SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Victoria House, London

Noise impact assessment report

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Version	Date	Comments	Author	Reviewer
A	28 July 22	Draft	Nitin Katiyar	Richard King
B	29 July 22	Final issue	Nitin Katiyar	Richard Muir

Summary

Sandy Brown has been commissioned to provide acoustic advice in relation to the adaptation at Victoria House, London, to provide laboratory enabled space based on an approximate 50:50 ratio of lab to office space.

An environmental noise survey has been carried out to determine the existing sound levels in the area.

Based on the requirements of the London Borough of Camden (LBC) and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed L_{Aeq} 48 dB during the daytime and L_{Aeq} 43 dB during the night.

A 3D acoustic model of the site and its surrounding noise sensitive receptors has been built to predict noise levels at nearby noise sensitive receptors during daytime and night time periods and then assessed against their respective plant noise limits.

During the daytime, the highest cumulative noise level with all plant running at design duty at any noise sensitive receptor is L_{Aeq} 32 dB. This is 16 dB below the daytime plant noise limit and demonstrates a low noise impact which meets LBC's noise policy.

During the night time, the highest cumulative noise level with three items of plant in operation is L_{Aeq} 25 dB. This is 18 dB below the derived night time plant noise limit and also comfortably meets LBC's noise policy.

Cumulative noise limits have also been defined for future tenant plant to ensure that the cumulative noise levels meet LBC's noise policy.

The short term operation of emergency generator has been assessed and the rating level at the most affected receptor will be 7 dB above the daytime representative background sound level which complies with LBC's adopted noise policy which allows + 10 dB allowance for the operation of emergency plant.

The survey methodology, results and noise impact assessment are presented within the body of this report.

Contents

1 Introduction

Sandy Brown has been commissioned to provide acoustic advice in relation to the adaptation at Victoria House, London, to provide laboratory enabled space based on an approximate 50:50 ratio of lab to office space.

An environmental noise survey has been carried out to establish background sound levels around the site and by nearby noise sensitive premises.

Manufacturer supplied noise data has been used to carry out a noise impact assessment in support of the proposed scheme with respect to atmospheric noise emissions from building services plant and the requirements of *BS4142:2014 Methods for rating and assessing industrial and commercial sound*. The assessment has also been carried in line with LBC's adopted noise policy.

The survey methodology, results and noise impact assessment are presented within the body of this report.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1.

The site (highlighted in red) is located with the main road Southampton Row to the east, Bloomsbury Place to the north, Bloomsbury Square to the North West and West.

Nearest noise sensitive receptors are indicated in blue.

The background noise survey measurement position is indicated by the letter 'L'.

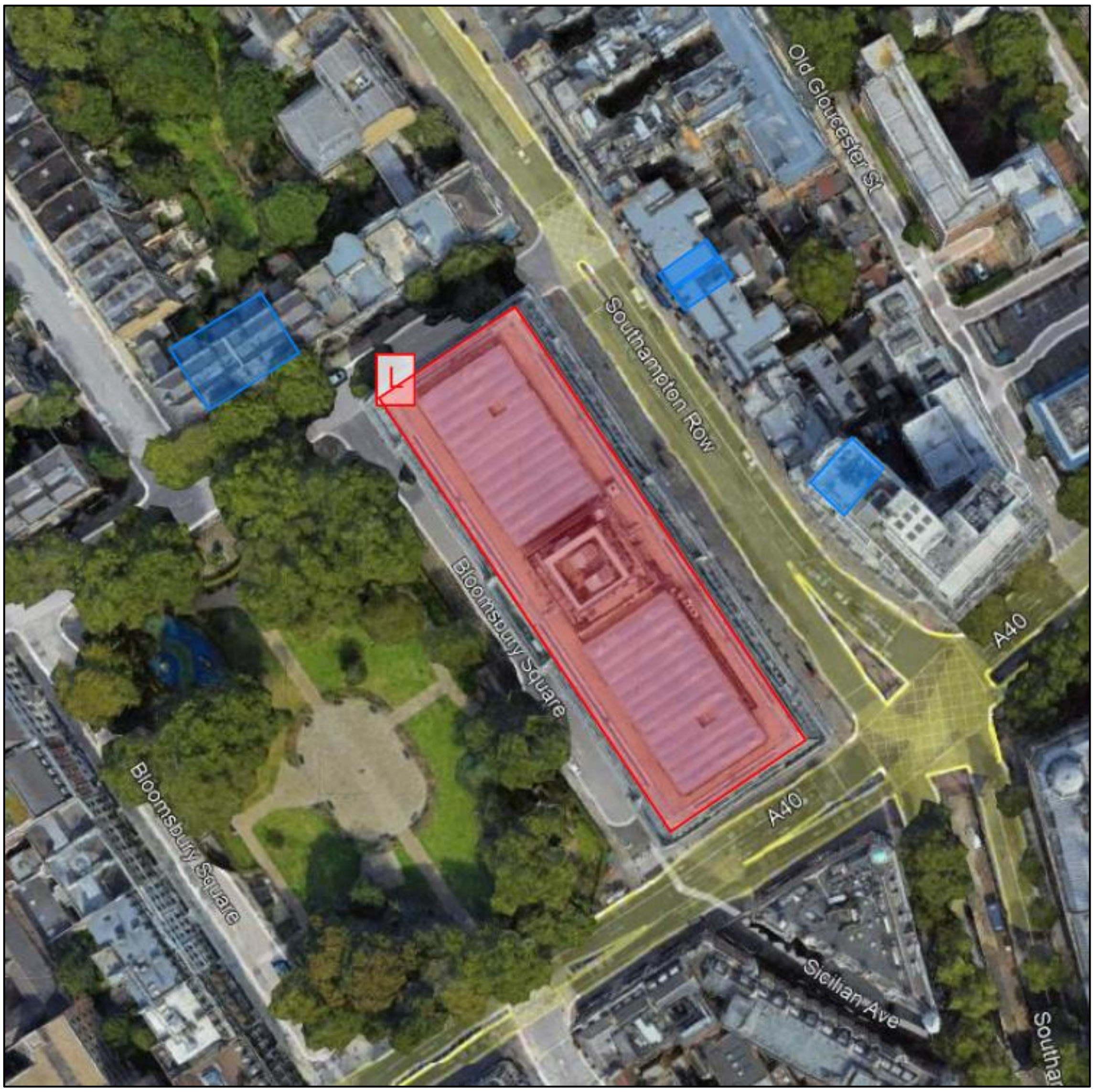


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.2 Adjacent premises

The site is surrounded predominantly by commercial properties. The nearest residential receptors are located at the top floor of 80A and 82 Southampton Row, 9th floor of the NYX Hotel London and properties located along 24, 26 and 27 Bloomsbury Square. Residential receptors are at highlighted in blue.

3 Building services noise egress criteria

3.1 Standard guidance

BS 4142:2014:+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

3.2 Local Authority criteria

The site is located within the jurisdiction of the London Borough of Camden, which considers residential spaces, schools and hospitals to be noise sensitive. Appendix 3 of London Borough of Camden Local Plan (2017) states that:

"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."

The requirements of the adaptation of Victoria House also include the provision of an emergency standby generator that will be operated for short periods during maintenance works, up to a total of three hours per month. It is understood LBC's adopted noise policy for the assessment of emergency plant noise allows noise levels + 10 dB above background for short periods of operation. However, should an extended standby period be required, normal plant noise limits are to be met.

4 Noise survey method

4.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over three days.

Details of the equipment used and the noise indices measured are provided in Appendix A.

The unattended measurements were taken over 15 minute periods 12:00 on 5 May 2022 and 15:30 on 8 May 2022. The equipment was installed by Byron Davies and collected by Serena Joynes.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter ‘L’. A photograph showing the measurement location is provided in Figure 2. This location was chosen to be reasonably representative of noise levels at the site and the nearest noise sensitive premises.

Figure 2 Photograph of logger at position 'L'

4.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

5 Noise survey results

5.1 Observations

The dominant noise sources observed at the site during the survey were from road traffic noise on Bloomsbury Place and Southampton Row.

5.2 Noise measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Day and night-time ambient noise levels measured during the unattended survey are presented in Table 1.

Measured minimum background sound levels are given in Table 2. The measurements were taken at facade level.

Table 1 Ambient noise levels measured during the unattended survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
5 May 2022	-	65
6 May 2022	66	65
7 May 2022	68	62
Average	67	64

Table 2 Minimum background sound levels measured during the unattended survey

Date	Daytime (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
5 May 2022	56[1]	50
6 May 2022	56	51
7 May 2022	54	52
8 May 2022	53[1]	-

[1] Measurement were not made over full daytime period due to monitoring start and end times

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 53 dB during the daytime and $L_{A90,15min}$ 50 dB at night.

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Daytime and night-time statistical analysis of representative values for the site are given in Figure 3 and Figure 4 and From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 58 dB during the daytime and $L_{A90,15min}$ 53 dB at night.

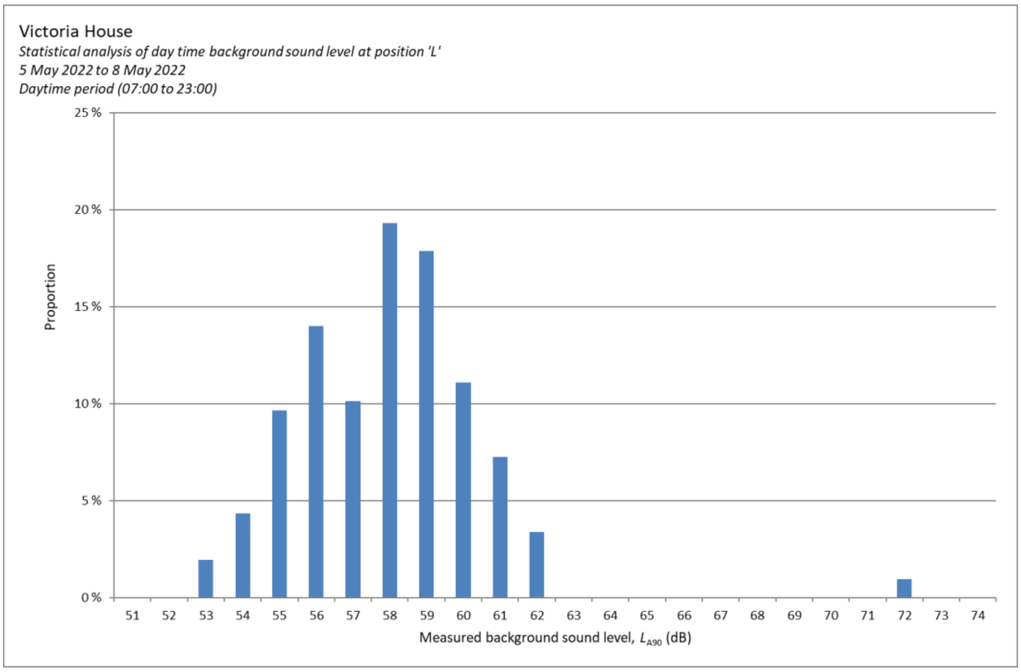


Figure 3 Daytime statistical analysis

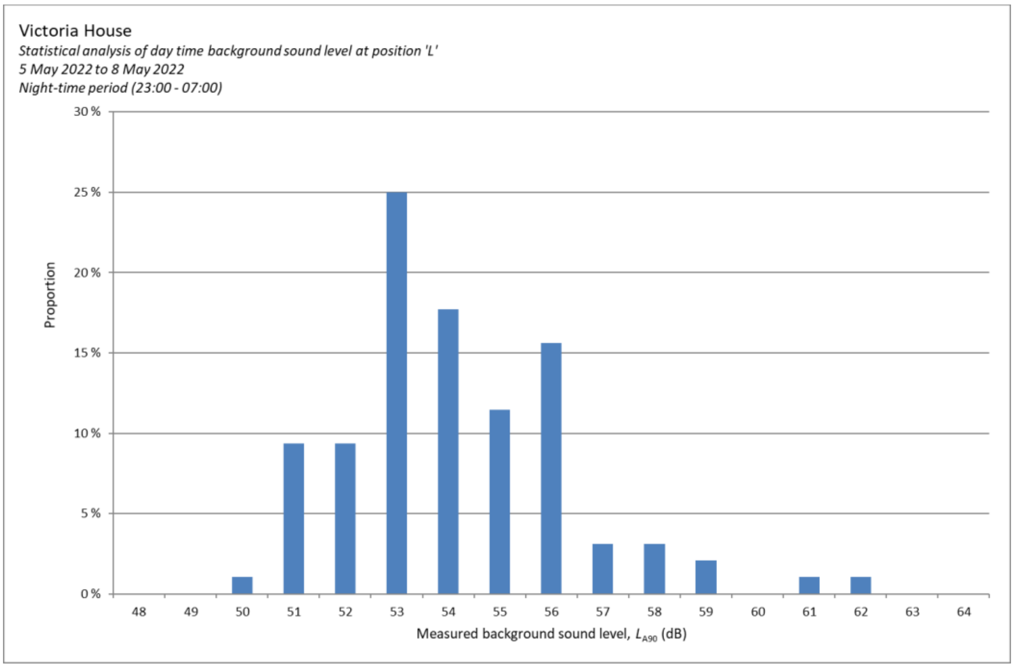


Figure 4 Night time statistical analysis

5.3 Basic limits

Based on the above criteria and measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 3.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels.

Table 3 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,5min}$ (dB)
Daytime (07:00-23:00)	48
Night-time (23:00-07:00)	43

6 Noise impact assessment

A 3D acoustic model of the site and its surrounding noise sensitive receptors has been built using the environmental noise modelling software package CadnaA. The massing of Victoria House has been defined based on information from architectural plans and sections. Existing receptors have been modelled based on approximate building heights obtained from mapping websites.

All proposed services equipment is to be mounted on the rooftop of Victoria House. Proposed noise sources have been entered into the model in their respective locations and their noise levels have been calibrated using manufacturer supplied noise data in terms of sound pressure level at 1 m.

Proposed plant installation locations are marked in green boxes in Figure 5. Item No. 1 denotes Air handling units (AHUs), 2. Dry air coolers (DACs), 3. Fume fans and 4. Chiller.

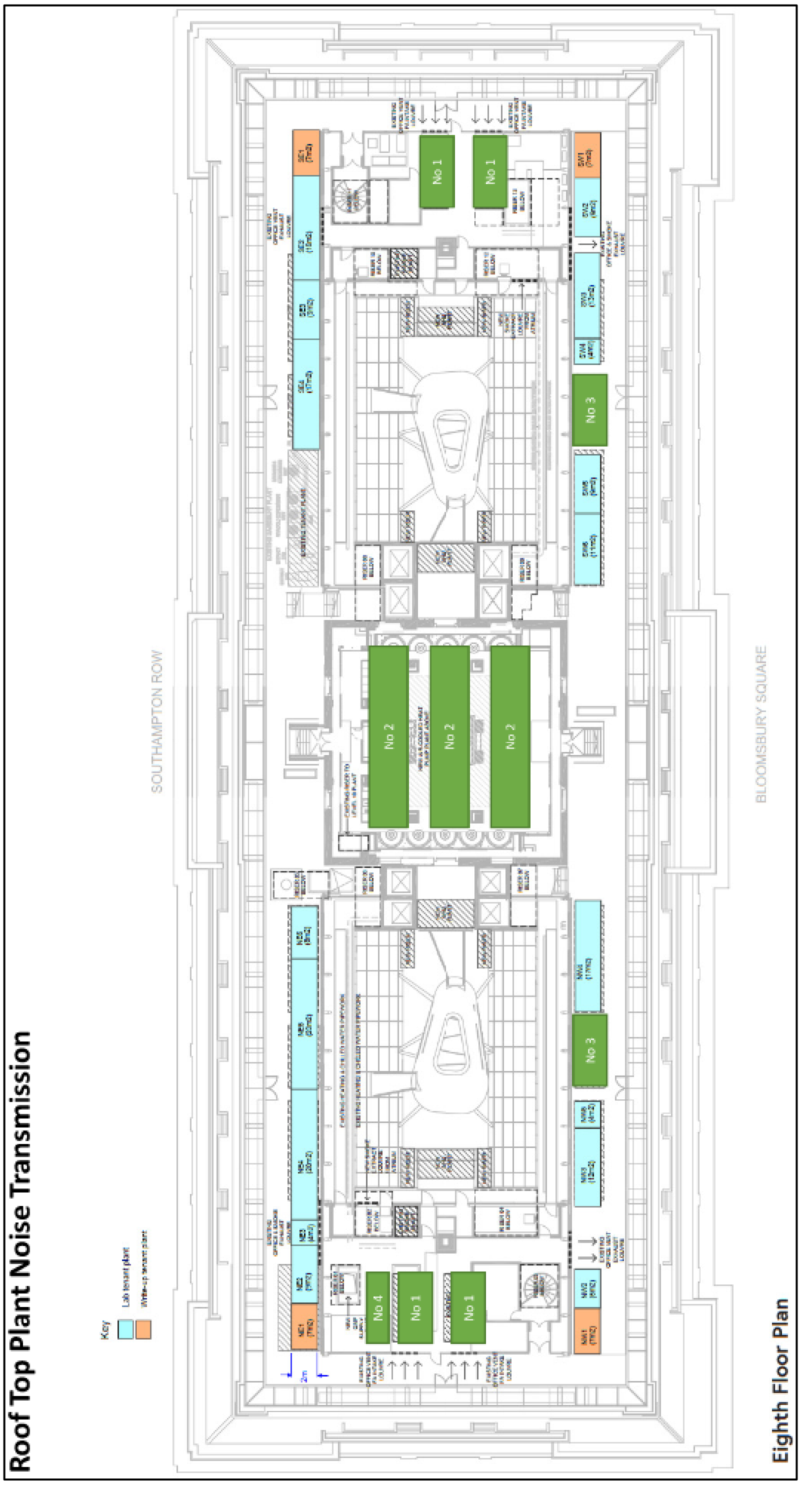


Figure 5 Rooftop plant locations

Model predictions have been carried out in accordance with the calculation methodology in line with ISO 9613-1:1993, ISO 9613-2:1996.

3D model views are shown in Figure 6 and Figure 7. Noise generating source locations are indicated by blue dots on the rooftop of Victoria House and noise sensitive receiver locations by black/white spheres.

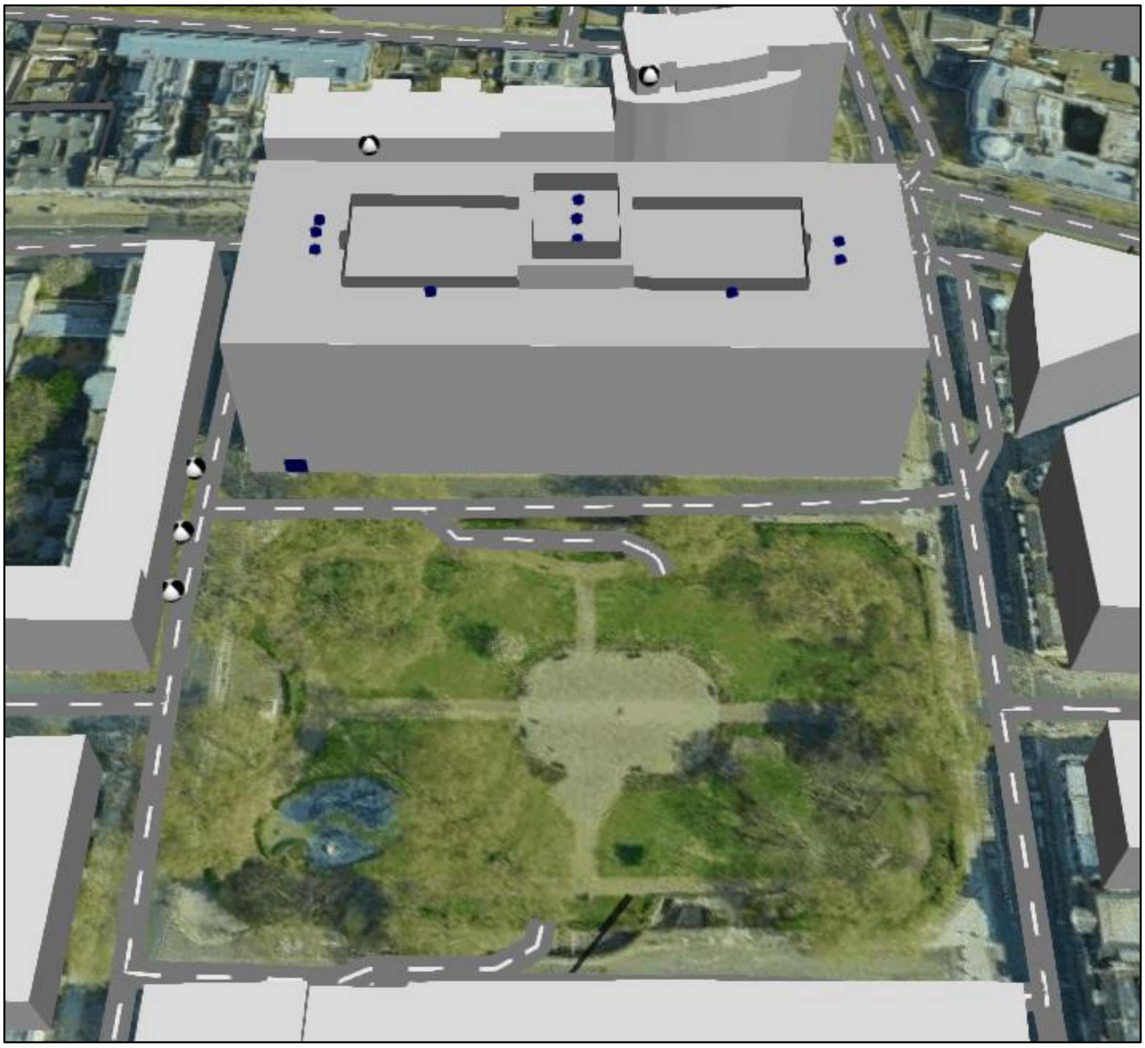


Figure 6 3D noise model westerly view

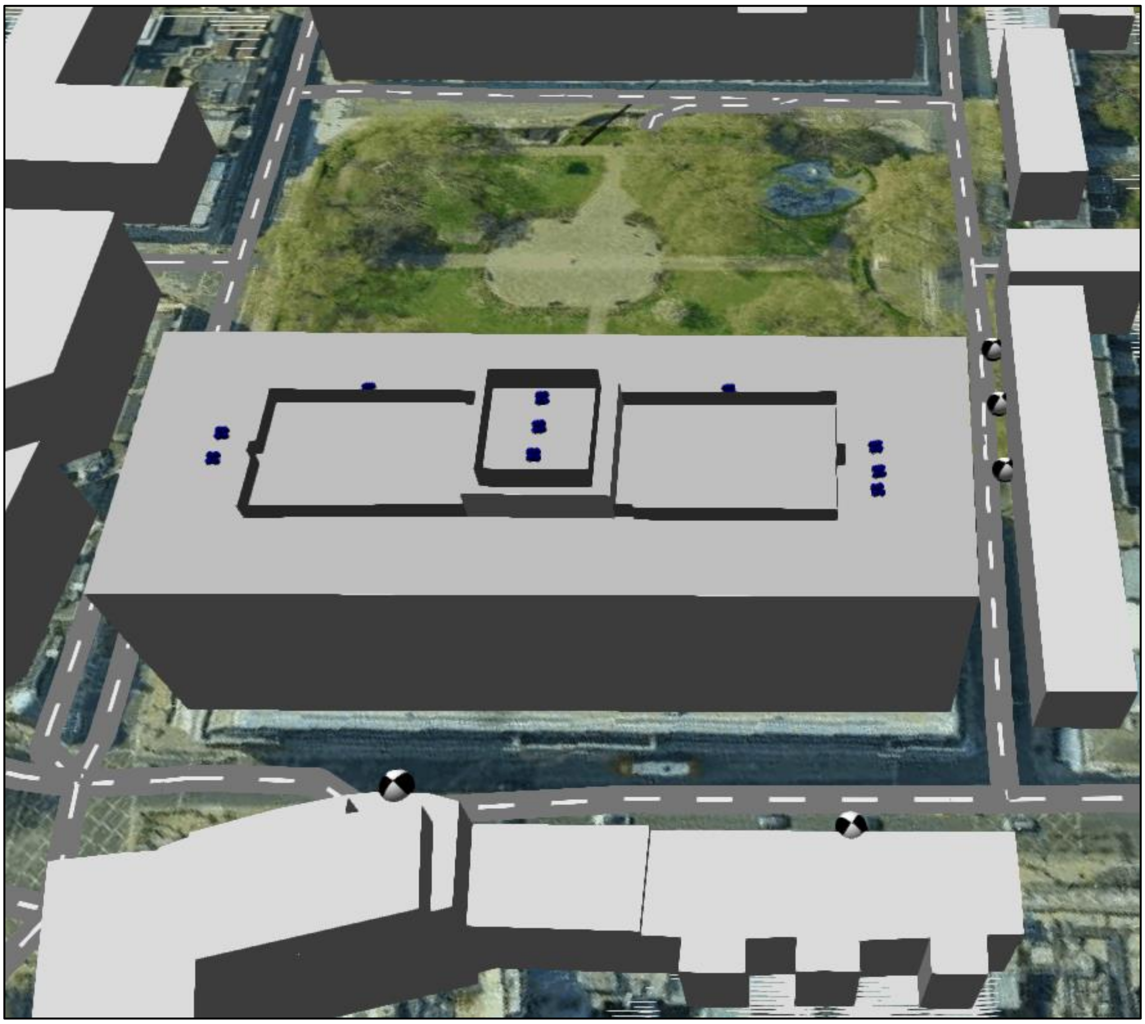


Figure 7 3D noise model easterly view

6.1 Daytime noise assessment

The following noise sources have been entered into the model for the daytime assessment:

- 3 x DACs – Güntner GFD 080.4C/2x7-MS1H/2P.E - 71 dB(A) at 1 m
- 4 x AHUs – Airedale – 50 dB(A) at 1 m
- 2 x Fume fans – Central Fans CMHV 800 – 71 dB(A) at 1 m
- 1 x Chiller – Mitsubishi EAHV-M1500 – 69 dB(A) at 1 m

The following noise sensitive receptors have been entered into the model:

- 80A and 82 Southampton Row – top floor, 11 m
- NYX Hotel London 50-60 Southampton Row – top floor, 33.5 m
- 24, 26 and 27 Bloomsbury Place – ground floor, 1.5 m

In each case the receptor locations were positioned at a distance of 1 m from the worst affected window.

The daytime model output in Figure 8 shows the cumulative plant noise emission level at the defined receptor locations.

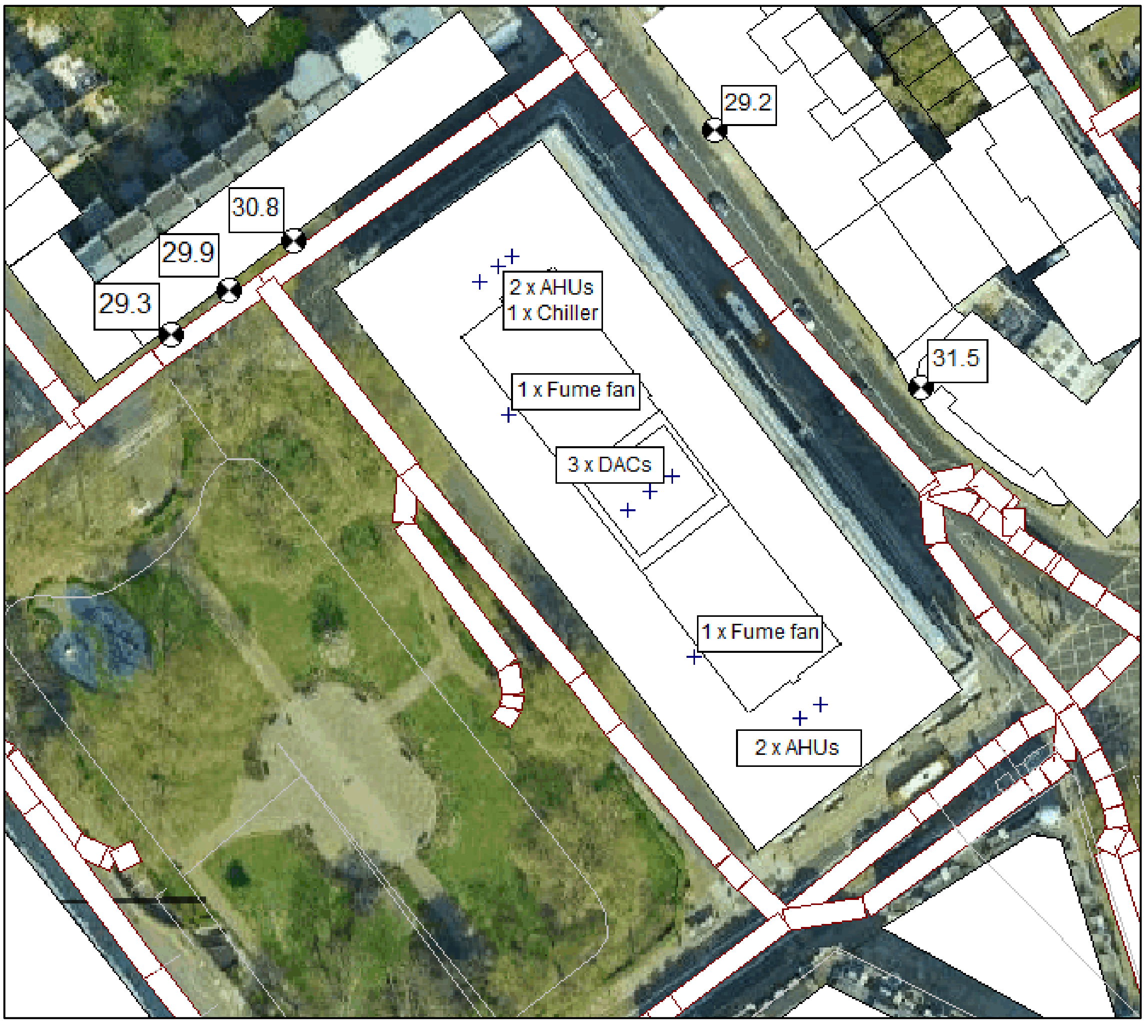


Figure 8 Daytime noise model output

As can be seen in Figure 8, the highest cumulative noise level of 32 dB(A) is predicted at the top residential floor of the NYX Hotel London. This is 16 dB below the daytime representative background sound level and is an indication of a low impact on the noise sensitive receptors within the context of the urbanised location. LBC's adopted noise policy has also been satisfied.

Therefore, no noise mitigation measures are required to further control noise emissions to meet daytime noise criteria.

6.2 Night time noise assessment

It is envisaged the following items of equipment will have the facility to operate during the night time hours:

- 2 x Fume fans – Central Fans CMHV 800 – 71 dB(A) at 1 m
- 1 x Chiller – Mitsubishi EAHV-M1500 – 69 dB(A) at 1 m

It should be noted that the chiller will operate at lower duty during night time hours, however, at the time of writing, noise data for the lower night time design duty is unavailable. In lieu of night time operational data, the higher daytime design duty noise levels have been used for the purposes of assessment.

The night time model output in Figure 9 shows the cumulative plant noise emission level at the defined receptor locations.

Figure 9 Night time model output

As can be seen in Figure 9, the highest night time cumulative noise level of 25 dB(A) is predicted at the ground floor of 27 Bloomsbury Square. This is 18 dB below the night time representative background sound level and is an indication of a low impact on the noise sensitive receptors within the context of the urbanised location. LBC's adopted noise policy has also been satisfied.

Therefore, no noise mitigation measures are required to further control noise emissions to meet night time noise criteria.

6.3 Attenuation of atmosphere ventilation terminations

Attenuator insertion loss performance for all atmosphere side intake and discharge ventilation pathways will be calculated during a later detailed design stage, as well as the attenuation to atmosphere via louvred façade openings at basement B1 and ground floor levels. Calculations of attenuator and louvre acoustic performance will be carried out on the basis that the cumulative noise from these atmosphere terminations in addition to noise from plant assessed within the body of this report continues to meet LBC's adopted noise policy.

6.4 Emergency generator daytime assessment

It is proposed an emergency generator will be located in the lower ground floor level loading bay and will be operated on up to three occasions per month, at a total of three hours during maintenance works. The loading bay is serviced by a large timber door towards the North of the Western elevation. The generator will be situated approximately 18m from the door which acts as the closest opening to atmosphere. For the purposes of assessment, a worst case scenario in which the door is in the open position during the generators operation has been adopted.

The 750KVA emergency generator has an associated casing breakout sound pressure level of 70 dB(A) at 1 m.

The location of the generator within the lower ground floor plan is shown in Figure 10.

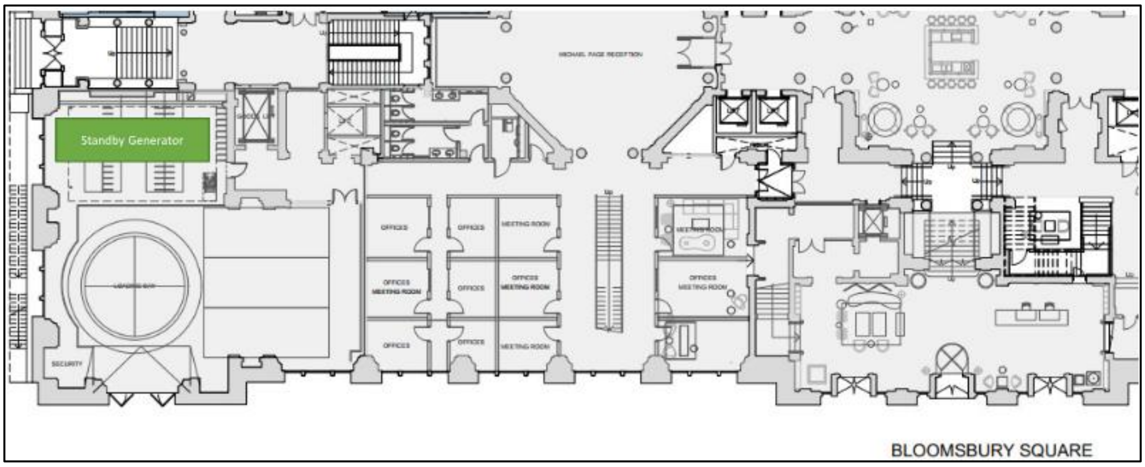


Figure 10 Emergency generator location

The daytime model output for the use of the emergency generator is shown in Figure 11.

Figure 11 Daytime assessment of emergency generator

As can be seen in Figure 11, the highest predicted noise level from the operation of the emergency generator is 52 dB(A) at 27 Bloomsbury Square. As the noise source will be operated for short periods of time, three times a month, and its operation may be distinguishable against the residual noise level at the receptors along Bloomsbury Square, a + 3 dB character correction for intermittency has been applied. The noise associated with the operation of the generator, therefore, is predicted to have a rating level of 55 dB(A). The rating level is 7 dB above the daytime representative background sound level and meets LBC's adopted noise policy for the operation of emergency plant.

Therefore, no noise mitigation measures are required to further control noise emissions to meet LBC's adopted noise for the short term operation of emergency equipment.

Should an emergency occur, and the operation of the emergency generator be required for a longer period of time which may no longer be considered short-term ie, during a power cut, as per LBC's adopted policy, normal plant noise limits will apply. In this scenario, the large timber doors servicing the loading bay will be closed to control noise breakout to nearby noise sensitive dwellings.

The daytime model output for the longer term use of the emergency generator is shown in Figure 12.

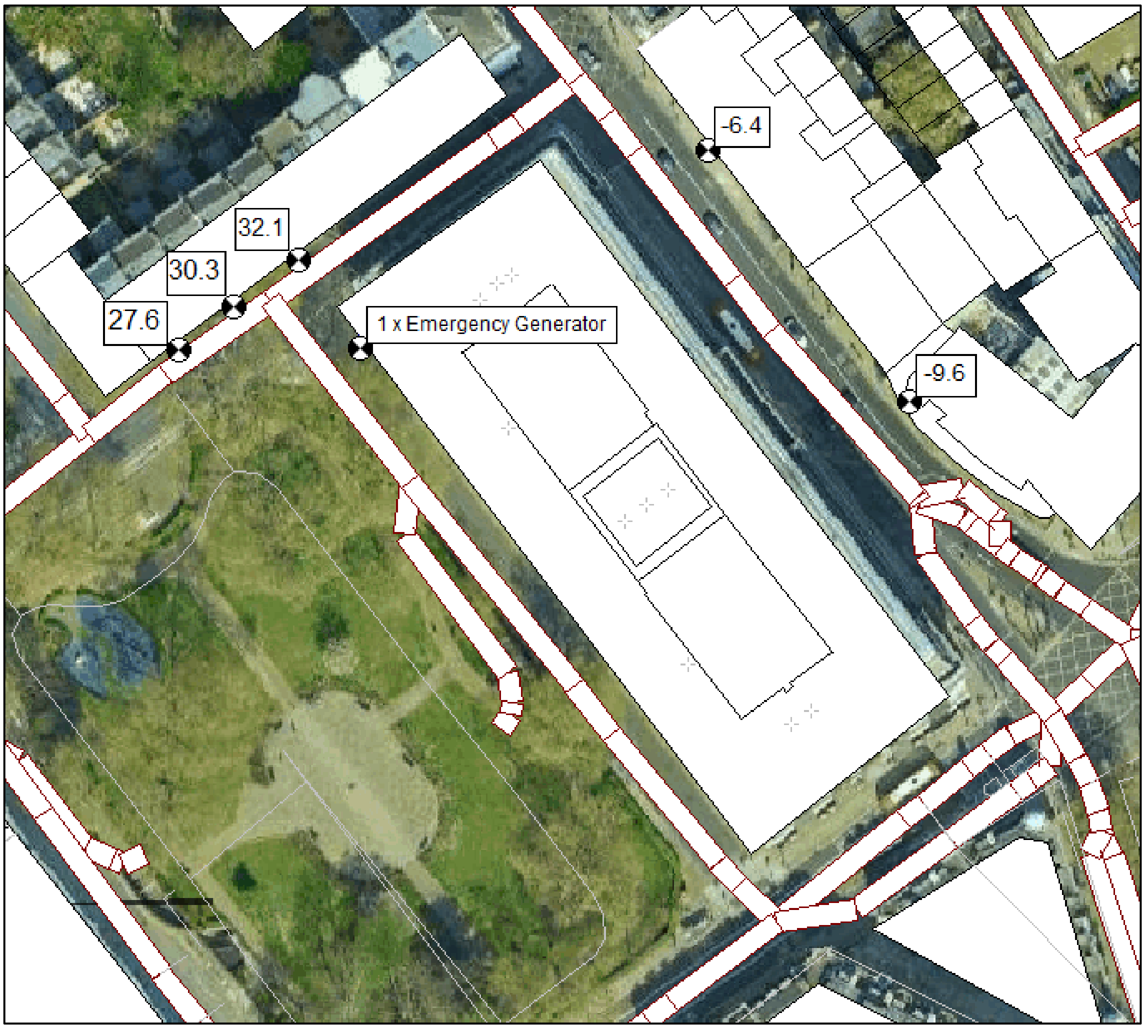


Figure 12 Emergency generator model output with doors closed

As can be seen in Figure 12, with the doors in the closed position, the highest predicted noise level from the operation of the generator at any receptor location is 32 dB(A) at 27 Bloomsbury Place. With the addition of a + 3 dB correction for operational intermittency, the rating level of 35 dB(A) is 13 dB below the representative daytime background sound level, which is an indication of a low impact and meets LBC's criteria for the prolonged use of emergency plant.

6.5 Tenant plant noise limits

Proposed noise generating plant presented and assessed within this report relates to all externally mounted noise generating plant under the landlord's adaptive works at Victoria House. Following delivery of the project that involves provision of CAT A and CAT B base build laboratory and office spaces, incoming tenant's will carry out their own respective fitout works according to their envisaged uses.

As the incoming tenants, their fitout works, associated externally mounted plant, locations and plant noise levels are not known at this stage, plant noise limits are defined within this section to ensure cumulative noise emission from all new plant meets LBC's adopted noise criteria.

The following cumulative tenant plant noise limits have been defined 1 m from the worst affected window for each nearby residential receptor:

- 80A and 82 Southampton Row – 43 dB(A) day, 38 dB(A) night
- NYX Hotel London 50-60 Southampton Row – 43 dB(A) day, 38 dB(A) night
- 24, 26 and 27 Bloomsbury Place – 43 dB(A) day, 38 dB(A) night

With tenant plant designed to meet the above cumulative noise limits at residential receptors, the total noise emission from landlord and tenant plant under the adaptive works is predicted to be 43 dB(A) during the day and 38 dB(A) during the night. These total plant noise emission levels remain 5 dB below their respective daytime and night time limits ie, 15 dB below day and night representative background sound levels and LBC's requirements will continue to be met.

7 Conclusion

The representative background sound levels from the noise survey were $L_{A90,15min}$ 58 dB during the day, and $L_{A90,15min}$ 53 dB during the night.

Based on the requirements of the Local Authority, the relevant plant noise limits at the most affected existing noise sensitive premises are L_{Aeq} 48 dB during the day, and L_{Aeq} 43 dB during the night.

The noise model was run to predict noise levels at nearby noise sensitive receptors during daytime and night time periods and then assessed against their respective plant noise limits.

The daytime and night time cumulative noise levels meet the requirements of LBC.

Appendix A

Survey details

Equipment

The unattended noise measurements were taken using a Rion NL-52 sound level meter.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00264550	Rion	29 Jul 22	TCRT20/1422
Microphone	UC-59/09698	Rion	29 Jul 22	TCRT20/1422
Pre-amp	NH-25/64675	Rion	29 Jul 22	TCRT20/1422
Calibrator	NC-74/34367631	Rion	29 Jul 22	TCRT20/1419

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meter used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{\mathrm{Aeq},T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{\mathrm{AFmax},T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{\mathrm{A90},T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

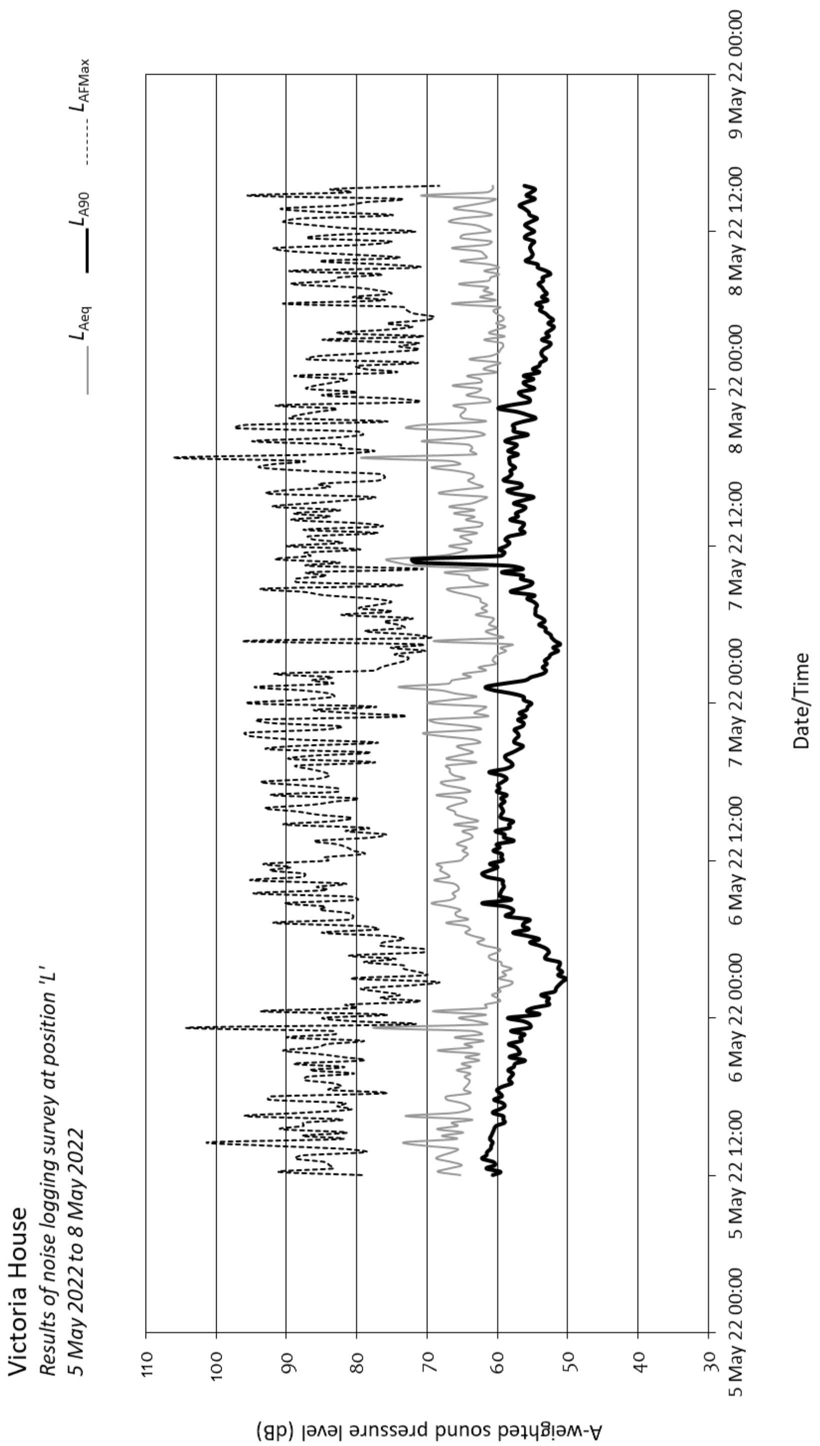
Weather conditions

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 8°C at night and 22°C during the day, and the wind speed was less than 6 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location 'L'


Victoria House
Results of noise logging survey at position 'L'
5 May 2022 to 8 May 2022
LAeq
LA90
LAFMax
A-weighted sound pressure level (dB)
110
100
90
80
70
60
50
40
30
5 May 22 00:00
5 May 22 12:00
6 May 22 00:00
6 May 22 12:00
7 May 22 00:00
7 May 22 12:00
8 May 22 00:00
8 May 22 12:00
9 May 22 00:00
Date/Time