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ENVIRONMENTAL
NOISE SURVEY
REPORT

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1.0 INTRODUCTION

Hoare Lea Acoustics has been appointed to undertake a background noise survey at the site of the proposed redevelopment of 3 Kidderpore Road, London NW3 7SX.

The purpose of the survey was to determine the existing background daytime and night-time noise climate at the site and the levels at the nearest noise sensitive residential facades.

This report contains a summary of the work undertaken, the results obtained and a consideration of the mechanical plant noise for the development.

2.0 SITE DESCRIPTION

The proposed site is a residential property located in Hampstead. Finchley Road runs approximately 120 metres to the south-west of the site and there are a number of low traffic flow residential roads to the north, east and west.



Figure 1: Hybrid aerial photograph showing the location of the proposed site and the logging sound level meter

The dominant source of noise at the site is the road traffic on Finchley Road, though much of this is screened by the surrounding residential properties.

3.0 NOISE SURVEY

An unattended measurement survey was undertaken between Friday 13th March and Tuesday 17th March 2009 in order to obtain a history of noise levels at the site for that period. A logging sound level meter was left in the rear garden of the property as shown in Figure 1.

The weather conditions throughout the survey period were generally favourable for undertaking environmental noise measurements, i.e. calm and dry.

An explanation of the acoustic terminology used in this report is provided in Appendix A and details of the equipment used are provided in Appendix B.

The sound level meter established values for the A-weighted $L_{Aeq,T}$, L_{Amax} and L_{A90} sound pressure levels measured for sequential five-minute periods throughout the survey. These levels are shown against time in Appendix C.

The logarithmically-averaged $L_{Aeq,T}$, L_{Amax} and L_{A90} noise levels for the sixteen-hour daytime and eight-hour night-time periods of the survey are shown in Table 1.

Table 1: Average noise levels measured during unattended survey

	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
$L_{Aeq,T}$ [dB]	50	47
Average L_{Amax} [dB]	65	60
Average L_{A90} [dB]	45	42

The minimum noise levels L_{A90} measured are shown in Table 2.

Table 2: Minimum L_{A90} noise levels measured during survey

	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Minimum L_{A90} [dB]	36	28

4.0 M&E PLANT NOISE LIMITS

Based on the results of this noise survey, we would propose that the limits for noise from M&E plant be set at 10dBA below the minimum measured background levels L_{A90} shown in Table 2, one metre from the nearest residential facade. In view of the low minimum sound pressure level L_{90} of 28dBA for both the daytime and night-time periods, the plant noise criteria have been increased to 30dB on the basis that even an open bedroom window should provide at least 10dB of attenuation, resulting in an internal level of 20dBA; 10dBA lower than that required to attain the BS8233 "good" standard.

A summary of these levels is shown in Table 3.

Table 3: Proposed M&E plant noise level criteria

Period	Noise level limit @1m from façade [dBA]
Daytime (07:00 – 23:00)	30
Night-time (23:00 – 07:00)	30

5.0 CONSIDERATION OF EXTERNAL M&E PLANT

The impact of noise from external M&E plant, such as condenser units, must be accounted for and mitigated where necessary to ensure that the level does not exceed the noise limits set in the previous section.

It is anticipated that it will be necessary to either enclose the proposed outdoor condenser units (provisionally Mitsubishi model number PURY-P750YSHM-A, 2 off.) in a suitable acoustic enclosure or to install them within the building ducted to outside. The following options are suggested as feasible solutions to achieve the required level of attenuation. These are indicative and do not constitute specific design advice; this should be sought once final plant selections have been confirmed.

5.1 Pre-fabricated acoustic enclosures

An acoustically rated enclosure, which may be supplied pre-assembled or in flat-pack form, provides the required attenuation without the need for additional ductwork or inline attenuators. An example is the Environ Modula shown in Figure 2 and similar units are available from other manufacturers.

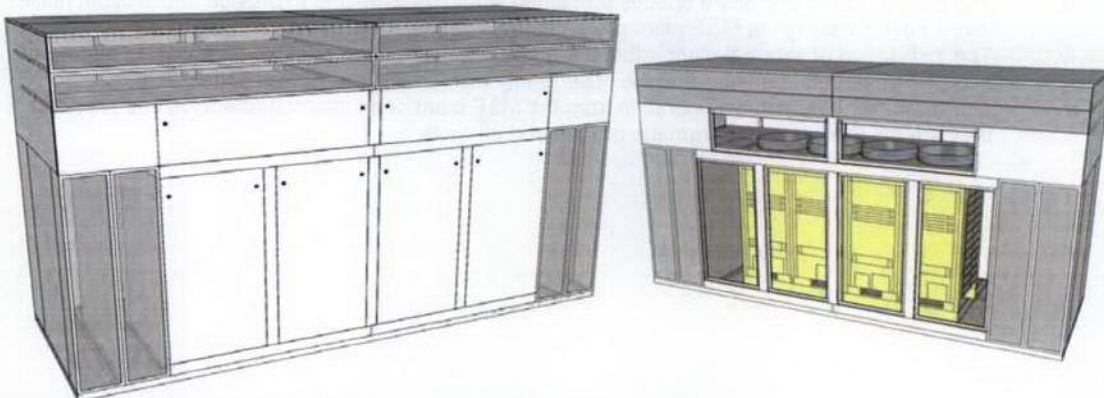


Figure 2: Environ Modula 4.2.25ACFF acoustically rated enclosure

The size of the enclosure will be determined following advice, including calculations, to be provided at a subsequent design stage by the enclosure manufacturer. Provided that this can be achieved on the basis that

the nearest noise-sensitive façade is approximately fifteen metres away from the proposed unit location, and provided that there will not be direct line of sight to the ventilation openings of the enclosure, it is expected that the level incident upon the façade will fall at or below the M&E plant noise criterion of 30dBA.

5.2 Installation in a basement or plant room

The degree of acoustic treatment required in order to ensure that the condenser noise does not exceed the noise limits is unclear at this stage as it is not known where they would be installed. A commensurate degree of acoustic treatment will be required nonetheless to ensure that noise emitted directly from the unit and that occurring through duct break-out will not lead to the noise limits being exceeded. Principally, this will involve adequate inline attenuation on both the intake and exhaust sides of each unit.

A full consideration of the acoustics aspects of the M&E installation will be provided at a subsequent design stage.

5.3 Vibration

All items of M&E plant and their respective enclosures located in the rear garden of the development should be resiliently isolated from the ground and all walls in order to prevent vibration from travelling through the property.

6.0 CONCLUSION

Hoare Lea Acoustics has been appointed to undertake a background noise survey at the site of the proposed redevelopment of 3 Kidderpore Avenue, London NW3 7SX.

The results of the survey and a consideration of plant noise levels have been presented in this report and are summarised below.

- i. The minimum background ambient noise levels for the sixteen-hour day and eight-hour night-time periods are 36dBA L_{90} and 28dBA L_{90} respectively;
- ii. The limits for M&E plant noise for both the sixteen-hour day and eight-hour night-time periods have been defined as 30dBA at the nearest residential façade;
- iii. The pre-fabricated enclosure options presented would be expected to provide for resultant noise levels not exceeding the M&E plant noise criteria set, subject to design and calculations;
- iv. The installation of external plant within the building fabric will require a commensurate degree of acoustic treatment to ensure that the M&E plant noise criteria are not exceeded and;
- v. There will be no transmitted vibration from the M&E plant or its associated enclosures provided they are resiliently isolated from the ground and all walls.

APPENDIX A – Acoustic terminology

Decibel (dB)

The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

A-Weighting

The 'A' weighting is a correction term applied to the frequency range in order to mimic the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies. An 'A' weighted value would be written as dB(A).

$L_{Aeq,T}$

The A-weighted equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

$L_{A90,T}$

The A-weighted noise level exceeded for 90% of the specified measurement period (T), frequently used to describe the background noise level.

L_{Amax}

The highest A-weighted noise level recorded.

APPENDIX B – Equipment list

Manufacturer	Model	Description	Serial number	Calibration date	Calibration certificate number
RION	NL-31	Integrating sound level meter	910453	20-Aug-07	03301
RION	NC-74	Calibrator	34551669	13-Jan-09	04341
RION	UC-53A	Microphone	101799	20-Aug-07	03301
RION	NH-21	Pre-amplifier	2294	20-Aug-07	03301

The above equipment fulfils IEC 61672 Class 1 and is traceable to calibration under BS7580: Part 1:1997.

APPENDIX C: Overall A-weighted sound pressure levels measured during unattended survey

