

**St Martin's House  
65-75 Monmouth Street  
London**

**ENVIRONMENTAL NOISE SURVEY  
& PLANT NOISE ASSESSMENT  
REPORT 20810/PNA2**

For:

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9 June 2015

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APPENDIX A

Revision No.	Date	Description
-	09/06/2015	First Issue

This report has been prepared by Hann 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 building service plant is proposed to serve office space and residential dwellings within 65-75 Monmouth Street. 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 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 24 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 roof level position, thought to be representative of the noise climate of the nearest affected property.

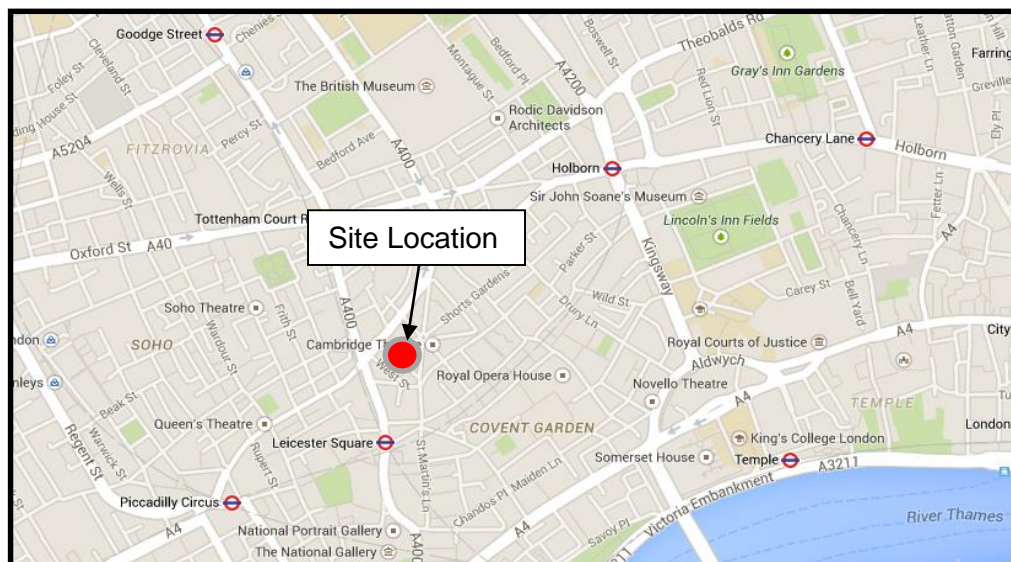
Based on the results of the noise survey, and with reference to the requirements of the Local Authority, to recommend suitable plant noise emission criteria.

To assess the proposed plant and comment on its acceptability.

## 3.0 SITE DESCRIPTION

### 3.1 Location

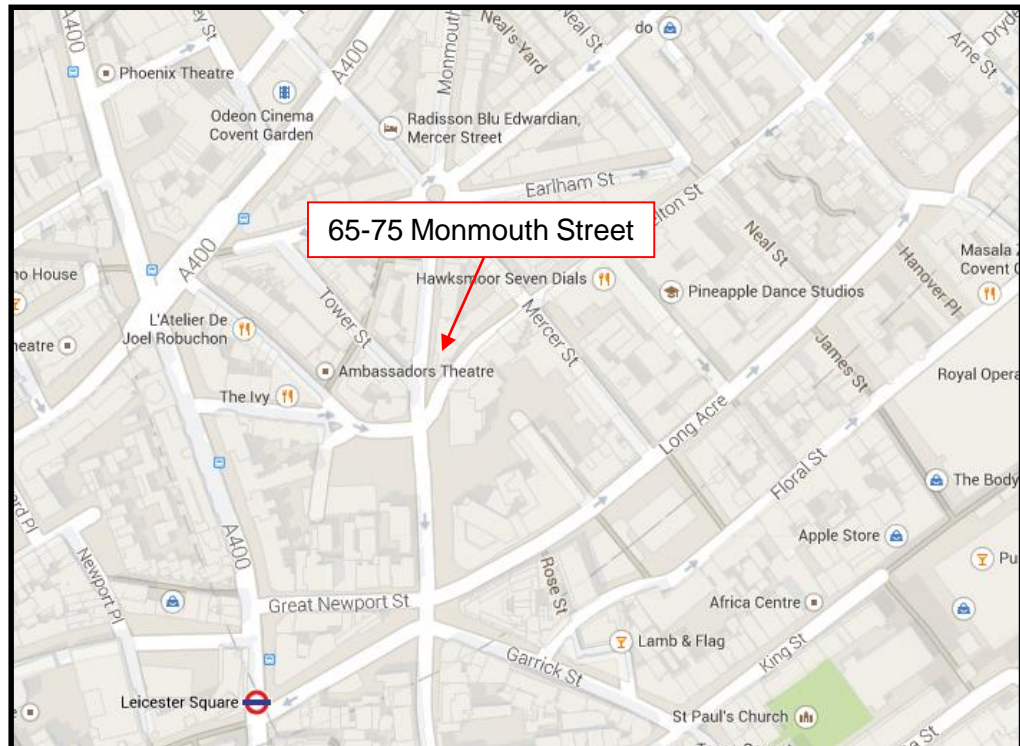
The site is located at 65-75 Monmouth Street, London and falls within the London Borough of Camden's jurisdiction. See Location Map below.



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### 3.2 Description

65-75 Monmouth Street is a 4 storey (plus basement) building containing a mixture of retail and office premises. The site is bound by 63 Monmouth Street and 11 Shelton Street and a mixture of commercial and residential properties. Seven Dials roundabout lies to the north of the site and Long Acre and Covent Garden to the south. See Site Plan below.



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## 4.0 ACOUSTIC TERMINOLOGY

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

## 5.0 METHODOLOGY

The survey was undertaken by Greg Barry, MSc (Hons) AMIOA.

### 5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:00 hours on Wednesday 22 October 2014 to 12:00 hours on Thursday 23 October 2014.

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 and the sky was generally clear. We understand that generally 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 the rear of the site at roof level. The microphone was attached to a pole and protruded from the fourth floor skylight window and was located at a distance of 1m from the roof.

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



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### 5.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Latest Verification
<b>Position 1</b> Type 1 Data Logging Sound Level Meter	Larson Davis	824	3803	LD calibration on 09/09/2014
<b>Position 1</b> Type 1 ½" Condenser Microphone	PCB	377B02	2470596	LD calibration on 09/09/2014
<b>Position 1</b> Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 21/03/2013

The sound level meters, including the extension cables, were calibrated prior to and on completion of the survey. No significant changes were found to have occurred (no more than 0.2 dB).

The sound level meters were located in environmental cases with the microphones connected to the sound level meters via extension cables. The microphone were fitted with Larson Davis windshields.

## 6.0 RESULTS

The results have been plotted on Time History Graphs 20810/TH1 and 20810/TH2 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 measured daytime and night-time  $L_{Aeq}$  and lowest  $L_{A90}$  noise levels are presented in the following table.

Period	$L_{Aeq, T}$ (dB)	Lowest $L_{A90}$ (dB)
Daytime (07:00 – 23:00)	62	52
Night-time (23:00 – 07:00)	55	45

## 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 from road traffic noise.

## 8.0 PLANT NOISE EMISSION CRITERIA

London Borough of Camden has advised the following criteria in relation to plant noise emissions for normal operation



*“Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), 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 attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the LA90, expressed in dB(A).”*

The supporting text to Development Policy DP28 also includes the following:

“Noise sensitive development includes housing, schools and hospitals as well as offices, workshops and open spaces”.

Based on the above criteria we propose the following plant noise emission limits to be achieved at one metre from the window of the nearest noise sensitive premises.

Plant Noise Emission Criteria (dB re 2x10 <sup>-5</sup> Pa)	
Daytime (07:00 – 23:00 hours)	Night-Time (23:00 – 07:00 hours)
47	40

## 9.0 PLANT NOISE ASSESSMENT

We understand that the following item of plant is to be installed at 73-75 Monmouth Street.

Plant Description	Location	Qty	Plant Make	Model Number
Residential Condensing Unit	Roof	2	Mitsubishi	MXZ-4D83VA
Office Condensing Unit	Roof	6	Mitsubishi	PUMY-P112VKM1

### 9.1 Plant Noise Emissions

We understand the manufacturer's noise data for the equipment to be as follows:

Plant Description	Sound Power Level (dB re 1x10 <sup>-12</sup> Watts) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Residential Condensing Unit	49	50	49	50	44	40	36	28	51
Office Condensing Unit	64	52	52	49	46	41	35	30	51

### 9.2 Location of Plant

We understand that the proposed plant is to be installed at roof level. The plant will be installed behind the pitched roof which will offer acoustic screening to all sides of the plant area.

### 9.3 Noise Sensitive Façade

The nearest noise sensitive façade is noted to be the fourth floor of 73-75 Monmouth Street and is of residential use.

### 9.4 Plant Operating Hours

The 2No. residential condensing units will operate up to 24 hours a day. As we understand, the proposed office condensing units will only be operational during office daytime hours.

### 9.5 Plant Noise Impact Assessment

Our calculations relating to the proposed plant installation are presented in Appendix B.

Our calculations indicate that the proposed residential and office plant when running simultaneously should meet the daytime requirements of the Local Authority outlined in Section 8.0.

Our calculations indicate that the proposed residential plant should meet the night-time requirements of the Local Authority outlined in Section 8.0.

## 10.0 CONCLUSIONS

A detailed 24 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 with reference to the requirements of the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive façade.

The assessment indicates that the proposed plant should be capable of achieving the requirements of the Local Authority at the nearest noise sensitive façade.



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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<sub>10</sub> & L<sub>90</sub>**: If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L<sub>n</sub> indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L<sub>10</sub> is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L<sub>90</sub> is the average minimum level and is often used to describe the background noise.

It is common practice to use the L<sub>10</sub> 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<sub>eq</sub>** : The concept of L<sub>eq</sub> (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<sub>eq</sub> 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<sub>eq</sub> very straightforward.

**L<sub>max</sub>** : L<sub>max</sub> is the maximum sound pressure level recorded over the period stated. L<sub>max</sub> is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L<sub>eq</sub> noise level.

## Appendix B

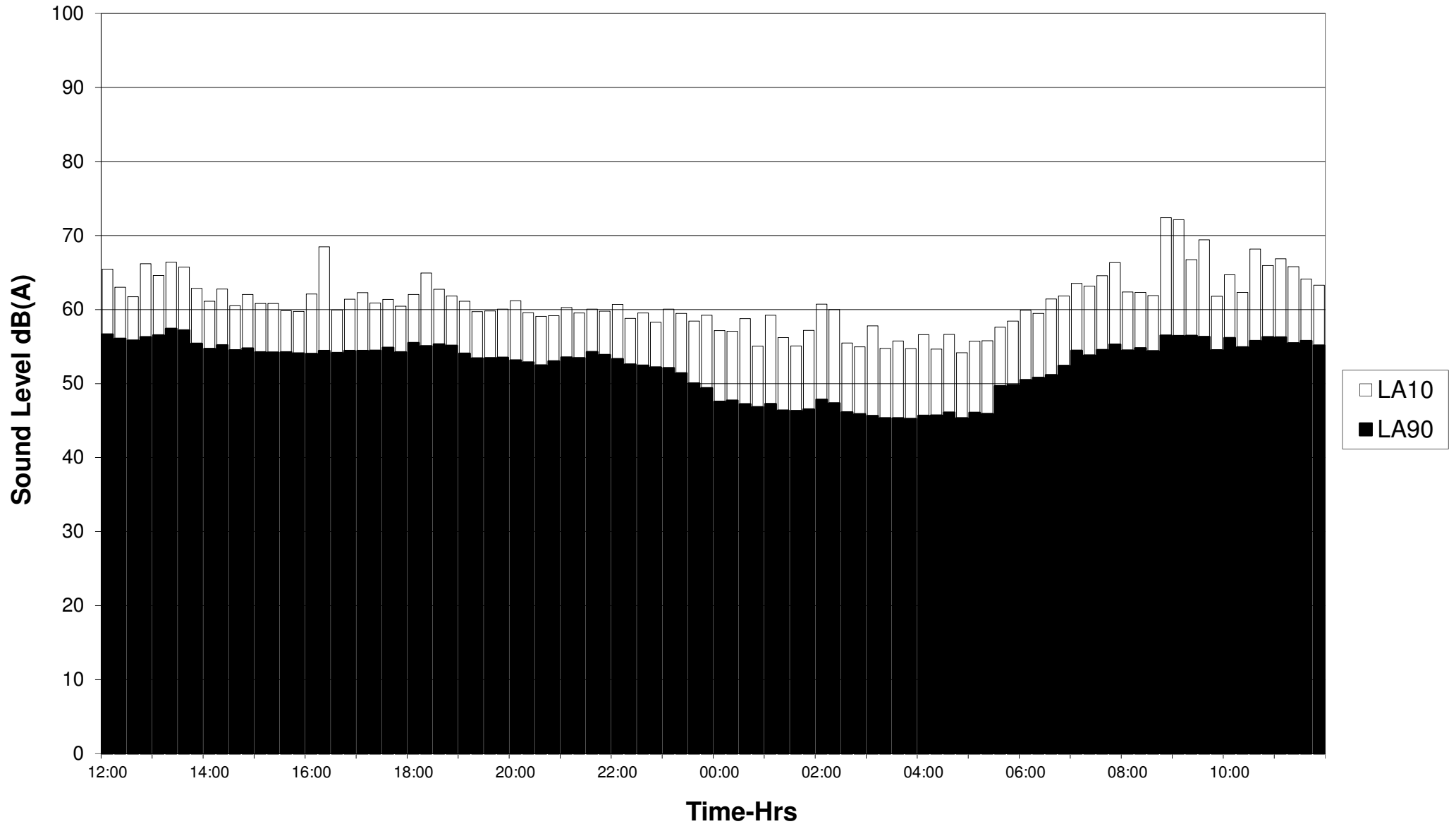
### Daytime – Office and Residential Plant

	Sound Pressure Level (dB re 2 x 10 <sup>-5</sup> Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
<b>Office Condensing Unit 1,2,3,5 and 6 at 1m</b>	64	52	52	49	46	41	35	30	51
Barrier Loss (pitched roof)	-8	-10	-12	-15	-18	-20	-20	-20	
Distance Loss	-8	-8	-8	-8	-8	-8	-8	-8	
Correction for 5No. units	+7	+7	+7	+7	+7	+7	+7	+7	
Resultant Noise Level	58	45	43	38	33	25	16	11	40
<b>Office Condensing Unit 4 at 1m</b>	64	52	52	49	46	41	35	30	
Barrier Loss (pitched roof)	-7	-8	-9	-12	-14	-17	-20	20	
Distance Loss	-6	-6	-6	-6	-6	-6	-6	-6	
Resultant Noise Level	48	34	32	27	21	13	7	2	29
<b>Residential Condensing Unit 3 and 4 at 1m</b>	49	50	49	51	44	40	36	28	51
Barrier Loss (pitched roof)	-7	-9	-11	-13	-16	-19	-20	-20	
Distance Loss	-6	-6	-6	-6	-6	-6	-6	-6	
Correction for 2No. units	+3	+3	+3	+3	+3	+3	+3	+3	
Resultant Noise Level	39	38	32	34	25	18	13	5	33
<b>Façade Correction</b>	+3	+3	+3	+3	+3	+3	+3	+3	
<b>Cumulative Noise Level</b>	<b>58</b>	<b>46</b>	<b>44</b>	<b>40</b>	<b>34</b>	<b>26</b>	<b>18</b>	<b>13</b>	<b>41</b>

### Night-time –Residential Plant Only

	Sound Pressure Level (dB re 2 x 10 <sup>-5</sup> Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
<b>Residential Condensing Unit 3 and 4 at 1m</b>	49	50	49	51	44	40	36	28	51
Barrier Loss (pitched roof)	-7	-9	-11	-13	-16	-19	-20	-20	
Distance Loss	-6	-6	-6	-6	-6	-6	-6	-6	
Correction for 2No. units	+3	+3	+3	+3	+3	+3	+3	+3	
Resultant Noise Level	39	38	32	34	25	18	13	5	33
<b>Façade Correction</b>	+3	+3	+3	+3	+3	+3	+3	+3	
<b>Cumulative Noise Level</b>	<b>42</b>	<b>41</b>	<b>35</b>	<b>37</b>	<b>28</b>	<b>21</b>	<b>16</b>	<b>8</b>	<b>36</b>

**69 Monmouth Street, London**  
**L<sub>A10</sub> and L<sub>A90</sub> Noise Levels**  
**Wednesday 22/10/2014 - Thursday 23/10/2014**  
**Position 1**



**69 Monmouth Street, London**  
**L<sub>Aeq</sub> and L<sub>Amax</sub> Noise Levels**  
**Wednesday 22/10/2014 - Thursday 23/10/2014**  
**Position 1**

