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REPORT No. 460307/2

25 ROCHESTER SQUARE
LONDON
NW1 9SA

ENVIRONMENTAL NOISE SURVEY REPORT
&
PLANT NOISE ASSESSMENT

PREPARED: 27TH APRIL 2016

Presented By: Fred Blyth MIOA

CONTENTS

1.0 Introduction

1.1 St Moritz Productions Ltd has commissioned Noico Ltd to conduct an environmental noise survey at 25 Rochester Square, London NW1 9SA.

1.2 The purpose of the survey is to obtain statistical noise data and to determine the background noise levels at the site. Based on the noise survey data, noise criteria are to be established for limiting noise emission from the mechanical plant installations serving the premises. The noise criteria are to be set in accordance with the requirements of the local planning authority (London Borough of Camden).

1.3 Noico Ltd has also been commissioned to carry out a plant noise assessment for the proposed mechanical plant to be installed at the same premises, i.e. 25 Rochester Square, London NW1 9SA.

1.4 The development site comprises a three storey semi-detached town house in a row of similar properties along the northern side of Rochester Square, between Camden Mews and Stratford Villas. The front of the property looks out, beyond the road, onto the centre section of the square itself, whilst the back of the house looks onto the rear gardens of the aforementioned side roads together with those opposite, fronting onto Murray Street. There are no commercial properties in the immediate area.

2.0 Instrumentation

2.1 A precision grade Norsonic 140 'Type 1' Integrating Sound Level Meter was used for the survey. This was equipped with an environmental microphone and extension cable. The instrument was powered by an external battery and stored in a weatherproof case.

2.2 The instrument was calibrated prior and subsequent to use with no calibration drift recorded.

3.0 Survey Details

3.1 Location: The environmental noise analyser microphone was located externally at second floor level on scaffolding close to the gap between this property and the one next door, i.e. no. 24 Rochester Square. This position was chosen as it was considered to be representative of the background noise environment that exists at the nearest noise affected properties. Note, from the observations made on site, the nearest noise affected properties are considered to be the residences on either side, namely nos. 24 & 26 Rochester Square. Note, the exact position of the nearest noise-affected properties is to be confirmed by the local planning authority, prior to final design of any necessary mechanical plant noise control measures.

3.2 Period: Monitoring was carried out continuously from approximately 11:00 hrs on the 16th of March 2016 through to 11:10 hrs on the 18th of March 2016. The instrument was set up to monitor noise levels continuously and store data in fifteen minute intervals.

3.3 Weather: The prevailing weather condition throughout the majority of the survey period was satisfactory for noise monitoring, being dry, cold and with little to moderate breeze. Wind speed, although not recorded, was considered to be less than 5 m/s throughout the survey period. Some rain was expected to fall during the course of the survey

3.4 Site Noise Characteristics: The ambient noise level was characterised by road traffic noise, in particular along Rochester Square itself and the nearby Camden Road. Additionally, noise from mechanical plant serving other buildings in the area may have been audible and, if so, is likely to be contributing to the ambient noise level in the area. It is thought that no unusual events occurred during the survey period and the data are considered to be a true representation of ambient noise levels.

4.0 Survey Results

4.1 The results of the environmental survey are presented in graphical and numerical format in the attached appendices, showing the recorded values of L_{Aeq} and L_{A90}.

4.2 See Appendix 1 for a glossary of terms.

4.3 With reference to the measured data, the minimum background noise level measured during the survey period was:

Daytime (07:00 to 23:00hrs)	- 44.5 L_{A90}
Night time (23:00 to 07:00hrs)	- 41.1 L_{A90}

5.0 Environmental Noise Level Criteria

5.1 Criteria for mechanical services noise emission are normally based upon the prevailing level of background noise in the period of concern and may be set against this to a level as normally defined by the local planning authority.

5.2 The London Borough of Camden has advised that noise arising from fixed plant installations should be at least 5dB(A) below the minimum background noise level (as expressed as an L_{A90}) at the nearest noise affected property.

5.3 To conform to the above criteria, and in accordance with the minimum background noise levels measured during the survey (summarised in 4.3 above), noise from the proposed plant installations should not exceed the following value.

Daytime plant operation (07:00 to 23:00hrs)	- 39.5 dB L_{Aeq}
24 hour plant operation	- 36.1 dB L_{Aeq}

Note: These levels must be achieved cumulatively with all plant operating, and as measured at 1 metre from the window of the nearest affected property.

6.0 BS 4142

6.1 Using BS 4142 the likelihood of complaints from local residents due to plant noise emissions is assessed by the difference between noise from the new source(s) and the existing background level. The noise from the new source(s) is expressed in terms of a rating level, calculated from the specific noise source(s) plus any 'acoustic feature corrections' and is given as an $L_{Aeq,T}$ noise level.

6.2 The acoustic feature correction is applied where the source emits a noise of a tonal, impulsive or intermittent nature.

6.3 The existing background noise level is expressed in terms of an $L_{A90,T}$ noise level. The rating level can be subtracted from the background noise level to determine noise impact against the design criteria.

7.0 BS 4142 Assessment

7.1 We understand that one new condenser unit is to be installed at high level on the outside wall at the rear of this property. The condenser unit in question is as follows:

> One No. Daikin outdoor heat pump condenser unit model RX35K having a manufacturer's sound pressure level (S.P.L.) of 48dB(A) when measured at 1 metre and in cooling mode.

The condensing unit will also have the following frequency spectrum:

Condenser sound pressure level @ 1 metre

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dBA
S.P.L. @ 1m (dB)	50	47	49	45	41	36	29	20	48

7.2 The nearest affected windows to the proposed plant location are approximately five metres distant, these being on the top floor of no. 26 Rochester Square and the lower floor of no. 24 - the original closest top floor window opening of no. 24 is now bricked up.

7.3 Being a residential property we have assumed that the plant can operate over the full 24-hour time period.

7.4 The units have a gradually declining curve across the frequency spectrum and no acoustic feature correction needs to be added.

7.5 The following tables show our BS 4142 calculation for the condenser emissions to the nearest affected windows in the neighbouring property as highlighted in clause 7.2 above:

Condenser noise at nearest affect window (side wall)

Description	dB(A)
1 No Daikin model RX35K : S.P.L. @ 1m	48
Wall Reflections	+3
Distance attenuation ($20\log_{10}5/1$)	-14
Specific Noise Level (dB)	37
Correction for tonality or temporal character (dB)	0
Rating Noise Level (dB)	37
Criterion (24hr operation) – clause 5.3 above	36
Excess (24hr operation)	**+1**

7.6 It can be seen that the noise level at the nearest affected noise sensitive property will be exceeded and acoustic treatment will be required.

7.7 It will be necessary to consider enclosing the condenser unit and providing both attenuated inlet and discharge air paths to ventilate the unit. The enclosure should be constructed using 50mm thick acoustic panels and 150mm deep acoustic louvres that achieve the following insertion loss for the performance of the housing and both air paths.

Enclosure and air path attenuation (dB)

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Insertion loss (dB)	2	3	6	10	15	16	13	13

6.0 Conclusion

6.1 A background noise level survey has been carried out at 25 Rochester Square, London NW1 9SA.

6.2 Based upon the survey results and discussions with the local planning authority, criteria applicable to noise from the mechanical services plant have been established.

8.3 A plant noise assessment has been undertaken for the proposed mechanical equipment to be located at 25 Rochester Square, London NW1 9SA and it has been established that acoustic treatment will be required in order to meet the requirements of the local council and achieve the required criteria at the nearest affected noise sensitive location. Recommendations for the acoustic treatment have been given.

Appendix 1 - Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n,T}$	Lp which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1 m from the façade of the nearest affected sensitive property.

Appendix 2 - Environmental Noise Monitoring Data

Date	LAeq	LA90
(2016/03/16 10:56:17.00)	54.8	50.9
(2016/03/16 11:11:19.00)	54	50.3
(2016/03/16 11:26:22.00)	52.3	49.6
(2016/03/16 11:41:25.00)	72.2	51.4
(2016/03/16 11:56:28.00)	74.6	51.7
(2016/03/16 12:11:31.00)	53.4	50
(2016/03/16 12:26:34.00)	56.1	50.3
(2016/03/16 12:41:37.00)	56.6	49.6
(2016/03/16 12:56:41.00)	55.8	50.1
(2016/03/16 13:11:44.00)	79.9	50.5
(2016/03/16 13:26:47.00)	76.7	50.6
(2016/03/16 13:41:51.00)	80.8	51.1
(2016/03/16 13:56:54.00)	75.2	49.6
(2016/03/16 14:11:58.00)	71.3	49.9
(2016/03/16 14:27:01.00)	53.7	49.4
(2016/03/16 14:42:05.00)	52.8	49.8
(2016/03/16 14:57:08.00)	53.8	49.7
(2016/03/16 15:12:11.00)	54.5	49.8
(2016/03/16 15:27:15.00)	53.7	49.9
(2016/03/16 15:42:19.00)	53.4	50.2
(2016/03/16 15:57:22.00)	53	50.4
(2016/03/16 16:12:26.00)	53.4	50.5
(2016/03/16 16:27:29.00)	54	50.1
(2016/03/16 16:42:33.00)	53.5	49.9
(2016/03/16 16:57:36.00)	54.1	50.6
(2016/03/16 17:12:40.00)	57.2	50.5
(2016/03/16 17:27:43.00)	52.5	50.3
(2016/03/16 17:42:47.00)	53.5	50.4
(2016/03/16 17:57:50.00)	53.1	50.4
(2016/03/16 18:12:54.00)	55.1	50.4
(2016/03/16 18:27:57.00)	54.5	49.3
(2016/03/16 18:43:01.00)	51.6	49.3
(2016/03/16 18:58:04.00)	52.4	48.6
(2016/03/16 19:13:08.00)	51.1	48.6
(2016/03/16 19:28:12.00)	51	48.6
(2016/03/16 19:43:16.00)	50.8	48.8
(2016/03/16 19:58:19.00)	53.2	48.4
(2016/03/16 20:13:23.00)	52.5	48.7
(2016/03/16 20:28:27.00)	54	48.6
(2016/03/16 20:43:30.00)	52.3	48.3
(2016/03/16 20:58:34.00)	51.2	48.4
(2016/03/16 21:13:38.00)	53.9	48.9
(2016/03/16 21:28:42.00)	51.4	47.9
(2016/03/16 21:43:45.00)	50.4	47.8

Date	LAeq	LA90
(2016/03/16 21:58:49.00)	50.5	47.9
(2016/03/16 22:13:53.00)	53.6	48.5
(2016/03/16 22:28:57.00)	50.6	48.3
(2016/03/16 22:44:01.00)	51.8	48.2
(2016/03/16 22:59:04.00)	49.9	47.7
(2016/03/16 23:14:08.00)	50.1	47.9
(2016/03/16 23:29:13.00)	49.5	47.2
(2016/03/16 23:44:16.00)	49.6	47.2
(2016/03/16 23:59:20.00)	48.7	45.7
(2016/03/17 00:14:25.00)	49	46.2
(2016/03/17 00:29:28.00)	47.7	44.6
(2016/03/17 00:44:31.00)	48.1	44.5
(2016/03/17 00:59:34.00)	47.7	43.7
(2016/03/17 01:14:36.00)	47.6	44.3
(2016/03/17 01:29:39.00)	47.6	44
(2016/03/17 01:44:42.00)	46.5	42.3
(2016/03/17 01:59:46.00)	45.7	42.3
(2016/03/17 02:14:49.00)	47.3	42.7
(2016/03/17 02:29:53.00)	46.8	43.6
(2016/03/17 02:44:56.00)	57.3	42.1
(2016/03/17 03:00:00.00)	46.5	43.1
(2016/03/17 03:15:03.00)	47.9	43.3
(2016/03/17 03:30:06.00)	47.5	42.8
(2016/03/17 03:45:10.00)	47.6	43.2
(2016/03/17 04:00:13.00)	51.4	44.5
(2016/03/17 04:15:17.00)	49	45.2
(2016/03/17 04:30:20.00)	52.4	46.1
(2016/03/17 04:45:24.00)	52	46.8
(2016/03/17 05:00:27.00)	53.3	48.2
(2016/03/17 05:15:31.00)	55.8	48.5
(2016/03/17 05:30:35.00)	56	48.4
(2016/03/17 05:45:38.00)	53.2	48.3
(2016/03/17 06:00:42.00)	51.3	47.8
(2016/03/17 06:15:46.00)	53.4	50.2
(2016/03/17 06:30:49.00)	52.3	49.6
(2016/03/17 06:45:53.00)	53.1	49.8
(2016/03/17 07:00:57.00)	58.3	50.4
(2016/03/17 07:16:01.00)	51.8	48.9
(2016/03/17 07:31:04.00)	52.5	49.4
(2016/03/17 07:46:08.00)	51.4	48.8
(2016/03/17 08:01:12.00)	52.8	49.1
(2016/03/17 08:16:15.00)	56.8	49.6
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(2016/03/17 08:46:23.00)	52.4	48.8
(2016/03/17 09:01:27.00)	53.7	49.6

Date	LAeq	LA90
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(2016/03/17 09:31:34.00)	57	49.4
(2016/03/17 09:46:37.00)	59.8	50.4
(2016/03/17 10:01:41.00)	57.1	50.1
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(2016/03/17 13:32:34.00)	54.8	47
(2016/03/17 13:47:38.00)	60.7	47
(2016/03/17 14:02:42.00)	51.6	47.2
(2016/03/17 14:17:46.00)	62	46.6
(2016/03/17 14:32:50.00)	49	46.5
(2016/03/17 14:47:54.00)	52.4	46.5
(2016/03/17 15:02:58.00)	49.7	46
(2016/03/17 15:18:02.00)	49.8	46
(2016/03/17 15:33:06.00)	49.3	46.1
(2016/03/17 15:48:10.00)	55.1	47.2
(2016/03/17 16:03:14.00)	53.3	47.2
(2016/03/17 16:18:17.00)	54.1	47.5
(2016/03/17 16:33:21.00)	52.4	47.5
(2016/03/17 16:48:25.00)	51.9	47.2
(2016/03/17 17:03:29.00)	54.8	47.7
(2016/03/17 17:18:33.00)	56.7	48.2
(2016/03/17 17:33:37.00)	54.2	47.1
(2016/03/17 17:48:40.00)	51	46.3
(2016/03/17 18:03:44.00)	51.8	46.3
(2016/03/17 18:18:48.00)	50.8	46.5
(2016/03/17 18:33:52.00)	51.5	46
(2016/03/17 18:48:56.00)	49.8	45.3
(2016/03/17 19:04:00.00)	48.2	45.6
(2016/03/17 19:19:04.00)	49.5	46
(2016/03/17 19:34:08.00)	48.5	45.7
(2016/03/17 19:49:12.00)	47.6	45.3
(2016/03/17 20:04:16.00)	51.9	45.8
(2016/03/17 20:19:20.00)	49.7	45.7

Date	LAeq	LA90
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(2016/03/17 20:49:28.00)	50.5	45.4
(2016/03/17 21:04:32.00)	49.3	45.8
(2016/03/17 21:19:36.00)	48.1	45.5
(2016/03/17 21:34:40.00)	47.6	44.8
(2016/03/17 21:49:44.00)	49.4	45
(2016/03/17 22:04:48.00)	49.6	44.5
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(2016/03/17 22:34:56.00)	47.8	44.8
(2016/03/17 22:50:00.00)	50.2	45.8
(2016/03/17 23:05:04.00)	47.7	44.8
(2016/03/17 23:20:08.00)	47.5	44.3
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(2016/03/18 00:20:24.00)	49.7	44.3
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(2016/03/18 00:50:30.00)	46.6	42.9
(2016/03/18 01:05:33.00)	47.4	44.6
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(2016/03/18 01:50:42.00)	47	43.4
(2016/03/18 02:05:46.00)	46.5	41.5
(2016/03/18 02:20:49.00)	51.5	43.8
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(2016/03/18 02:50:56.00)	47.7	42.2
(2016/03/18 03:05:59.00)	47.7	42.7
(2016/03/18 03:21:03.00)	49.9	41.1
(2016/03/18 03:36:06.00)	50.4	43.1
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(2016/03/18 05:06:27.00)	54.9	47.3
(2016/03/18 05:21:31.00)	55.6	48.3
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(2016/03/18 06:21:45.00)	50.9	47.2
(2016/03/18 06:36:49.00)	51.8	47.8
(2016/03/18 06:51:52.00)	51.6	48.1
(2016/03/18 07:06:56.00)	50.2	46.5
(2016/03/18 07:21:59.00)	52.3	47.3
(2016/03/18 07:37:03.00)	51.4	47.2

Date	LAeq	LA90
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(2016/03/18 08:07:11.00)	50.1	47.5
(2016/03/18 08:22:14.00)	51.6	48.1
(2016/03/18 08:37:18.00)	55	49.4
(2016/03/18 08:52:22.00)	57.8	48.6
(2016/03/18 09:07:25.00)	64	50.3
(2016/03/18 09:22:29.00)	54.7	50.3
(2016/03/18 09:37:32.00)	58.7	50.4
(2016/03/18 09:52:36.00)	54.2	50
(2016/03/18 10:07:40.00)	52.8	49.7
(2016/03/18 10:22:44.00)	52	49.4
(2016/03/18 10:37:48.00)	53.8	48.9
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Figure 1

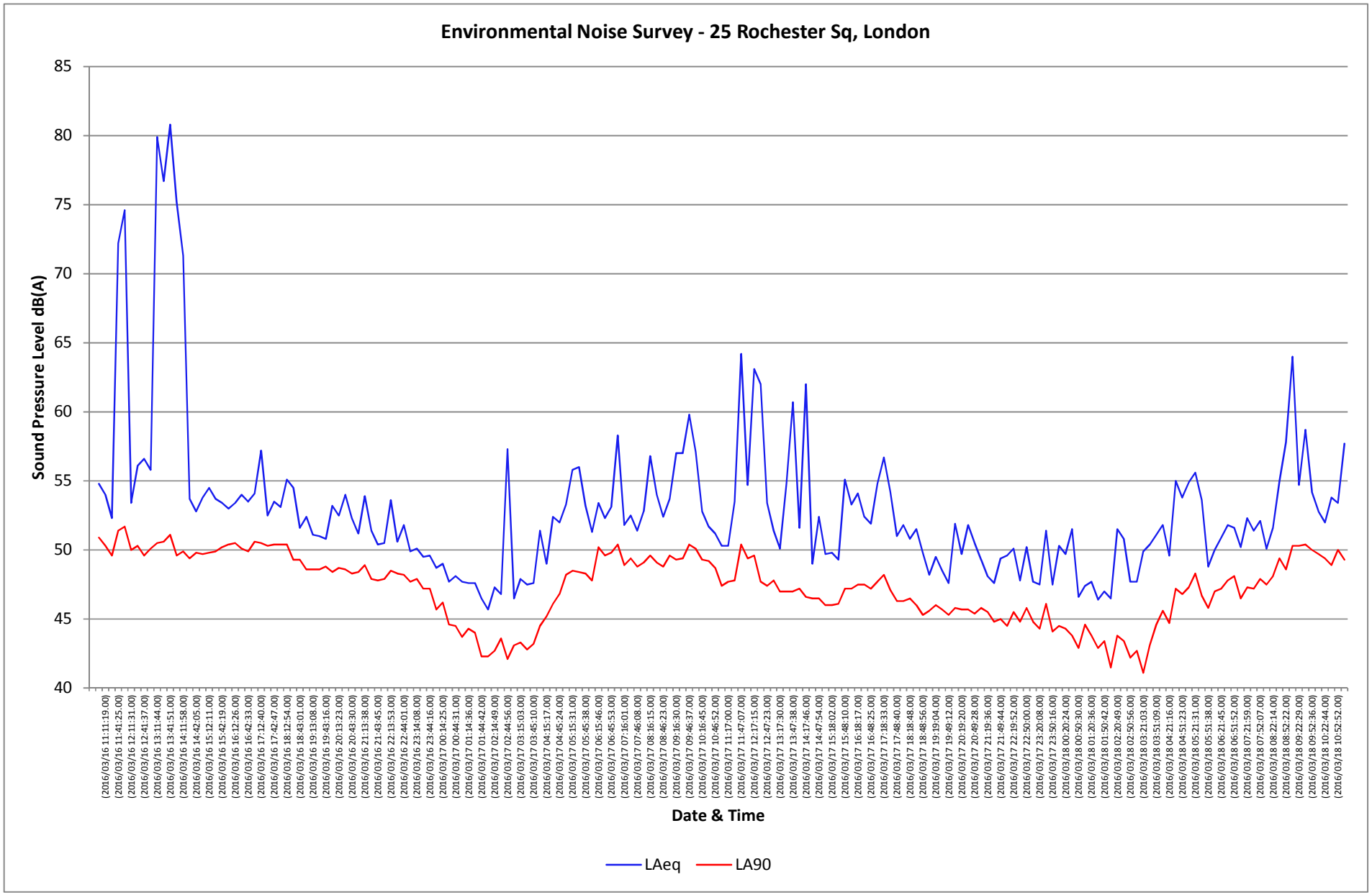
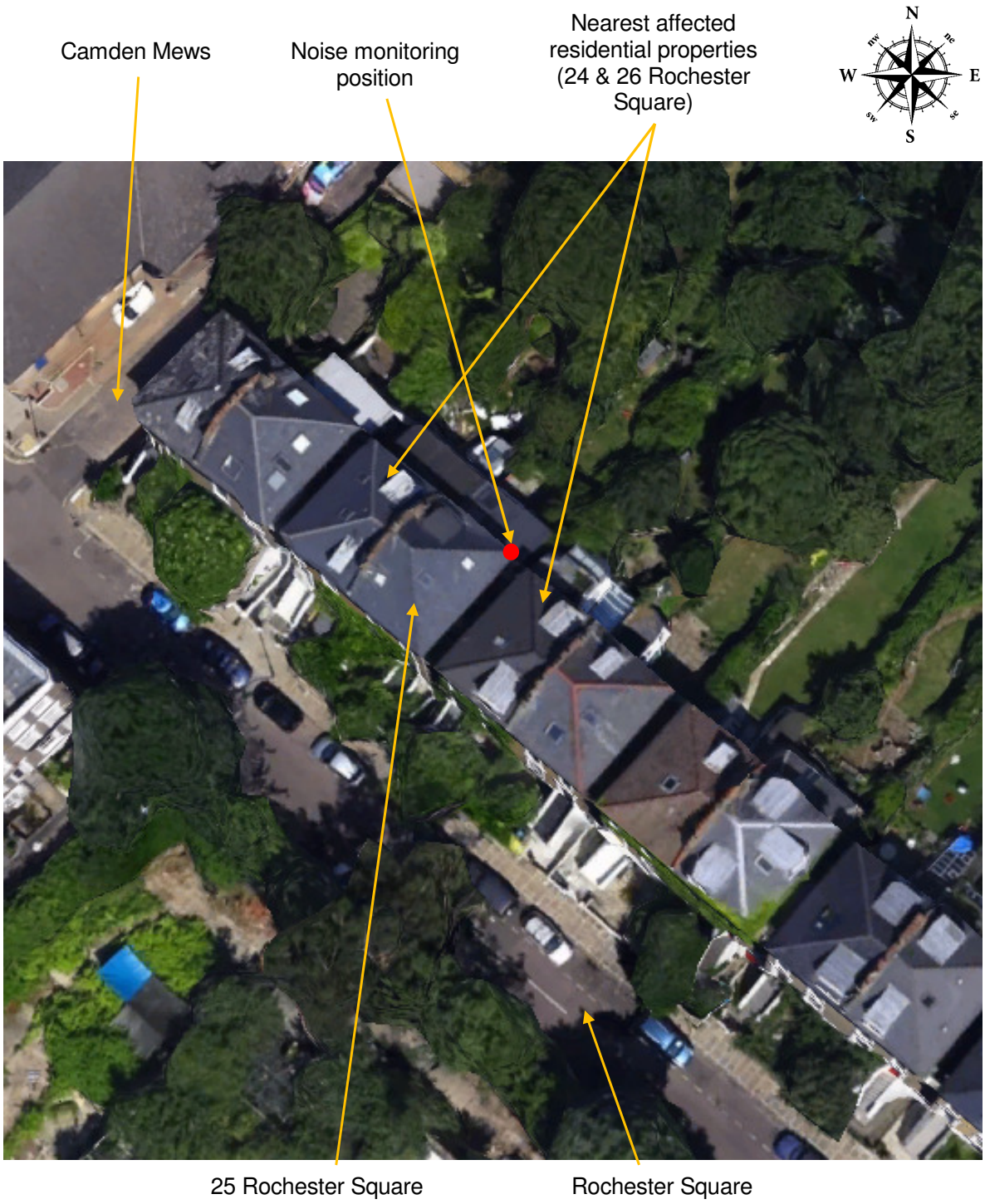

Environmental Noise Survey - 25 Rochester Sq, London
Sound Pressure Level dB(A)
85
80
75
70
65
60
55
50
45
40
Date & Time
LAeq
LA90

Figure 2



NOICO Noise Control Engineers	Project: 25 Rochester Sq	Title: Noise Survey Position
	Dwg No. 01 Rev A	Date: 05/04/2016
	Patrick House, Station Road Hook, Hampshire RG27 9HU	Tel: 01256 766207 Fax: 01256 768413