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18-20 ELSWORTHY ROAD
LONDON

PLANT NOISE ASSESSMENT

Technical Report: R8200-2 Rev 0

Date: 24th October 2019

For: Sherlock London Ltd
64-66 Old Street
London
EC1V 9AN

24 Acoustics Document Control Sheet

Project Title: 18-20 Elsworthy Road, London – Plant Noise Assessment

Report Ref: R8200-2 Rev 0

Date: 24th October 2019

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed by	Approved By
0	Approved for issue	Jon Munns	Chris McConnell	Stephen Gosling

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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been instructed by Sherlock London to undertake a plant noise assessment to address a planning condition for the development at 18-20 Elsworthy Road, London.

1.2 This report presents the results of the assessments, following site visits and a background noise survey undertaken between 30th September and 1st October 2019.

1.3 All sound pressure levels quoted in this report are in dB relative to 20 µPa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

2.1 Planning permission was granted on 30th March 2015 for demolition of existing buildings and construction of five residential units, comprising: one seven-bed dwelling house, one four-bed maisonette, one three-bed flat and two one-bed flats. The development includes roof level plant, a mechanical ventilation and heat recovery (MVHR) unit in an external lightwell and toilet extract fans on each façade.

2.2 The nearest noise-sensitive property to the proposed plant is 16 Elsworthy Road, located to the north-east of the site.

2.3 It is understood that the proposed plant will operate on demand at any time of day or night. Therefore, this assessment will consider the specific noise level from the plant against daytime and night-time background noise levels.

2.4 An aerial view of the site and the noise survey measurement locations are shown in Figure 1, and the proposed locations of the plant are shown in Figure 2.

3.0 RELEVANT CRITERIA

BS 4142:2014+A1:2019 Methods for Rating Industrial and Commercial Sound

3.1 BS 4142:2014+A1:2019 [Reference 1] provides a method for rating the effects of industrial and commercial sound on residential receptors.

3.2 The standard advocates a comparison between the representative measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent, or otherwise distinctive in character, a rating correction should be applied.

3.3 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact, also depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

3.4 BS 4142 requires the noise impact to be assessed depending on the context. In relation to situations where background noise levels are low, the standard states "Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night".

Planning Permission 2014/5413/P

3.5 Condition 4 of the planning permission relates to noise levels from plant and is reproduced below:

> *Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A).*

4.0 NOISE MEASUREMENTS

Background Noise Survey

4.1 A background noise survey was undertaken between 30th September and 1st October 2019 to assess the existing background noise levels, using the following equipment:

- Rion precision sound level meter Type NL-52;
- Norsonic acoustic calibrator Type 1251.

4.2 Measurements were undertaken in samples of 5 minutes in terms of the overall free-field A-weighted L_{eq}, L_{90} and $L_{max,f}$ noise levels. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 6]. The measurement location is shown on Figure 1.

4.3 The instrumentation calibration was checked before and after the surveys in accordance with the manufacturer's instructions. No significant drift in calibration was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards.

4.4 The instrumentation was fitted with environmental weather shields during the surveys. Periods affected by rainfall and works on site have been excluded from the analysis.

4.5 As the plant will operate on demand over 24 hours, it is considered appropriate to base the assessment on the night-time background noise levels. The results of the background noise survey are shown graphically in Appendix B and are summarised in Table 1 below.

Typical Night-Time Background (23:00 – 07:00 hours) Sound Pressure Level (dB $L_{A90,15min}$)
45

Table 1: Summary of measured night-time background noise level.

4.6 Please note that 24 Acoustics defines the typical background noise level to be the average level minus one standard deviation.

4.7 Based on the measured background noise levels, in accordance with the criteria from planning condition 4, noise levels from plant should not exceed 40 dB $L_{Aeq,15min}$ at the nearest noise sensitive façades.

5.0 NOISE IMPACT ASSESSMENT

Plant Noise Data

5.1 It is proposed to install new plant as outlined below. Locations of the proposed units are shown in Figure 2.

- 1 × Nuaire MRXBOXAB-ECO4 MVHR unit in the lower ground floor lightwell on the western boundary of the site;
- 3 × Daikin ERLQ016CV3 condenser units on the roof;
- 15 × VES Turbo 100 toilet extract fans;
- 2 × Nuaire NA-E-150T toilet extract fan;
- 2 × Nuaire ES-OPUSDC75-M toilet extract fans.

5.2 Of the toilet extract fans, only two contribute significantly to noise levels at sensitive properties: one VES Turbo 100 and one Nuaire ES-OPUSDC75-M exhaust from the eastern façade of the building, near 16 Elsworthy Road. The remainder of the extract fans exhaust to roof level or other façades and are not considered to contribute significantly to noise levels at the nearest sensitive windows.

5.3 The nearest sensitive receptor to the proposed plant is 16 Elsworthy Road, immediately adjacent to the east of the site. The nearest window at the front of the property is approximately 5 metres from the lightwell containing the Nuaire MVHR unit, and 15 metres from the nearest condenser. The nearest window at the rear of the property is 12 metres from the nearest condenser, and 15 metres from the lightwell but completely screened by the building. The extract fan terminations on the façade are approximately 3 metres from the front of 16 Elsworthy Road but screened by the edge of the building.

5.4 The manufacturer's sound power level data for the Nuaire MVHR unit and Nuaire ES-OPUSDC75-M extract fan has been provided and is shown in Table 2 below. 24 Acoustics understands that the design duty of the Nuaire MVHR unit is 50%.

Sound Power Level (dB) at Octave Band Centre Frequency (Hz)									**dBA**
Unit	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Nuaire MRXBOXAB-ECO4 open inlet (50 % duty)	44	48	45	43	37	33	19	<16	44
Nuaire MRXBOXAB-ECO4 open outlet (50 % duty)	51	58	58	55	49	47	38	31	56
Nuaire ES-OPUSDC75-M induct outlet	71	69	58	54	52	48	42	33	58

Table 2: Manufacturer's sound power level data.

5.5 The manufacturers' sound pressure level data measured at specific distances for the Daikin ERLQ016CV3 condenser units and VES Turbo 100 toilet extract fan has been provided and is shown in Table 3 below.

Sound Pressure Level at specified distance (dB) at Octave Band Centre Frequency (Hz)									dBA
Unit	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Daikin ERLQ016CV3 @ 1 m	54	56	55	56	48	47	40	32	56
VES Turbo 100 outlet @ 3 m	-	-	-	-	-	-	-	-	36

Table 3: Manufacturers' sound pressure level data, at specified distance.

Noise Impact Assessment

5.6 Assessments of noise impact from the proposed plant have been undertaken for the front and rear of the nearest sensitive property, 16 Elsworthy Road.

5.7 The proposed plant is not considered to contain tonal or other distinctive characteristics; therefore, under the planning condition, the total noise at each receptor will need to achieve 5 dBA below the background noise level as per Condition 4.

5.8 The calculations have included losses due to distance, screening from the roof edge and building, and ductwork losses, as well as a correction for some of the plant being located in a lightwell. The assessments of noise from the proposed plant against the typical night-time background noise level for the front and rear of 16 Elsworthy Road are shown in Table 4 below.

	Front of 16 Elsworthy Road	**Rear of 16 Elsworthy Road**
Representative background noise level	45 dB $L_{A90,15min}$	45 dB $L_{A90,15min}$
Plant noise level	32 dB L_{Aeq}	29 dB L_{Aeq}
Level difference	-13 dBA	-16 dBA

Table 4: Plant noise assessments

5.9 Table 4 shows that noise levels from the proposed plant will not exceed 5 dBA below the typical night-time background noise level and will therefore comply with the planning condition.

6.0 CONCLUSIONS

6.1 24 Acoustics Ltd has been instructed by Sherlock London to undertake a plant noise assessment to address a planning condition for the development at 18-20 Elsworthy Road, London.

6.2 An environmental noise survey has been undertaken to determine the existing background noise levels representative of nearby residential properties.

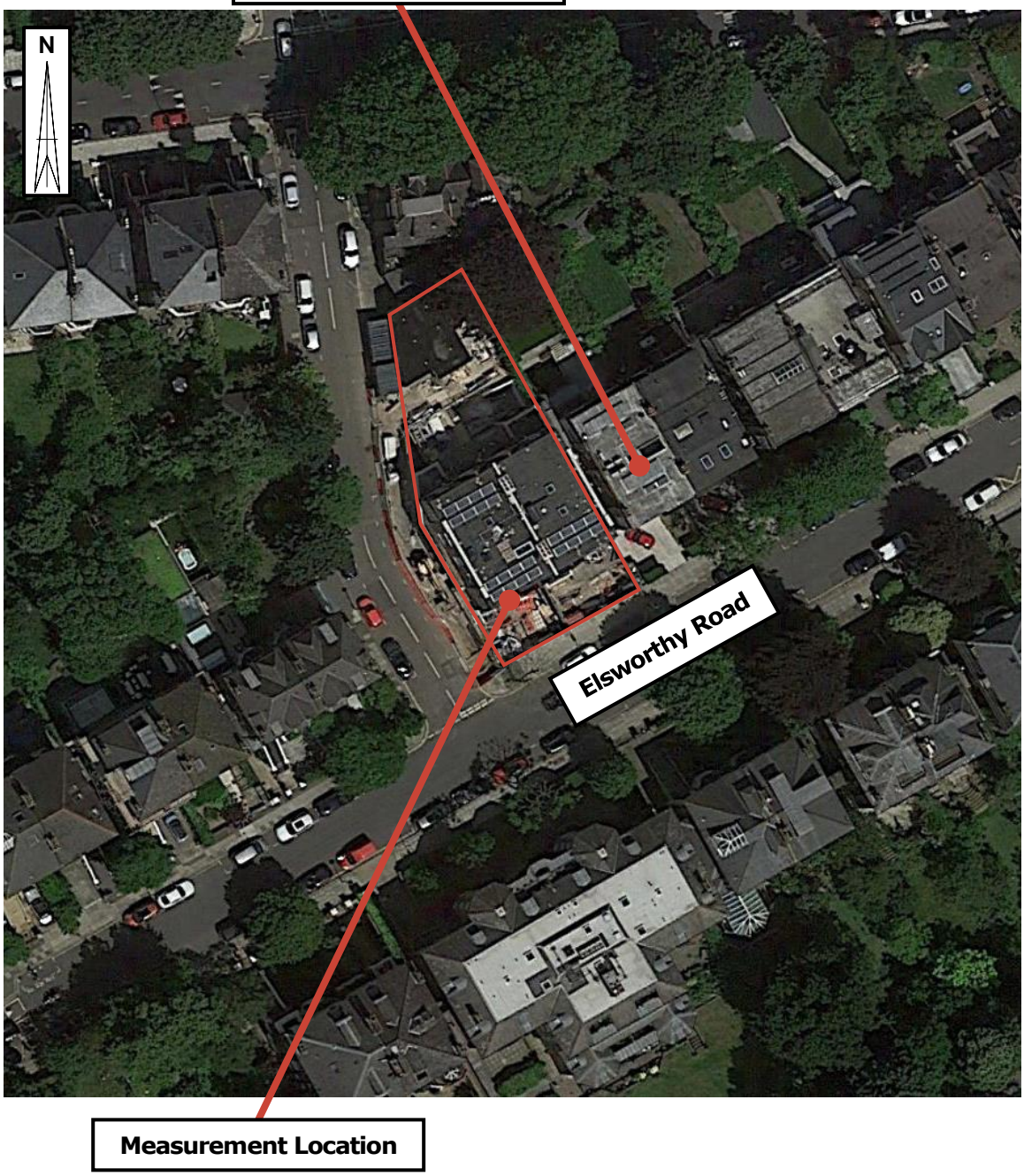
6.3 Calculations have been undertaken, based on manufacturer's noise data, to determine the plant noise levels at the nearest noise sensitive windows.

6.4 The assessment shows that noise from the proposed plant will comply with the planning condition and will therefore be acceptable.

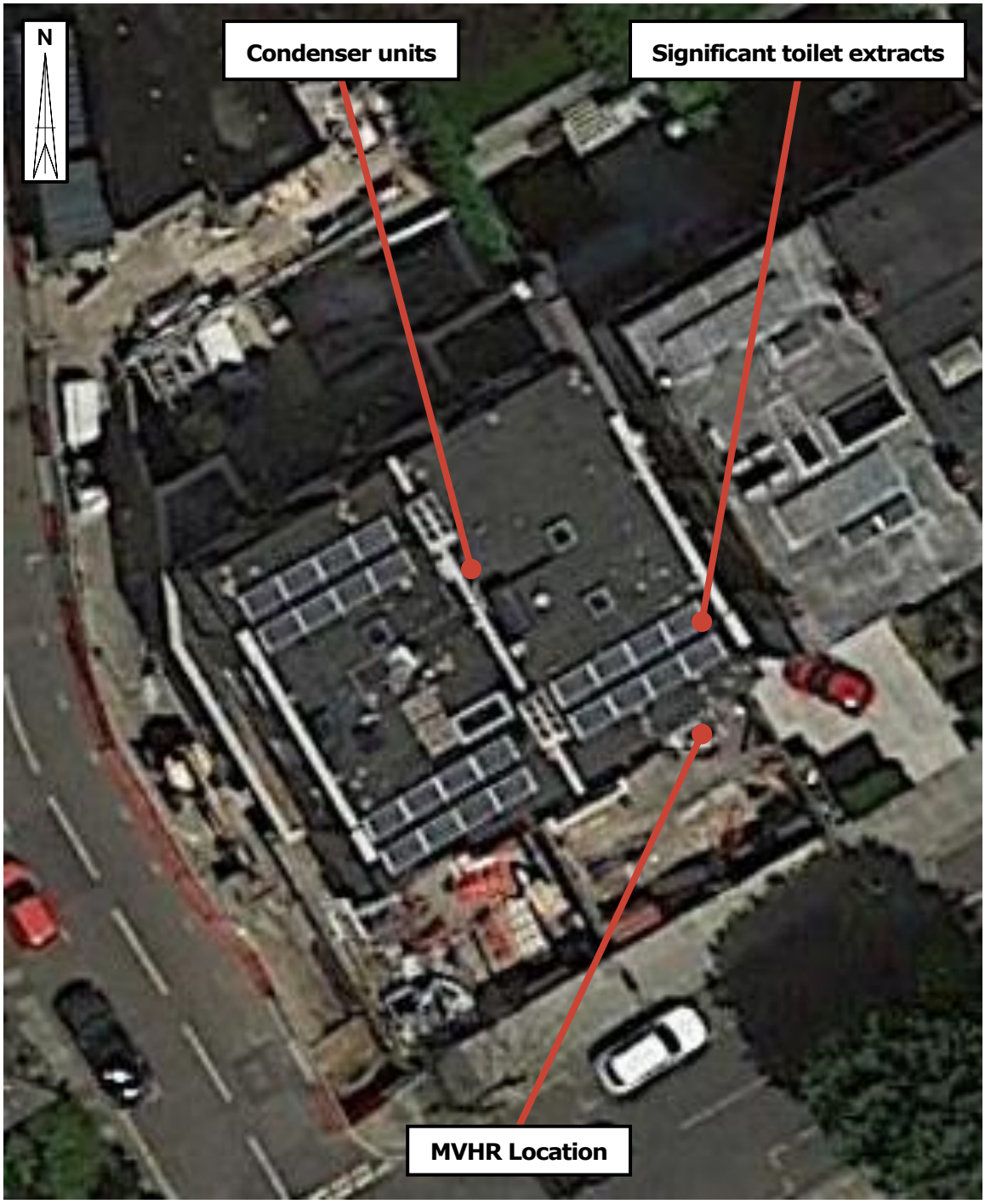
REFERENCES

1. British Standards Institution. British Standard 4142:2014+A1:2019 Methods for rating industrial and commercial sound, 2019.

2. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.



Project: 18-20 Elsworthy Road, London	**Title**: Aerial view, survey location, and nearest sensitive receptor.	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev**: 0
Date: October 2019	**Drawn By:** JM	**Job No**: 8200



Project: 18-20 Elsworthy Road, London	**Title**: Plant locations.	
DWG No: Figure 2	**Scale:** N.T.S.	**Rev**: 0
Date: October 2019	**Drawn By:** JM	**Job No**: 8200

APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B – AMBIENT NOISE SURVEY RESULTS

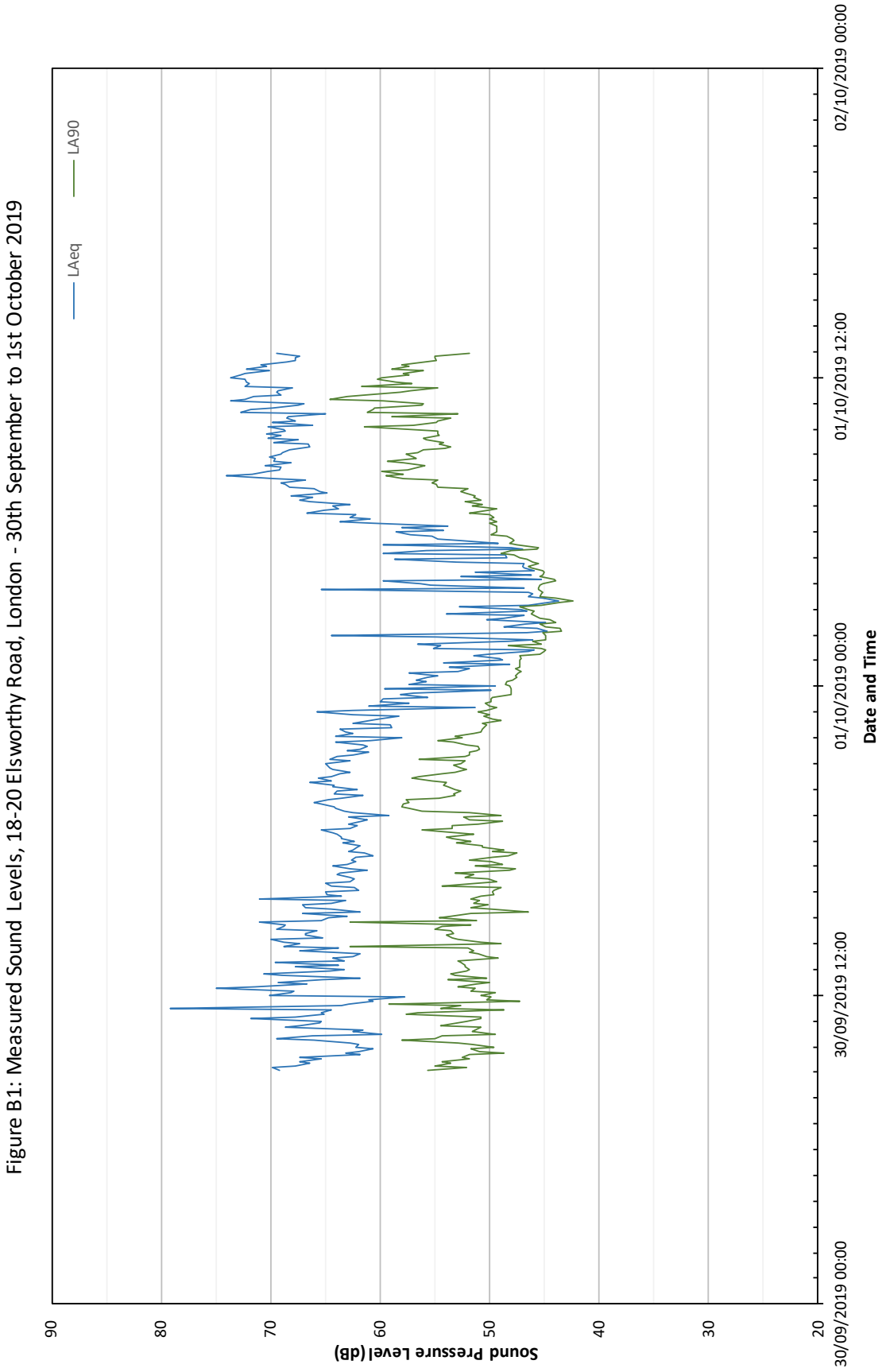


Figure B1: Measured Sound Levels, 18-20 Elsworthy Road, London - 30th September to 1st October 2019