16-19 Southampton Place
London

ENVIRONMENTAL NOISE SURVEY
& PLANT NOISE ASSESSMENT
REPORT 17107/PNA2(Option B)_RevA

For :

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1.0 INTRODUCTION

New items of building services plant are proposed to be installed at 16-19 Southampton Place. The plant noise emissions will be subject to the requirements of the Local Authority.

Hann Tucker Associates have therefore been commissioned to undertake a detailed environmental noise survey of the site in order to establish the currently prevailing background noise levels and propose suitable plant noise emission criteria based on the results of the survey and the requirements of the Local Authority.

The data has been used to assess the proposed plant and subsequently make recommendations to ensure the criteria of the Local Authority are met.

This report presents the survey methodology and findings.

2.0 OBJECTIVES

To establish, by means of detailed 72 hour daytime and night-time 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 position at the site, thought to be representative of the nearest affected property(s).

To measure L_{eq}, L_{90} and L_{max} octave band spectra noise levels for daytime and night-time periods at the measurement position in order to obtain a more detailed description of the noise climate.

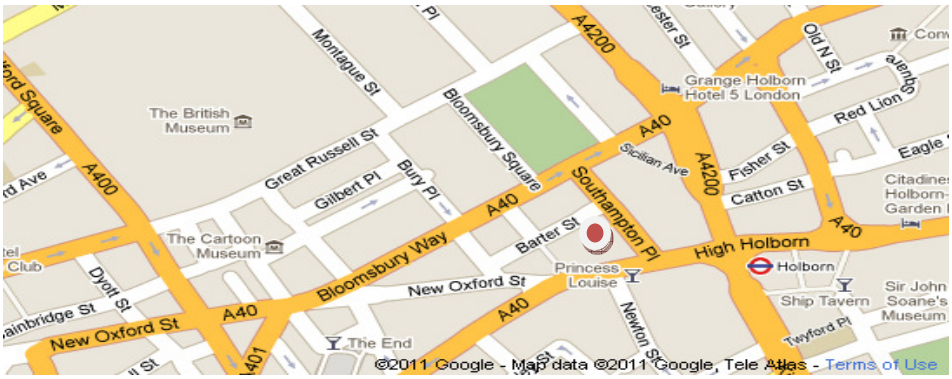
Based on the results of the noise survey, and in conjunction with the Local Authority, to recommend suitable plant noise emission criteria.

To assess the proposed plant and comment on its acceptability.

3.0 SITE DESCRIPTION

3.1 Location

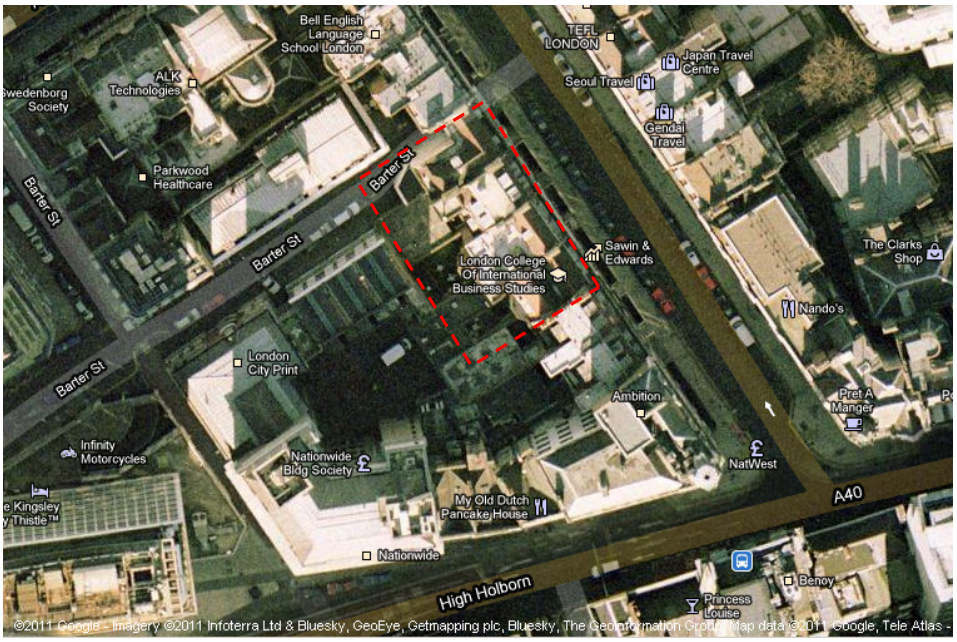
The site is located at 16-19 Southampton Place, London, and falls within the London Borough of Camden's jurisdiction. See Location Map below.



Location Map (maps.google.co.uk)

3.2 Description

16-19 Southampton Place is a 4No. storey property of educational use. The site is bound by Southampton Place to the East and by Barter Street to the North. Various residential and commercial properties bound the site in all other directions. See Site Plan below.



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 12:30 hours on Friday 11 February 2011 to 12:30 hours on Monday 14 February 2011.

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 light. The sky was generally clear. We understand that throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

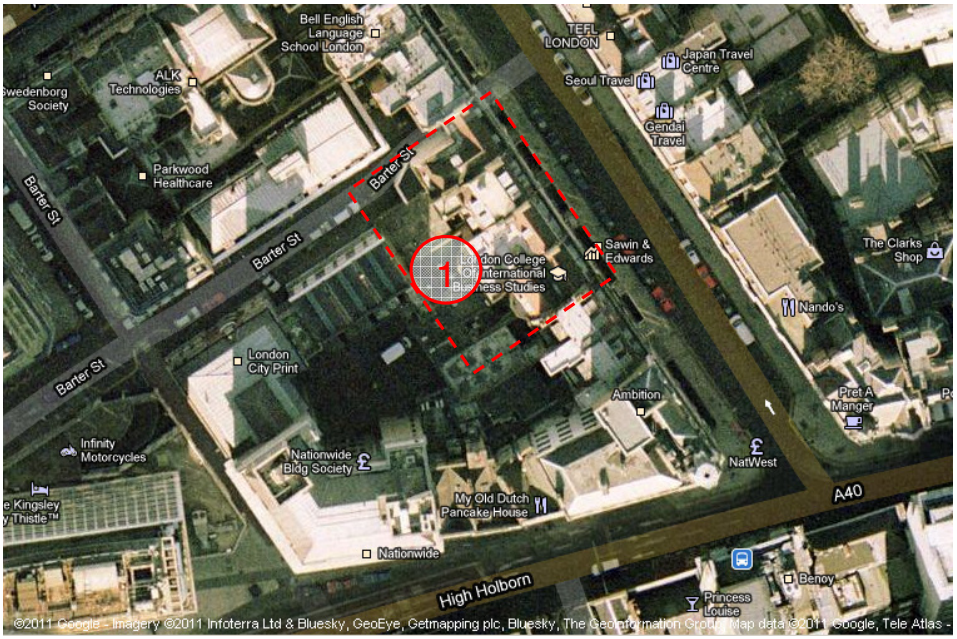
Measurements were taken continuously of the A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The noise level measurements were undertaken at 1No. position at the development site.

The microphone was attached to a pole and positioned in the courtyard to the rear of 18 Southampton Place.

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	Serial Number	Latest Verification
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3838	LD calibration on 27/09/2010
Position 1 Type 1 ½" Condenser Microphone	Larson Davis	377B02	108306	LD calibration on 27/09/2010
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 21/01/2011

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.

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 17107/TH3 to 17107/TH4 enclosed presenting the 15 minute A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} levels at the measurement position throughout the duration of the survey.

The lowest measured $L_{A90(15min)}$ are recorded in the table below:

Lowest measured $L_{A90(15min)}$ (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	**Night-Time (23:00 – 07:00 hours)**
45dBA	43dBA

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 traffic from the surrounding road network.

8.0 PLANT NOISE EMISSION CRITERIA

We understand that the requirements of Camden Council are as follows:

> *"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dBA less than the existing background measurement (L_{A90}), expressed in dBA 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 attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dBA below the L_{A90}, expressed in dBA."*

As the proposed plant has been judged to contain no tonal element and on the basis of the above and the survey results we thus propose the following plant noise emission limits to be achieved at 1m from the façades of the nearest neighbouring buildings:

Plant Noise Emission Criteria (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00)	**Night-Time (23:00 – 07:00)**
40dBA	38dBA

It should be noted that the above plant noise emission limits are subject to approval from Camden Council.

9.0 PLANT NOISE ASSESSMENT

9.1 Proposed Plant

The proposed plant is presented in the table below:

Plant Description	Building Serving	Quantity
Daikin REYQ28P	16 Southampton Place	1
Daikin REYQ22P	17 Southampton Place	1
Daikin REYQ20P	18 Southampton Place	1
Daikin RXYSQ4P	18 Southampton Place	1
Daikin REYQ22P	19 Southampton Place	1

9.2 Plant Noise Data

The manufacturer's noise data available is presented below:

Plant Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1 metre
Daikin REYQ28P	63dBA
Daikin REYQ22P	62dBA
Daikin RXYSQ4P	52dBA
Daikin REYQ20P	61dBA

9.3 Plant Operational Hours

As the site is of educational use, the proposed plant is only to operate during daytime hours only (07:00 – 23:00 hours).

9.4 Location of Plant

The plant is to be installed in 2No. areas onsite.

The locations and condenser references are show on the drawings provided by hurleypalmerflatt and Canaway Fleming and are described below:

9.4.1 Plant Serving Building 16 and 17

The plant is to be located on the roof of 17 Southampton Place. The nearest noise sensitive property was noted to be approximately 39 metres away to the West of the site.

9.4.2 Plant Serving Building 18 & 19

The plant is to be located in the courtyard to the rear of 18 Southampton Place. The nearest noise sensitive property was noted to be to the North West of the site to the rear of Barter Street.

9.5 Plant Noise Impact Assessment

Our calculations relating to the proposed plant installation are presented below.

9.5.1 Plant Serving Building 16 and 17

The proposed plant is to be installed on the roof of 17 Southampton Place. The noise sensitive window is approximately 39 metres away to the West of the proposed plant location.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa)
REYQ28P at 1 metre (Serving 16 Southampton Place)	63dBA
REYQ22P at 1 metre (serving 17 Southampton Place)	62dBA
Combined plant noise at 1 metre from plant	**66dBA**
Distance loss 39 metres	-27
Calculated noise level at 1 metre from noise sensitive façade.	39dBA

The calculated combined noise level with the proposed plant operating at 1 metre from the nearest noise sensitive façade is 39dBA. This should therefore meet the daytime requirements of the Local Authority.

9.5.2 Plant Serving Building 18 & 19

The plant is to be located in the courtyard area to the rear of 18 Southampton Place. The courtyard is enclosed on all 4No. sides. Due to the reverberant nature this creates, there are considered to be no acoustic losses within this area. The façade overlooking the courtyard is approximately 12 metres away to the North West of the courtyard opening, to the rear of Barter Street. We have therefore assumed a distance loss of 12 metres in our calculation.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa)
REYQ20P at 1 metre (Serving 18 Southampton Place)	61dBA
RXYSQ4P at 1 metre (serving 18 Southampton Place)	52dBA
REYQ22P at 1 metre (Serving 19 Southampton Place)	62dBA
Combined plant noise at 1 metre from plant	**65dBA**
Distance Loss 12 metres	-22
Calculated noise level at 1 metre from noise sensitive façade	43dBA

The calculated combined noise level with the proposed plant operating simultaneously at 1 metre from the nearest noise sensitive façade is 43dBA. This therefore exceeds the daytime requirements of the Local Authority.

10.0 MITIGATION MEASURES

Our calculations as detailed in Section 9.0 of this report indicate that the noise emissions from the proposed external condensers serving 18 and 19 Southampton Place exceed the requirements of the Local Authority in the absence of any mitigation. In order that the requirements are achievable, we recommend installing the plant within a full a acoustic enclosure(s) capable of reducing the plant noise emissions to the following limiting sound pressure levels when measured on site at 1 metre in any direction with the plant operating a full load:

Limiting Sound Pressure Levels (dB re $2x10^{-5}$ Pa) at 1 metre		
Plant	**Serving**	**dBA**
REYQ20P	18 Southampton Place	57
RXYSQ4	18 Southampton Place	57
REYQ22P	19 Southampton Place	57

Please find enclosed our list of Suitable Suppliers of Acoustic Enclosures for Small Air Conditioning Units.

Our calculations below demonstrate that with the proposed mitigation measures, the plant serving 18 and 19 Southampton Place should achieve the daytime criteria of the Local Authority.

	Sound Pressure Levels (dB re $2x10^{-5}$ Pa)
Enclosed REYQ16P at 1 metre (serving 18 Southampton Place)	57dBA
Enclosed RXYSQ4 at 1 metre (Serving 18 Southampton Place)	57dBA
Enclosed REYQ14P at 1 metre (serving 19 Southampton Place)	57dBA
Combined plant noise emissions at 1 metre	**62dBA**
Distance Loss 12 metres	-22
Calculated noise level at 1 metre from noise sensitive façade	40dBA

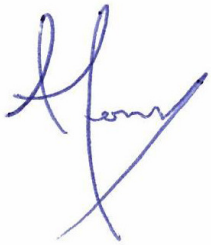
The calculated combined noise level with the plant serving 18 and 19 Southampton Place operating simultaneously when enclosed at 1 metre from the nearest noise sensitive façade is 40dBA. This should therefore meet the daytime requirements of the Local Authority.

11.0 CONCLUSIONS

A detailed 72 hour daytime and night-time fully automated environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

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

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window. Mitigation measures have been recommended in order to meet the proposed daytime 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.

dBA : 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 dBA level.

Because of being a logarithmic scale noise levels in dBA do not have a linear relationship to each other. For similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA 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 Ln 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.

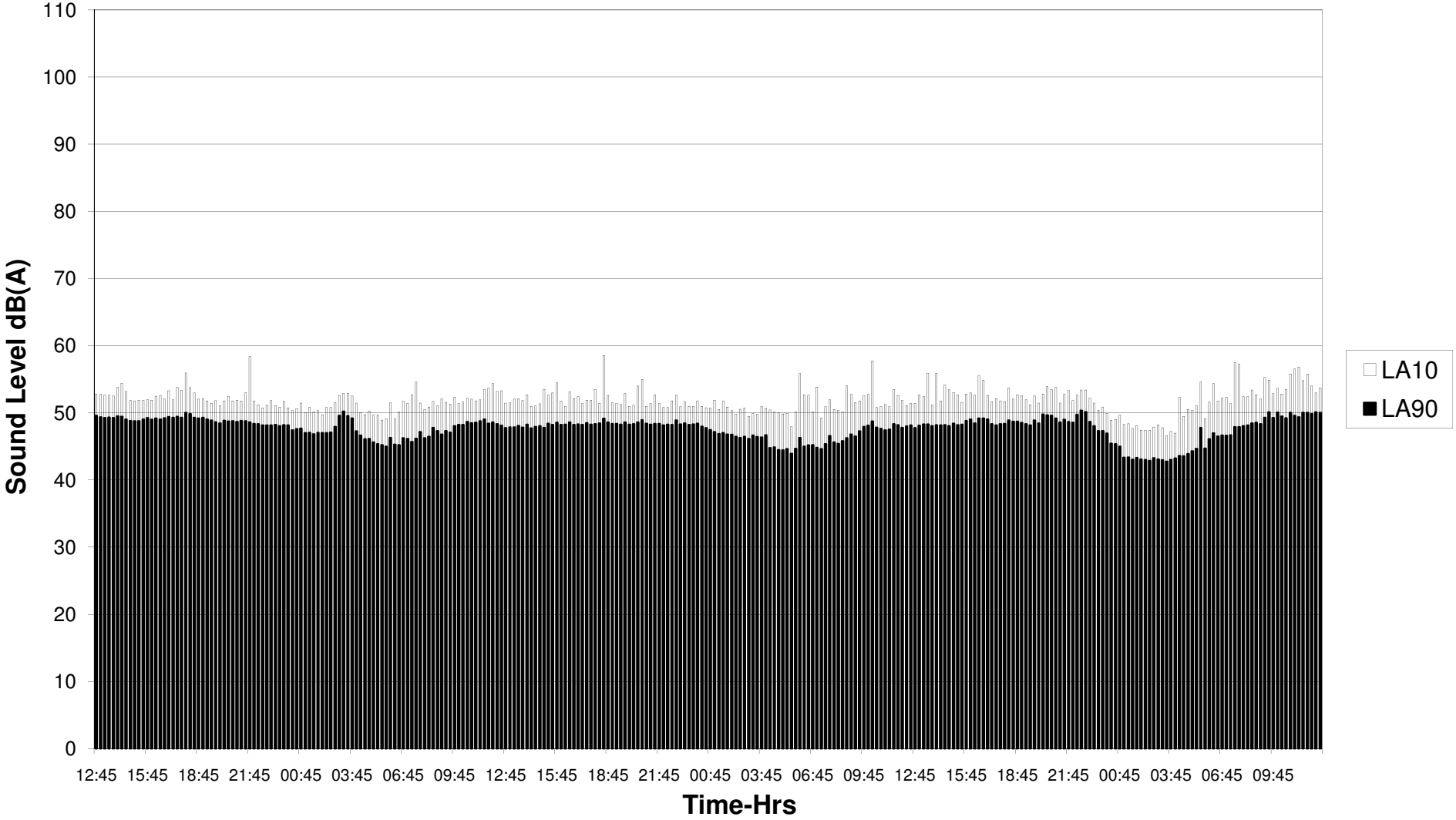
L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

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.

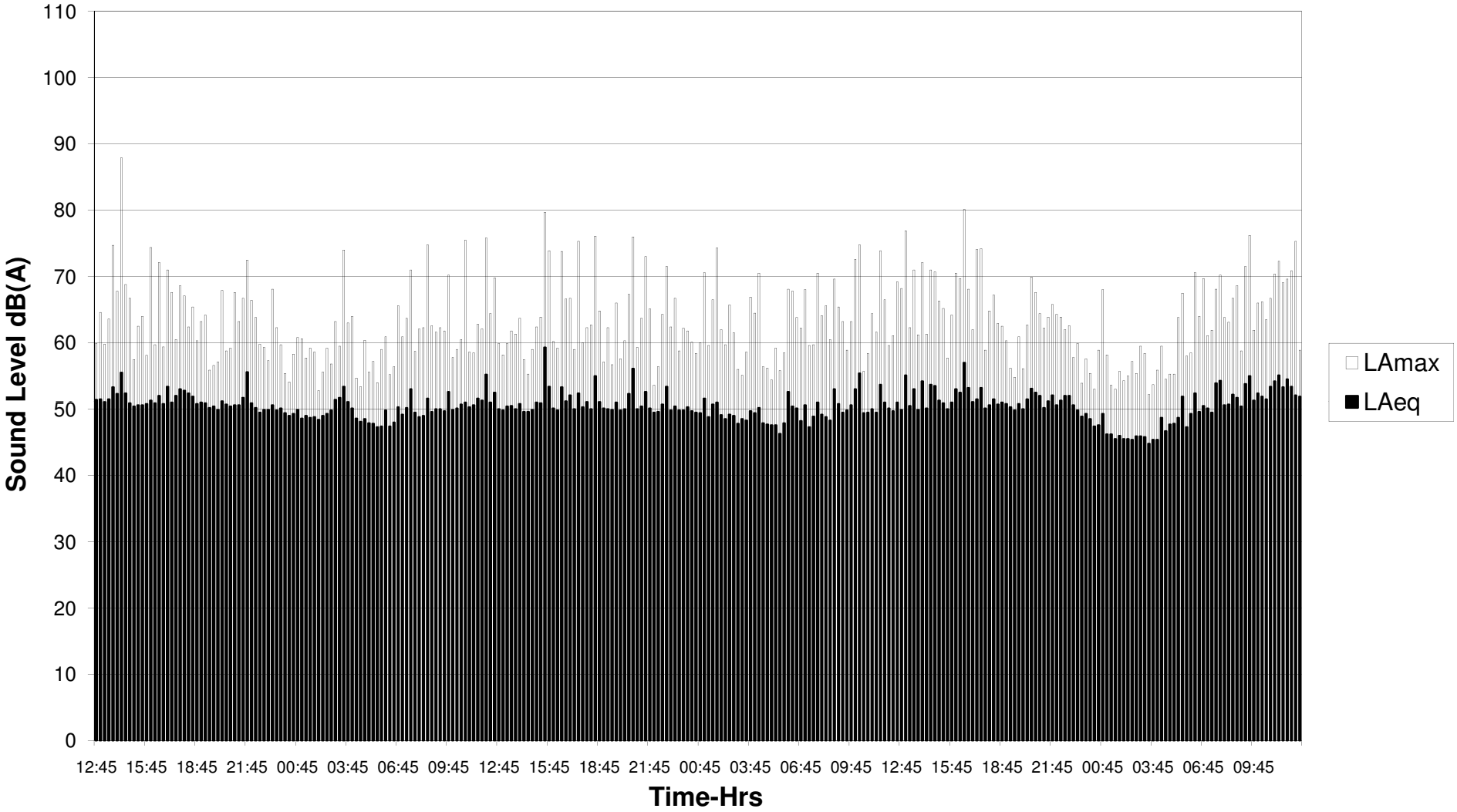
L_{max} : L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

16-19 Southampton Place
Position 1
L_{A10} and L_{A90} Noise Levels
Friday 11/02/2011 - Monday 14/02/2011



Time History Graph 17107/TH3

16-19 Southampton Place
Position 1
L_{Aeq} and L_{Amax} Noise Levels
Friday 11/02/2011 - Monday 14/02/2011



Time History Graph 17107/TH4

SUITABLE SUPPLIERS

of

ACOUSTIC ENCLOSURES

Name & Address	Telephone Number	Contact
Industrial Acoustic Company IAC House Moorside Road Winchester Hampshire SO23 7US	01962 87300	Scott Simmons - Enclosure Ventilation
Allaway Acoustics Ltd 1 Queens Road Hertford SG14 1EN	01992 550825	Jim Grieves Roger Wade
Acoustic Engineering Services Ltd 78 High Road Byfleet Surrey KT14 7QW	01932 352733	Barry Austin Mark Stagg

SUITABLE SUPPLIERS

of

ACOUSTIC ENCLOSURES FOR SMALL AIR CONDITIONING UNITS

Name & Address	Telephone Number	Contact
Environ Technologies Ltd Regus House 1010 Cambourne Business Park Cambourne Cambridge CB3 6DP	0870 383 3344	Steve Cox
Acoustic Engineering Services Ltd 78 High Road Byfleet Surrey KT14 7QW	01932 352733	Barry Austin Mark Stagg

THE ABOVE INFORMATION DOES NOT CONSTITUTE A RECOMMENDATION.