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REPORT No. 2003043-6A

58A Redington Road
London
NW3 7RS

ENVIRONMENTAL NOISE SURVEY REPORT

PREPARED: 10th July 2020

Presented By: Paul Cotton

CONTENTS

1.0 Introduction

1.1 Daniel Belov has commissioned Noico Ltd to conduct an environmental noise survey at 58A Redington Road, London, NW3 7RS.

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 Council).

1.3 The development site comprises a semi-detached property within a neighbourhood comprised in the main of residential properties.

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 on the roof of the premises largely away from existing plant. This position was chosen as it was considered to be representative of the background noise environment which exists at the nearest noise affected properties. Note, from the observations made on site, the nearest noise affected properties are considered to be ? of the development site. 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 24th June 2020 through to 14:00 hrs on the 26th June 2020. 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. Windspeed, 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 in the main by road traffic noise along Redington Road and Templewood Avenue. Whilst no observations were made of plant serving surrounding properties, should plant be serving these properties then this 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)	- 32.8 L_{A90}
Night time (23:00 to 07:00hrs)	- 28.4 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 London Borough of Camden Council has advised that noise arising from fixed plant installations should not cause an increase in the existing minimum background noise level (as expressed as a L_{A90}) at the nearest noise affected property. In practical terms, this means that the noise arising from the plant should be at least 10 dB(A) below the minimum background noise level. The local authority also confirmed that tonal contributions from plant should be kept to a minimum wherever possible.

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 (rounded) values.

Daytime plant operation (07:00 to 23:00hrs)	- 23 dB L_{Aeq}
Night time (23:00 to 07:00hrs)	- 18 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 the following new equipment is to be installed in the rear garden of the property:

2 no. Mitsubishi model PUMY-P200YKM1 condensing units, each having a manufacturer's sound pressure level at 1m of 61dB(A).

1 no. Mitsubishi model PUHZ-HW140YHA2 condensing unit, having a manufacturer's sound pressure level at 1m of 53dB(A).

1 no. Mitsubishi model PUZ-ZM35VKA condensing unit, having a manufacturer's sound pressure level at 1m of 46dB(A).

7.2 We have assumed the new plant has the capability of running 24/7 and have based our assessment on these running conditions.

7.3 A review of the plant noise level indicates that the units have a smooth declining curve across the frequency spectrum. Assuming the plant is inverter controlled then we feel that no acoustic feature correction need be added.

7.4 The following table shows our calculation for the condenser emissions to 1m from the façade of the nearest affected property:

Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Mitsubishi PUMY-P200YKM Lp @ 1m	64	61	61	58	57	52	49	41
Correction for 2 no. units	3	3	3	3	3	3	3	3
Resultant Lp of both units	67	64	64	61	60	55	52	44
Mitsubishi PUHZ-HW140YHA Lp @ 1m	61	56	52	51	48	43	38	30
Mitsubishi PUZ-ZM35VK Lp @ 1m	58	51	45	44	40	37	32	31
Resultant Lp of all units @ 1m	68	65	64	62	60	55	52	44
18m Distance correction (20log10 1/18)	-25	-25	-25	-25	-25	-25	-25	-25
Barrier loss	-5	-5	-5	-5	-5	-5	-5	-5
Receiver façade correction	3	3	3	3	3	3	3	3
A-weighting correction	-26	-16	-9	-3	0	1	1	-1
Resultant Lp(A) @ receiver	15	22	28	32	33	29	26	16
						Specific Noise Level	38	dB(A)
						Correction For Tonality	0	dB(A)
						Rating Noise Level	38	dB(A)
						Criterion	18	dB(A)
						Excess	**20**	**dB(A)**

7.5 It can be seen that the resultant noise level at the residential receiver is in excess of the requirements of the local authority and mitigation measures to are therefore required.

8.0 Mitigation Measures

8.1 An acoustic enclosure will need to be installed around the condensing units in order to reduce noise from plant to the requirements set by the local authority.

8.2 The acoustic enclosure will be typically manufactured from a combination of acoustic panel-work and suitably sized acoustic louvres (or attenuating splitter elements) which shall allow airflow into and out of the condensing units contained within. Plenum plates should be incorporated within the enclosure in order to prevent recirculation/short-circuiting of air. The enclosure shall be designed to impose minimal resistance (typically <15pa) on the plant contained within in order to ensure correct operation of the plant.

9.0 Conclusion

9.1 A background noise level survey has been carried out at 58A Redington Road, London, NW3 7RS.

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

9.3 A plant noise assessment for the proposed new equipment being installed at the project site has been undertaken. The provision of a suitably designed acoustic enclosure will reduce the excess noise in line with the requirements of the local authority (London Borough of Camden).

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
(2020/06/24 11:00:01.00)	40.9	34.9
(2020/06/24 11:15:01.00)	39.9	35.1
(2020/06/24 11:30:01.00)	43.6	37.4
(2020/06/24 11:45:01.00)	43.6	35.8
(2020/06/24 12:00:01.00)	47.3	37.2
(2020/06/24 12:15:01.00)	44.0	38.5
(2020/06/24 12:30:01.00)	46.5	38.2
(2020/06/24 12:45:01.00)	46.6	39.1
(2020/06/24 13:00:01.00)	45.6	37.9
(2020/06/24 13:15:01.00)	46.8	36.8
(2020/06/24 13:30:01.00)	46.5	37.7
(2020/06/24 13:45:01.00)	52.5	39.4
(2020/06/24 14:00:01.00)	52.0	45.7
(2020/06/24 14:15:01.00)	52.6	43.1
(2020/06/24 14:30:01.00)	55.0	42.8
(2020/06/24 14:45:01.00)	47.6	43.8
(2020/06/24 15:00:01.00)	47.4	39.8
(2020/06/24 15:15:01.00)	44.6	39.6
(2020/06/24 15:30:01.00)	47.2	41.2
(2020/06/24 15:45:01.00)	52.9	42.5
(2020/06/24 16:00:01.00)	52.9	40.2
(2020/06/24 16:15:01.00)	50.2	40.0
(2020/06/24 16:30:01.00)	47.9	39.0
(2020/06/24 16:45:01.00)	47.3	38.4
(2020/06/24 17:00:01.00)	46.7	37.8
(2020/06/24 17:15:01.00)	41.8	37.8
(2020/06/24 17:30:01.00)	49.2	38.1
(2020/06/24 17:45:01.00)	42.9	36.4
(2020/06/24 18:00:01.00)	42.8	37.6
(2020/06/24 18:15:01.00)	44.3	37.7
(2020/06/24 18:30:01.00)	41.4	37.6
(2020/06/24 18:45:01.00)	39.6	36.5
(2020/06/24 19:00:01.00)	48.4	39.1
(2020/06/24 19:15:01.00)	43.5	37.5
(2020/06/24 19:30:01.00)	45.2	37.2
(2020/06/24 19:45:01.00)	47.6	36.7
(2020/06/24 20:00:01.00)	45.2	37.6
(2020/06/24 20:15:01.00)	42.1	37.0
(2020/06/24 20:30:01.00)	39.7	36.0
(2020/06/24 20:45:01.00)	50.4	36.7
(2020/06/24 21:00:01.00)	38.1	34.2
(2020/06/24 21:15:01.00)	38.8	35.5
(2020/06/24 21:30:01.00)	39.2	35.5
(2020/06/24 21:45:01.00)	42.5	35.6

Date	LAeq	LA90
(2020/06/24 22:00:01.00)	37.9	35.3
(2020/06/24 22:15:01.00)	38.5	35.8
(2020/06/24 22:30:01.00)	51.0	35.9
(2020/06/24 22:45:01.00)	38.8	35.4
(2020/06/24 23:00:01.00)	46.4	35.2
(2020/06/24 23:15:01.00)	36.7	34.5
(2020/06/24 23:30:01.00)	37.2	35.0
(2020/06/24 23:45:01.00)	37.5	35.3
(2020/06/25 00:00:01.00)	37.0	35.1
(2020/06/25 00:15:01.00)	37.2	35.4
(2020/06/25 00:30:01.00)	37.6	35.6
(2020/06/25 00:45:01.00)	36.0	34.1
(2020/06/25 01:00:01.00)	36.3	33.9
(2020/06/25 01:15:01.00)	36.1	34.3
(2020/06/25 01:30:01.00)	36.5	33.8
(2020/06/25 01:45:01.00)	36.1	33.5
(2020/06/25 02:00:01.00)	37.2	34.6
(2020/06/25 02:15:01.00)	36.6	33.9
(2020/06/25 02:30:01.00)	36.7	34.5
(2020/06/25 02:45:01.00)	36.2	33.7
(2020/06/25 03:00:01.00)	35.5	33.3
(2020/06/25 03:15:01.00)	36.5	33.9
(2020/06/25 03:30:01.00)	37.0	34.2
(2020/06/25 03:45:01.00)	39.3	35.3
(2020/06/25 04:00:01.00)	45.5	35.8
(2020/06/25 04:15:01.00)	49.1	36.6
(2020/06/25 04:30:01.00)	46.4	36.3
(2020/06/25 04:45:01.00)	42.2	37.1
(2020/06/25 05:00:01.00)	40.8	36.1
(2020/06/25 05:15:01.00)	47.5	37.7
(2020/06/25 05:30:01.00)	43.2	37.4
(2020/06/25 05:45:01.00)	42.6	37.9
(2020/06/25 06:00:01.00)	41.0	38.2
(2020/06/25 06:15:01.00)	41.8	38.4
(2020/06/25 06:30:01.00)	41.9	38.8
(2020/06/25 06:45:01.00)	42.0	39.4
(2020/06/25 07:00:01.00)	43.0	39.0
(2020/06/25 07:15:01.00)	45.0	39.1
(2020/06/25 07:30:01.00)	43.3	39.3
(2020/06/25 07:45:01.00)	44.8	39.3
(2020/06/25 08:00:01.00)	49.7	39.6
(2020/06/25 08:15:01.00)	52.9	40.6
(2020/06/25 08:30:01.00)	50.7	39.4
(2020/06/25 08:45:01.00)	44.1	39.6
(2020/06/25 09:00:01.00)	53.4	39.9

Date	LAeq	LA90
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(2020/06/25 09:30:01.00)	58.3	39.3
(2020/06/25 09:45:01.00)	56.9	35.9
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(2020/06/25 10:45:01.00)	45.3	38.8
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(2020/06/25 12:00:01.00)	45.5	38.4
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(2020/06/25 12:30:01.00)	42.3	37.8
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(2020/06/25 19:45:01.00)	40.9	37.1
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(2020/06/25 21:45:01.00)	41.4	34.9
(2020/06/25 22:00:01.00)	39.4	34.3
(2020/06/25 22:15:01.00)	51.7	34.3
(2020/06/25 22:30:01.00)	40.2	34.4
(2020/06/25 22:45:01.00)	52.4	35.0
(2020/06/25 23:00:01.00)	42.7	35.0
(2020/06/25 23:15:01.00)	36.5	34.6
(2020/06/25 23:30:01.00)	36.0	34.2
(2020/06/25 23:45:01.00)	35.8	34.0
(2020/06/26 00:00:01.00)	36.7	33.8
(2020/06/26 00:15:01.00)	36.0	33.2
(2020/06/26 00:30:01.00)	36.9	33.6
(2020/06/26 00:45:01.00)	35.1	32.4
(2020/06/26 01:00:01.00)	33.3	31.4
(2020/06/26 01:15:01.00)	33.8	31.6
(2020/06/26 01:30:01.00)	34.7	32.1
(2020/06/26 01:45:01.00)	33.9	31.2
(2020/06/26 02:00:01.00)	33.1	29.6
(2020/06/26 02:15:01.00)	30.4	29.0
(2020/06/26 02:30:01.00)	30.5	28.7
(2020/06/26 02:45:01.00)	31.9	29.0
(2020/06/26 03:00:01.00)	30.6	28.4
(2020/06/26 03:15:01.00)	32.6	30.3
(2020/06/26 03:30:01.00)	30.5	28.6
(2020/06/26 03:45:01.00)	34.5	29.7
(2020/06/26 04:00:01.00)	34.2	29.6
(2020/06/26 04:15:01.00)	43.8	30.9
(2020/06/26 04:30:01.00)	45.5	31.7
(2020/06/26 04:45:01.00)	41.7	34.8
(2020/06/26 05:00:01.00)	41.4	31.5
(2020/06/26 05:15:01.00)	40.6	31.5
(2020/06/26 05:30:01.00)	42.1	39.2
(2020/06/26 05:45:01.00)	42.9	40.6
(2020/06/26 06:00:01.00)	43.5	37.3
(2020/06/26 06:15:01.00)	45.0	35.7
(2020/06/26 06:30:01.00)	44.7	37.3
(2020/06/26 06:45:01.00)	43.7	38.8
(2020/06/26 07:00:01.00)	42.1	38.4
(2020/06/26 07:15:01.00)	40.6	35.7
(2020/06/26 07:30:01.00)	41.0	36.4

Date	LAeq	LA90
(2020/06/26 07:45:01.00)	40.6	33.0
(2020/06/26 08:00:01.00)	43.8	34.6
(2020/06/26 08:15:01.00)	77.5	33.5
(2020/06/26 08:30:01.00)	67.6	35.3
(2020/06/26 08:45:01.00)	71.3	36.0
(2020/06/26 09:00:01.00)	78.1	37.9
(2020/06/26 09:15:01.00)	71.9	36.9
(2020/06/26 09:30:01.00)	47.1	35.8
(2020/06/26 09:45:01.00)	43.1	35.9
(2020/06/26 10:00:01.00)	41.9	36.7
(2020/06/26 10:15:01.00)	40.0	35.2
(2020/06/26 10:30:01.00)	77.2	35.5
(2020/06/26 10:45:01.00)	74.7	35.3
(2020/06/26 11:00:01.00)	76.0	35.4
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(2020/06/26 11:30:01.00)	43.6	36.9
(2020/06/26 11:45:01.00)	60.0	37.2
(2020/06/26 12:00:01.00)	43.6	37.4
(2020/06/26 12:15:01.00)	57.2	38.8
(2020/06/26 12:30:01.00)	52.3	39.9
(2020/06/26 12:45:01.00)	52.5	37.8
(2020/06/26 13:00:01.00)	38.3	32.8
(2020/06/26 13:15:01.00)	39.9	35.2
(2020/06/26 13:30:01.00)	56.3	38.2
(2020/06/26 13:45:01.00)	43.5	36.6
(2020/06/26 14:00:01.00)	44.2	37.7

Appendix 3 – Assessment of proposed acoustic enclosures

We have received details of acoustic enclosures that are proposed for each plant item.

Each item of plant and the manufacturer confirmed resultant noise levels are detailed below:

2 no. enclosures for Mitsubishi model PUMY-P200YKM1 condensing units. The enclosure manufacturer claims a resultant noise level of 35-41dB(A) at 1m for each unit.

1 no. enclosure for Mitsubishi model PUHZ-HW140YHA2 condensing unit. The enclosure manufacturer claims a resultant noise level of 27-33dB(A) at 1m.

1 no. enclosure for Mitsubishi model PUMY-P200YKM1 condensing unit. The enclosure manufacturer claims a resultant noise level of 25dB(A) at 1m.

We have assessed the proposed enclosures and details our calculation as follows:
N.B. We have utilised the manufacturer confirmed upper noise level estimations.

Frequency (Hz)	**dB(A)**
Mitsubishi PUMY-P200YKM Lp(A) @ 1m	41
Correction for 2 no. units	3
Resultant Lp of both units	44
Mitsubishi PUHZ-HW140YHA Lp(A) @ 1m	33
Mitsubishi PUZ-ZM35VK Lp(A) @ 1m	25
Resultant Lp of all units @ 1m	44
18m Distance correction (20log10 1/18)	-25
Barrier loss	-5
Receiver façade correction	3
Resultant Lp(A) @ receiver	17
Specific Noise Level	17
Correction For Tonality	0
Rating Noise Level	17
Criterion	18
Level of safety	**-1**

Our calculation shows that the proposed enclosures will reduce noise from plant to a level that satisfies the local authority's requirements.

Figure 1

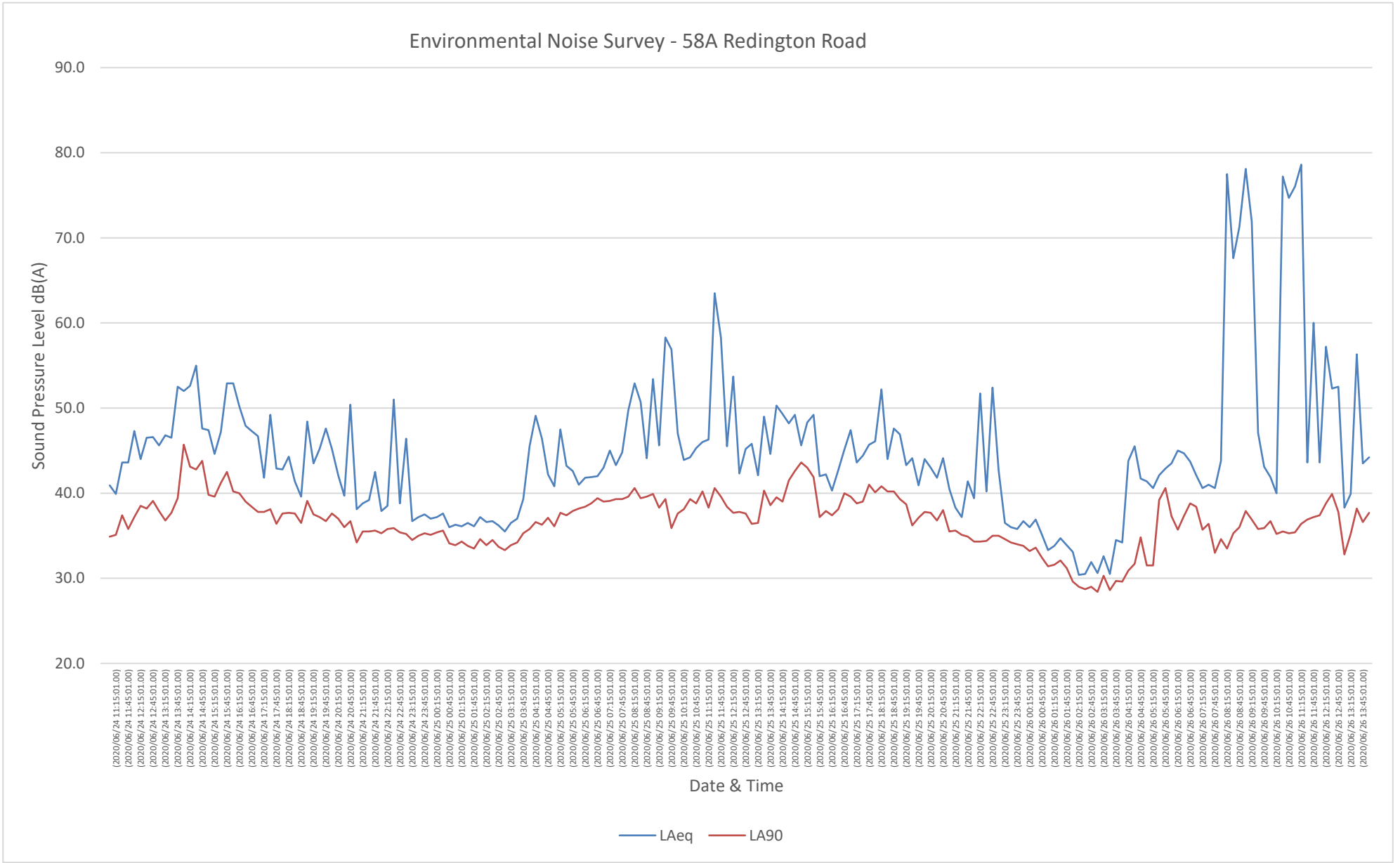
Environmental Noise Survey - 58A Redington Road
Sound Pressure Level dB(A)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
Date & Time
LAeq
LA90

Figure 2

NOICO NOISE CONTROL	Project: 58A Redington Road	Title: Noise Survey Position
	Dwg No: 2003043-6 Rev A	Date: 9th July 2020

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