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REPORT No. 360941/1

28 LITTLE RUSSELL STREET
LONDON
WC1A 2HN

ENVIRONMENTAL NOISE SURVEY

AND

PLANT NOISE ASSESSMENT REPORT

PREPARED: 14th October 2016

Presented By: Martyn Ayling BSc, MIOA

CONTENTS

1.0 Introduction

1.1 Thirdway Interiors Ltd have commissioned Noico Ltd to conduct an environmental noise survey at the 28 Little Russell Street, London WC1A 2HN.

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 Following completion of the survey, a detailed noise assessment is to be carried out on the proposed external plant installations to establish whether the plant will meet the planning noise requirements or whether noise control measures will be required. The client has advised that the plant will only operate during office opening hours (in this instance weekdays between 08:00 hrs to 18:00 hrs.

1.4 The development site is located on the north side of Little Russell Street and close to its junction with Museum Street. The building comprises five stories, with commercial office space on all floors. It is bordered to the west and east by adjacent neighbouring properties in Little Russell Street which appear to be predominantly commercial offices. To the south is St Georges Church Bloomsbury. To the north the site borders Gilbert Street, and directly opposite some six metres away is a student accommodation block of a similar height to the development site. The student accommodation block is considered to be the nearest noise sensitive building to the site.

1.5 The proposed plant locations are on the 5th floor roof in the north west corner of the building. The windows of the nearest noise sensitive properties within the adjacent student accommodation block are on the same level as the plant, and some 11 metres away with direct line of sight.

2.0 Instrumentation

2.1 A precision grade Norsonic 140 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 the rear of the building on the 4th floor balcony/terrace area. This position was chosen as it was considered to be representative of the background noise environment that exists at the nearest noise affected properties. As highlighted above, the nearest noise affected properties are considered to be those directly opposite the site on the north side of Gilbert Place which we understand is a student accommodation block. The nearest windows to the rear of these buildings were approximately 7 metres from the noise monitoring location.

3.2 Period: Monitoring was carried out continuously from approximately 11:15 hrs on the 27th September 2016 through to 10:45 hrs on the 29th September 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, mild and with little to moderate breeze. Wind speed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

3.4 Site Noise Characteristics: The ambient noise level was characterised by road traffic in the local area, but in particular the major roads of Great Russell street (approximately 40 metres to the north) and the A40 Bloomsbury Road (approximately 60 metres to the south). 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)	- 48.6 L_{A90}
Night time (23:00 to 07:00hrs)	- 45.6 L_{A90}
Plant operation period (08:00 to 18:00hrs)	- 51.5 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 Council has advised that noise arising from fixed plant installations shall be 5dBA below the existing minimum background noise level (as expressed as a L_{A90}) at 1 metre from the façade of the nearest adjacent residential window, or at 1.2m above any adjacent residential garden, terrace, balcony or patio.

5.3 To conform to the above criteria, and in accordance with the minimum background noise levels measured during the survey (detailed summarised in 4.3 above), noise from the proposed plant installations should not exceed the following value. Note, these have been rounded to the nearest whole number

Daytime plant operation (07:00 to 23:00hrs)	- 44 dB L_{Aeq}
24 hour plant operation	- 41 dB L_{Aeq}
Plant operation period (08:00 to 18:00hrs)	- 47 dB L_{A90}

Note: These levels must be achieved cumulatively with all plant operating.

6.0 Plant noise assessment

6.1 Project data

6.1.1 Plant location

It is understood that 3No. (three) new outdoor air conditioning condensing units (with horizontal discharge air) are to be installed externally on the 5th floor roof, in the north west corner. Two units will be installed close to the edge of the roof facing towards Gilbert Street, whilst the third unit will be located behind the existing roof plantroom and therefore screened from view from the adjacent noise sensitive properties in Gilbert Street.

6.1.2 Proposed items of plant

All three items of plant are identical and these are listed as follows together with manufacturers certified noise level data.

Plant item	Manufacturer/Model	Noise level	Period of operation
Outdoor condensing units (3No)	Mitsubishi Heavy Industries model FDC 200VS condensing unit	57dB(A) at 1m	Office working hours only – 08:00hrs to 18:00hrs

6.1.3 Noise Sensitive Receptors

As highlighted above, the nearest noise sensitive receptors are the upper floor bedrooms within the adjacent student accommodation block directly opposite the rear of the site in Gilbert Street. Plant noise emissions have therefore been assessed to the nearest windows within the building. The distance from the proposed plant installation to the nearest windows is assessed to be approximately 11 metres.

6.2 Noise assessment

Our assessment of the proposed plant items is as follows:

Note:

A loss of -10dB(A) has been allowed for the screening effect of the plantroom structure which is located between the condensing unit No.3 and the adjacent noise sensitive receptors.

Plant item	Plant Noise level	Distance to nearest windows	Distance loss from unit to window	Screening from adjacent plantroom structure	Resultant Noise level
Outdoor condensing unit No.1	57dB(A) at 1m	11m	21dB	N/A	36dB(A)
Outdoor condensing unit No.2	57dB(A) at 1m	11m	21dB	N/A	36dB(A)
Outdoor condensing unit No.3	57dB(A) at 1m	13m	22dB	-10dB	25dB(A)
TOTAL					39dB(A)
Facade correction					+3dB
TOTAL					**42dB(A)**
NOISE CRITERIA (plant operation period)					**47dB(A)**
Margin of safety					**5dB(A)**

6.3 Summary

Our calculations indicate that the combined total noise level at the nearest windows of the nearest noise sensitive dwelling is likely to be 42dBA, which equates to 5dBA below the proposed plant noise emission limit, thereby meeting the planning requirements of the Local Authority (London Borough of Camden).

7.0 Conclusion

7.1 A background noise level survey has been carried out at 28 Little Russell Street, London WC1A 2HN

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

7.3 A plant noise assessment has been carried out on the proposed mechanical plant installations and it has been established that the plant will achieve the noise emission limits required by the Local Planning Authority with a reasonable margin of safety.

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
(2016/09/27 11:15:04.00)	55.9	53
(2016/09/27 11:30:04.00)	59.1	53.6
(2016/09/27 11:45:04.00)	57	54.3
(2016/09/27 12:00:04.00)	58.1	53.7
(2016/09/27 12:15:04.00)	56.1	53.9
(2016/09/27 12:30:04.00)	60.4	53.8
(2016/09/27 12:45:04.00)	58.8	54
(2016/09/27 13:00:04.00)	65.9	53.8
(2016/09/27 13:15:04.00)	59.7	53.8
(2016/09/27 13:30:04.00)	57.5	53.4
(2016/09/27 13:45:04.00)	59.9	53
(2016/09/27 14:00:04.00)	55.9	52.3
(2016/09/27 14:15:04.00)	56.1	52.2
(2016/09/27 14:30:04.00)	55.7	51.9
(2016/09/27 14:45:05.00)	56	52.8
(2016/09/27 15:00:05.00)	59.8	52
(2016/09/27 15:15:04.00)	56.3	52.5
(2016/09/27 15:30:05.00)	54.8	52
(2016/09/27 15:45:05.00)	54.3	52.5
(2016/09/27 16:00:05.00)	55.2	52.9
(2016/09/27 16:15:05.00)	58.4	53
(2016/09/27 16:30:05.00)	54.1	51.9
(2016/09/27 16:45:04.00)	56.9	52.5
(2016/09/27 17:00:05.00)	56.2	52.4
(2016/09/27 17:15:05.00)	56.9	52.4
(2016/09/27 17:30:05.00)	62.8	54
(2016/09/27 17:45:05.00)	61.1	53.5
(2016/09/27 18:00:05.00)	60.2	53.2
(2016/09/27 18:15:05.00)	57.2	53.9
(2016/09/27 18:30:05.00)	56.4	54
(2016/09/27 18:45:05.00)	55.6	53.7
(2016/09/27 19:00:04.00)	55.5	53.7
(2016/09/27 19:15:05.00)	56.3	53.3
(2016/09/27 19:30:05.00)	55.4	51.6
(2016/09/27 19:45:04.00)	54.4	51.4
(2016/09/27 20:00:05.00)	52.4	49.9
(2016/09/27 20:15:05.00)	53.8	49.8
(2016/09/27 20:30:05.00)	64	50.2
(2016/09/27 20:45:04.00)	51.4	49.5
(2016/09/27 21:00:04.00)	51.5	49.1
(2016/09/27 21:15:05.00)	50.3	48.9
(2016/09/27 21:30:05.00)	55.6	49.4
(2016/09/27 21:45:04.00)	54.9	49.1

Date	LAeq	LA90
(2016/09/27 22:00:04.00)	51.2	48.8
(2016/09/27 22:15:04.00)	49.9	48.7
(2016/09/27 22:30:04.00)	49.8	48.6
(2016/09/27 22:45:04.00)	50.7	48.7
(2016/09/27 23:00:04.00)	51.6	48.3
(2016/09/27 23:15:04.00)	49.1	47.8
(2016/09/27 23:30:04.00)	49.5	47.6
(2016/09/27 23:45:04.00)	48.3	47.1
(2016/09/28 00:00:08.00)	48.1	46.8
(2016/09/28 00:15:04.00)	49.3	46.4
(2016/09/28 00:30:04.00)	47.7	46.4
(2016/09/28 00:45:04.00)	47.4	45.8
(2016/09/28 01:00:04.00)	48.4	45.9
(2016/09/28 01:15:04.00)	47.6	46.3
(2016/09/28 01:30:04.00)	47.7	46.6
(2016/09/28 01:45:04.00)	47.8	46.3
(2016/09/28 02:00:04.00)	47.6	46.2
(2016/09/28 02:15:04.00)	47.7	46.3
(2016/09/28 02:30:04.00)	48.4	46.6
(2016/09/28 02:45:04.00)	47.4	46.4
(2016/09/28 03:00:04.00)	47.4	46.3
(2016/09/28 03:15:05.00)	47.6	46.3
(2016/09/28 03:30:04.00)	47.6	46.1
(2016/09/28 03:45:04.00)	47.4	46.1
(2016/09/28 04:00:04.00)	47.1	45.8
(2016/09/28 04:15:04.00)	46.9	45.6
(2016/09/28 04:30:04.00)	47.3	46
(2016/09/28 04:45:04.00)	47.9	45.8
(2016/09/28 05:00:04.00)	48.6	46.1
(2016/09/28 05:15:05.00)	48.2	46.7
(2016/09/28 05:30:04.00)	52.6	47.2
(2016/09/28 05:45:04.00)	49.5	47.7
(2016/09/28 06:00:05.00)	50.3	48.2
(2016/09/28 06:15:04.00)	50.8	48.3
(2016/09/28 06:30:04.00)	51.4	49
(2016/09/28 06:45:04.00)	51.7	49.3
(2016/09/28 07:00:04.00)	51.8	50.3
(2016/09/28 07:15:04.00)	52.1	50.5
(2016/09/28 07:30:04.00)	53	50.9
(2016/09/28 07:45:04.00)	55.5	51.1
(2016/09/28 08:00:04.00)	58.4	52
(2016/09/28 08:15:04.00)	57	52.1
(2016/09/28 08:30:04.00)	61.5	52.9
(2016/09/28 08:45:04.00)	55.3	52.9
(2016/09/28 09:00:04.00)	55.5	53.6
(2016/09/28 09:15:04.00)	55	53.3

Date	LAeq	LA90
(2016/09/28 09:30:05.00)	55.5	52.8
(2016/09/28 09:45:04.00)	54.6	52.3
(2016/09/28 10:00:04.00)	55.8	51.8
(2016/09/28 10:15:04.00)	58.8	51.5
(2016/09/28 10:30:04.00)	56.6	52
(2016/09/28 10:45:04.00)	55.2	52.6
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(2016/09/28 14:00:04.00)	60.7	53.9
(2016/09/28 14:15:05.00)	61.4	51.7
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(2016/09/28 14:45:04.00)	54.9	51.7
(2016/09/28 15:00:04.00)	55.3	52.4
(2016/09/28 15:15:04.00)	57.7	53.8
(2016/09/28 15:30:04.00)	56	52.9
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(2016/09/28 16:00:04.00)	57.9	55
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(2016/09/28 16:30:04.00)	57.6	54.3
(2016/09/28 16:45:04.00)	55.6	53.4
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(2016/09/28 20:00:04.00)	61.5	58.7
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Date	LAeq	LA90
(2016/09/28 21:00:04.00)	61.3	56.9
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(2016/09/29 02:00:04.00)	51.1	47.8
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(2016/09/29 07:30:04.00)	52.7	50.7
(2016/09/29 07:45:04.00)	56.8	51.5
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(2016/09/29 08:15:04.00)	56.8	52.7

Date	LAeq	LA90
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(2016/09/29 08:45:05.00)	58.4	53.5
(2016/09/29 09:00:04.00)	63.9	54
(2016/09/29 09:15:04.00)	58.2	54.2
(2016/09/29 09:30:05.00)	57.1	54.4
(2016/09/29 09:45:04.00)	58	54.7
(2016/09/29 10:00:04.00)	57.3	54.4
(2016/09/29 10:15:04.00)	55.3	52.7
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(2016/09/29 10:45:05.00)	53.1	51.7

Figure 1

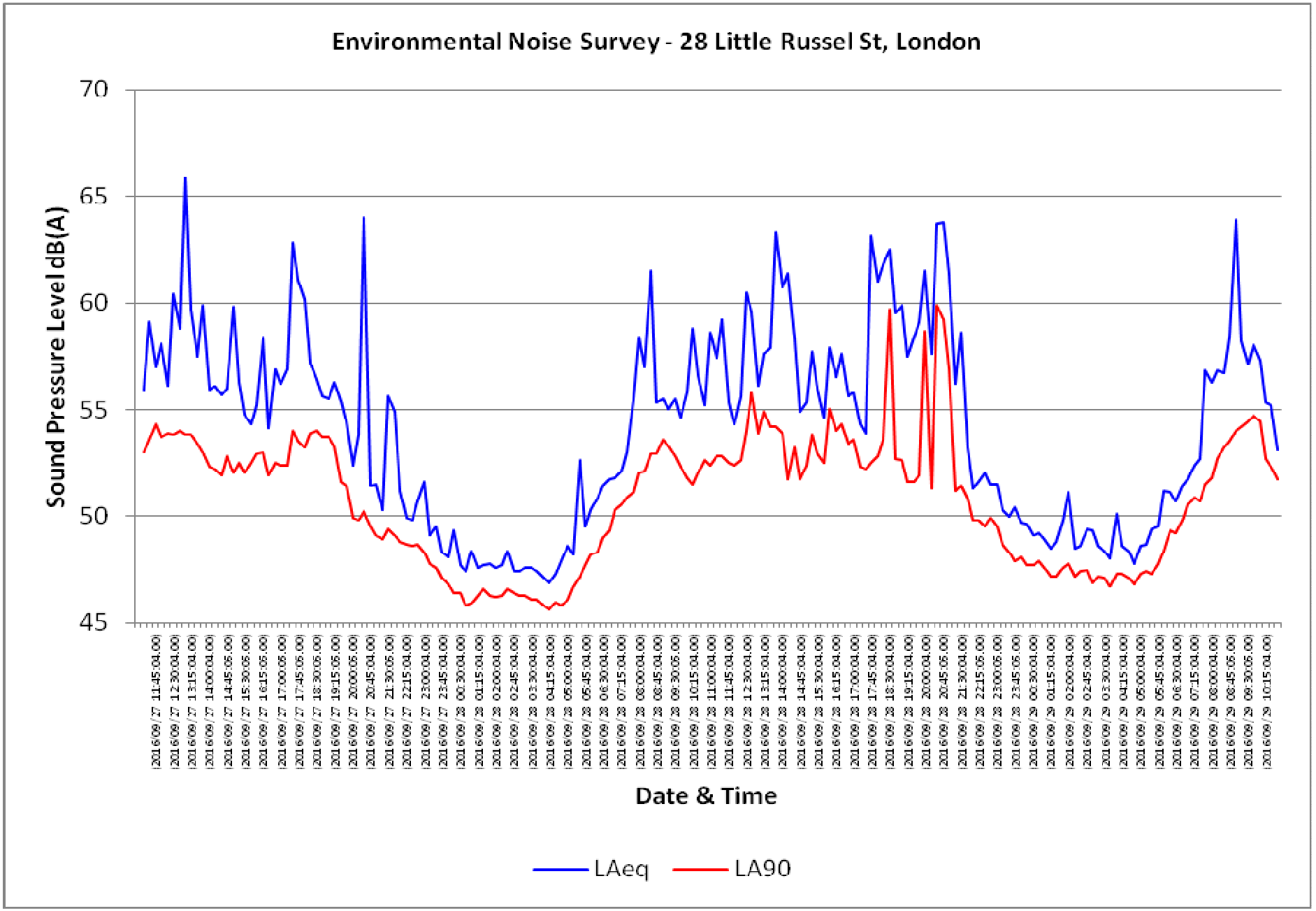
Environmental Noise Survey - 28 Little Russel St, London
Sound Pressure Level dB(A)
70
65
60
55
50
45
Date & Time
LAeq
LA90

Figure 2

NOICO Noise Control Engineers	Project: 28 Little Russell Street	Title: Noise Survey Position
	Dwg No. 360941/Rev A	Date: 14th October 2016
	Patrick House, Station Road Hook, Hampshire RG27 9HU	Tel: 01256 766207 Fax: 01256 768413