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Consultants in Acoustics, Noise & Vibration

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Chester Balmore

Environmental noise survey report and plant noise assessment

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Version	Date	Comments	Author	Reviewer
A	08 Mar 16		Richard Deane	Stephen Stringer

Summary

Sandy Brown Associates LLP (SBA) has been appointed to provide acoustic design advice in relation to The Chester Balmore, a new mixed residential/commercial development on Chester Road, London.

An environmental noise survey has been carried out to determine the existing background sound levels in the area and to set appropriate plant noise limits in line with the requirements of Camden Council.

The noise survey was performed between 17:00 on 26 February 2016 and 08:15 on 01 March 2016.

Background noise levels measured during the survey were found to range from L_{A90} 50dB during the daytime to L_{A90} 40 dB at night.

Based on the requirements of Camden Council and on the results of the noise survey, noise emission limits at 1 m from the worst affected windows of the nearby noise sensitive premises for all plant have been set. These limits are cumulative, and apply with all plant operation under normal conditions.

An assessment of the noise levels from the operation of the proposed new rooftop plant has been undertaken and where necessary the required mitigation measures have been determined.

Contents

1 Introduction

Sandy Brown Associates LLP (SBA) has been appointed to provide acoustic design advice in relation to The Chester Balmore, a new mixed residential/commercial development on Chester Road, London.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

This report presents the survey method, results of the environmental noise survey, a discussion of acceptable limits for noise emission from new building services plant, and an assessment of the noise egress levels from the proposed plant items.

2 Site description

2.1 The site and its surrounding

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

The Chester Balmore development is a mixed use development in Highgate, North London, within the London Borough of Camden. The development is bounded on three sides by Chester Road to the south, Raydon Street to the north-west and Balmore Street to the north. The south east boundary is formed by a residential property.

Figure 1 Site map showing the site (red) and its surroundings, Highgate library (blue), and Brookfield school (yellow)

2.2 Adjacent premises

The area is predominantly residential and residential properties are located all around the site. Other buildings of note in the area include Highgate library and Brookfield school, both to the west of the site, indicated in Figure 1.

3 Development proposal

Under the original proposals it was the intention to locate the air handling equipment associated with the surgery to a dedicated section of the adjacent refuse storage area. However, the size of air handling equipment required to serve the surgery would exceed the permissible noise levels and therefore an alternative location was considered.

It is now proposed to locate the air handling unit at roof level to serve the ground floor Doctor's Surgery at 68 Chester Road. The proposed location of the air handling unit is indicated on drawing 574/19405PL1, as issued by Rick Mather Architects.

4 Method

Details of the equipment used, the noise indices, and the weather conditions during the survey are provided in Appendix A. Further information on the specific survey method is provided in this section.

4.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over approximately 4 days to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 15 minute periods between 17:15 on 26 February 2016 and 08:15 on 01 March 2016. The equipment was installed and collected by Richard Deane.

The microphone was positioned on the north western most point on the roof, at least 3 meters from any reflective surface, and as such was considered to be free field.

The measurement position used during the survey is indicated in Figure 2, denoted by the letter ‘L’. A photograph showing the measurement location is provided in Figure 3. This location was chosen to provide consistency with the previous noise survey and also to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises.

Figure 2 Measurement location of the unattended measurements

Figure 3 A photograph showing the location of the measurement location

5 Measurement results

5.1 Observations

The dominant noise source observed at the site during the survey consisted of a low level of road traffic along Chester Road and Raydon Street, which are both fairly busy roads and form part of a bus route. Other noise sources included infrequent overhead flights, noise from pedestrians and patrons of the Chester Road shops, and noise from children playing in the street and around Brookfield school.

5.2 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A graph showing the results of the unattended measurements is provided in Appendix B.

The day, evening, and night time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00 – 19:00) $L_{Aeq,16h}$ (dB)	Evening (19:00 – 23:00) $L_{Aeq,4h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Friday 26 February 2016	-	58	49
Saturday 27 February 2016	57	55	51
Sunday 28 February 2016	56	53	48
Monday 29 February 2016	57	55	52
Average	54	53	48

The representative background sound levels measured during the unattended survey are given in Table 2.

Table 2 representative background sound levels measured during the survey

Date	Daytime (07:00 – 19:00) L_{A90} (dB)	Evening (19:00 – 23:00) L_{A90} (dB)	Night (23:00 – 07:00) L_{A90} (dB)
Weekday	50	43	41
Weekend	48	45	40

6 Building services noise egress limits

6.1 Standard guidance

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014 '*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 the nearest noise sensitive.

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.

6.2 Local Authority criteria

Camden Council set out planning conditions for new plant items in developments in the noise and vibration chapter of their development plan, DP 28. It is stated that all noise emissions from new building services, when measured at 1 metre external to a sensitive facade, must be at least 5 dB below the background noise level, with a penalty of 5 dB if the noise is considered to be tonal or contain distinct impulses.

7 Plant noise limits- noise egress

Based on the criteria set out in Section 6.2 and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the most affected windows of the nearest noise sensitive premises should not exceed 5 dB below the minimum external noise level. These limits are set out in Table 3.

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} dB)	
	Weekday	Weekend
Daytime (07:00-19:00)	45	43
Evening (19:00-23:00)	38	40
Night-time (23:00-07:00)	36	35

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), the plant should be designed to achieve a limit 5 dB below those set out above.

8 Plant noise assessment

This section presents manufacturer's data for the proposed plant, an assessment of noise egress to the worst affected noise sensitive premises, and recommendations for noise mitigation measures where necessary.

Indicative plant selection has been provided by Rick Mather Architects. The item of plant to be installed on the roof of the Chester Balmore is to be a Daikin condensing unit REYQ12T.

Table 4 presents the manufacturer's noise data for the units listed above.

Table 4 Noise data for the proposed plant item

	Sound pressure level at 1m (dB) Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daikin REYQ12T	59	66	60	62	53	50	44	37

The above noise levels are for one of the condenser units running at normal operating duty.

8.1 Tonality and hours of operation

It is considered that based on the manufacturer's noise data, the proposed plant is not tonal. The plant will be operating continuously in the day. Both of these factors mean that a noise limit penalty will not be necessary since the plant noise will be continuous and will not contain any tones.

The plant is proposed to run within the hours of 07:00-19:00. As such the plant will be assessed to achieve the day time limits given in Table 3.

8.2 Predicted noise levels

It is considered that the residences of Stoneleigh Terrace on Raydon Street to the north will be the most affected residential window.

Figure 4 Location of proposed condenser units' at the second floor terrace.

The noise level resulting from the operation of the proposed items of plant has been calculated taking into consideration distance attenuation and any screening.

The predicted noise egress levels at the worst affected receptors at 1m from the most affected windows are given in Table 5.

Table 5 Predicted noise egress to Stoneleigh Terrace

Receptor	Predicted noise level from at 1 m from receptor, L_{Aeq} (dB)
Stoneleigh Terrace	38

Based on these calculations, it is considered that if the plant is to operate from the hours of 07:00 to 19:00, the noise egress limits at the nearest noise sensitive premises will be met and no mitigation will be required. The noise emission limits for the hours of 19:00-23:00 will also be met.

9 Conclusion

A noise survey has been carried out to determine the existing background sound levels in the vicinity of the site and surrounding noise sensitive premises.

Background noise levels measured during the survey were found to range from L_{A90} 50dB during the daytime to L_{A90} 40 dB at night.

Based on the requirements of Camden Council and on the results of the noise survey, noise emission limits at 1 m from the worst affected windows of the nearby noise sensitive premises for all plant have been set.

These limits are cumulative, and apply with all plant operating under normal conditions. Since the proposed plant items will contain no tonal or attention catching features (such as tonal elements, whines, whistles, bangs etc), no penalty on the noise limits is necessary.

An assessment of the proposed rooftop plant associated with the development has been carried out at the nearest noise sensitive premises, which are located to the north at Stoneleigh Terrace.

The proposed plant item is expected to comply with the relevant noise limits, providing that the operational hours of the plant are limited to daytime and evening hours (07:00-23:00).

Appendix A

Survey details

Equipment

A Svantek 957 sound level meter was used to undertake the unattended measurements. The 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	SVAN957/12327	Svantek	2 Nov 17	1511575
Microphone	ACO7052H/43273	Svantek	2 Nov 17	1511575
Pre-amp	SV12L/13569	Svantek	2 Nov 17	1511575
Calibrator	SV30A/7451	Svantek	30 Oct 17	1510572

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

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant deviation in calibration occurred.

Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The L_{A90} is considered most representative of the background sound level for the purposes of complying with any local authority requirements.

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.*

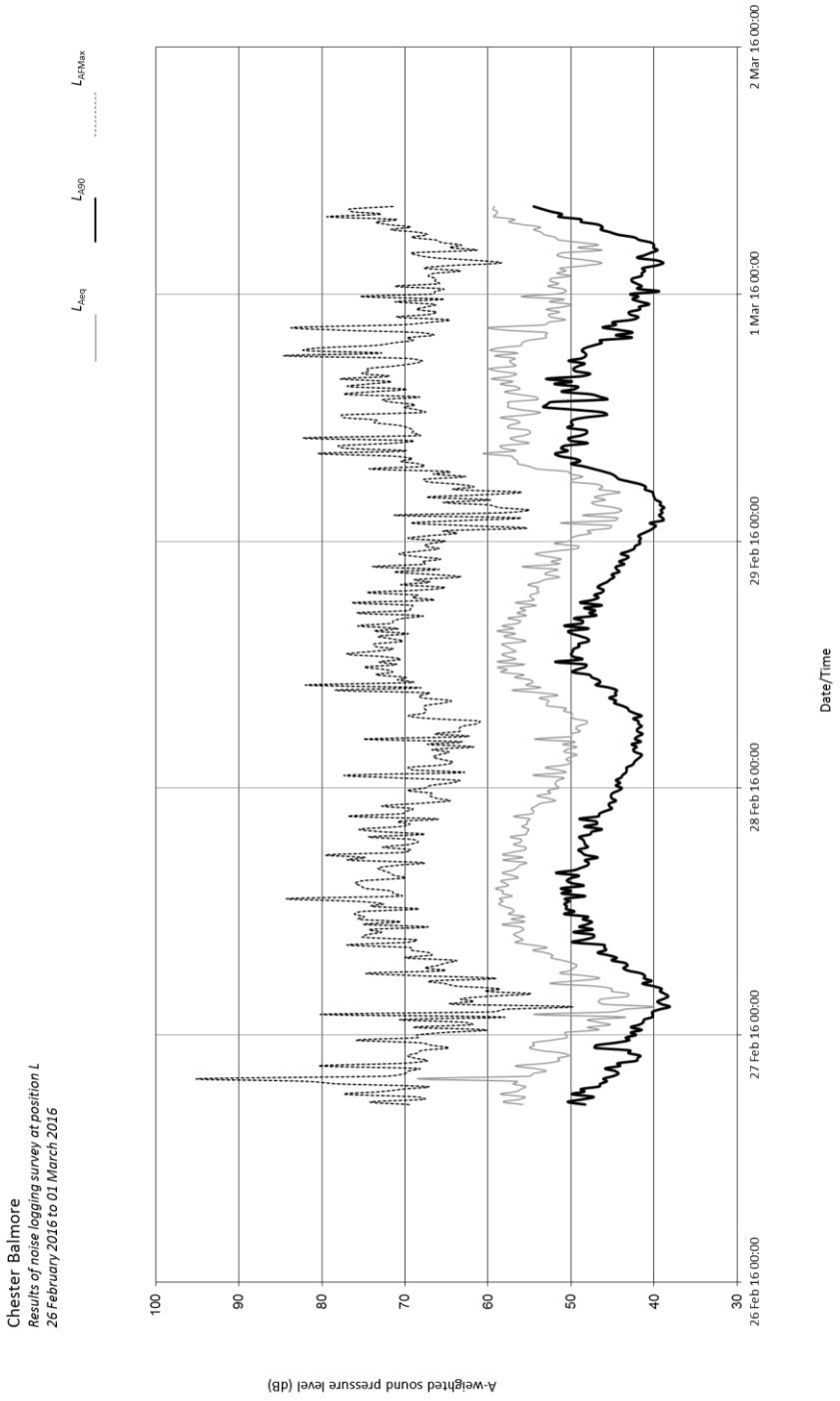
Weather conditions

During the unattended noise measurements between 26 February 2016 and 01 March 2016, weather reports for the area indicated that temperatures varied between 0°C at night and 13°C during the day, and the wind speed was less than 10 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location L


Chester Balmore
Results of noise logging survey at position L
26 February 2016 to 01 March 2016
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
26 Feb 16 00:00
27 Feb 16 00:00
28 Feb 16 00:00
29 Feb 16 00:00
1 Mar 16 00:00
2 Mar 16 00:00
Date/Time