RBA ACOUSTICS

25-27 CLARENDON ROAD, LONDON N22

Planning Stage Noise Impact Assessment

Reference: 13410.RP01.NIA.0
Prepared: 20 June 2024
Revision Number: 1

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Revision	Comment	Date	Prepared By	Approved By
1	Updated Floor Layouts	20 June 2024	Shing-Cheung To	Robert Barlow

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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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1. INTRODUCTION

A development plan is proposed for land known as 25-27 Clarendon Road, London N22 situated between Clarendon Road and adjacent railway lines. The intention is to see the land, currently accommodating manufacturing use, redeveloped into a co-living scheme providing residential accommodation (with associated amenity) and working space.

An assessment has been carried out in relation to the noise levels likely to be incident on the proposed building façades and to provide acoustic performance specifications such that acceptable internal noise criteria can be achieved.

This report details the results of the noise survey and sets out the acoustic performance requirements of the external building fabric elements. In addition, suitable plant noise emission criteria have been developed based upon the survey results and the requirements of London Borough of Haringey.

2. SITE DESCRIPTION

The site at Clarendon Road is located within a mixed industrial and residential area within the London Borough of Haringey.

The existing site layout accommodates a two-storey industrial building and a car park on the east and north quadrant. Elevated railways lines (including tracks leading to sidings & an enclosed depot) are in proximity to the western boundary of the site.

The noise climate at the east end of the site is predominantly impacted by intermittent road traffic noise from Clarendon Road. At the far West of the site, the noise climate is influenced by railway noise. Faint intermitted air traffic noise was also noted.

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

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

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

- 11:00 hours Thursday 21 March to 09:30 hours Monday 25 March 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 on site during equipment mobilisation and weather reports for the area, conditions were generally suitable for obtaining representative noise measurements.

Although it was seen that occasional periods of rain did occur over the measurement period, it is not thought to have adversely affected the data collected, and thus the results are considered to be representative of the typical noise climate.

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. The measurement positions are also illustrated on the site plan in Figure 1 and photographs in Figures 2 and 3 in Appendix F.

Measurement Position 1 – Clarendon Road

Measurements were undertaken along the eastern boundary. The microphone of the sound level meter was installed 1m outside the first-floor window and approximately 4m above ground level, overlooking Clarendon Road. Measurements from the microphone are subject to reflection effects from the façade and have therefore been corrected in the results and analysis.

The noise climate at this measurement position consisted predominantly of road traffic noise from Clarendon Road (and ambient traffic noise from Turnpike Lane) and is thought to be indicative of the future façade noise levels and climate.

Measurement Position 2 – Rear of Site

Measurements were undertaken to the rear of the existing building with the microphone mounted on a pole approximately 4m above ground level and facing towards the railway lines.

The noise climate at this measurement position consisted predominantly of faint road traffic noise from Clarendon Road and intermittent rail noise.

3.3 Instrumentation

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

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

3.4 Typical Lowest L_{A90} Background Noise Levels

When considering the existing background levels of a site, BS 4142:2014, Methods for Rating and Assessing Industrial and Commercial Sound" recommends assessing to the "typical" measured $L_{A90,\ 15mins}$ background levels, BS 4142:2014 goes on to state:

> *"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."*

BS 4142:2014 suggests that statistical analysis is a suitable method to determine the "typical" background level. This can be carried out by calculating the level of the most-commonly occurring $L_{A90,\ 15mins}$ period during the proposed operating hours of equipment.

"Typical-Lowest" Background Levels

We generally consider that designing to the most-commonly occurring $L_{A90,\ 15mins}$ period is not sufficient during those slightly quieter periods. In our opinion, a more representative value would be the "typical-lowest" level, which 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.

Histogram charts are shown in Appendix F which presents the most commonly occurring $L_{A90,15min}$ noise levels.

3.5 Results

The noise levels measured are shown as time-histories on the attached Graphs 1-6 (Appendix E). The period averaged L_{Aeq} noise levels and the typical lowest-recorded L_{A90} measured noise levels are summarised in Table 1, along with typical L_{AFmax} levels measured during the night-time.

Table 1 – Measured Levels

Measurement Position	Period	Measured Noise Levels (dBA)		
		Period-Averaged L_{eq}	Typical Lowest-Recorded L_{90}	Typical Night L_{max}
Position 1 – Front of Site	Daytime (07:00 – 23:00)	61*	46	-
	Night-time (23:00 – 07:00)	56*	43	72*
Position 2 – Rear of Site	Daytime (07:00 – 23:00)	54	39	-
	Night-time (23:00 – 07:00)	53	35	69

* Façade Corrected

Following the measurements obtained, corrections to the as measured noise levels are required to be applied to account for the future façade positioning of the proposed building closer to the location to the railway lines and with direct line of sight (at upper floor levels). A noise map of the site and the proposed development was constructed to facilitate future analyses.

The site plan in Figure 4 Appendix F outlines the façade positioning of the proposed building.

4. CRITERIA

This section outlines typical assessment criteria in terms of the relevant standards.

4.1 National Planning Policy Framework

The Department for Levelling Up, Housing and Local Communities *National Planning Policy Framework* (NPPF) 2023, sets out the Government's planning policies for England. In respect of noise, Paragraphs 174, 185 and 187 of the NPPF state the following:

"174) Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.

185) Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

(a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

(b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The above presents no quantitative guidance on a site's suitability for residential developments and we have therefore, for the purposes of this assessment, referred to the following documents.

4.2 Noise Policy Statement for England

The Department for Environment Food and Rural Affairs (2010) *Noise Policy Statement for England* (NPSE) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

The statement sets out the long-term vision of the government's noise policy, which is to "promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development".

This long-term vision is supported by three aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvements of health and quality of life.

The long-term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

The Explanatory Note within the NPSE provides further guidance on defining "significant adverse effects" and "adverse effects" using the following concepts:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

The three aims can therefore be interpreted as follows:

- The first aim is to avoid noise levels above the SOAEL;
- The second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- The third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

The NPSE recognises that it is not possible to have single objective noise-based measures which define the SOAEL, LOAEL and NOEL and that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

4.3 Planning Practice Guidance (Noise)

The Department for Levelling Up, Housing and Local Communities *Planning Practice Guidance (Noise)* (PPG(N)) 2014 "*advises on how planning can manage potential noise impacts in new development*" and provides guidelines that are in line with the NPPF. The guidance is an online resource and was last updated on 22 July 2019.

The PPG(N) states that local planning authorities should:

> *"take account of the acoustic environment and in doing so consider:*
>
> - *Whether or not a significant adverse effect is occurring or likely to occur;*
> - *Whether or not an adverse effect is occurring or likely to occur; and*
> - *Whether or not a good standard of amenity can be achieved."*

The guidance uses the same concepts of adverse effect levels as the NPSE, and these are provided in full in Table below.

The guidance recognises that the use of the word "level" does not mean that a single number value will necessarily be appropriate in determining the effects of noise exposure. Rather, factors to be considered in determining whether noise is a concern can include the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative effects.

Table 2 – Noise Exposure Hierarchy Table from PPG(N)

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid through use of appropriate mitigation whilst taking into account the social and economic benefit
Unacceptable Observed Adverse Effect Level			
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent through use of appropriate mitigation

4.4 ProPG

The Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health (2017) *Professional Planning Guidance on Planning & Noise* (ProPG) provides guidance on a recommended approach to the management of noise within the planning system in England. Although the guide does not form part of government policy itself, it is referenced in PPG(N) as useful guidance.

ProPG encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

ProPG advocates a two stage approach to the early assessment of noise. Stage 1 involves the assessment of the noise climate at the development site against the Noise Risk Assessment scale provided in Table 3. The levels used in the assessment should be the result of environmental noise monitoring conducted at the site coupled with predictions of future free-field levels assuming *"no subsequent mitigation is to be included as part of the development proposal"*.

Table 3 – ProPG Noise Risk Assessment

Noise Risk	Indicative $L_{Aeq, period}$ Noise Levels (dB)		Comments
	Daytime $L_{Aeq, 16\ hr}$ (07:00 – 23:00)	Night-time $L_{Aeq, 8\ hr}$ (23:00 – 07:00)	
Negligible	<50 dB	<40 dB	These noise levels indicate that the development site is likely to be acceptable, and the application need not normally be delayed on noise grounds.
Low	50 dB < L < 60 dB	40 dB < L < 50 dB	At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
Medium	60 dB < L <70 dB	50 dB < L <60 dB	As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
High	>70 dB	>60 dB	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

It should be noted that a site in the High noise risk category should not necessarily be refused planning permission on grounds of noise, but rather that the site will present more acoustic challenges and the importance of applying the principles of good acoustic design will increase. A site identified as in the negligible risk category are likely to be acceptable in terms of noise; sites in low, medium and high-risk categories will require a further Stage 2 assessment to establish a recommendation.

Stage 2 of the ProPG approach considers four elements:

- Good acoustic design process: minimising unreasonable acoustic conditions and preventing unacceptable acoustic conditions
- Internal noise level guidelines: in line with guidance within BS 8233:2014 (or justified alternative)
- Assessment of other relevant issues: assessment of outcomes in accordance with national and local planning policy to form part of a recommendation.

4.5 British Standard 8233:2014

British Standards Institution (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 achieving suitable resting and sleeping conditions within residential properties as set out in Table 4.

Table 4 – BS 8233:2014 Residential Criteria

Room	07:00 to 23:00	23:00 to 07:00
Living Rooms	35 dB $L_{Aeq,16hour}$	--
Bedrooms	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

4.6 World Health Organisation Guidelines

WHO (2018) *Environmental Noise Guidelines for the European Region* sets out to define "*recommended exposure levels for environmental noise in order to protect population health*". The guidance document relates specifically to external noise levels, and recommends that "*all CNG* [WHO (1999) *Guidelines for Community Noise*] *indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid*". RBA therefore make reference to Guidelines for Community Noise for recommendations on internal noise levels.

Guidelines for Community Noise describes guideline levels that are "*essentially values for the onset of health effects from noise exposure*". A table of guideline values is included, relating to adverse health effects, defined as any temporary or long-term deterioration in physical, psychological, or social functioning that is associated with noise exposure. The following, as displayed in Table 5, is an extract from Table 4.1: Guideline values for community noise in specific environments, as stated in the WHO document.

Table 5 – Guideline Values for Community Noise

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	$L_{Amax,f}$ (dB)
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-times	30	8	45

With reference to maximum noise levels the following guidance is provided within the WHO guidance:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991) and most studies show an increase in the percentage of awakenings at SEL values of 55-60 dBA (Passchier-Vermeer 1993; Finegold et al. 1994; Pearsons et al. 1995). For intermittent events that approximate aircraft noise, with an effective duration of 10-30s, SEL values of 55-60 corresponds to a L_{Amax} value of 45dB. Ten to 15 of these events during an 8 hour night-time implies a $L_{Aeq, 8h}$ of 20-25dB. This is 10-15dB below the $L_{Aeq, 8h}$ or 30dB for continuous night-time noise exposure, and shows that intermittent character of noise must be taken into account when setting night-time noise limits for noise exposure. For example, this can be achieved by considering the number of noise events and the difference between the maximum sound pressure level and the background of these events."

Therefore, the frequency of occurrence of maximum noise events should not typically exceed 10-15 times in any night.

4.7 Summary

The project criteria adopted for bedrooms and living areas are therefore as follows:

Night-time (23:00 – 07:00)	30dB L_{Aeq} and typically < 45dB $L_{Amax,f}$ *
Daytime (07:00 – 23:00)	35dB L_{Aeq}

* Under WHO, 10-15 occurrences during the night-time in excess of 45dBA are "allowable". The new 2014 version of BS 8233 states L_{max} levels in the region of 45-55dBA could be considered acceptable.

5. EXTERNAL NOISE ASSESSMENT

As discussed in Section 4.4, ProPG provides an early indication of the likely suitability of a site for new residential development and provides a framework for considering good acoustic design. The acoustic measurements have been used to determine the daytime and night-time L_{Aeq} noise levels at the façades of the proposed development.

With reference to Section 4.4, the noise levels measured at the site result within the following Noise Risk categories as defined in ProPG for both daytime and night-time periods.

The Site Plan in Figure 4, Appendix F, indicates the façade reference numbers.

Table 6 – ProPG Assessment

Façade	Period	Noise Risk Category
1	Daytime (07:00 -23:00)	Low
	Night-time (23:00 – 07:00)	Medium
2	Daytime (07:00 -23:00)	Low
	Night-time (23:00 – 07:00)	Low
3	Daytime (07:00 -23:00)	Medium
	Night-time (23:00 – 07:00)	High
4	Daytime (07:00 -23:00)	Medium
	Night-time (23:00 – 07:00)	High
5	Daytime (07:00 -23:00)	Medium
	Night-time (23:00 – 07:00)	Medium
6	Daytime (07:00 -23:00)	Medium
	Night-time (23:00 – 07:00)	Medium

ProPG states that as noise levels increase, a good acoustic design process should be followed and demonstrated.

6. EXTERNAL BUILDING FABRIC ASSESSMENT

6.1 Background

Preliminary analyses of the external building fabric have been undertaken in order to ascertain the required acoustic performance of the glazing and other external fabric elements to achieve the project criteria.

6.2 Assumptions

Our external building fabric analyses have assumed the following:

(a) Room Dimensions

Room dimensions and glazed areas have been taken from preliminary drawings for the development.

(b) Noise Levels

The assessment has been based on the measured noise levels as detailed in Section 3.5.

(c) Room Absorption

The calculations assume that the co-living studios are acoustically 'soft' with carpets, curtains and other soft furnishings. The living areas are assumed to be less acoustically absorptive (with a hard floor finish, although with furnishings).

Details of the absorption coefficients assumed in the calculations are provided in Appendix B.

(d) Non-Glazed Façade Areas

The calculations assume the external wall construction will comprise a traditional build, i.e. external brickwork or blockwork with a plasterboard inner layer.

The following sound reduction indices (equating to an overall R_w of 58dB) for all non-glazed façade areas:

Table 7 – Sound Reduction Indices of Lightweight Non-Glazed Elements

Assumed Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
35	42	48	53	63	70	74	74

Should the proposals for non-glazed areas change, it is critical RBA are informed at the earliest opportunity as this could have a significant impact on the sound insulation performance requirements of the glazing systems.

(e) Ventilation

We have assumed that background ventilation is to be provided by mechanical means (e.g. MVHR).

6.3 Guidance Constructions and Façade Zoning

Due to the differences in the prevailing noise climate around the site, three primary glazing zones have been defined and are shown on the façade zoning plan provided in Figures 8 to 12 (Appendix F).

Appendix C details the suggested sound reduction performance specification for the glazed elements of the external building fabric.

The glazing performance specifications apply to the glazing package as a whole – inclusive of glazing, louvres, spandrel panels, framing, opening lights, doors, seals, etc. The performance of the glazing system will depend on many factors such as the glazing configuration, size of window panels, quality of framing, quality of sealing, etc.

Please note – *The glazing configurations described in Table 8 are given for costing purposes only. All window systems should be capable of meeting the performance specifications shown in Appendix C, with laboratory test certificates being made available in support of the quoted performance. Glazing proposals which simply reflect the guidance constructions indicated in this report will not, in isolation, be sufficient evidence that a window configuration will meet the performance specification.*

For guidance purposes RBA would typically expect the following glazing configurations to prove commensurate with achieving the required internal noise criteria.

Table 8 – Guidance on Glazing Constructions

Zone	Glazing Type	Example Glazing Configuration	R_w (dB)
Z1	Double Glazing	4mm glass / 12mm air gap / 6mm glass	33
Z2	Double Glazing	4mm glass / 12mm air gap / 8mm glass	35
Z3	Double Glazing	10mm glass / 12mm air gap / 6.4mm acoustic laminate glass	39

These specifications are provided for the purposes of planning stage works only and should be reviewed as the detailed design of the building progresses.

7. PLANT NOISE EMISSION LIMITS

7.1 Criteria

The requirements of London Borough of Haringey's Environmental Health Department regarding new building services plant are understood to require new building services plant to be designed to achieve a noise level of 10dB below the lowest background L_{A90} during operational hours, as measured 1m outside the nearest-affected residential window.

The lowest recorded background L_{A90} is summarised in Table 9 below.

Table 9 –Lowest Measured Background Noise Levels

Position	Period	Lowest Recorded L_{A90}
Position 1 – Front of Site	Daytime (07:00 – 23:00)	44
	Night-time (23:00 – 07:00)	42
Position 2 – Rear of Site	Daytime (07:00 – 23:00)	36
	Night-time (23:00 – 07:00)	32

In line with the above, Table 10 proposes the noise emission limits for new items of plant.

Table 10 – Plant Noise Emission Limits

Position	Period	Noise Emissions Limit (dBA)
Position 1 – Front of Site	Daytime (07:00 – 23:00)	34
	Night-time (23:00 – 07:00)	32
Position 2 – Rear of Site	Daytime (07:00 – 23:00)	26
	Night-time (23:00 – 07:00)	22

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

7.2 Assessment

At this early stage in the design, final plant selections have not been made. It is therefore not possible to undertake an assessment to determine compliance with the recommended noise limits.

Once such information is available, an assessment can be carried out to determine what, if any, attenuation measures are required to control noise emission to a suitable level. The above limits should be considered in the development of the building services design.

8. CONCLUSION

RBA Acoustics have undertaken noise monitoring at the proposed development site at 25-27 Clarendon Road, London N22. The measured noise levels are presented within this report.

The measured noise levels are presented within this report. The CadnaA acoustics software has been used, along with the measured noise levels, for the assessment of the glazing requirements to ensure suitable internal noise levels are capable of being achieved at the proposed development with reference to BS 8233 and WHO, as well as at the external amenity space areas.

Plant noise emission limits have also been set in line with the requirements of the Local Authority to facilitate ongoing design of building services plant associated with the development.

External noise levels can be controlled by the specification and adoption of suitable building envelope construction (e.g. high acoustic performance glazing configurations and provision of mechanical ventilations) such that acceptable internal noise levels can be achieved internally within the future residential dwellings. Such measures should avoid future occupants being exposed to levels of noise that may be considered harmful in terms of adverse health effects or quality of life, in line with the requirements of the NPPF.

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.
$L_{eq,T}$	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.
Octave band	A frequency band in which the upper limit of the band is twice the frequency of the lower limit.
1/3 Octave band	A frequency band which is one-third of an octave band.
R_w	A single number quantity which characterises the airborne sound insulation of a material or building element in a laboratory test.

Appendix B – Room Absorption Coefficients

For the purposes of the analyses RBA have assumed the absorption coefficients detailed in Table B1 for bedrooms and Table B2 for living rooms.

Table B1 – Bedroom Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.25	0.27	0.31	0.32	0.32	0.32

Table B2 – Living Room Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.20	0.22	0.22	0.22	0.23	0.27

Appendix C – External Building Fabric Acoustic Specification

External façade constructions and components, such as brise soleil, grilles, ventilators, curtain walling systems or other architectural features, are not to give rise to intrusive whistling, creaking, rattling or other noises as a result of wind or other climate effects.

The contractor shall take reasonable precautions to avoid unwanted noise including creaking, rattling and whistling being generated by the Contractors works when subject to environmental conditions (including wind) and thermal expansion over the life of the façade.

Window Sound Insulation Performance

Glazed units (inclusive of glazing, louvres, timber panels, spandrel panels, infill panels, framing, opening lights, balcony/terrace doors, seals, etc. as appropriate) should achieve the following minimum sound reduction indices as tested in general accordance with BS EN ISO 10140-2-2010:

Table C1 – Window Sound insulation Performance Specification

Ref.	Minimum Recommended Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)								R_w (dB)
	63	125	250	500	1k	2k	4k	8k	
Z1	19	23	22	27	38	40	41	41	33
Z2	22	26	22	28	38	41	42	42	35
Z3	27	30	26	34	41	46	53	53	39

Note: R_w is the "overall weighted sound reduction index" tested in a laboratory

N.B. as the internal noise criteria is expressed in overall terms, other frequency-specific performance levels may ultimately prove acoustically acceptable. Test data for representative samples of all glazing systems shall be submitted to RBA Acoustics for approval to demonstrate compliance with the above performance specifications.

Appendix D – Instrumentation

The following equipment was used for the measurements.

Table C1 – Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1403127	U43500	28 February 2025
Norsonic Pre Amplifier	1209A	12071		
Norsonic ½“ Microphone	1225	41473	43499	28 February 2025
Norsonic Sound Calibrator	1251	31986	U43498	28 February 2025
Norsonic Type 1 Sound Level Meter	Nor140	1403226	U42991	18 January 2025
Norsonic Pre Amplifier	1209	12556	U42992	18 January 2025
Norsonic ½“ Microphone	1225	25179		
Norsonic Sound Calibrator	1251	31988	U42989	18 January 2025

Appendix E – 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 E1 – 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 E2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Acoustic glazing - weight	Strain of neck, limbs or back. Fall from height.	Contractors	3	5	15	Provide sufficient manpower, lifting gear and structural support	1	5	5

L: Likelihood S: Severity R: Rating

Appendix F – Graphs and Site Plans

Clarendon Road, London, N22

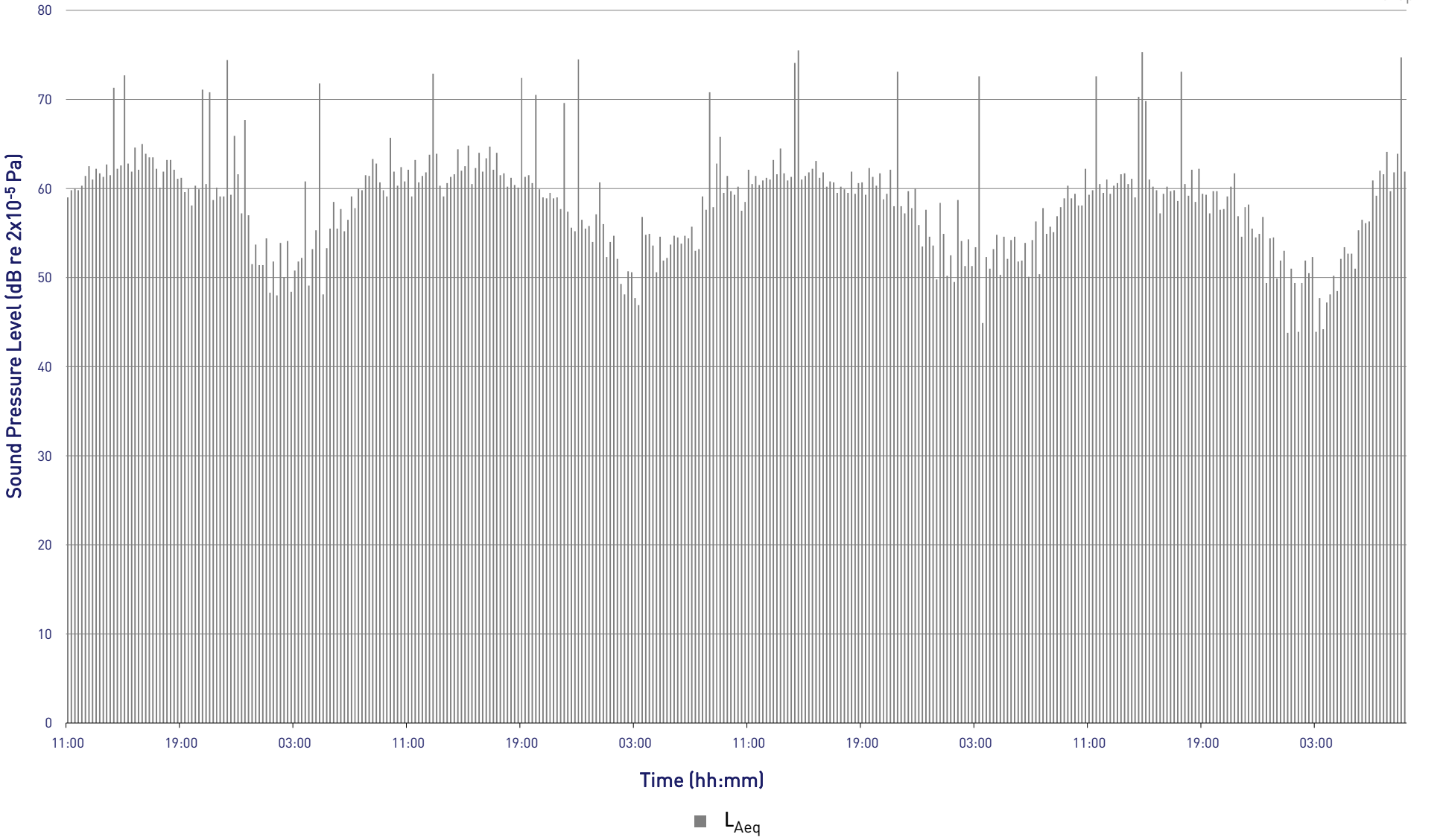
L_{Aeq} Time History

Measurement Position 1 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 1



Clarendon Road, London, N22

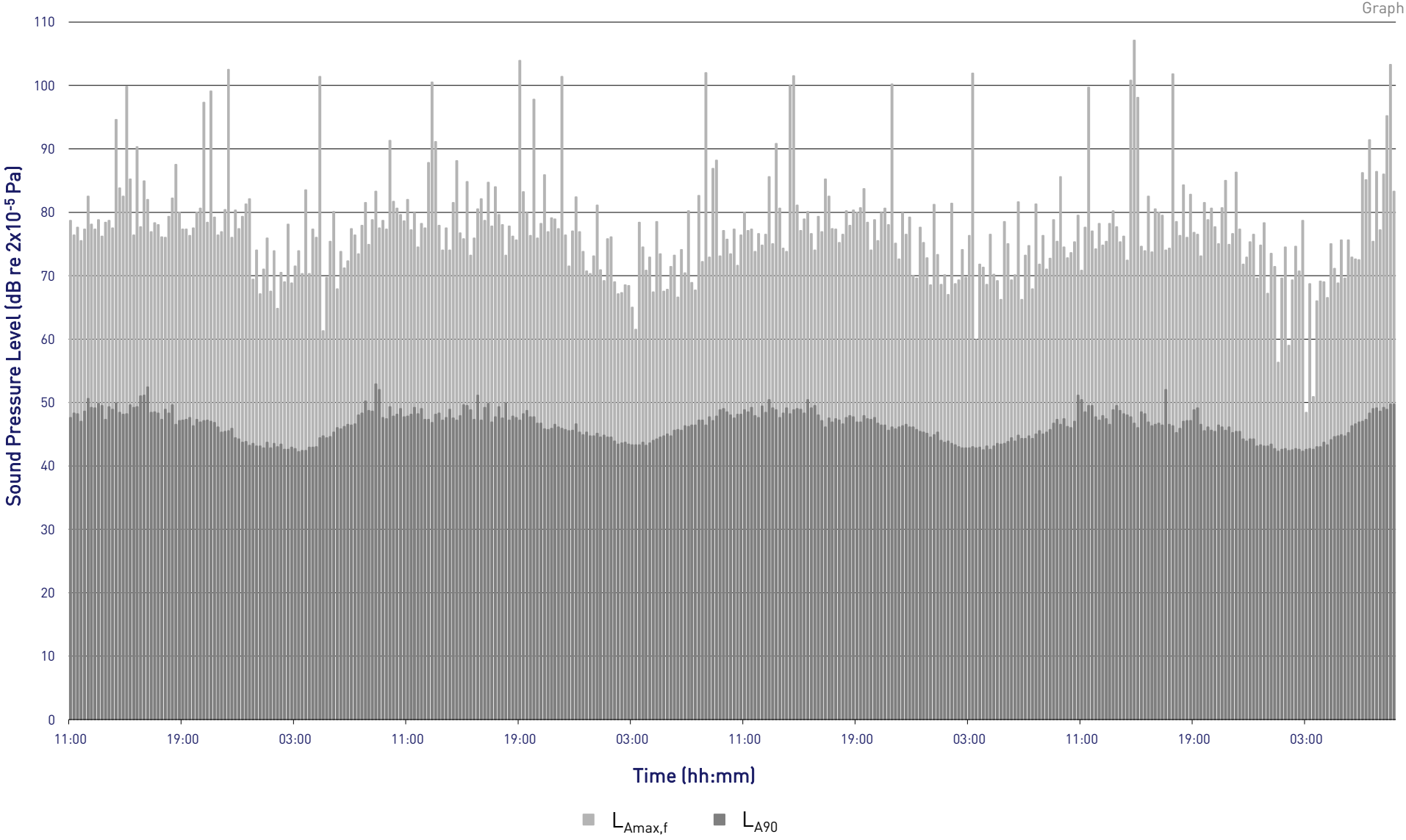
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 2



Clarendon Road, London, N22

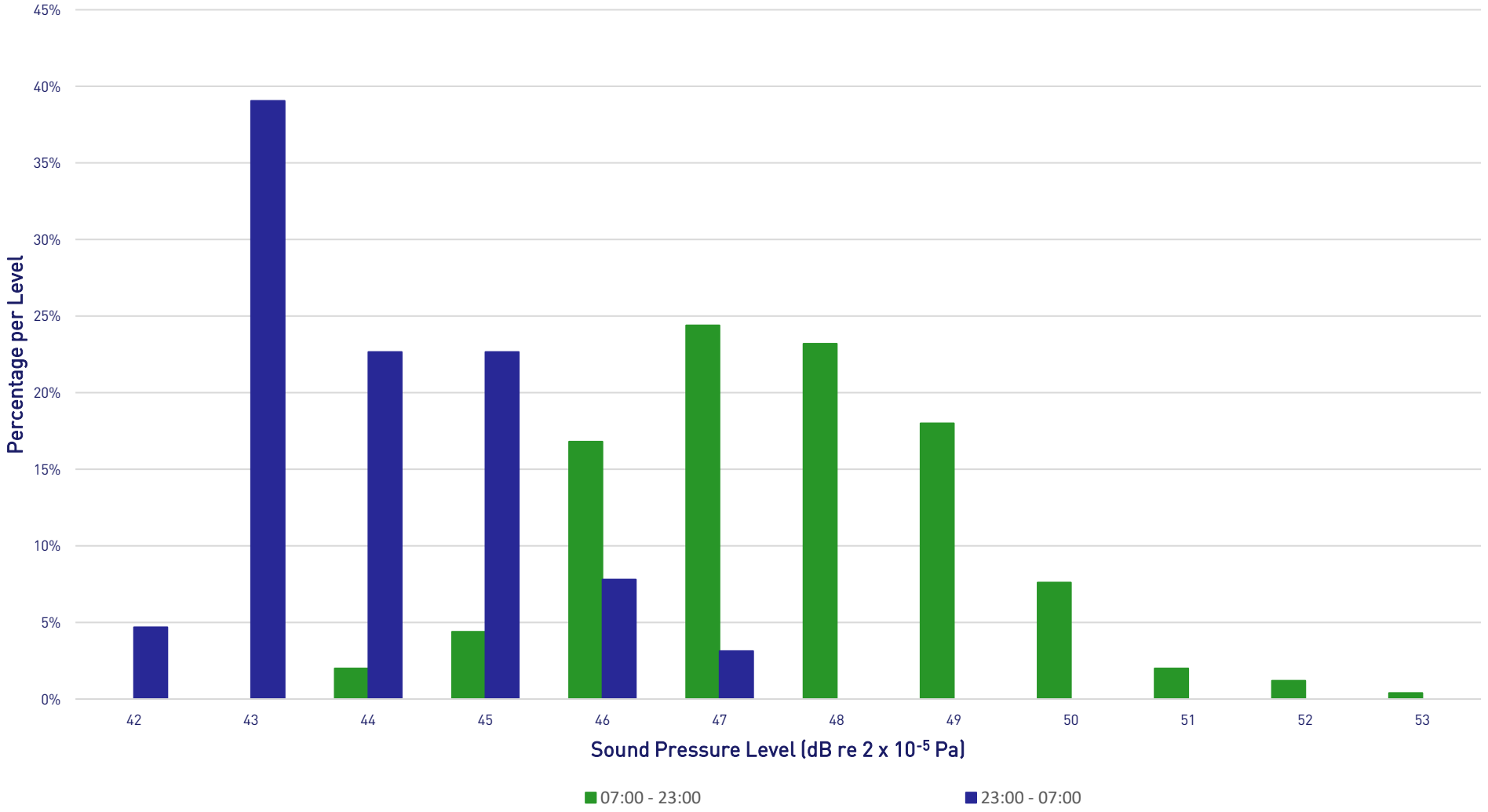
$L_{A90,15\ minutes}$ Histogram

Measurement Position 1 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 3



Clarendon Road, London, N22

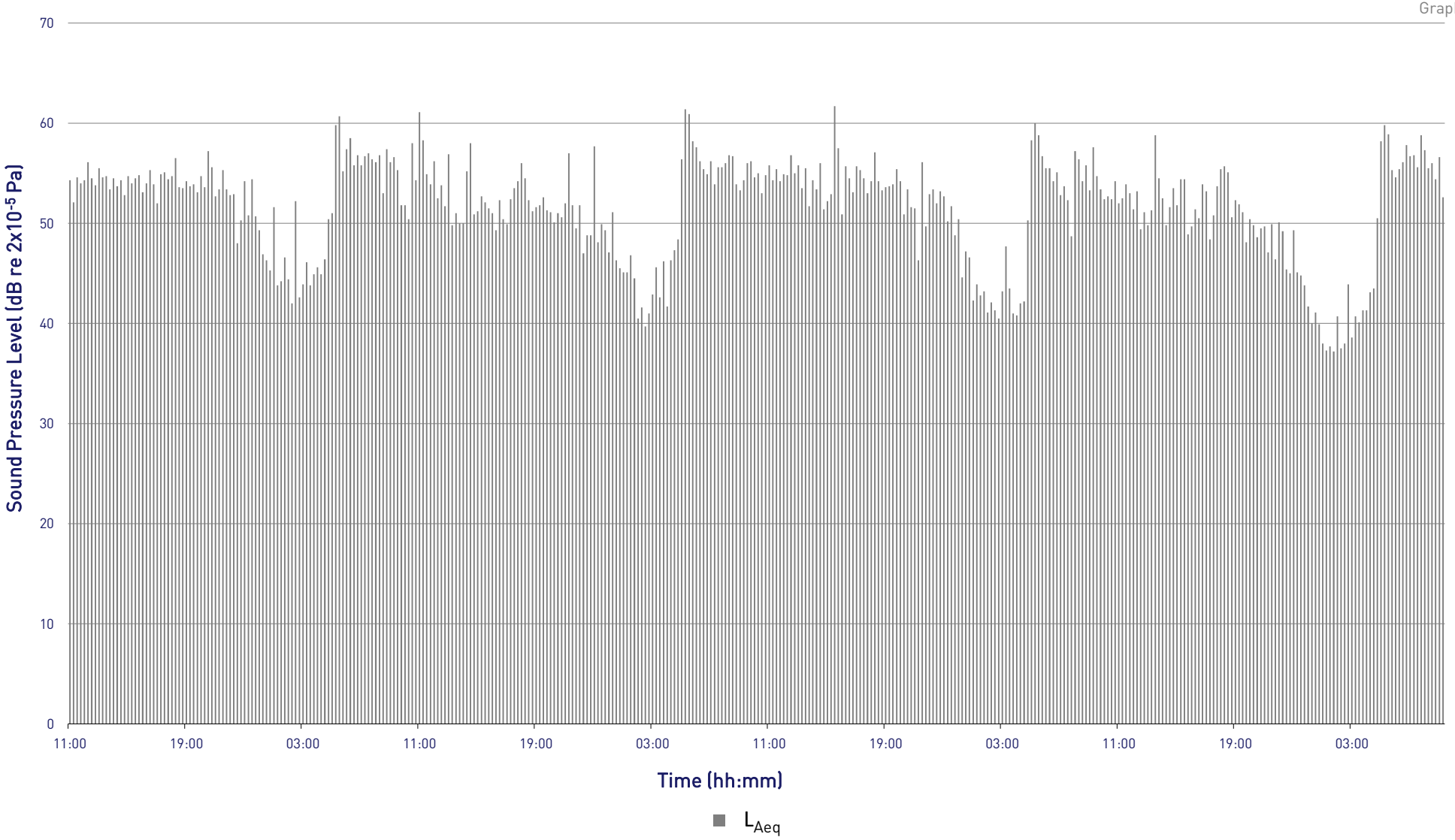
L_{Aeq} Time History

Measurement Position 2 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 4



Clarendon Road, London, N22

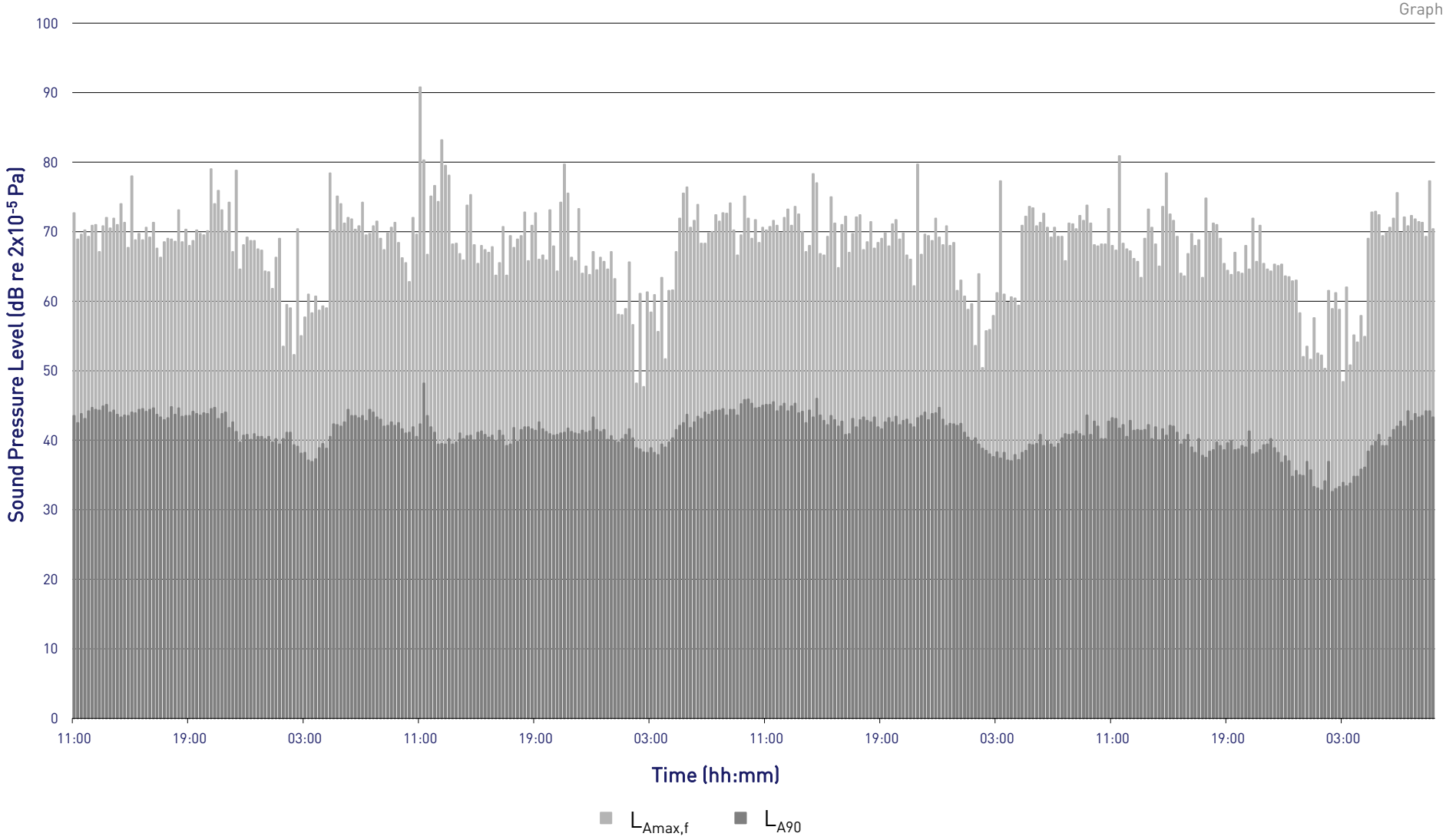
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 2 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 5



Clarendon Road, London, N22

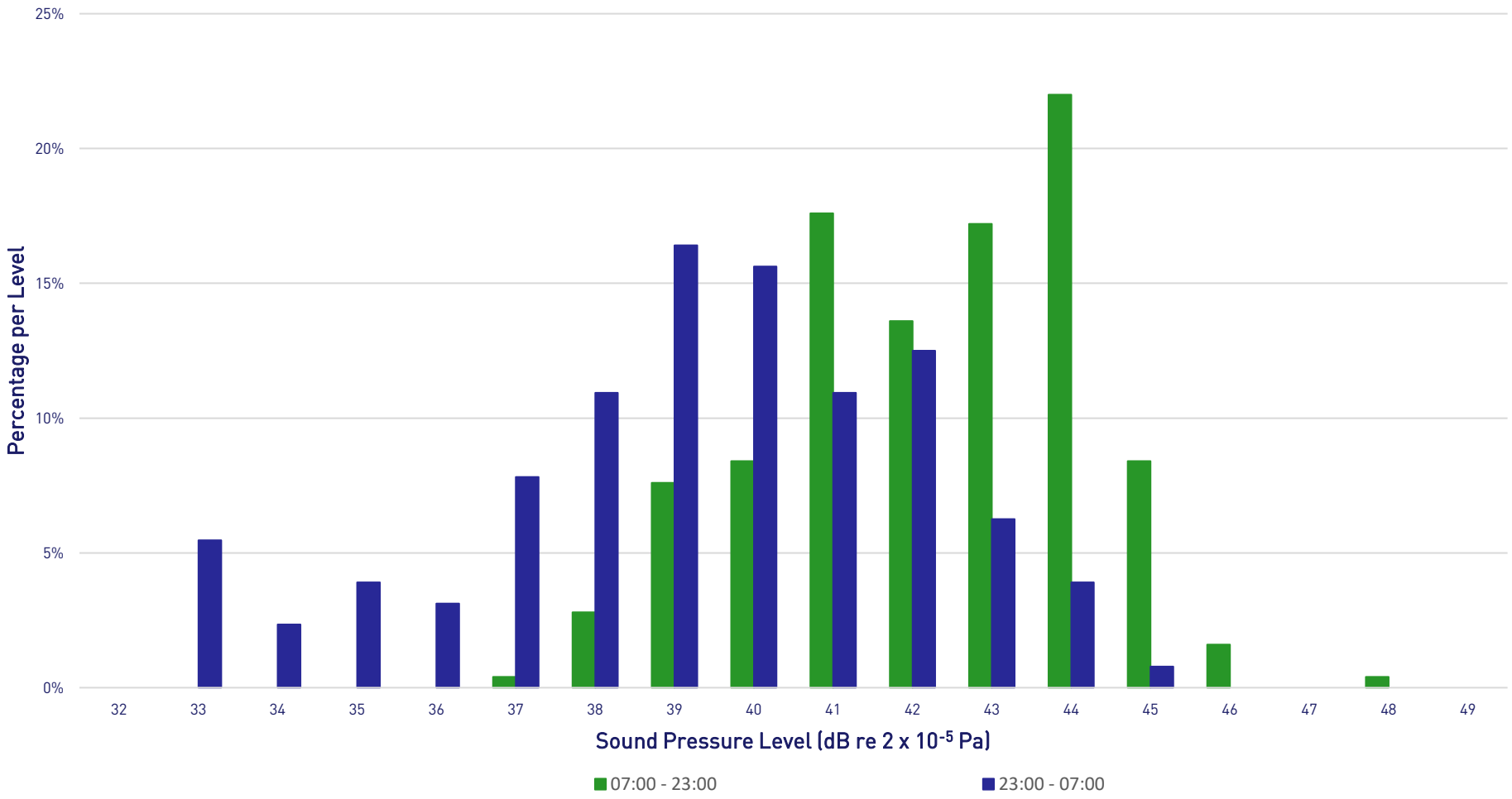
$L_{A90,15\ minutes}$ Histogram

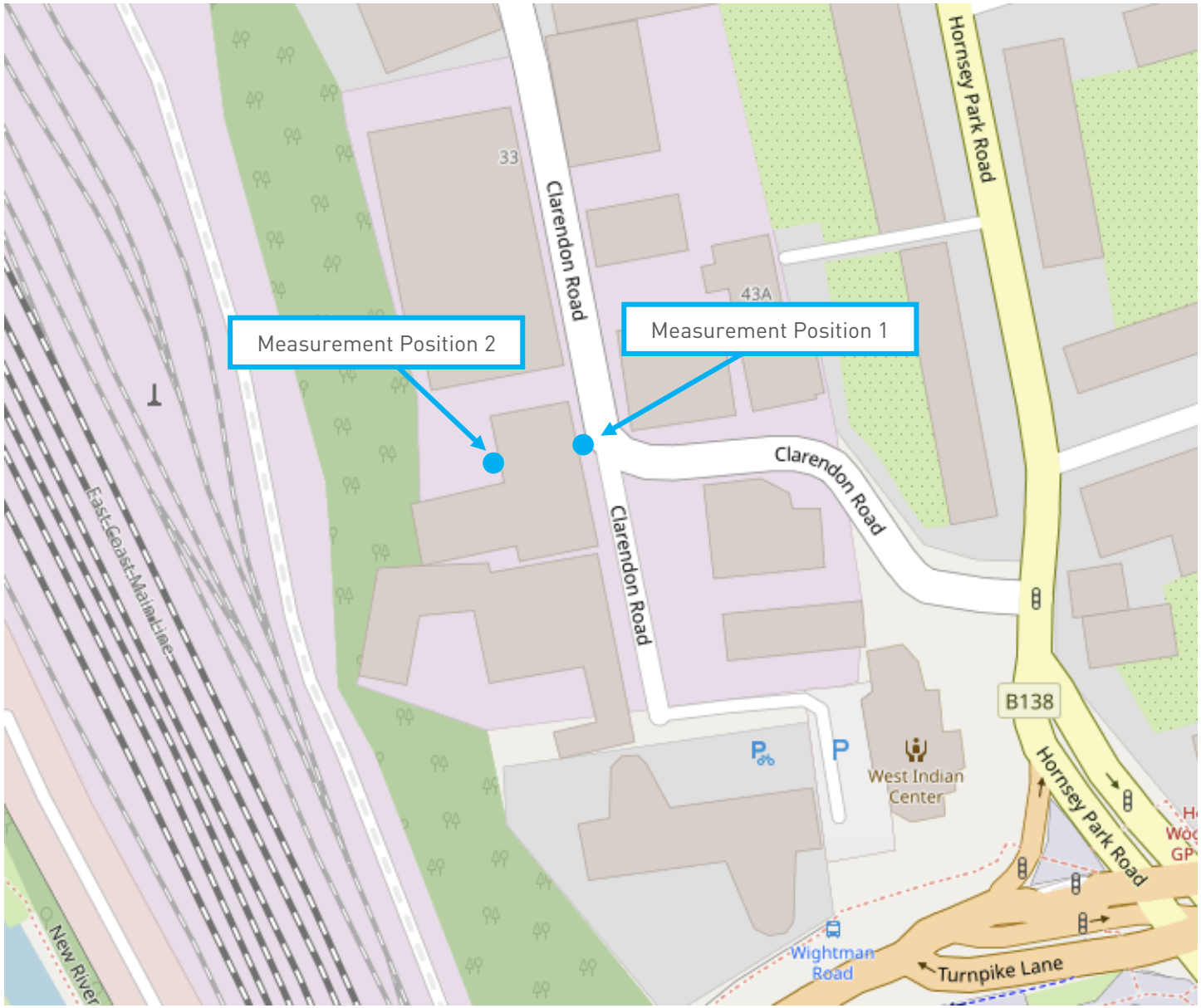
Measurement Position 2 - Thursday 21st March to Monday 25th March 2024

RBA ACOUSTICS

Project: 13410

Graph 6

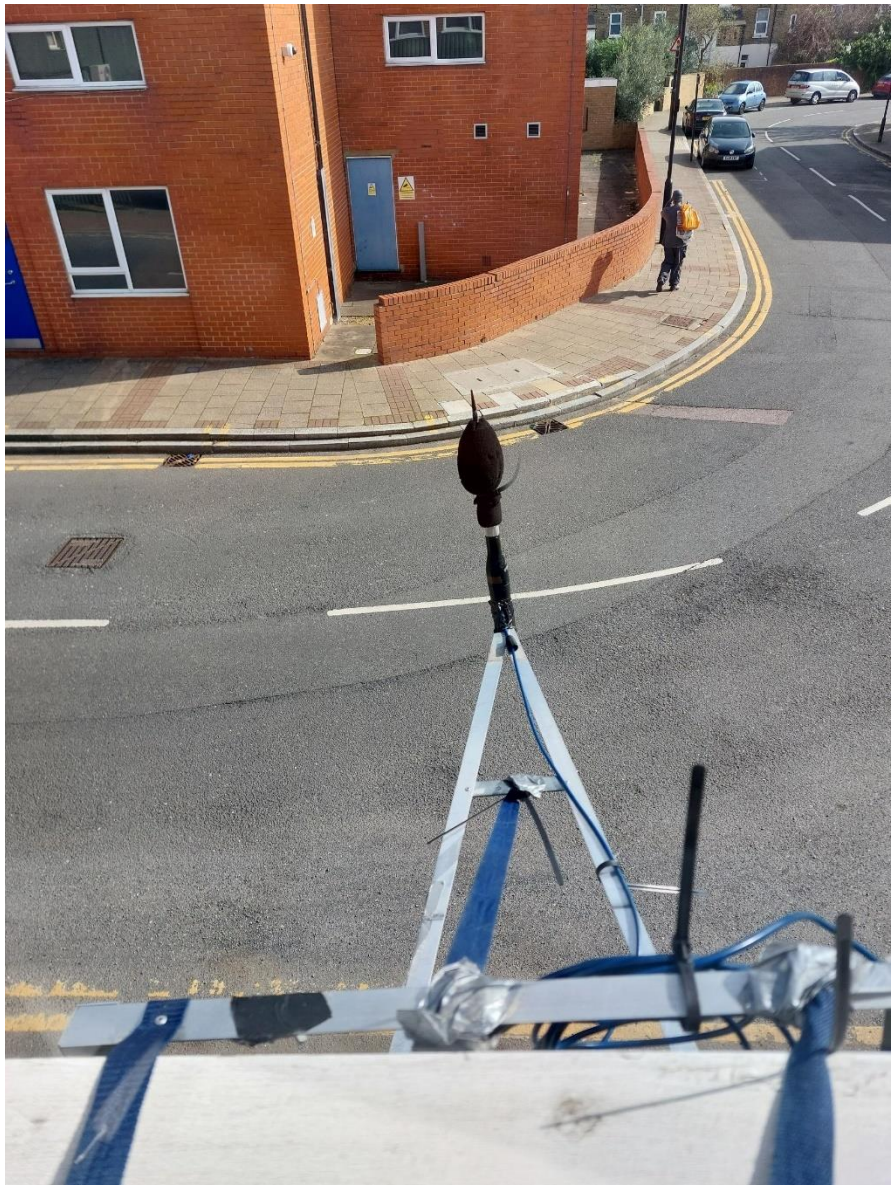




25-27 Clarendon Road, London N22
Site Plan Indicating Measurement Positions
Project 13410

Figure 1
20 June 2024
Not to Scale

RBA ACOUSTICS



25-27 Clarendon Road, London N22
Photographs Illustrating Measurement Position 1
Project 13410

Figure 2
20 June 2024
Not to Scale

RBA ACOUSTICS

25-27 Clarendon Road, London N22
Photographs Illustrating Measurement Position 2
Project 13410

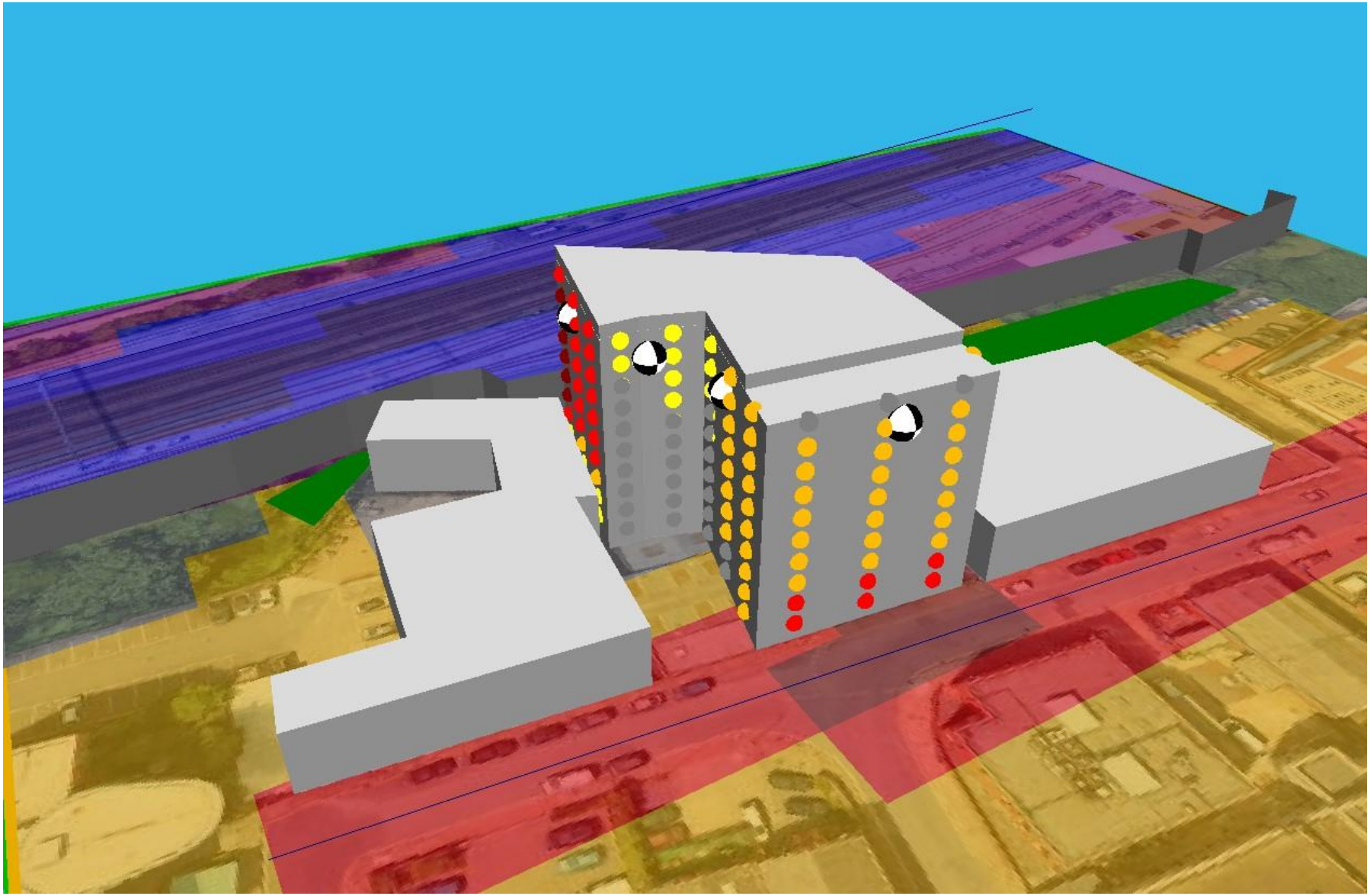
Figure 3
20 June 2024
Not to Scale

RBA ACOUSTICS

25-27 Clarendon Road, London N22
Site Plan Outlining Future Façade Positioning
Project 13410

Figure 4
20 June 2024
Not to Scale

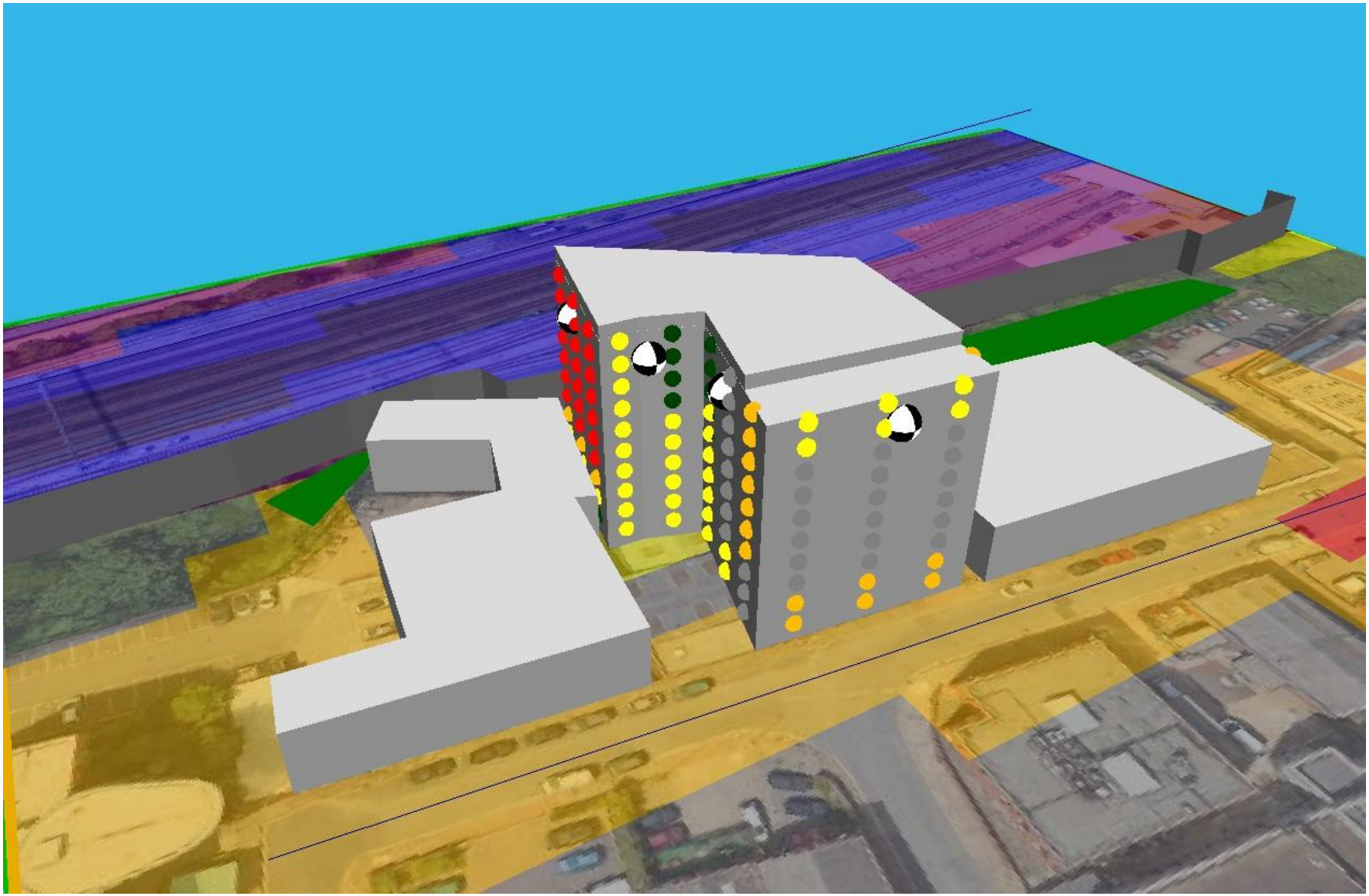
RBA ACOUSTICS



25-27 Clarendon Road, London N22
Predicted Daytime L_{eq} Incident on Facades
Project 13410

Figure 5
20 June 2024
Not to Scale

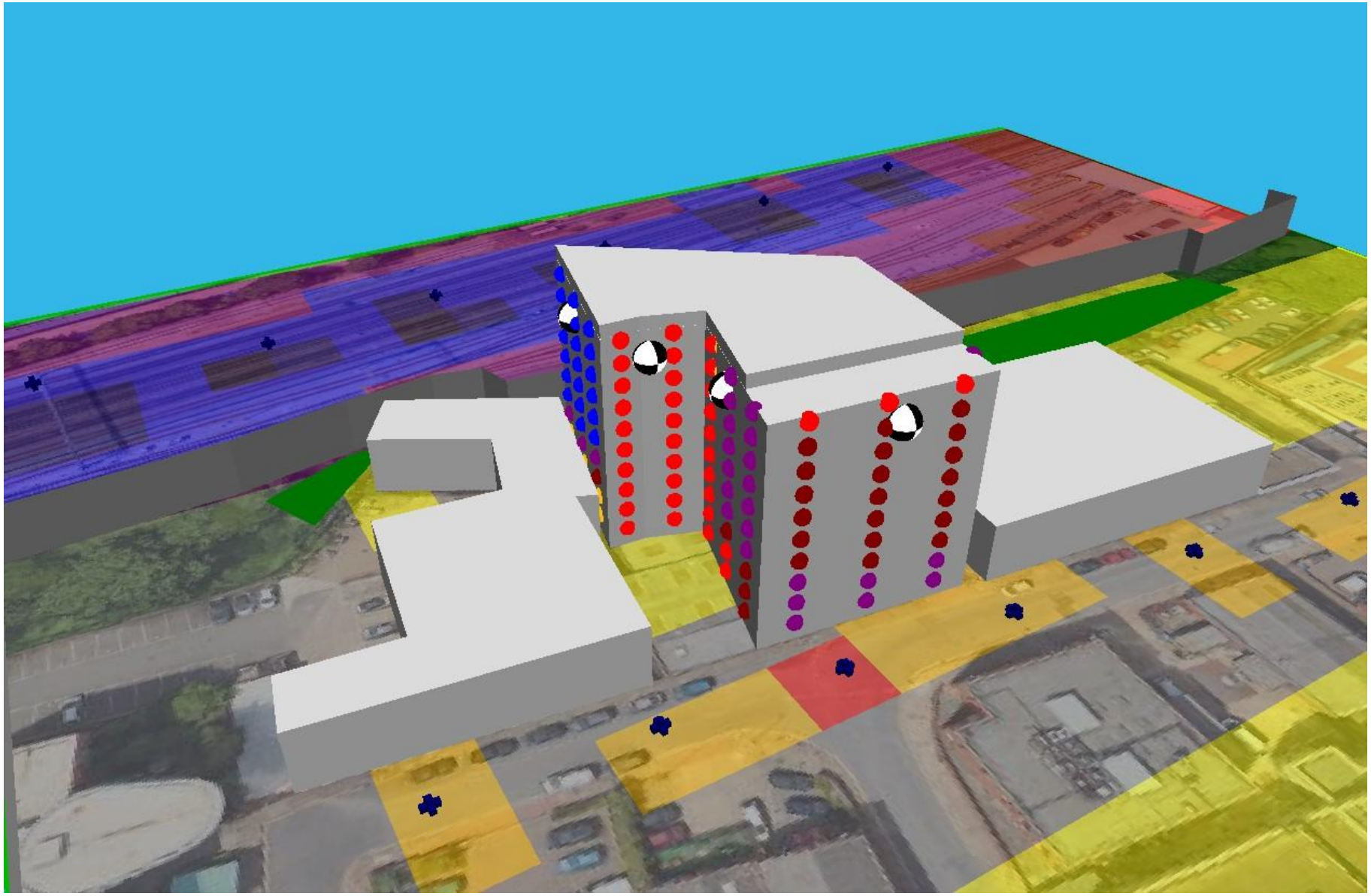
RBA ACOUSTICS



25-27 Clarendon Road, London N22
Predicted Night-time L_{eq} Incident on Facades
Project 13410

Figure 6
20 June 2024
Not to Scale

RBA ACOUSTICS



25-27 Clarendon Road, London N22
Predicted night-time L_{max} Incident on Facades
Project 13410

Figure 7
20 June 2024
Not to Scale

RBA ACOUSTICS

Zone 1

Zone2

Zone 3

25-27 Clarendon Road, London N22
Façade Zoning Plan, 1st Floor
Project 13410

Figure 8
20 June 2024
Not to Scale

RBA ACOUSTICS

Zone 1

Zone2

Zone 3

25-27 Clarendon Road, London N22
Façade Zoning Plan, 2nd and 3rd Floor
Project 13410

Figure 9
20 June 2024
Not to Scale

RBA ACOUSTICS

Zone 1

Zone2

Zone 3

25-27 Clarendon Road, London N22
Façade Zoning Plan, 4th to 6th Floor
Project 13410

Figure 10
20 June 2024
Not to Scale

RBA ACOUSTICS

Zone 1

Zone2

Zone 3

25-27 Clarendon Road, London N22
Façade Zoning Plan, 7th Floor
Project 13410

Figure 11
20 June 2024
Not to Scale

RBA ACOUSTICS

Zone 1

Zone2

Zone 3

25-27 Clarendon Road, London N22
Façade Zoning Plan, 8th Floor
Project 13410

Figure 11
20 June 2024
Not to Scale

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