

**School of Oriental
and African Studies
London**

**ENVIRONMENTAL NOISE SURVEY
REPORT 15771/ENS1**

For :

Vivid Interiors
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6 July 2009

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This report has been prepared by Harn Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

1.0 INTRODUCTION

New air conditioning plant is proposed for location on the roof of the main building within the School of Oriental and African Studies (SOAS) Campus located on Thornhaugh Street adjacent to Russell Square.

This report presents the noise survey methodology and findings.

2.0 OBJECTIVES

To establish, by means of detailed 72 hour fully automated environmental noise monitoring, the existing A-weighted (dBA) L_{10} , L_{90} , L_{eq} and L_{max} environmental noise levels at a selected accessible roof level position on the site.

Based on the results of the noise survey, and in conjunction with the Local Authority, to recommend suitable plant noise emission criteria.

3.0 SITE DESCRIPTION

3.1 Location

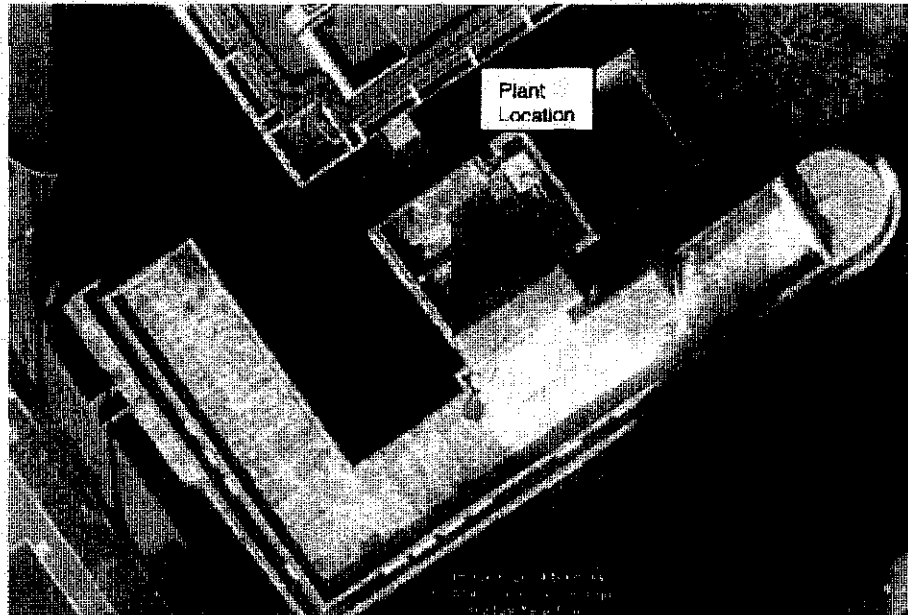
The main building is bordered by Thornhaugh Street and Torrington Square which falls within the Borough of Camden jurisdiction. See Location Map below.



Location Map (maps.google.co.uk)

3.2 Description

The main building extends up to 4th floor level. The proposed plant location is on the 4th floor roof, level with the top floor of an adjacent SOAS building.



Site Plan (maps.google.co.uk)

4.0 ACOUSTIC TERMINOLOGY

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 METHODOLOGY

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 15:45 hours on Tuesday 30 June 2009 to 12:00 hours on Friday 3 July 2009.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were fine. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{10} , L_{90} , L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The noise level measurements were undertaken at one position on a 4th floor roof. The measurement position is described in the table below.

Position No	Description
1	The microphone was located approximately 0.5m above the 4 th floor roof facing North East. This location was selected as it was the nearest point to the proposed plant location that was not dominated by existing plant noise.

The position was selected in order to assess the lowest noise levels at the development site for subsequent use in setting plant noise emission criteria and is shown on the plan below.

Plan Showing Unmanned Measurement Positions (maps.google.co.uk)

5.3 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type
Type 1 Data Logging Sound Level Meter	Larson Davis	820
Type 1 Calibrator	Larson Davis	CAL200

The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant change was found to have occurred (no more than 0.1dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a Larson Davis windshield.

6.0 RESULTS

The results have been plotted on Time History Graphs 15771/TH1 to 15771/TH2 enclosed presenting the 15 minute A-weighted (dBA) L_{10} , L_{50} , L_{90} and L_{max} levels at the measurement position throughout the duration of the survey.

7.0 DISCUSSION OF NOISE CLIMATE

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be local road traffic movements.

8.0 PLANT NOISE EMISSION CRITERIA

We understand the London Borough of Camden require the following plant noise emission criteria to be adopted with regards to nearby noise sensitive (residential) facades:

Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (L_{A90}), expressed in dB(A) when all plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attentions should be given to reducing the noise levels from that piece of plant/equipment at any sensitive facade to at least 10dB(A) below the L_{A90} , expressed in dB(A).

With reference to Time History Graph 15771/TH1 the lowest measured background noise levels (L_{p0}) were as follows:

Daytime (07:00 - 23:00)	Night-time (23:00 - 07:00)
51dBA	48dBA

We therefore recommend the following plant noise emission criteria at the nearby noise sensitive (residential) facades

Daytime (07:00 - 23:00)	Night-time (23:00 - 07:00)
46dBA	43dBA

9.0 PLANT NOISE ASSESSMENT

We understand the following plant is proposed for location on the 4th floor roof:

- 2 No. Daikin RXYQ12P Condensers each rated at 80dBA Sound Power Level or 60dBA Sound Pressure Level (according to manufacturers data)

The nearest residential buildings are at least 40m away on Thornhaugh Street and are well screened from the proposed plant location. Our calculations are as follows:

Condenser Sound Power Level 80dBA
2 No. Units = 83dBA
Distance Correction to 40m = -43dBA
Screening Correction = -5dBA
Result = 35dBA

The above calculation gives a maximum noise level contribution from the proposed plant of approximately 35dBA which is significantly lower than the proposed plant noise emission limits.

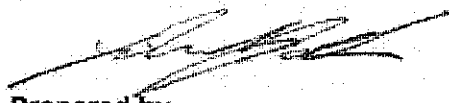
The nearest non-residential windows appear to be classrooms / studies on an adjacent SOAS building, approximately 9m from the proposed plant location, level with the 4th floor roof. Our calculations indicate a noise level contribution of approximately 52dBA at 1m from the facade which should ensure a suitable internal noise level is maintained even when the windows are open.

10.0 CONCLUSIONS

A detailed 72 hour fully automated environmental noise survey has been undertaken in order to establish the currently prevailing roof level environmental noise climate on the site.

Plant noise emission criteria have been recommended based on the results of the noise survey and in conjunction with the Local Authority.

The proposed roof level plant has been assessed and found to comply with the proposed plant noise emission criteria.



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Appendix A

The acoustic terms used in this report are as follows:

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_{10} & L_{90} : 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.

It is common practice to use the L_{10} index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

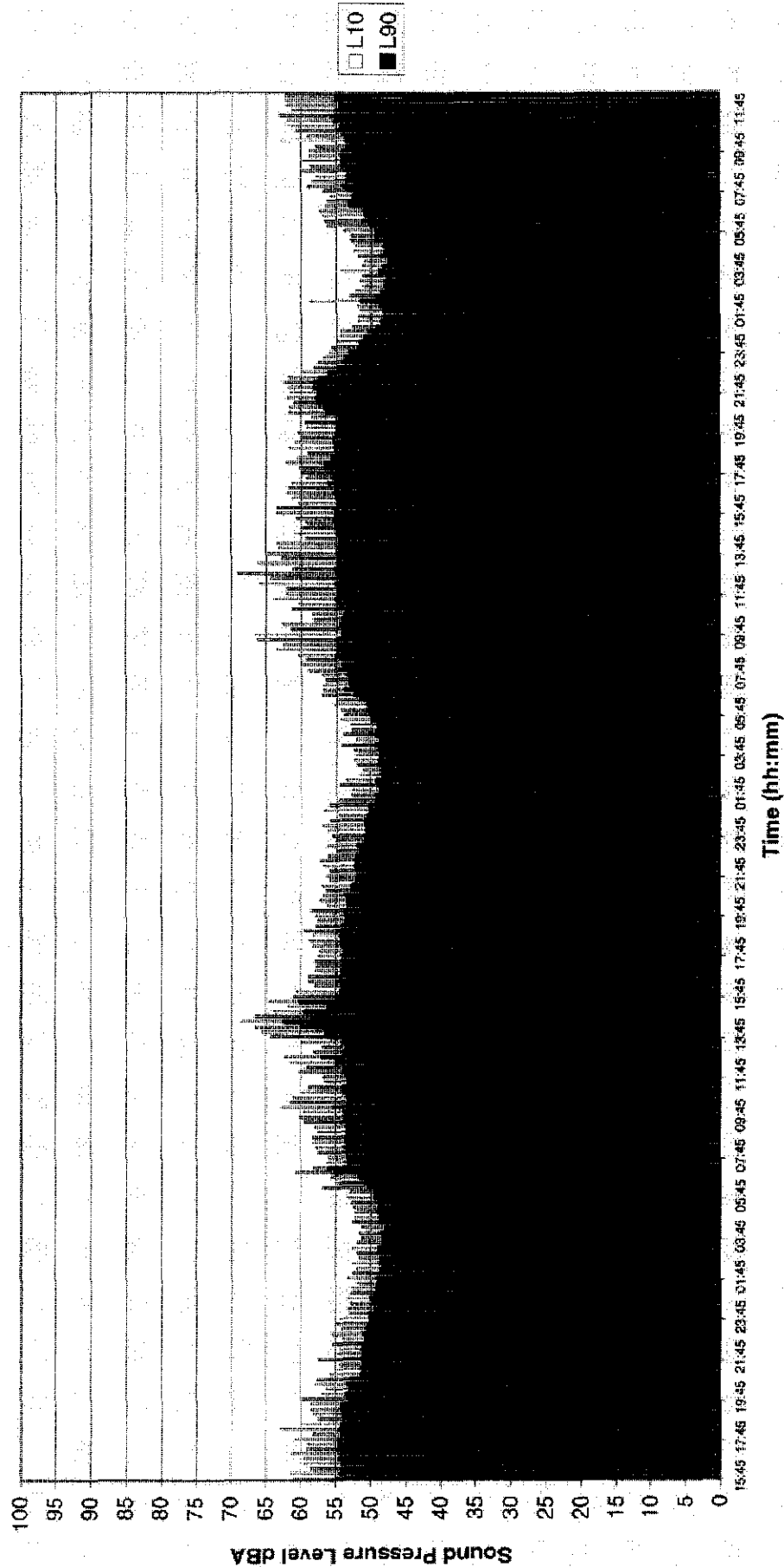
L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

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 (e.g. 1 hour).

The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward.

L_{max} : L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Roof Level Environmental Noise Survey School Of Oriental and African Studies 30 June 2009 - 03 July 2009



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