Downing Court London

ENVIRONMENTAL NOISE SURVEY & PLANT NOISE ASSESSMENT REPORT 19406/PNA1

For:

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APPENDIX A

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

Downing Court, Grenville Street is a residential property. A new roof top extension is proposed for the property. The proposals include the installation of various items of plant.

Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey at the site and advise on the necessary noise control measures.

This report presents the survey methodology, findings and plant noise assessment.

2.0 OBJECTIVES

To establish the existing noise levels by means of fully automated noise monitoring over a period of approximately 24 hours at 1No. secure and accessible position.

To assess the noise emissions from the proposed plant, based upon any data/information with which we are provided, and comment upon the acceptability.

To present our results in a report to support the planning application as far as reasonably possible, advising on noise control measures if required to satisfy the requirements of the Local Authority if necessary.

3.0 SITE DESCRIPTION

3.1 Location

Downing Court falls within the jurisdiction of the London Borough of Camden. See Map below.



Location Map (maps.google.co.uk)

3.2 Description

Downing Court is a 6No. story residential building.

It is bounded by residential dwellings to the West and South. The closest dwellings are No.s 11-12 Grenville Street and 28 Bernard Street (adjoining). It is bounded by Grenville Street to the East and Bernard Street to the North. 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 15:30 hours on Thursday 25 July 2013 to 15:30 hours on Friday 26 July 2013.

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 and the sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar to these and 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 full 15 minute periods.

5.2 Measurement Positions

The noise level measurements were undertaken at 1No. positions around the development site. The measurement positions are described in the table below.

Position No	Description
1	The sound level meter was located on the roof of Downing Court to the Northwest of the property. The microphone was located approximately 20 metres above ground level.

The position was selected in order to assess the lowest noise levels at the site that are considered representative of the noise climate at the nearest noise sensitive windows, for subsequent use in setting plant noise emission criteria.

The location of the monitoring position is shown on the site 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	Туре	Serial Number	Latest Verification
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3444	LD calibration on 09/05/2011
Position 1 Type 1 ½" Condenser Microphone	РСВ	377B02	122885	LD calibration on 09/05/2011
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 02/03/2012

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.

The sound level meter was calibrated prior to and on completion of the surveys. No significant deviations occurred.

6.0 RESULTS

The results have been plotted on Time History Graphs 19406/TH1 to 19406/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 lowest measured L_{A,90} noise levels are presented in the following table.

Position	Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)
1	49	47

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 sources were noted to be low levels of road noise from the surrounding roads.

8.0 PLANT NOISE EMISSION CRITERIA

Downing Court lies within the London Borough of Camden. Camden council's advice relating to noise emissions from plant installations can be found in the document Camden Development Policies (2010) – Section 3

The document is as follows:

"Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade [must not exceed 10dBA below the measured LA90 level during the day, evening or night.]"

On the basis of the above and our survey results, we propose the following plant noise emission limits at 1m from the facades of the nearest neighbouring buildings.

	Plant Noise Emission Criteria (dBA re:2x10 ⁻⁵ Pa)								
Position	Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)							
1	39	37							

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

9.0 PLANT NOISE ASSESSMENT

The following new items of plant are proposed at Downing Court:

Plant Description	Location	Qty	Plant Make	Model Number
Air to Water Heat Pump	6 th Floor	2	Worcester Bosch	Greensource 7kW
Twinfan Unit	Roof	1	NuAire	Quietscroll EST9-R

9.1 Plant Noise Emissions

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

Plant		In DuctSound Power Level (dBA) at Octave Band Centre Frequencies								
Description	63	63 125 250 500 1k 2k 4k 8k								
Air to Water Heat Pump	74	68	67	63	58	56	52	49		

Plant		Sound Power Level (dBA) at Octave Band Centre Frequencies										
Description	63	125	250	500	1k	2k	4k	8k				
Twinfan Unit	-	85	85	79	78	77	76	69				

9.1 Operating Hours

We understand that the plant will potentially operate 24 hours per day.

9.2 Location of Plant

The twin extract fan unit is to be located on the roof of the building.

The air to water heat pumps are located on the west facade and on the inside corner of the building.



Plan Showing Proposed Plant Locations (maps.google.co.uk)

9.3 Nearest Noise Sensitive Location

In line with the Local Authority criteria, the nearest noise sensitive location for Heat Pump A is 28 Bernard Street approximately 3m away from the west facade. For Heat Pump B the nearest noise sensitive location is the flat A kitchen. For the Twinfan unit, the nearest noise sensitive location is the north facade of flat A.

9.4 Plant Noise Impact Assessment

9.4.1 Air to Water Heat Pump A

The table below presents our calculations relating to the proposed heat air pump on the west facade at the nearest noise sensitive area:

		Sound Level dB at Octave Band Centre Frequencies								
	63	125	250	500	1k	2k	4k	8k		
Air to Water Heat Pump – Sound Power Level	74	68	67	63	58	56	52	49	65	
Air to Water Heat Pump – Sound Pressure Level @ 1m	63	57	56	52	47	45	41	38	54	
Distance Loss @ 3m	-10	-10	-10	-10	-10	-10	-10	-10	-	
Calculated Noise Level at West Facade. Sound Pressure Level	53	47	46	42	37	35	31	28	44	

Our calculations indicate the noise from the plant room would not meet the requirements of the Local Authority unless positioned within an appropriate acoustic enclosure. Please see our enclosed louvre specification below.

With the use of an acoustic enclosure as per our enclosed specification, our calculations indicate the noise from the plant should be 32dBA at a distance of 3 metres from the enclosure. This meets the requirements of the Local Authority.

9.4.2 Air to Water Heat Pump B

The table below presents our calculations relating to the proposed heat air pump on the inside corner at the nearest noise sensitive area:

		Sound Level dB at Octave Band Centre Frequencies								
	63	125	250	500	1k	2k	4k	8k		
Air to Water Heat Pump – Sound Power Level	74	68	67	63	58	56	52	49	65	
Air to Water Heat Pump – Sound Pressure Level @ 1m	63	57	56	52	47	45	41	38	54	
Distance Loss @ 4m	-12	-12	-12	-12	-12	-12	-12	-12	-	
Calculated Noise Level at Flat A bathroom. Sound Pressure Level	51	45	44	40	35	33	29	26	42	

Our calculations indicate the noise from the plant room would not meet the requirements of the Local Authority unless positioned within an appropriate acoustic enclosure. Please see our enclosed louvre specification below.

With the use of an acoustic enclosure as per our specification, our calculations indicate the noise from the plant should be 32dBA at a distance of 4 metres from the enclosure. This meets the requirements of the Local Authority.

9.4.3 Twinfan Unit

The table below presents our calculations relating to the proposed plant installation at the nearest noise sensitive area:

	Sound Level dB at Octave Band Centre Frequencies								
	125	250	500	1k	2k	4k	8k		
Twinfan Unit - Inlet In-duct Sound Power Level	85	85	79	78	77	76	69	-	
Twinfan Unit – Inlet Induct Sound Pressure level @ 1m	77	77	71	70	69	68	61	76	
Distance Loss @ 2m	-6	-6	-6	-6	-6	-6	-6	-	
Barrier Correction	-10	-12	-14	-17	-20	-23	-24	-	
Calculated Noise Level at North Facade Sound Pressure Level	61	59	51	47	43	39	31	54	

Our calculations indicate the noise from the plant room would not meet the requirements of the Local Authority unless placed in an appropriate acoustic enclosure. Please see our enclosed louvre specification below.

With the use of an acoustic enclosure as per our specification, our calculations indicate the noise from the plant room should be 34dBA at the North facade. This meets the requirements of the Local Authority.

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.

We have proposed plant noise emission criteria based on the requirements of the Local Authority.

Our calculations indicate the plant noise levels exceed the Local Authority criteria outlined in Section 8.0.

We have therefore proposed amelioration measures for both plant areas which our calculations indicate should meet the requirements.

Prepared by Robert Hollinshead Trainee Assistant Consultant HANN TUCKER ASSOCIATES

Checked by Andrew Fermer Director HANN TUCKER ASSOCIATES

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.

L₁₀ & L₉₀: 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 L₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L₉₀ 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.

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

Downing Court – Twin Extract Fan

ACOUSTIC SPECIFICATION FOR ACOUSTIC LOUVRE SCREENING

Acoustic louvre screening shall extend:

- continuously around all sides of the plant area.
- from the roof up to the highest part of the plant.

The louvre blades shall face in the direction opposite to that which would be conventional for weather louvers, such that the plant is not visible between the louvre blades when viewed from below.

Performance

The acoustic louvres shall be at least 300mm deep and provide, in their as-installed condition, the following minimum combined sound reduction indices (SRI's) when tested in accordance with BS EN ISO 10140-2:2010:

	Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)										
63	63 125 250 500 1k 2k 4k 8k										
13	13 15 18 30 37 39 35 36										

Construction

The louvre frame shall be constructed from a suitable gauge of galvanised mild steel, or aluminium, supporting louvre blades of like material. The acoustic material in the blades shall be packed to a density of not less than 45kg/m³ and be inert, rot and vermin proof, non-hygroscopic incombustible mineral fibre. This shall be faced with glass fibre cloth, or other approved infill protection membrane, and retained on the lower blade face by perforated galvanised mild steel or aluminium (not "expamet" or similar derivative) having a minimum thickness of 0.5mm fixed at 200mm (max) centres.

All junctions between the acoustic screen and adjacent structures shall be made good and sealed with a heavy grout and/or non-hardening dense mastic.

The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, etc., as appropriate, and is suitably weatherproofed.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

Downing Court – Air to Water Heat Pumps A

ACOUSTIC SPECIFICATION FOR ACOUSTIC LOUVRE SCREENING

Acoustic louvre screening shall extend:

- continuously around all sides of the plant area.
- from the roof up to the highest part of the plant.

The louvre blades shall face in the direction opposite to that which would be conventional for weather louvers, such that the plant is not visible between the louvre blades when viewed from below.

Performance

The acoustic louvres shall be at least 300mm deep and provide, in their as-installed condition, the following minimum combined sound reduction indices (SRI's) when tested in accordance with BS EN ISO 10140-2:2010:

Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)											
63	125	250	500	1k	2k	4k	8k				
6	7	10	12	18	18	14	13				

Construction

The louvre frame shall be constructed from a suitable gauge of galvanised mild steel, or aluminium, supporting louvre blades of like material. The acoustic material in the blades shall be packed to a density of not less than 45kg/m³ and be inert, rot and vermin proof, non-hygroscopic incombustible mineral fibre. This shall be faced with glass fibre cloth, or other approved infill protection membrane, and retained on the lower blade face by perforated galvanised mild steel or aluminium (not "expamet" or similar derivative) having a minimum thickness of 0.5mm fixed at 200mm (max) centres.

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Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

Downing Court – Air to Water Heat Pumps B

ACOUSTIC SPECIFICATION FOR ACOUSTIC LOUVRE SCREENING

Acoustic louvre screening shall extend:

- continuously around all sides of the plant area.
- from the roof up to the highest part of the plant.

The louvre blades shall face in the direction opposite to that which would be conventional for weather louvers, such that the plant is not visible between the louvre blades when viewed from below.

Performance

The acoustic louvres shall be at least 300mm deep and provide, in their as-installed condition, the following minimum combined sound reduction indices (SRI's) when tested in accordance with BS EN ISO 10140-2:2010:

Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)											
63	125	250	500	1k	2k	4k	8k				
6	6	8	10	14	18	16	15				

Construction

The louvre frame shall be constructed from a suitable gauge of galvanised mild steel, or aluminium, supporting louvre blades of like material. The acoustic material in the blades shall be packed to a density of not less than 45kg/m³ and be inert, rot and vermin proof, non-hygroscopic incombustible mineral fibre. This shall be faced with glass fibre cloth, or other approved infill protection membrane, and retained on the lower blade face by perforated galvanised mild steel or aluminium (not "expamet" or similar derivative) having a minimum thickness of 0.5mm fixed at 200mm (max) centres.

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The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

Downing Court L_{A10} and L_{A90} Noise Levels Thursday 25/07/2013 - Friday 26/07/2013



Downing Court L_{Aeq} and L_{Amax} Noise Levels Thursday 25/07/2013 - Friday 26/07/2013

