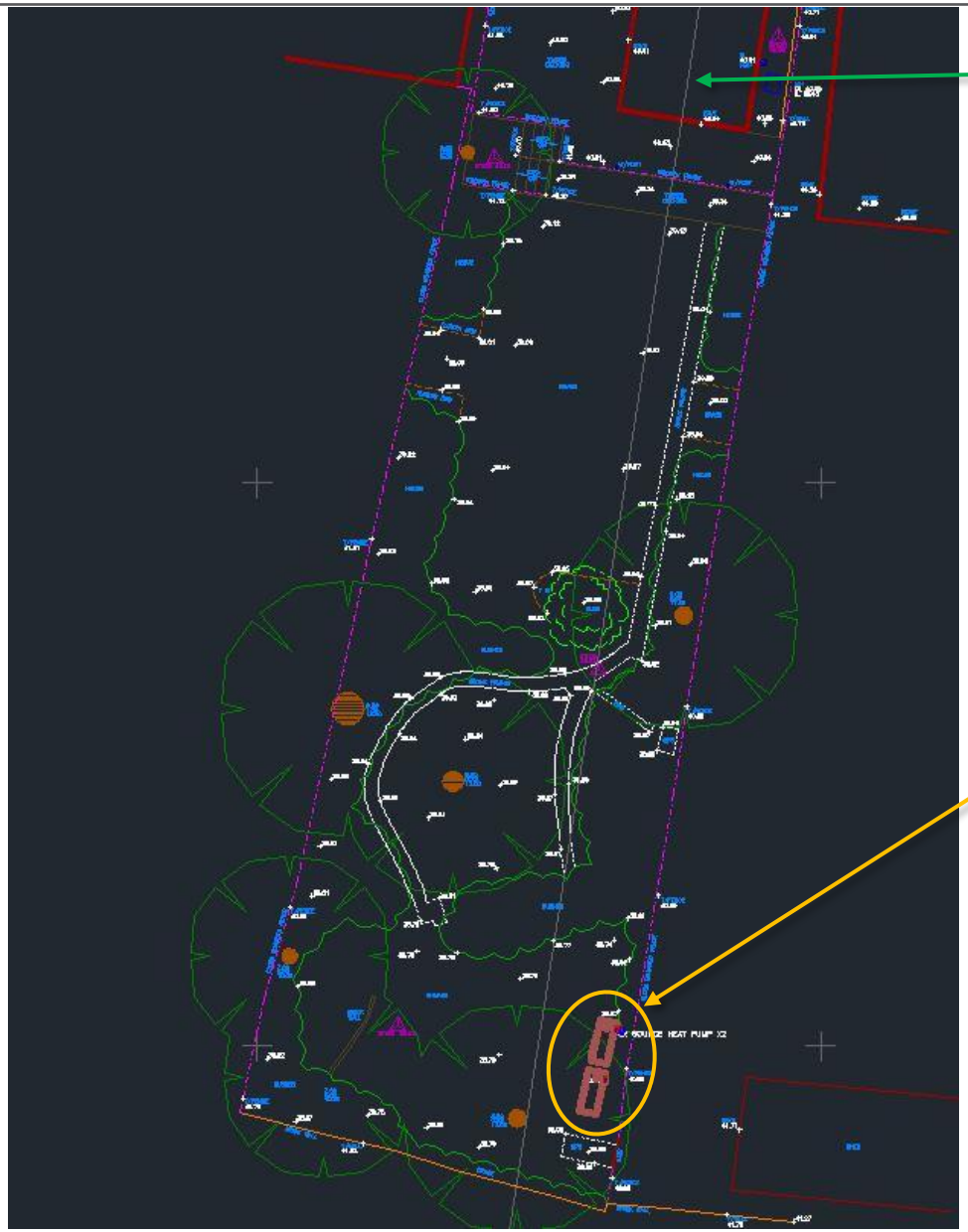
Project 11624

Figure 1

24 January 2022

Not to Scale

RBA ACOUSTICS



251 Goldhurst Terrace, Kilburn NW6 3EP

Plan showing Proposed Plant Location

Project 11624

Figure 2

24 January 2022

Not to Scale

RBA ACOUSTICS

251 Goldhurst Terrace, Kilburn NW6 3EP

Photos showing Measurement Location

Project 11624

Figure 3

24 January 2022

Not to Scale

RBA ACOUSTICS

Appendix C – Graphs

251 Goldhurst Terrace, NW6

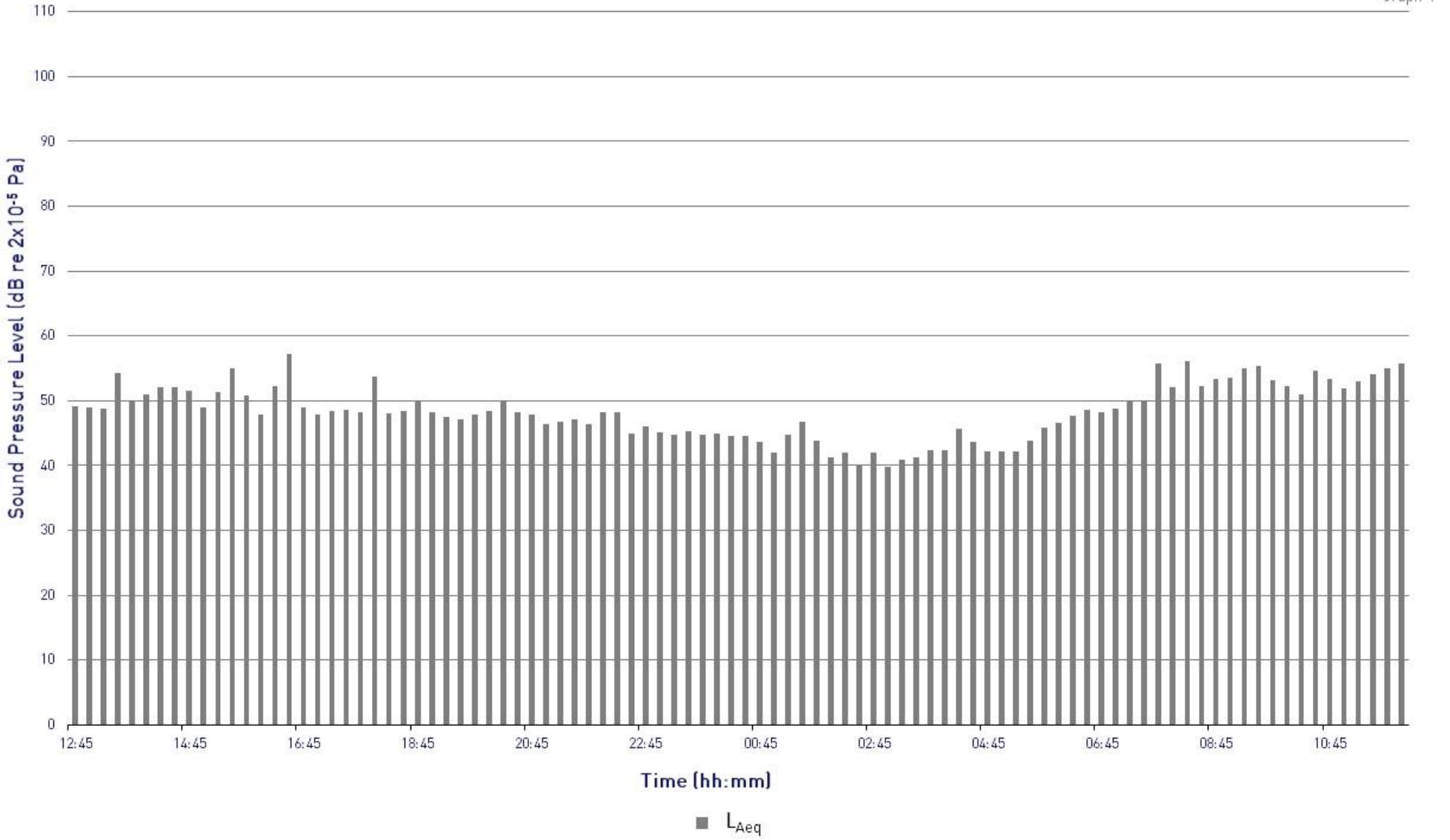
L_{Aeq} Time History

Measurement Position 1, Monday 17th January to Tuesday 18th January 2022

RBA ACOUSTICS

Project: 11624

Graph 1



251 Goldhurst Terrace, NW6

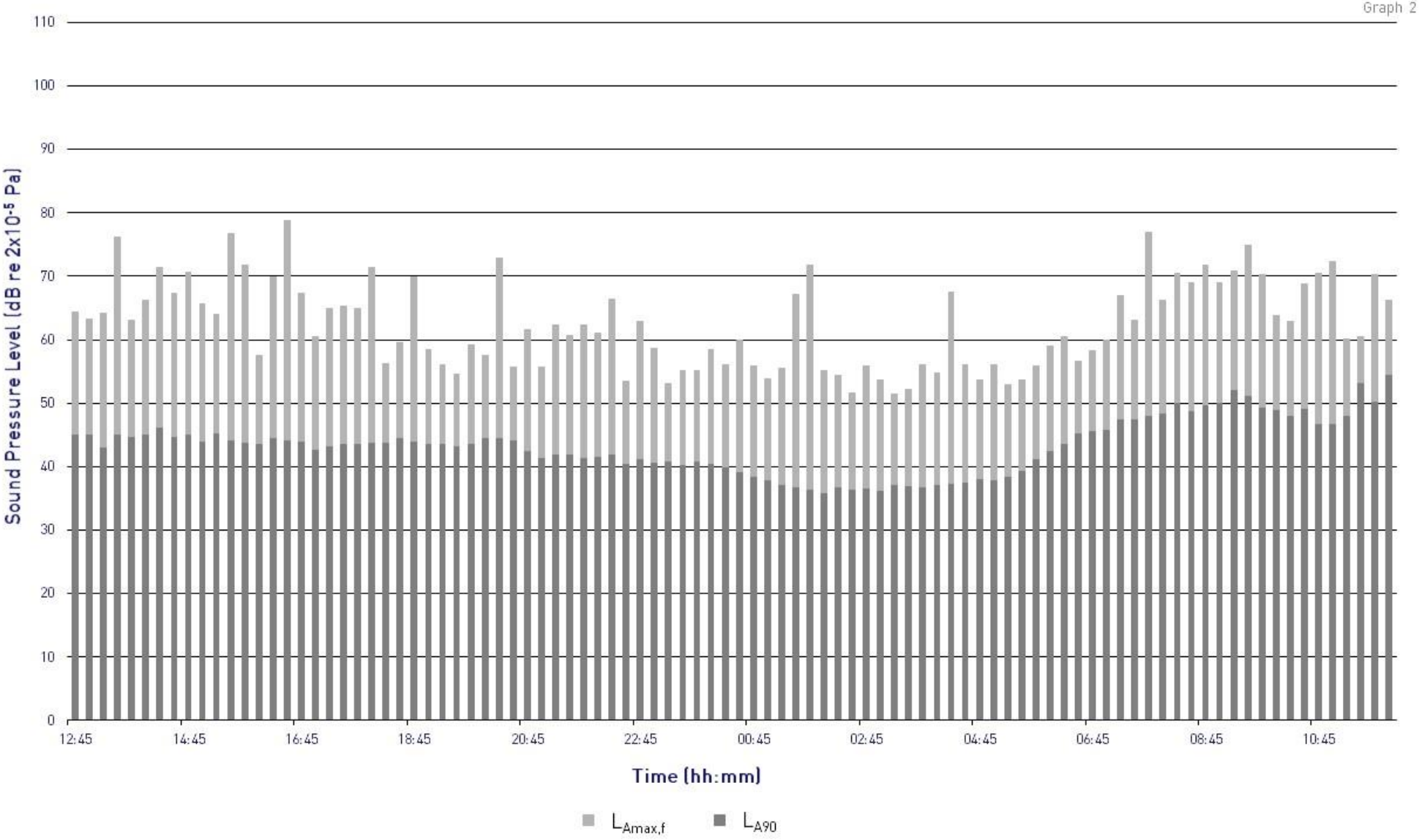
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1, Monday 17th January to Tuesday 18th January 2022

RBA ACOUSTICS

Project: 11624

Graph 2



Appendix D – 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	1406255	U37581	7 April 2023
Norsonic Pre Amplifier	1209	20491		
Norsonic ½" Microphone	1225	225529	37580	7 April 2023
Norsonic Sound Calibrator	1251	34391	U37579	7 April 2023

Appendix E – Plant Calculations

Table C1 – Example Calculation, ASHP.01 (Receptor A)

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
L_p at 1m	45	45	47	45	40	37	33	25	46
Reflections	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance loss (33m)	-30	-30	-30	-30	-30	-30	-30	-30	-
Noise level at Receptor A	**18**	**18**	**20**	**18**	**13**	**10**	**6**	**0**	**19**

Table C2 – Summary Noise Levels

Unit	Received noise level (dB) at 1m (Receptor A)		Received noise level (dB) at 1m (Receptor B)	
	Daytime (07:00 – 19:00)	Night-time (23:00 – 07:00)	Daytime (07:00 – 19:00)	Night-time (23:00 – 07:00)
ASHP.01	19	19	17	17
ASHP.02	19	19	17	17
Total Received Level (dBA)	**22**	**22**	**20**	**20**

*Possible discrepancies within one dB are subject to the number rounding.

Appendix F – 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 reasonably 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

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