

29 Museum Street London

Environmental Noise Survey and Plant Noise Assessment Report

23820/PNA1 Rev1

15 December 2016

For:
Alhambra Hotel Ltd
c/o Freeson & Tee
1 Sandwich Street
London
WC1H 9PF





Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk



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Document Control

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0	2/12/2016	-	Fauwaz Baig Assistant Consultant BEng(Hons), AMIOA	Gareth Evans Associate BSc(Hons), MIOA
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			Fauwaz Baig Assistant Consultant BEng(Hons), AMIOA	Gareth Evans Associate BSc(Hons), MIOA

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Appendix A – Acoustic Terminology



1.0 Introduction

New building service plant is proposed to be installed at 29 Museum Street, London. 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 at the site and to propose suitable plant noise emission criteria based on the requirements of the Local Authority.

This report presents the survey methodology and findings.

2.0 Objectives

To establish, by means of detailed fully automated environmental noise monitoring, the existing A-weighted (dBA) 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.

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

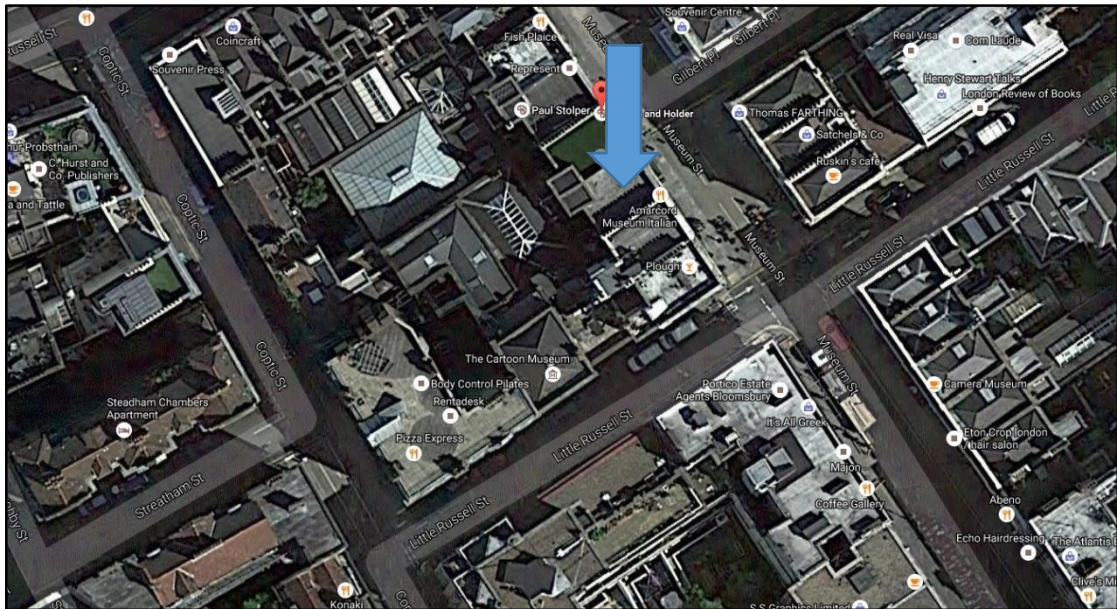
Based on the results of the noise survey, and in conjunction with the Local Authority, to recommend suitable plant noise emission criteria.

To assess proposed plant and comment on its suitability.

3.0 Site Description

3.1 Location

The site is located at 29 Museum Street, London WC1A 1LH and falls within the London Borough of Camden's jurisdiction. See Location Map below.



Location Map (Imagery © 2016 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2016 Google.)

3.2 Description

The current site is a ground plus three storey building. It is bounded by Gilbert Place to the north-east, residential properties to the east, west and to the south. The area is a mix of residential flats and a number of small commercial properties including a mixture of shops and offices located throughout on the ground floors.

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 F.Baig BEng (Hons), AMIOA.

5.1 Procedure

Environmental noise monitoring was undertaken from approximately 14:15 hours on 21 November 2016 to 14:15 hours on 22 November 2016.

During the period we were on site the wind conditions were calm and the sky was generally overcast. We understand the weather conditions were similar during the survey period. These conditions are considered suitable for obtaining representative measurement results.



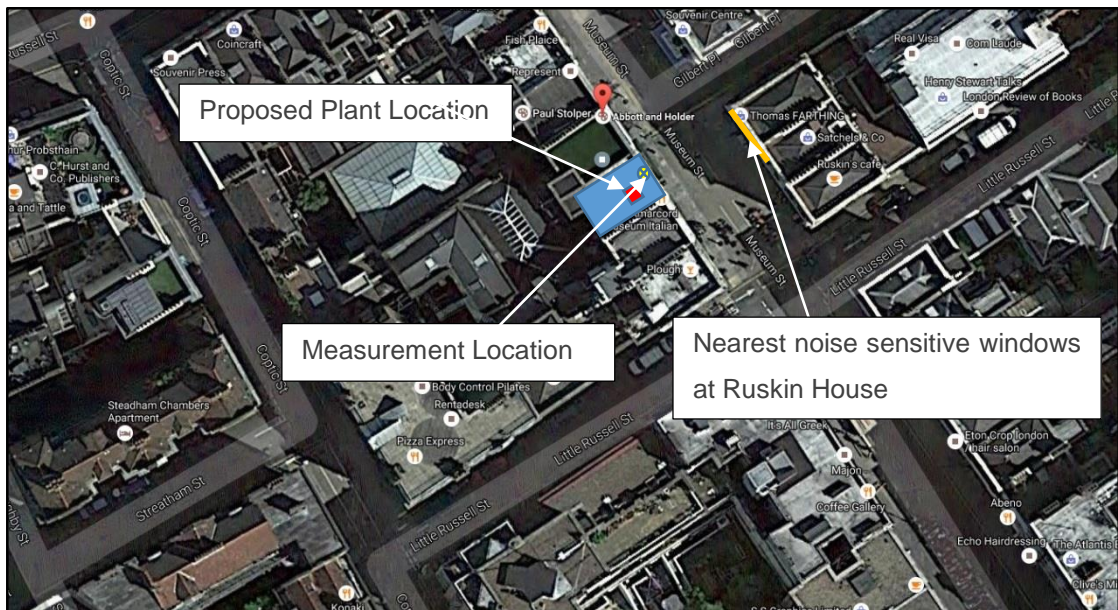
Measurements were taken continuously of the A-weighted (dBA) L_{90} , L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The noise level measurements were undertaken at a single position at the south of the site near the proposed plant location at roof level. The microphone was positioned approximately 12m above ground and approximately 3m from any reflecting surfaces.

The nearest noise sensitive windows are thought to be on the third floor of Ruskin House at an approximate distance of 13m from the proposed plant location.

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 Measurement Position & Nearest Noise Sensitive Windows (Imagery © 2016 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2016 Google.)

5.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3542	LD calibration on 19/02/2016
Type 1 1/2" Condenser Microphone	Larson Davis	377B02	104675	
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 09/06/2016



The sound level meter was connected to an extension cable and was fitted with a microphone windshield.

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

6.0 Results

The results have been plotted on Time History Graph 23820/TH1 enclosed presenting the 15 minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at the measurement position throughout the duration of the survey.

The daytime $L_{Aeq(16-hour)}$ and night-time $L_{Aeq(8-hour)}$ noise levels are presented in the table below:

Position	Daytime $L_{Aeq(16-hour)}$	Night-time ($L_{Aeq(8-hour)}$)
1	56 dBA	51 dBA

The following table presents the lowest measured L_{A90} background noise levels during the survey:

Position	Lowest Measured L_{A90} Background Noise Level		
	Daytime (07:00 – 23:00) Hours	Night-time (23:00 – 07:00) Hours	24 Hours
1	51 dBA	46 dBA	46 dBA

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 road traffic noise from the surrounding road network.

8.0 Plant Noise Emission Criteria

The site lies falls within the London Borough of Camden. We understand the London Borough of Camden's advice relating to noise emissions from air conditioning plant is as follows:



“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 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 L_{A90} , expressed in dB(A)”.

In order to meet the above advice, noise emissions from the proposed plant should not exceed a level of 5dB below the lowest measured $L_{A90(15min)}$. Therefore, based on the results of the noise survey and the advice above, we recommend the following plant noise emission levels to be achieved with all plant running simultaneously at 1m external to the nearest noise sensitive façade.

Plant Noise Emission Criteria (dBA re:2x10 ⁻⁵ Pa)		
Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)	24 Hours
46 dBA	41 dBA	41 dBA

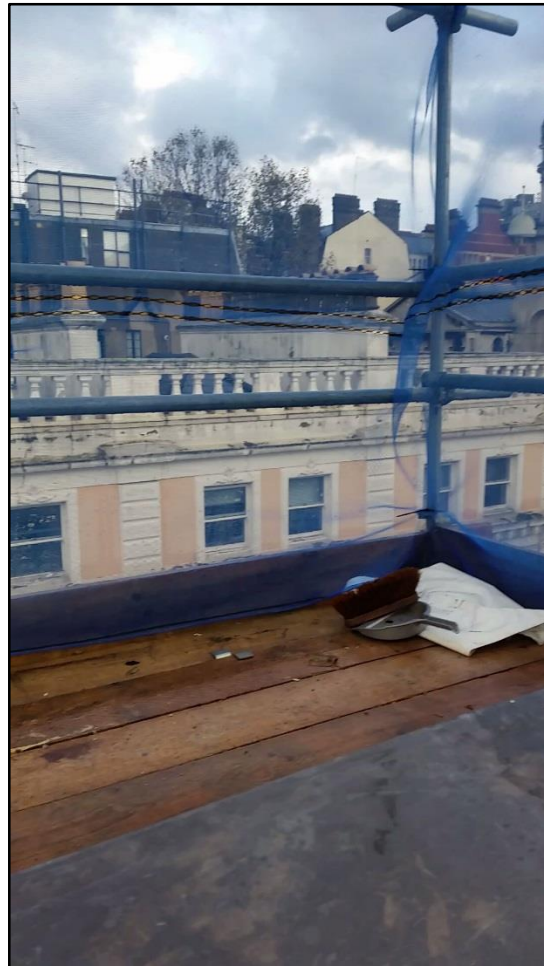
It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

9.0 Plant Noise Assessment

We understand that the following items of plant are to be installed at the site:

Description	Manufacturer	Qty	Plant Model	Sound Pressure Level (dBA)	Plant Location
A/C units	Mitsubishi	4	Pumy-P140VKM2	51 @1m	External Roof Plant Area

The plant is to be located at roof level. The closest noise sensitive windows are located on the third floor of Ruskin House at a distance of approximately 13m from the proposed plant. The plant will be installed behind a parapet wall which is approximately 1m high.



View as seen from the parapet wall showing the closest noise sensitive windows in the background.

9.1 Plant Noise Emissions

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

Pumy-P140VKM2	Sound Pressure Level @ 1m at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Standard Cooling	64	52.8	51.3	50	45.4	39.7	33.5	28.2
Standard Heating	59.2	59.7	51.1	52.4	46.8	41.7	36.7	31.2
Low Noise Mode	63.2	49.2	47	47.1	41.6	36.5	32.8	30.6



9.2 Plant Noise Impact Assessment

The following table summarises our calculations of atmospheric noise emission from the proposed plant to the nearest noise sensitive residential window, for the daytime and night-time periods under standard cooling, heating and low noise modes.

	Sound Pressure Level (dBA) Standard Cooling Mode	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
A/C unit (Cumulative)	57 @1m	57@ 1m
Barrier Loss	-14	-14
Distance Correction (13m)	-18	-18
Radiation Mode Correction	+3	+3
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	31	31

	Sound Pressure Level (dBA) Standard Heating Mode	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
A/C unit (Cumulative)	59 @1m	59@ 1m
Barrier Loss	-14	-14
Distance Correction (13m)	-18	-18
Radiation Mode Correction	+3	+3
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	33	33

	Sound Pressure Level (dBA) Low Noise Mode	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
A/C unit (Cumulative)	54 @1m	54@ 1m
Barrier Loss	-14	-14
Distance Correction (13m)	-18	-18
Radiation Mode Correction	+3	+3
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	28	28

Our calculations therefore indicate that noise levels from the proposed plant should be capable of achieving the proposed plant noise emission criteria presented 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.

Environmental 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.

As assessment has been carried out to determine the likely plant noise emissions to the nearest noise sensitive window. Our assessment indicates the proposed building services plant should be capable of the proposed environmental noise criteria.



Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that 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_{90,T} L₉₀ is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

L_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

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.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

29 Museum Street

Position 1

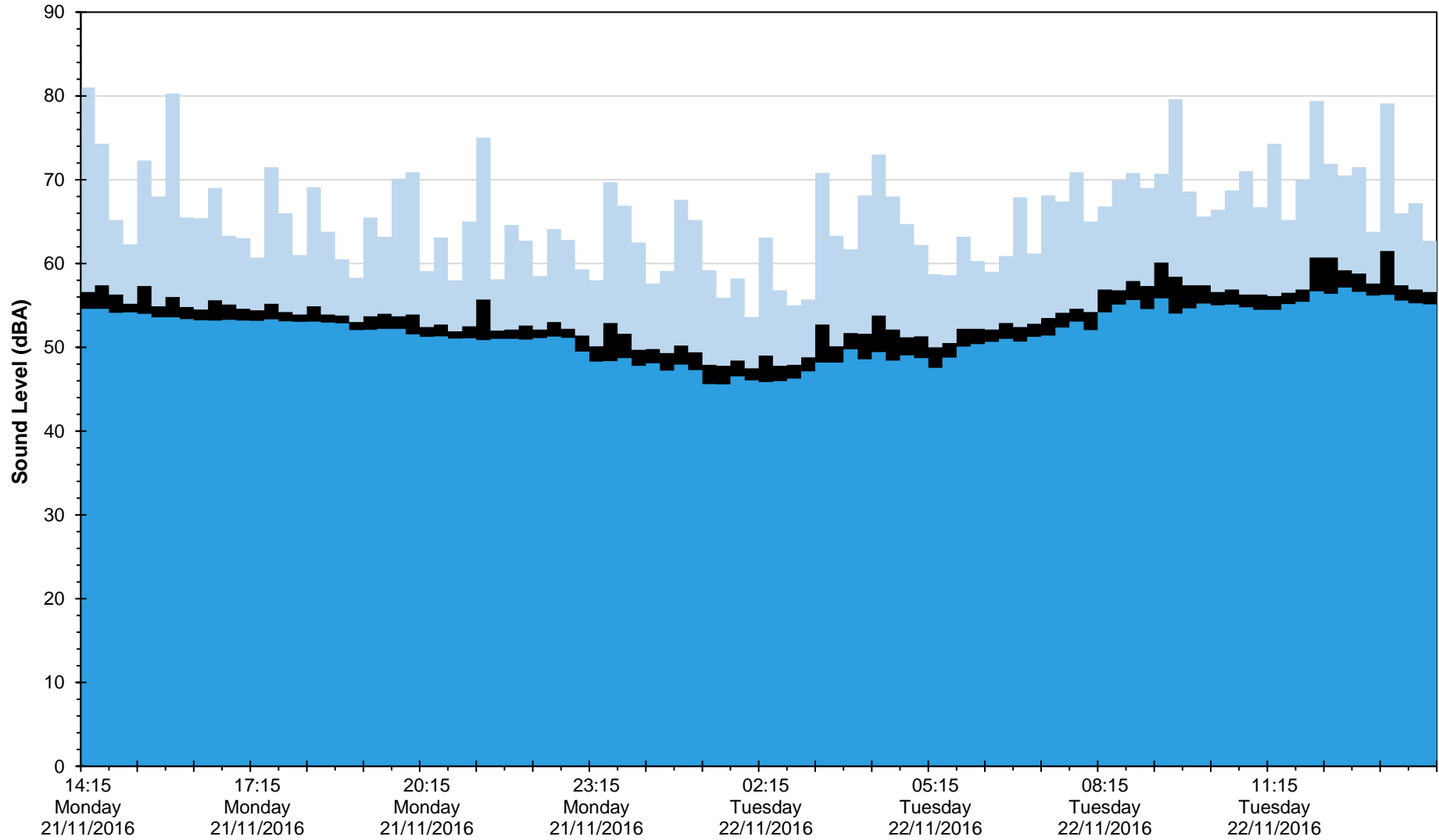
L_{Aeq} , L_{Amax} and L_{A90} Noise Levels

Monday 21 November 2016 to Tuesday 22 November 2016

■ L_{Amax}

■ L_{Aeq}

■ L_{A90}



Date and Time

23820/TH1