Environmental Equipment Corporation Ltd
Richmond House, Churchfield Road
Walton on Thames
Surrey. KT12 2TP
t: 01932 230940
f: 01932 230941
e: info@eecnoisecontrol.co.uk

Project:

1 Ely Place

Title:

Background Noise Survey and Plant Assessment

FAO: Gideon Whittingham, Planning Officer

quietly moving forward

Environmental Equipment Corporation Ltd
Richmond House, Churchfield Road
Walton on Thames
Surrey. KT12 2TP
t: 01932 230940
f: 01932 230941
e: info@eecnoisecontrol.co.uk

Report Title	1 Ely Place Background Noise Survey and Plant Assessment
Reference	jm/EC11992-004
Version	
Issue Date	22 May 2012
Client	MDA Consulting Ltd
Author	Jon Mudd BEng(Hons) MIOA Director
Checked	Tim Meed BSc(Hons) MIOA Director

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by MDA Consulting Ltd on behalf of Hatton Garden Estates to undertake a background noise survey at 1 Ely Place, with a view to ascertaining prevailing background noise levels for the immediate vicinity.

1.02 Proposals are being submitted to the London Borough of Camden to install new plant on the 4th floor terrace. Noise levels from the plant need to be assessed as part of the planning application and are therefore addressed in this report.

1.03 This report is prepared solely for MDA Consulting Ltd and Hatton Garden Estates. Environmental Equipment Corporation Ltd accepts no responsibility for its use by any third party.

1 SITE

1.01 No. 1 Ely Place is between the junctions of Ely Place, Hatton Garden and Charterhouse Street. It is proposed that new plant will be installed on the 4th floor terrace area as part of a future fit out of the building. The 4th floor terrace is at the rear of the property and overlooks the rear of the properties along Ely Place and Hatton Garden which are all of commercial use. There are residential properties on the opposite side of Hatton Garden which have a line of sight to part of the terrace area. The following photographs show views of the site and immediate surroundings.

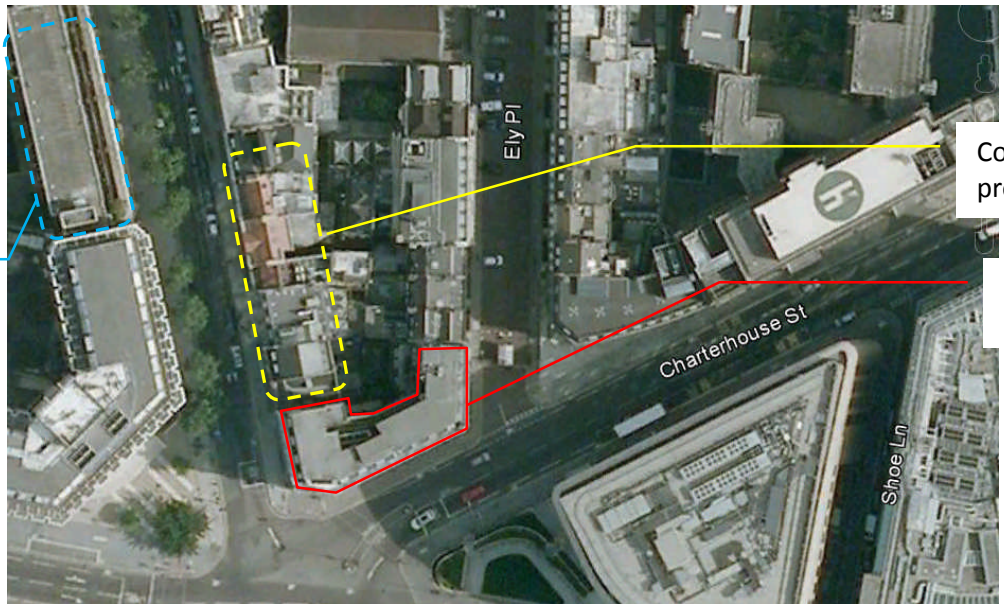


Photo 1: Aerial view of site and the surroundings

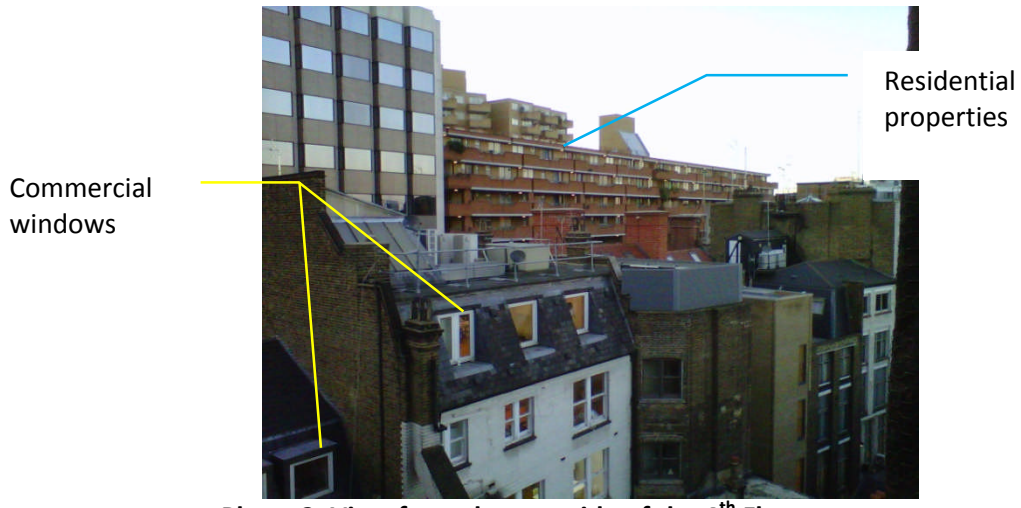


Photo 2: View from the east side of the 4th Floor rear terrace

1.02 The nearest noise sensitive windows belong to adjacent commercial properties. The nearest residential properties are approximately 60 metres away from the terrace.

2 MEASUREMENTS

2.01 Background noise levels have been measured over a 24 hour period at a suitable location, representative of the immediate noise environment outside the commercial properties, as shown on the site plan in Appendix A. None of the existing plant installed on the 4th floor terrace was operating, however there was significant plant and traffic noise audible at the measurement location.

2.02 The equipment was set up to integrate sound levels over 5 minute intervals for 24 hours between 1500hrs, Wednesday 1st February and 1500hrs, Thursday 2nd February, 2012.

2.03 Levels were recorded as A weighted L_{eq}, L_{10} and L_{90}.

2.04 Weather conditions during the survey were calm and dry throughout.

3 EQUIPMENT

3.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2250 Light Integrating Sound Level Meter conforming to type 1 BS EN 60804 & BS EN 60651: 1994.
- Brüel & Kjær Condenser Microphone type 4950.
- Brüel & Kjær Outdoor Microphone, type 4952/UA1679.
- Tripod.

3.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter B&K2250	Serial No.	2766725
	Calibration Date	14.6.11
	Cal Certificate No.	C1104527
Outdoor Microphone B&K 4952	Serial No.	2751633
	Calibration Date	17.6.11
	Cal Certificate No.	C1104663
Calibrator B&K4231	Serial No.	1761563
	Calibration Date	18th October 2011
	Cal. Certificate No.	00577/1

N.B. Copies of calibration certificates are available upon request.

3.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

4 RESULTS

4.01 A list of the levels measured is included in Appendix B and represented graphically in Appendix C.

4.02 A summary of the time averaged ambient level and lowest measured background levels are shown in Table 5.1, below.

Period	$L_{Aeq,T}$ – dB	L_{A90} – dB
Day time (0700-1900 hrs)	62.8	51.3
Evening (1900-2300 hrs)	59.6	51.3
Night-time (2300-0700 hrs)	57.0	48.2

Table 5.1: Measured Ambient and Lowest Background Noise Levels

5 DISCUSSION

5.01 The London Borough of Camden Environmental Health Department require that noise levels generated by mechanical services plant should be designed to a level of 5 dB below the lowest measured background level during the proposed period of operation and as measured at the nearest noise sensitive windows. If the plant noise is considered tonal then the design criterion should be 5 dB more stringent.

5.02 Based on the measured noise levels, as summarised in Table 5.1, the applicable criteria for this application will be 46, 46 and 43 dB(A) for the respective day, evening and night-time periods based on non-tonal plant.

6 PLANT ASSESSMENT

6.01 The proposed plant consists of a maximum of two units. One will be installed to serve the fourth floor and an additional unit at a future time may be installed to serve the third floor. The report considers the scenario of both units being installed.

6.02 The proposed condensing units will be sited on the fourth floor level roof. The plant will be positioned within an alcove area of the roof which will effectively screen it from all the surrounding properties. The proposed location is shown in the following photograph.

Photo 3: View towards proposed plant location

6.03 The manufacturer's published noise level for these units (Mitsubishi PURY-P200 and Mitsubishi PURY-P250) is 56 dB(A) and 57 dB(A)at 1m free-field for the fourth and third floor units respectively.

6.04 Allowing for distance attenuation over 20m, and the acoustic screening provided by the plant location with respect to the nearest commercial windows, the cumulative plant noise level has been calculated to be 36 dB(A), as indicated below.

Element	Level	Comments
Cumulative Source Noise	60 dB(A)	At 1m
Distance Attenuation	- 21 dB	20m parallelepiped distance loss
Directivity	+ 6 dB	2 No. additional reflective surfaces
Acoustic Screening	- 9 dB	Plant location with respect to windows
Propagated Noise	**36 dB(A)**	1m outside commercial windows

Table 7.1: Plant Noise Calculation

6.05 Allowing for distance attenuation over 60m, and the acoustic screening provided by the plant location with respect to the nearest residential windows, the cumulative plant noise level has been calculated to be 23 dB(A), as indicated below.

Element	Level	Comments
Cumulative Source Noise	60 dB(A)	At 1m
Distance Attenuation	- 31 dB	60m parallelepiped distance loss
Directivity	+ 6 dB	2 No. additional reflective surfaces
Acoustic Screening	- 12 dB	Plant location with respect to windows
Propagated Noise	**23 dB(A)**	1m outside residential windows

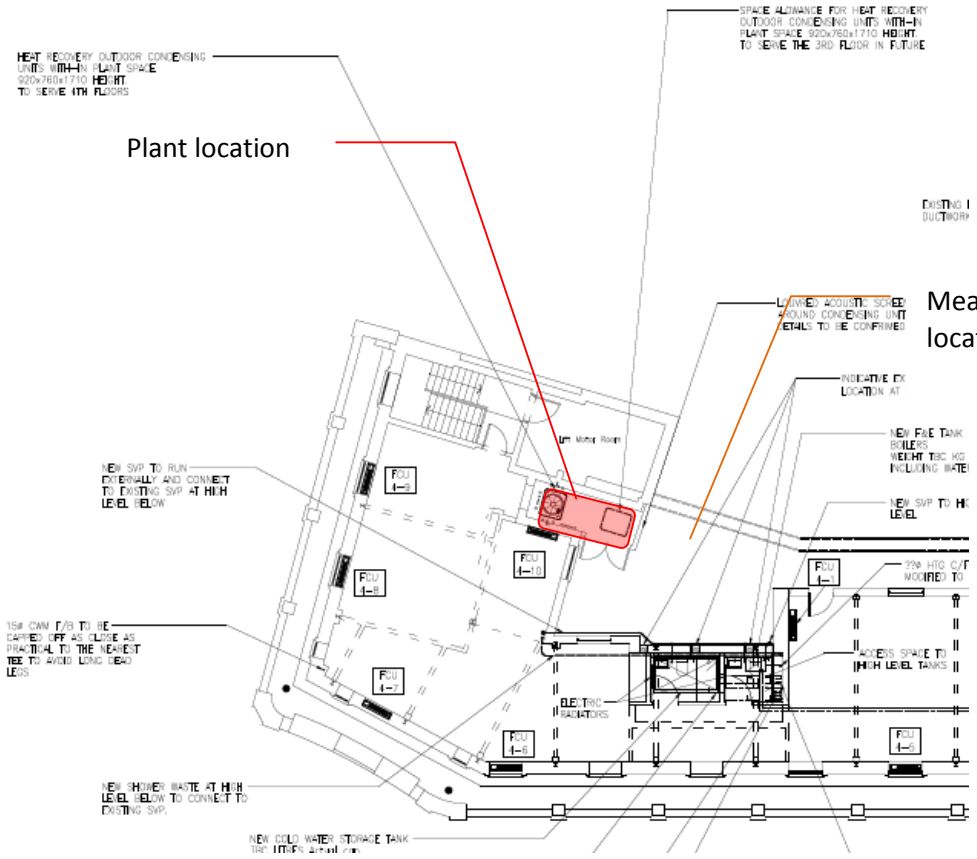
Table 7.1: Plant Noise Calculation

6.06 As discussed in section 6 of this report, the applicable noise level design criterion for the proposed new plant has been set at 43 dB(A) outside the nearest noise sensitive windows.

6.07 The calculated plant noise levels are at least 7 dB(A) less than the design criterion and therefore satisfy the planning requirements of the London Borough of Camden.

APPENDIX A

SITE PLAN
&
MEASUREMENT LOCATION



APPENDIX B

SURVEY RESULTS
(TABULAR)

EC 11992 - 1 Ely Place

HGE

24 Hour Noise data

Time	$L_A$eq	L_A10	L_A90
15:05	78.6	56.1	52.1
15:10	62.0	61.6	52.9
15:15	55.7	56.4	53.8
15:20	54.9	55.2	53.5
15:25	54.4	55.2	52.5
15:30	60.8	61.6	52.9
15:35	58.1	57.1	53.9
15:40	55.0	55.9	53.0
15:45	54.1	54.9	53.2
15:50	56.4	56.9	54.1
15:55	55.9	57.0	54.0
16:00	54.8	55.6	53.2
16:05	54.1	54.9	52.9
16:10	61.0	57.4	53.2
16:15	55.4	56.1	53.4
16:20	54.7	54.6	52.8
16:25	53.8	54.4	52.6
16:30	57.2	57.5	53.3
16:35	60.8	56.7	53.9
16:40	70.4	55.7	53.4
16:45	57.0	55.4	52.9
16:50	56.1	55.4	52.6
16:55	56.7	57.0	53.0
17:00	54.3	55.0	53.4
17:05	54.2	55.2	53.0
17:10	54.0	55.0	52.8
17:15	54.2	54.9	53.0
17:20	67.1	55.6	52.7
17:25	56.3	57.6	53.6
17:30	55.5	56.8	52.5
17:35	54.3	55.1	52.5
17:40	53.5	54.4	52.5
17:45	57.4	55.0	52.8
17:50	56.0	56.2	52.8
17:55	54.8	55.8	51.8
18:00	55.6	56.7	53.0
18:05	53.8	55.1	52.4
18:10	54.6	54.8	52.7
18:15	54.2	55.4	52.9
18:20	58.1	55.7	53.3
18:25	54.9	57.3	52.6
18:30	64.3	55.3	52.2
18:35	54.9	56.0	53.1
18:40	55.0	55.6	53.4
18:45	60.4	60.1	52.8
18:50	58.3	54.6	52.3
18:55	60.0	56.1	52.6
19:00	58.6	55.1	52.8

Time	$L_A$eq	L_A10	L_A90
19:05	57.8	56.8	53.0
19:10	56.5	55.9	52.6
19:15	55.1	55.1	52.5
19:20	53.8	54.2	51.8
19:25	57.6	56.3	52.6
19:30	54.2	55.5	52.1
19:35	55.8	55.0	52.4
19:40	58.6	55.2	52.2
19:45	56.5	54.7	51.8
19:50	70.8	57.1	52.5
19:55	59.2	59.7	52.4
20:00	55.9	55.8	51.9
20:05	57.2	57.6	52.3
20:10	61.8	55.7	52.5
20:15	64.5	56.3	51.3
20:20	59.4	54.9	52.3
20:25	59.6	55.7	52.8
20:30	56.1	56.0	52.6
20:35	54.0	54.2	52.0
20:40	61.3	54.6	52.4
20:45	55.6	54.5	51.7
20:50	53.5	54.5	51.5
20:55	53.5	54.6	52.1
21:00	63.7	64.9	52.8
21:05	53.4	54.4	51.7
21:10	54.8	55.2	52.4
21:15	53.9	53.8	51.8
21:20	53.8	53.6	51.6
21:25	53.4	54.1	52.2
21:30	54.6	54.9	51.5
21:35	55.8	54.3	52.1
21:40	52.6	53.6	51.6
21:45	54.5	55.5	51.7
21:50	65.7	55.1	52.3
21:55	55.9	54.6	51.9
22:00	60.4	56.2	51.4
22:05	57.0	55.2	51.3
22:10	56.2	54.7	52.3
22:15	63.6	55.9	51.7
22:20	56.5	54.7	51.7
22:25	58.3	54.3	51.7
22:30	55.9	54.7	51.9
22:35	53.7	54.5	51.7
22:40	58.8	54.1	51.4
22:45	54.0	55.9	51.4
22:50	56.7	53.9	51.4
22:55	52.6	53.5	51.4
23:00	53.1	53.8	51.6

EC 11992 - 1 Ely Place

HGE

24 Hour Noise data

Time	$L_A$eq	L_A10	L_A90
23:05	53.7	55.0	51.7
23:10	52.7	53.6	51.6
23:15	55.1	53.8	50.9
23:20	55.0	54.1	50.9
23:25	54.7	55.0	51.5
23:30	53.9	53.8	51.0
23:35	59.0	54.3	51.4
23:40	52.7	53.4	50.9
23:45	55.1	54.7	51.4
23:50	52.3	53.4	51.2
23:55	55.1	56.4	50.2
00:00	53.1	54.6	51.0
00:05	70.6	53.5	51.1
00:10	57.0	55.4	50.6
00:15	53.0	52.8	49.7
00:20	54.0	53.2	50.6
00:25	52.0	53.1	50.8
00:30	55.8	57.4	50.6
00:35	51.9	53.2	49.8
00:40	51.9	52.9	50.4
00:45	58.7	53.2	50.7
00:50	52.6	52.1	50.0
00:55	52.9	54.7	50.4
01:00	52.1	52.7	50.1
01:05	56.9	53.6	50.3
01:10	51.8	52.5	50.1
01:15	52.4	52.2	48.3
01:20	50.9	52.2	49.5
01:25	53.4	52.5	49.8
01:30	53.4	52.9	49.9
01:35	52.8	52.2	49.2
01:40	56.9	52.8	50.1
01:45	51.0	51.8	49.7
01:50	50.5	51.4	49.4
01:55	50.7	51.6	49.6
02:00	58.9	51.8	49.8
02:05	50.7	51.8	49.5
02:10	51.2	52.5	49.7
02:15	50.3	51.4	49.2
02:20	50.5	51.5	49.6
02:25	56.7	51.8	49.8
02:30	54.7	52.0	49.8
02:35	50.9	51.8	49.6
02:40	52.7	51.7	49.8
02:45	50.3	51.4	48.9
02:50	50.6	51.5	49.6
02:55	56.1	53.6	49.7
03:00	50.7	51.8	49.4

Time	$L_A$eq	L_A10	L_A90
03:05	50.3	51.0	48.2
03:10	50.8	52.0	49.6
03:15	53.8	52.7	50.0
03:20	53.0	52.0	48.5
03:25	54.4	52.4	50.0
03:30	50.9	51.5	50.0
03:35	54.3	52.0	49.9
03:40	51.0	52.6	48.9
03:45	54.7	51.9	49.6
03:50	51.6	51.2	49.6
03:55	52.1	52.5	49.9
04:00	69.0	51.8	49.8
04:05	52.6	52.0	49.7
04:10	50.7	51.9	49.7
04:15	68.0	52.4	49.5
04:20	51.8	50.9	48.4
04:25	51.0	52.1	50.0
04:30	50.9	52.1	49.8
04:35	61.2	51.8	48.8
04:40	50.6	51.9	49.5
04:45	50.6	51.5	49.4
04:50	53.3	52.0	49.9
04:55	50.8	52.2	49.4
05:00	54.6	52.8	50.2
05:05	51.2	52.5	49.9
05:10	51.2	52.5	49.8
05:15	51.6	52.6	50.0
05:20	51.4	53.0	50.2
05:25	54.6	52.8	50.3
05:30	51.4	52.7	50.2
05:35	51.2	52.4	50.2
05:40	51.9	52.5	49.7
05:45	52.0	53.1	50.8
05:50	52.7	53.8	51.7
05:55	51.9	53.2	50.6
06:00	57.8	53.6	50.7
06:05	52.1	53.0	51.1
06:10	52.7	54.0	51.2
06:15	53.2	54.7	51.7
06:20	52.7	54.1	51.5
06:25	53.2	53.5	51.2
06:30	53.1	54.6	51.2
06:35	54.2	55.1	53.2
06:40	54.5	56.6	52.6
06:45	53.4	54.9	51.8
06:50	53.4	54.6	52.1
06:55	53.4	54.5	52.1
07:00	53.7	54.9	52.4

EC 11992 - 1 Ely Place

HGE

24 Hour Noise data

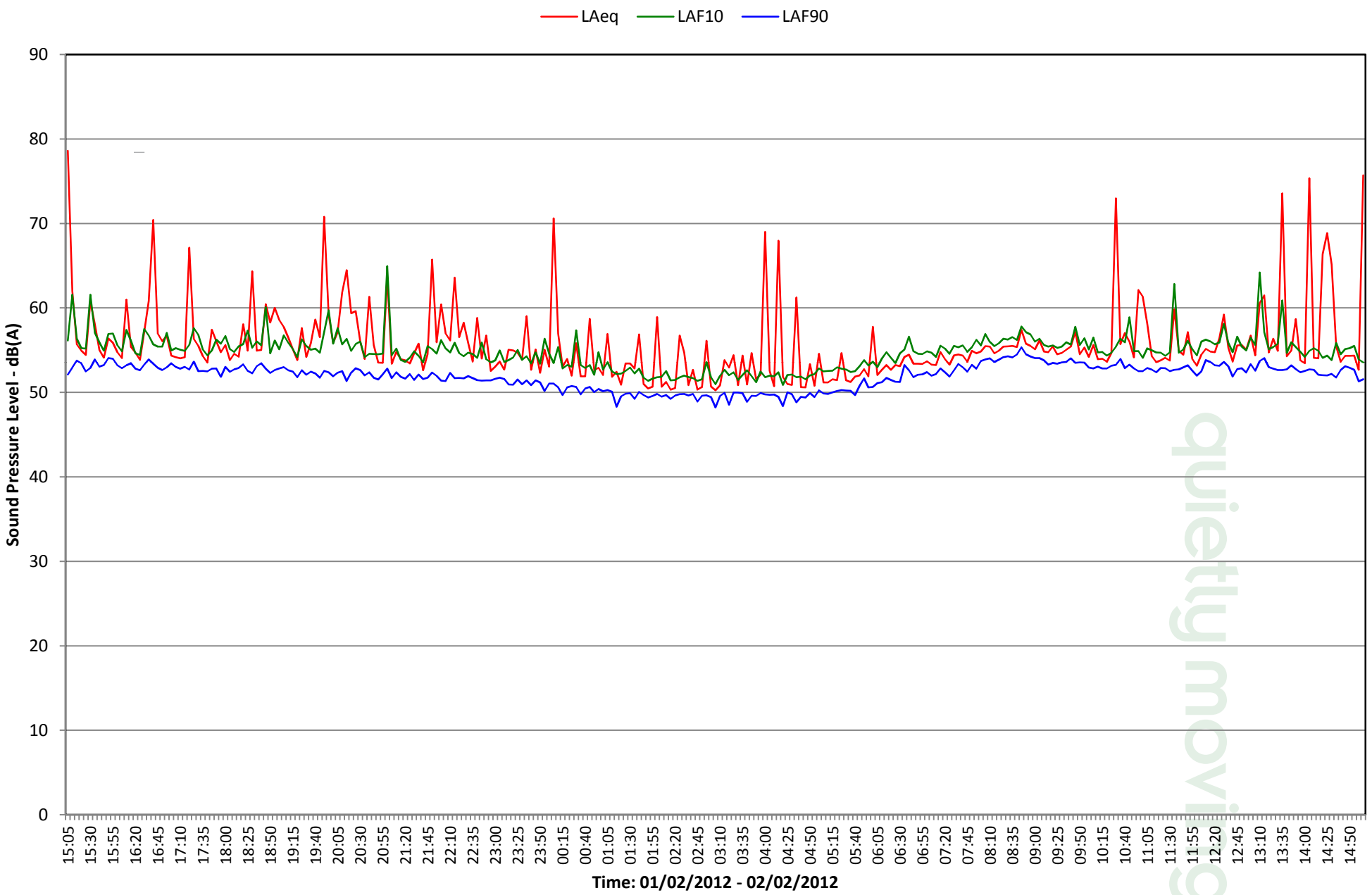
Time	$L_A$eq	L_A10	L_A90
07:05	53.3	54.7	52.0
07:10	53.2	54.2	52.2
07:15	54.8	55.5	52.8
07:20	53.9	55.2	52.4
07:25	53.3	54.6	51.9
07:30	54.4	55.5	52.6
07:35	54.5	55.3	53.4
07:40	54.3	55.6	53.0
07:45	53.6	54.8	52.4
07:50	54.9	55.3	53.2
07:55	54.6	56.2	52.8
08:00	54.8	55.6	53.7
08:05	55.5	56.9	53.9
08:10	55.4	56.0	54.0
08:15	54.6	55.5	53.6
08:20	54.9	55.8	53.9
08:25	55.4	56.4	54.2
08:30	55.4	56.2	54.3
08:35	55.5	56.5	54.1
08:40	55.4	56.2	54.5
08:45	57.4	57.8	55.3
08:50	55.8	57.1	54.5
08:55	55.5	56.9	54.3
09:00	55.1	56.0	54.1
09:05	56.1	56.4	54.1
09:10	54.8	55.6	53.8
09:15	54.8	55.4	53.3
09:20	55.4	55.5	53.5
09:25	54.5	55.3	53.4
09:30	54.7	55.4	53.5
09:35	55.1	55.9	53.6
09:40	55.4	55.7	54.0
09:45	57.2	57.8	53.5
09:50	54.5	55.6	53.5
09:55	55.3	56.4	53.5
10:00	54.2	55.1	52.9
10:05	55.6	56.5	52.8
10:10	53.9	54.7	53.0
10:15	54.0	54.8	52.8
10:20	53.6	54.4	52.8
10:25	54.7	54.7	53.2
10:30	73.0	55.4	53.3
10:35	55.7	56.4	54.0
10:40	57.0	55.9	52.9
10:45	56.0	58.9	53.3
10:50	54.1	54.9	52.8
10:55	62.1	54.9	52.5
11:00	61.3	54.1	52.5

Time	$L_A$eq	L_A10	L_A90
11:05	58.1	55.2	52.9
11:10	54.3	55.0	52.7
11:15	53.6	54.7	52.4
11:20	53.8	54.7	52.9
11:25	54.1	54.3	52.9
11:30	53.8	54.7	52.5
11:35	59.8	62.8	52.7
11:40	54.9	54.7	52.7
11:45	54.5	55.1	53.0
11:50	57.1	56.1	53.2
11:55	54.0	55.1	52.6
12:00	53.2	54.4	52.0
12:05	54.5	56.0	52.5
12:10	55.2	56.3	53.8
12:15	54.8	56.0	53.6
12:20	54.8	55.7	53.2
12:25	56.4	55.9	53.2
12:30	59.2	58.1	53.6
12:35	55.3	55.8	53.1
12:40	53.7	54.8	51.9
12:45	55.6	56.6	52.8
12:50	55.6	55.4	52.9
12:55	55.1	55.0	52.3
13:00	56.7	56.5	53.3
13:05	54.4	55.6	52.6
13:10	60.6	64.2	53.7
13:15	61.5	57.1	54.1
13:20	54.7	55.1	53.0
13:25	56.4	55.4	52.8
13:30	54.9	55.8	52.6
13:35	73.6	60.9	52.6
13:40	54.3	54.7	52.7
13:45	54.9	55.9	53.2
13:50	58.7	55.4	52.7
13:55	53.8	54.8	52.4
14:00	53.4	54.2	52.5
14:05	75.3	54.9	52.7
14:10	54.1	55.2	52.7
14:15	54.0	54.9	52.1
14:20	66.4	54.1	52.0
14:25	68.8	54.4	52.0
14:30	65.1	53.8	52.2
14:35	55.5	55.8	51.8
14:40	53.6	54.5	52.7
14:45	54.3	55.1	53.1
14:50	54.3	55.2	52.9
14:55	54.4	55.5	52.7
15:00	52.7	53.9	51.3

APPENDIX C

SURVEY RESULTS
(GRAPHICAL)

Noise Level Time History at 1 Ely Place



APPENDIX D

GLOSSARY OF TECHNICAL TERMS

TECHNICAL TERMS AND UNITS

Decibel (dB) - This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure levels, intensities and power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound.

Sound Power Level (SWL) - This is a function of the noise source alone and is independent of its surroundings. It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level a 1 metre from the sound source measured in open space.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into one-third octave bands.

"A" Weighting - A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies. The most commonly used weighting is the "A" weighting. The "A" weighted SPL can be measured directly or derived from octave or one-third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) Curves - The "A" weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single-figure index. This is done by defining the maximum permissible sound pressure level at each frequency for each curve. To measure the noise rating of a given environment, the SPL is measured in octave or one-third octave bands and the noise rating is then the highest NR curve touched by the measured levels.

Intermittency and Time-Weighting - The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time-weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows:-

L_{90} This is the sound pressure level exceeded for 90% of the measurement period. It is widely used to measure background noise levels.

L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise. For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the notional steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.