RBA ACOUSTICS

31-37 WHITFIELD STREET, LONDON

Environmental Noise Survey

Reference: 9536.RP01.ENS.2
Prepared: 4 November 2019
Revision Number: 2

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	21 October 2019	Joe Allen	Alex J Wyatt
1	Updated to include proposed plant locations	28 October 2019	Joe Allen	Alex J Wyatt
2	Updated based on planners comments	4 November 2019	Joe Allen	Alex J Wyatt

Terms of contract:

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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 again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.

In line with our Environmental Policy, up to two hard copies of the report will be provided upon request. Additional copies of the report, or further hard copies of revised reports, would be subject to an administrative cost of £20.00 (+VAT) per copy.

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Contents

1.0 INTRODUCTION 1

2.0 ENVIRONMENTAL NOISE SURVEY 1

3.0 INTERNAL NOISE 2

4.0 EXTERNAL NOISE 5

5.0 CONCLUSION 6

APPENDIX A – ACOUSTIC TERMINOLOGY

APPENDIX B – INSTRUMENTATION

APPENDIX C – CDM CONSIDERATIONS

APPENDIX D – GRAPHS AND SITE PLANS

1.0 INTRODUCTION

The existing site and buildings at 31-37 Whitfield Street and 50a Charlotte Street are to be refurbished and enhanced to make office space. The current façade and glazing are to be retained, but the refurbishment is to include Category A fit-out. In addition, as part of the enhancement, new items of plant are to be installed at the roof level of 31-37 Whitfield Street, as well as a UKPN substation to be located at ground floor close to the Charlotte Street entrance.

London Borough of Camden requires an assessment to be undertaken of internal noise levels within noise sensitive developments to ensure acceptable levels are achieved. In addition, an assessment of atmospheric noise emissions from any proposed new building services equipment to the nearest noise sensitive property is required.

RBA Acoustics have been commissioned to undertake measurements within the development to assess the ambient internal noise levels. Measurements of the prevailing noise conditions at the site have also been undertaken to provide the design criteria required by London Borough of Camden.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

In accordance with the requirements of the Local Authority, monitoring of the prevailing background noise was undertaken over the following period:

Tuesday 8 October to Wednesday 9 October 2019

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period, however the weather was generally considered satisfactory it 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 duration.

2.2 Measurement Locations

Internal Ambient Noise Level Measurements

To determine the internal ambient noise levels within the development a microphone was attached to a tripod and located within the building at first floor level. The tripod was situated approximately 1.5m away from the glazing of the façade overlooking Whitfield Street, which was considered to be the "noisiest" façade.

It was noted that levels of traffic passing-by on Whitfield Street were very low and that, subjectively, the internal ambient noise levels within the development due to external noise intrusion were very low.

Plant Noise Measurements

To determine the existing noise climate around the site, measurements were undertaken at the following locations. The measurement positions are also illustrated on the Site Plan in Figure 1 attached.

There was no plant serving the actual development building in operation during the noise survey, as these have been out of commission for some time.

Position 1 - Roof

Measurements were undertaken with the microphone attached to a tripod at a height of 1.5m and located on the roof of 31-37 Whitfield Street, approximately in the centre of the roof close to where the proposed plant is to be installed.

The prevailing noise climate was noted to mainly consist of road traffic noise from the nearby Tottenham Court Road and the surrounding road network.

Position 2 - Courtyard

Measurements were undertaken with the microphone attached to a pole, located within the centre of the rear courtyard on top of the lower roof level of the development. This position is considered as being representative of the noise climate experienced at the nearest residential windows to the development.
The prevailing noise climate was noted to consist of low levels of plant noise from other nearby commercial properties as well as low levels of road traffic noise from the surrounding road network.

2.3 Instrumentation

Details of the instrumentation used to undertake the survey are provided in Appendix B attached.

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

3.0 INTERNAL NOISE

This section contains the information relevant to the internal noise levels, providing the results of the internal noise measurements and compares them with relevant criteria.

3.1 Criteria

London Borough of Camden's Requirements

The requirements of the London Borough of Camden regarding noise and vibration as provided in Camden Local Plan 2017 are given below.

Policy A4 Noise and Vibration

The council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration (Appendix 3). We will not grant planning permissions 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 any 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 phase of development.

Appendix 3 of the Camden Local Plan 2017 further states

Special consideration will need to be given to noise sensitive developments that are proposed in areas which are, or expected to become, subjected to levels of noise likely to have an adverse effect. The threshold of acceptability of the noise will primarily depend on two factors: the intended use of the noise sensitive development and the source of the noise experiences, or likely to be experienced.

... levels are use specific and different levels will apply dependent on the use of the premises. The Council will take into account the likely times of occupation for types of development and will be amended according to the time of operation of the establishment under consideration.

British Standard 8233:2014

BS 8233:2014 *Guidance on Sound insulation and noise reduction for buildings* draws on the results of research and experience to provide information on achieving internal acoustic environments appropriate to their functions.

The noise level values given are in terms of an average (L_{Aeq}) level.

The standard advises internal ambient noise levels for providing masking for acoustic privacy in shared spaces without causing disturbance within office spaces as set out in Table 1. A brief explanation of the acoustic terminology used in this report is shown in Appendix A attached.

Table 1 – BS 8233:2014 Indoor Ambient Noise Level Criterion

Objective / Activity	Typical Situations / Location	Design range $L_{Aeq,T}$ (dB)
Typical noise levels for acoustic privacy in shared spaces	Open plan office	45-50
Study and Work Requiring Concentration	Staff/Meeting Room, Training Room	35-45
	Executive Office	35-40

British Council for Offices

BCO provides guidance on external noise intrusion levels (whether from road, rail or aircraft sources) should, after attenuation by the composite building envelope, not exceed the following design criteria:

Table 2 – BCO Design Criteria

Criterion	Environment	Design Range
External noise intrusion levels	Open plan offices	NR40 (≈45dBA)
	Speculative Offices*	NR38 (≈43dBA)
	Cellular Offices	NR35 (≈40dBA)

*Please note, the speculative office criterion is a compromise between the ideal for open plan and cellular offices.

In addition, $L_{Amax\ (fast)}$ noise intrusion levels should not normally exceed 55 dBA in open plan/speculative offices or 50 dBA in cellular offices.

Summary

As the development is for a Cat A open-plan fit-out, a target value of ~45dB L_{Aeq} would normally be targeted, but a lower value of ~40dB L_{Aeq} would be appropriate for cellularised spaces, for future reference.

3.2 Results

The development is to retain the existing façade elements including the glazing, which comprises sealed double-glazing. As such, a sound level meter was installed within the first floor level on the noisiest façade, which overlooks Whitfield Street, to carry out an assessment of the worst-case noise levels. As the windows are sealed there is no concern for an increase in noise levels due to open windows.

The noise levels measured internally are shown as time-histories on the attached Graphs 1 & 2.

Table 3 details the results of the measurement for the daytime (07:00-23:00) and night-time (23:00-07:00) periods, as well as extended office hours (08:00-20:00) which are considered representative of the hours of use of the development.

Table 3 – Measured Internal Noise Levels

Measurement Period	L_{eq} (dBA)
Extended Office Hours (08:00 – 20:00)	36
Daytime (07:00 – 23:00)	36
Night-time (23:00 – 07:00)	28

Table 3 shows that the internal ambient noise levels are considerably below those typically required by the London Borough of Camden or any industry standard guidance. The measurements were made in the vacant first floor area with exposed slab and soffit. Once fit-out of the office space has been undertaken, which is likely to include a raised deck as well as furnishings, then noise levels will only decrease due to the increase in absorption. Therefore, the resultant noise levels will be further within the required criteria for office spaces, and in fact will be acceptable if the space is cellularised further.

4.0 EXTERNAL NOISE

This section contains the information relevant to the external noise levels and determines suitable criteria to ensure the proposed plant will not cause disturbance to the nearest noise sensitive receptors.

4.1 Results

The noise levels measured externally are shown as time-histories on the attached Graphs 3-6.

The "typical lowest" background L_{A90} noise levels measured have been used in our analyses which are summarised in Table 4.

Table 4 – Measured Background Levels

Measurement Position	"Typical Lowest" $L_{A90, 15mins}$ Noise Level during period (dB)		
	Extended Office Hours (08:00 – 20:00 hours)	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Position 1	53	52	49
Position 2	50	50	44

4.2 Criteria

Section 3.1 states Policy A4 of Camden Local Plan 2017 with regards to noise and vibration. Appendix 3 of Camden Local Plan 2017 provides further information as to the required noise levels for proposed plant items:

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' (BS4142) will be used. For such cases a 'Rating Level' of 10dB 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, i.e. residential properties adjoining the development site:

- Office Hours 40 dB
- Daytime 40 dB
- Night-time 34 dB

Should the proposed plant be identified as having tonal characteristics, noise emissions from the plant should not exceed the following levels when assessed at the nearest noise sensitive location:

- Office Hours 35 dB
- Daytime 35 dB
- Night-time 29 dB

4.3 Future Analysis

At the time of writing, details regarding the specific plant items, their noise levels and operating hours required for mechanically servicing the property are not fully available, as plant details are yet to be confirmed. Therefore predictions to the nearest noise sensitive (i.e. residential) adjacencies are currently unable to be undertaken to satisfy the above requirements.

However, noise emissions can be controlled by the requirement to achieve the plant noise emission criteria detailed in Section 4.2. The items of plant are proposed to be located on the upper roof, as indicated on the attached site plan in Figure 1. This is a typical location for such items of plant as it is usually less overlooked by nearby adjacencies, therefore reducing the impact. Based on this information and considering the location of the nearest noise sensitive receptors, the proposed plant and any required mitigation will be designed to meet the plant noise emission criteria detailed in Section 4.2. Methods for appropriately controlling plant noise emissions will include acoustic screens, attenuators, anti-vibration mounts and enclosures.

The currently proposed rooftop plant layout is attached in Figure 5, which includes Air Handling Units (AHUs) and VRF Air Source Heat Pumps (ASHPs). Typically the AHUs will have in-line attenuators fitted to them, both on the roomside and the atmospheric side, to both the supply and extract systems. The ASHPs can either be fully enclosed with proprietary enclosures or a bank of them can be surrounded by either louvres or solid panel screens (probably the latter).

A full report detailing plant selections and predicted noise levels and the required mitigation measures will be prepared once such details are available.

The report will also cover off the substation, but these are always very quiet and never an acoustic concern.

5.0 CONCLUSION

RBA Acoustics have undertaken noise monitoring at the proposed development site at 31-37 Whitfield Street, London. The measured noise levels are presented within this report. The resultant noise levels have been used in the assessment of ambient internal noise levels to ensure suitable levels are achieved within the development with reference to the London Borough of Camden's requirements, in addition to BCO and BS 8233.

Furthermore, noise criteria have been set to ensure proposed items of plant at the development will not cause disturbance to the nearest noise sensitive receptors in line with typical Planning Condition wording enforced by the LBC.

We do not consider planning approval should be rejected on the basis of noise and can confirm internal noise levels are significantly within those required.

At this stage, limited information is available regarding the proposed plant installation. However, provided the noise criteria detailed within this report are met, the proposed items of plant would likely be considered acceptable.

A detailed assessment will be carried out once full details are available to ensure the proposed criteria are achieved.

Appendix A – Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum 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, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Instrumentation

The following equipment was used for the measurements

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1403127	30803	30 January 2021
Norsonic Pre Amplifier	1209A	12071	30816	31 January 2021
Norsonic ½" Microphone	1225	41473		
Norsonic Sound Calibrator	1251	31986	30801	30 January 2021
Norsonic Type 1 Sound Level Meter	Nor140	1403226	30806	30 January 2021
Norsonic Pre Amplifier	1209A	12066	30818	31 January 2021
Norsonic ½" Microphone	1225	168180		
Norsonic Sound Calibrator	1251	31988	30804	30 January 2021
Norsonic Type 1 Sound Level Meter	Nor140	1404477	30809	30 January 2021
Norsonic Pre Amplifier	1209A	12067	30817	31 January 2021
Norsonic ½" Microphone	1225	40851		
Norsonic Sound Calibrator	1251	35378	30807	30 January 2021

Appendix C – 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 > 3 days)
4 – Serious (e.g. fracture, hospitalisation > 24 hrs, incapacitation > 4 weeks)
5 – Fatal (single or multiple)

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

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:

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Isolators	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 D – Graphs and Site Plans

31-37 Whitfield Street

L_{Aeq} Time History

Internal

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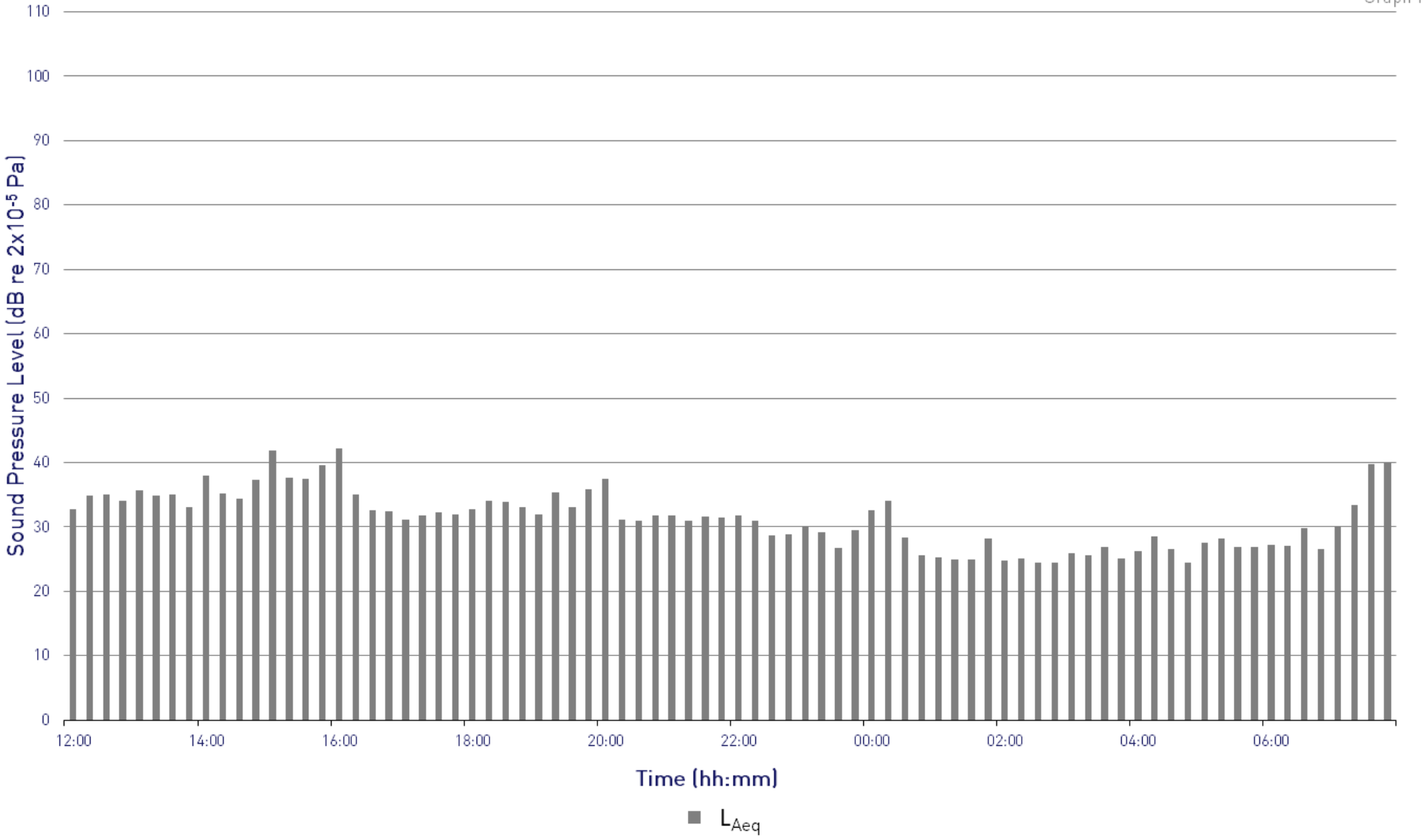
Graph 1



31-37 Whitfield Street

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

Internal

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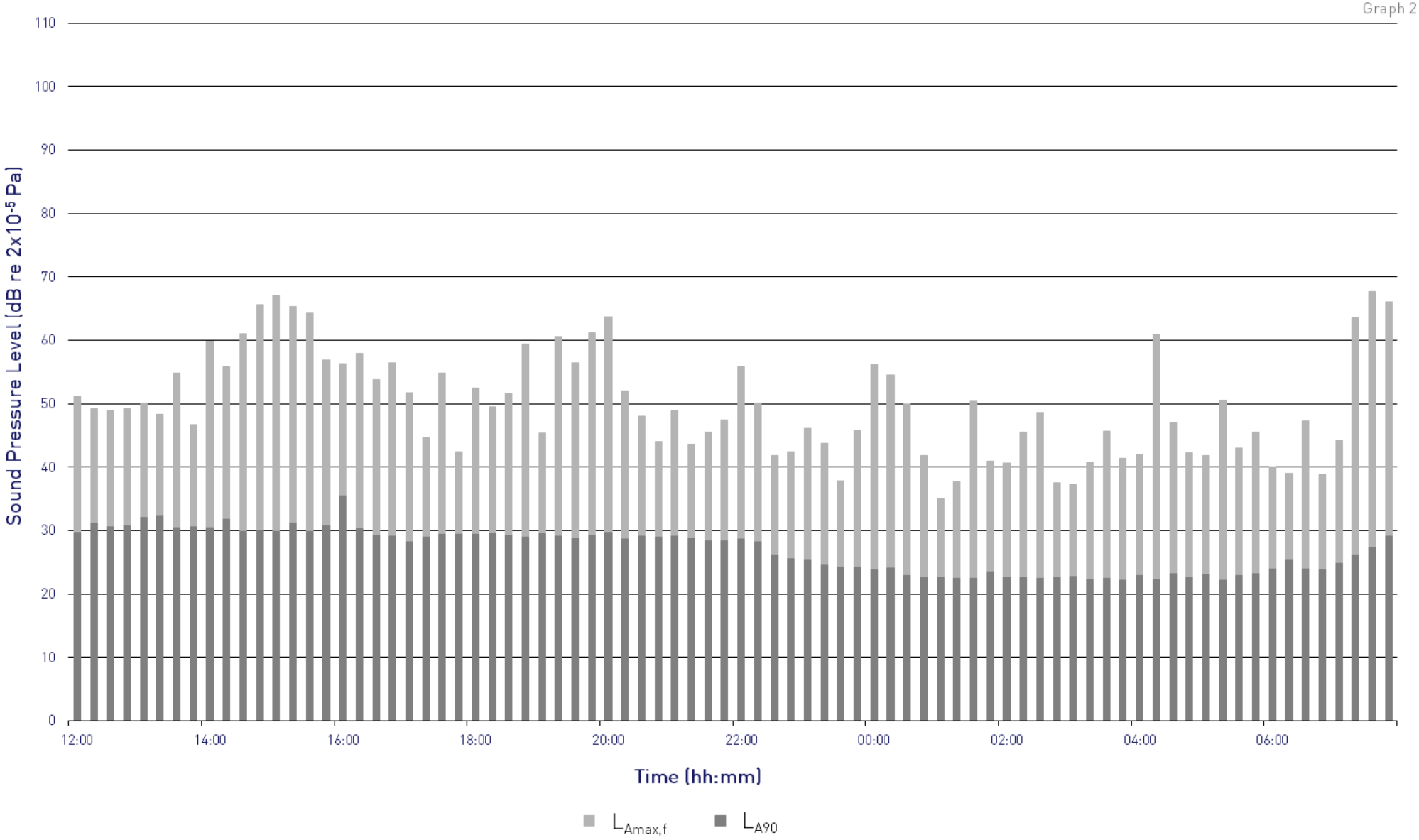
Graph 2



31-37 Whitfield Street, London

L_{Aeq} Time History

Plant Area (Roof) - Position 1

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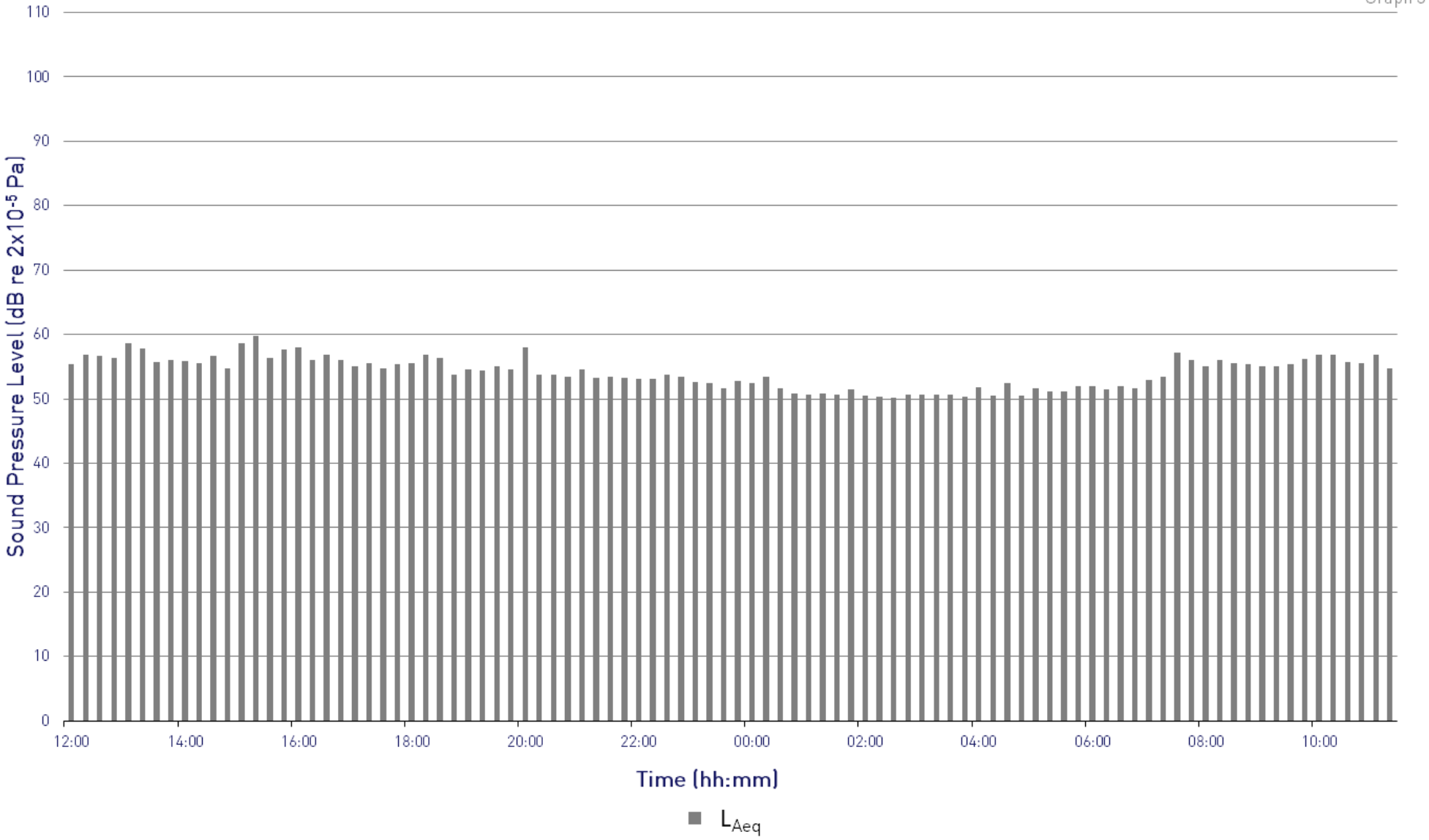
Graph 3



31-37 Whitfield Street, London

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

Plant Area (Roof) - Position 1

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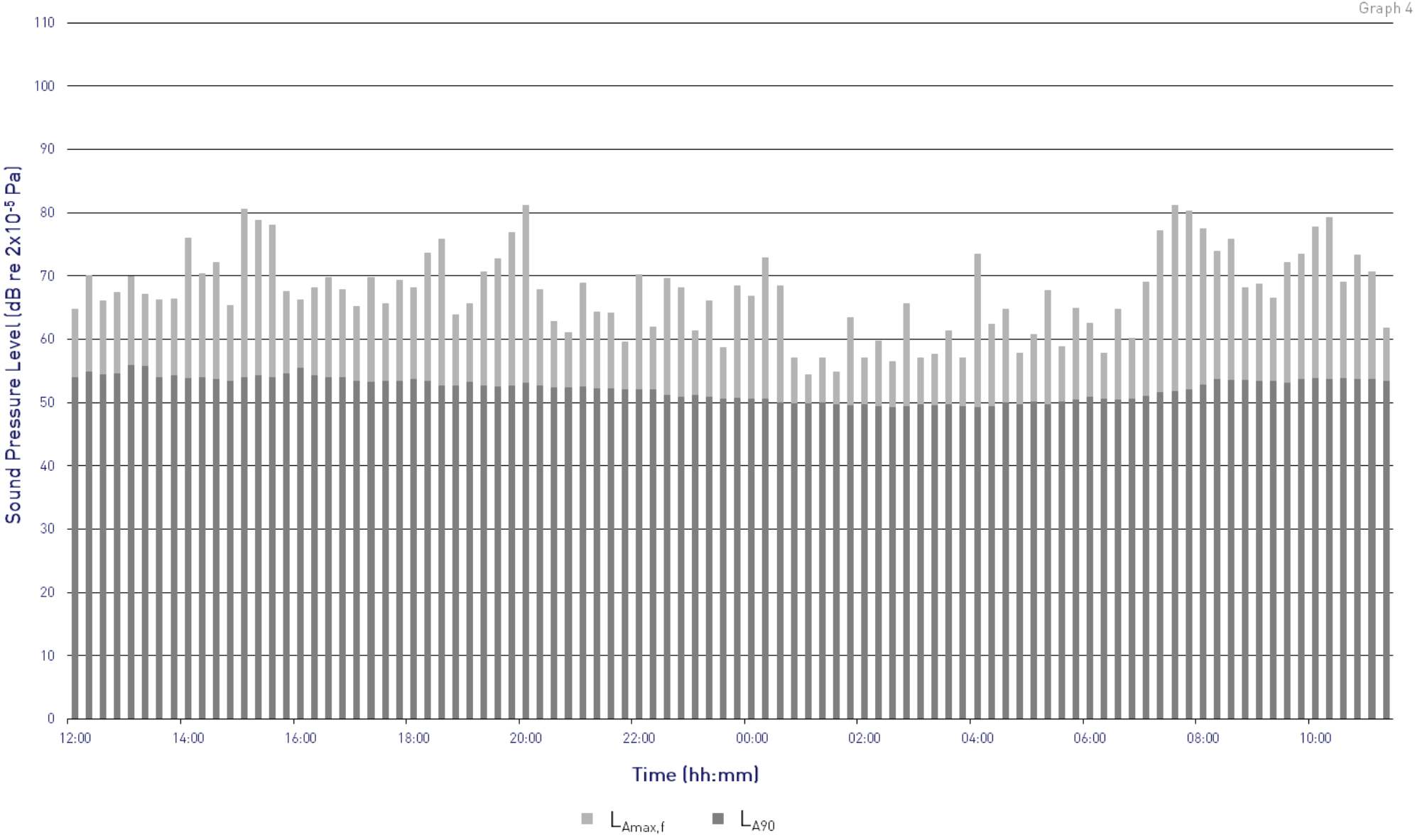
Graph 4



31-37 Whitfield Street, London

L_{Aeq} Time History

Courtyard - Position 2

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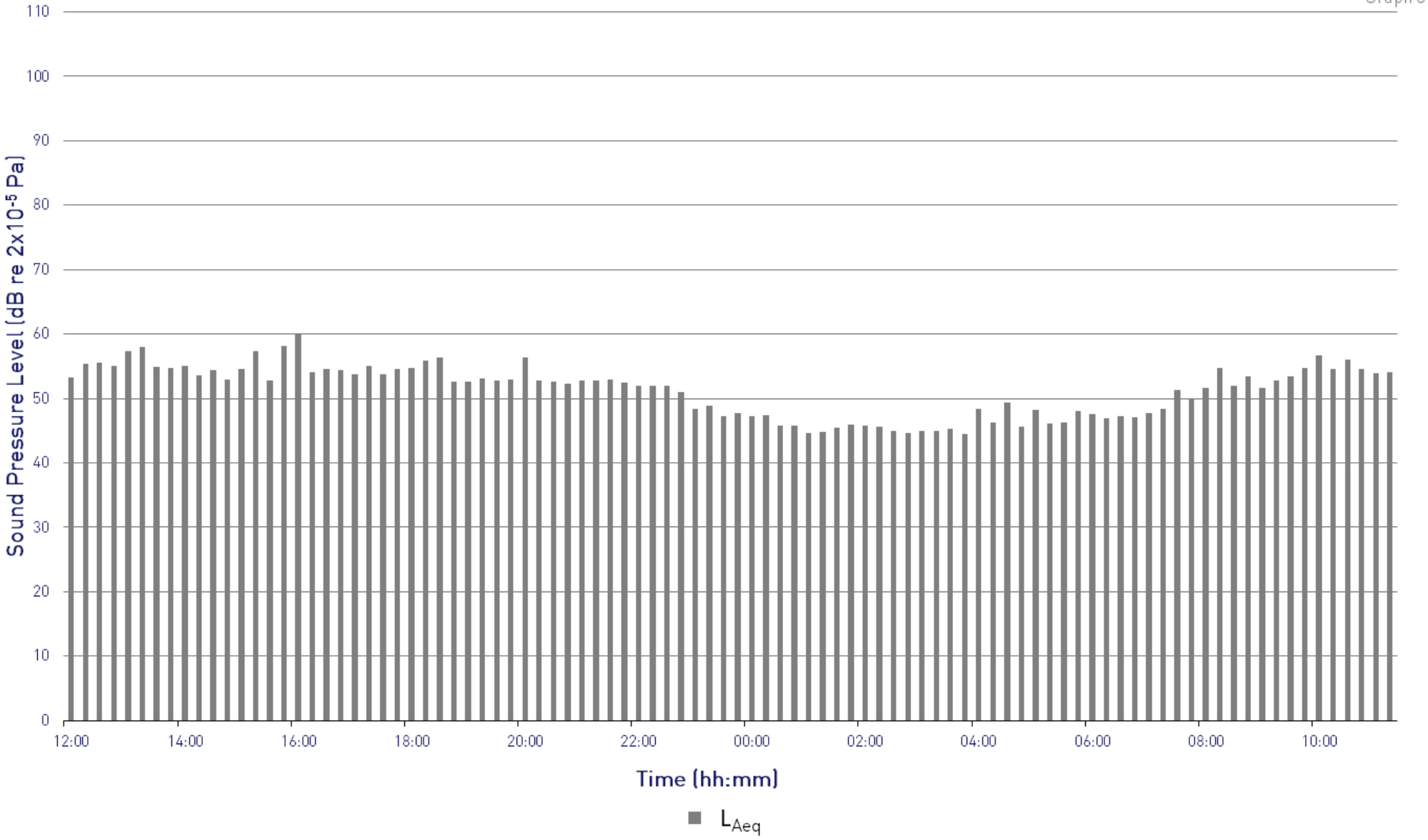
Graph 5



31-37 Whitfield Street, London

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

Courtyard - Position 2

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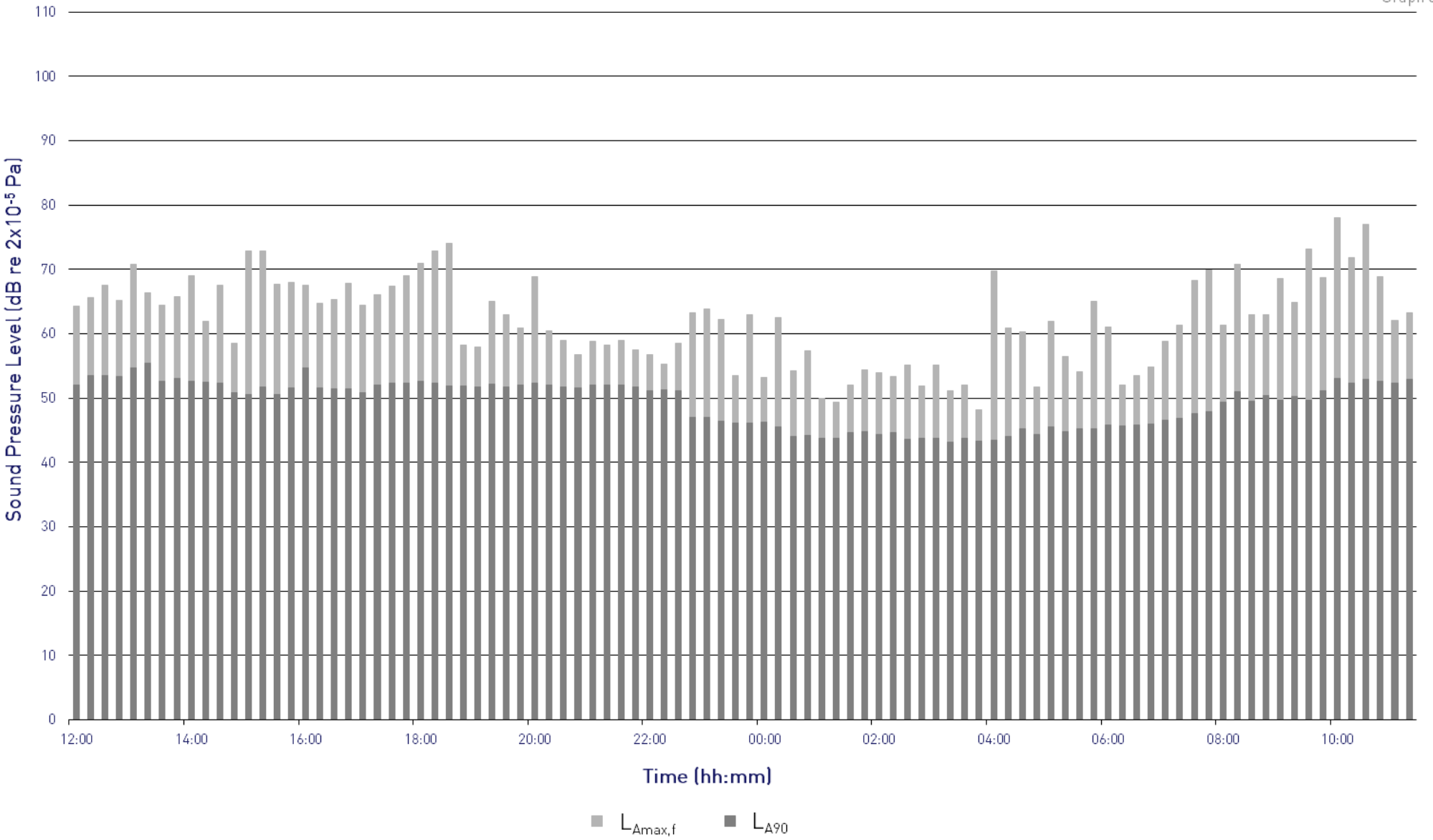
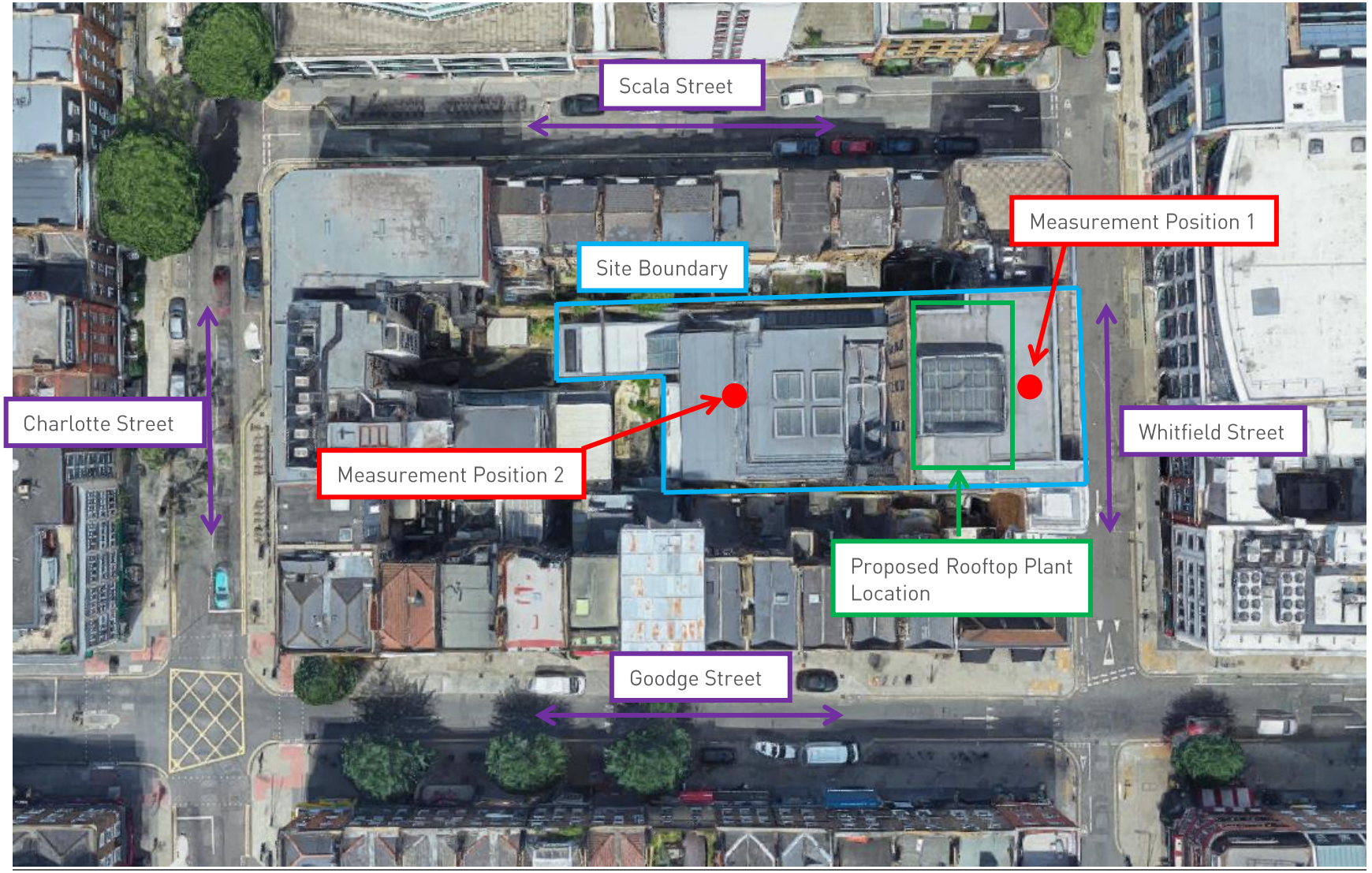
Graph 6





31-37 Whitfield Street, London
Site Plan
Project 9536

Figure 1
4 November 2019
Not to Scale

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31-37 Whitfield Street, London
External Measurement Position 1 (Roof)
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Figure 2
4 November 2019
Not to Scale

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31-37 Whitfield Street, London
External Measurement Position 2 (Courtyard)
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Figure 3
4 November 2019
Not to Scale

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31-37 Whitfield Street, London
Internal Measurement Position
Project 9536

Figure 4
4 November 2019
Not to Scale

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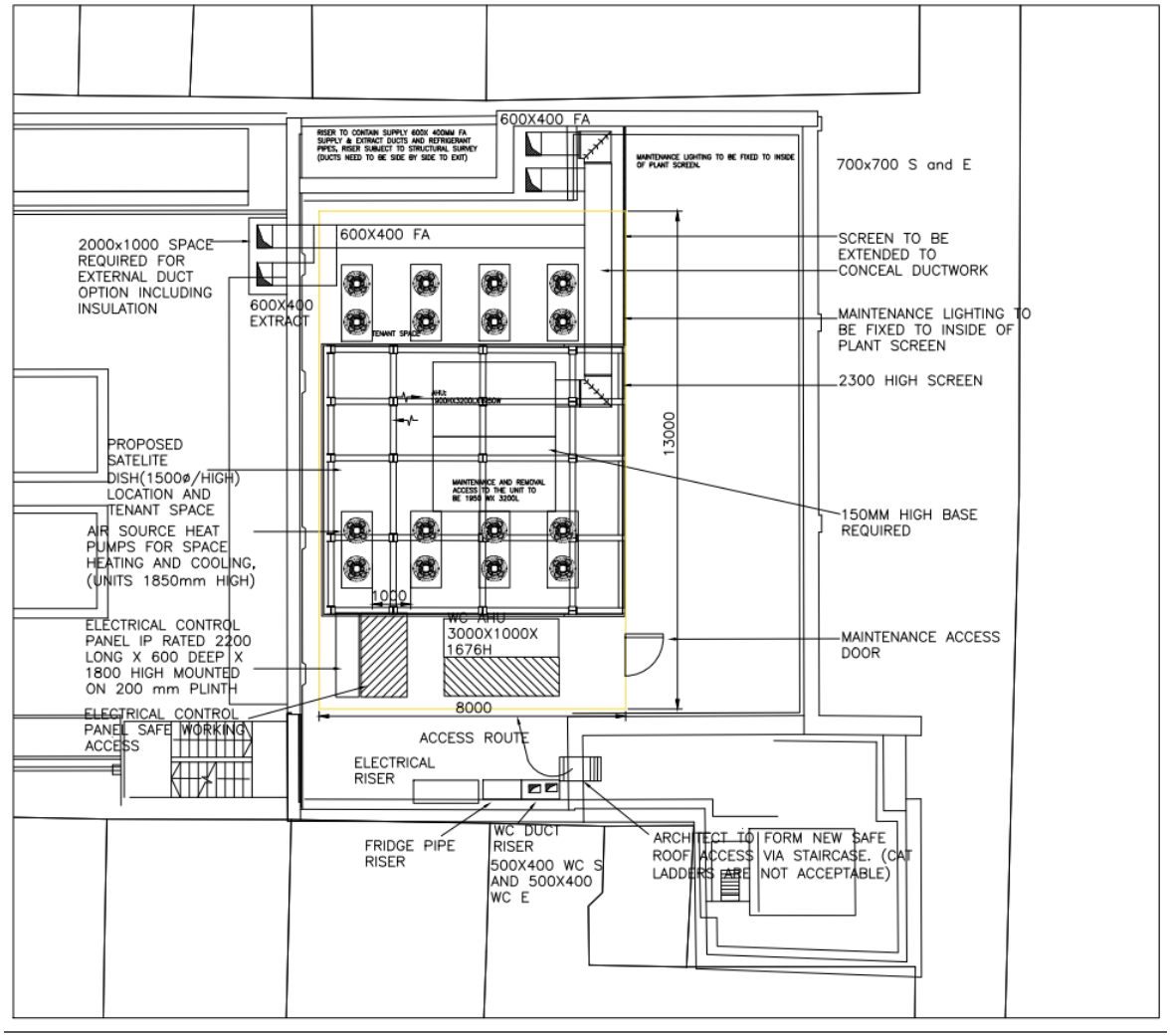

31-37 Whitfield Street, London
Currently proposed rooftop plant location
Project 9536

Figure 5
4 November 2019
Not to Scale

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