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24-28 BLOOMSBURY WAY, LONDON

LONDON

PLANT NOISE ASSESSMENT

Technical Report: R10180-4 Rev 1

Date: 7th February 2024

For: RWE Central Ltd
20 Thomas Street
London
SE1 9RS

24 Acoustics Document Control Sheet

Project Title: 24-28 Bloomsbury Way, London – Plant Noise Assessment

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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been appointed by RWE Central Ltd, to undertake an assessment of noise associated with proposed new plant at 24-28 Bloomsbury Way, London.

1.2 This report presents the results of the assessment following site visits and environmental noise measurements undertaken between 10th to 15th August 2023.

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 24-28 Bloomsbury Way is a five-storey building located to the north of the A40, opposite Barter Street, within the London Borough of Camden. Figure 1 shows the site layout.

2.2 New plant is proposed to serve the office spaces, comprising two mechanical ventilation and heat recovery units (MVHRs) and a condenser on the lower ground floor as described in Figures 2 and 3.

2.3 The nearest residential properties are in the Russell Chambers building which share the lightwell with 24-28 Bloomsbury Way, as shown in Figures 1 and 2.

2.4 The proposed AHUs will only operate during office hours (08:00 to 18:00 Monday to Friday). The condenser unit will operate on demand over 24 hours.

3.0 CRITERIA

Local Authority Guidance

3.1 Appendix 3 of the Camden Local Plan [Reference 1] provides criteria for assessing noise from industrial and commercial sources and states the following:

> *"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."*

3.2 In line with the scope of BS 4142:2014, the above requirements will apply to noise from new plant at the nearest affected residential properties.

BS 4142: 2014

3.3 BS 4142:2014 [Reference 2] provides a method for rating the effects of industrial and commercial sound on residential areas.

3.4 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.

3.5 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).

4.0 ASSESSMENT METHODOLOGY

4.1 The following assessment methodology has been used:

i. Background noise measurements have been undertaken to determine existing levels of background noise at the nearest residential properties;
ii. Based on the survey results and Camden Council's requirements, plant noise criteria have been defined;
iii. Calculations have been undertaken to determine the noise level associated with the proposed new plant at the nearest noise sensitive receptors.

5.0 ENVIRONMENTAL NOISE SURVEY

Survey Method

5.1 Environmental noise measurements were undertaken at the site between the 10th and 15th August 2023, in order to determine the prevailing background noise levels in the lightwell.

5.2 The monitor was installed in free-field conditions on the north-eastern side of the lightwell at first floor level. This location is considered representative of nearby residential properties and is shown in Figure 1.

5.3 Background noise levels were measured using the following equipment:

- Rion precision sound level meter Type NL-32;
- Brüel & Kjær acoustic calibrator Type 4231.

5.4 Noise 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 3].

5.5 The instrumentation's 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. All instruments were fitted with environmental weather shields during the surveys.

5.6 Weather conditions during the survey were fine and dry with wind speeds generally below 5 m/s.

Results

5.1 The results of the background noise measurements are described graphically in Appendix B and summarised in Table 1 in accordance with BS 4142).

Date	Typical Background Noise Level, dB	
	AHU Operating Hours, $L_{A90,1\ hour}$ (08:00-18:00 hrs)	**Condenser Operating Hours, $L_{A90,15min}$ (24 hours)**
Thursday 10/8/2023	39	36
Friday 11/8/2023	39	35
Monday 14/8/2023	39	35
Tuesday 15/8/2023	39	34
Representative	**39**	**35**

Table 1: Location 1 - Summary of Background Noise Levels.

5.7 24 Acoustics determines the typical background level to be the average minus one standard deviation.

5.8 Prevailing background noise levels at the measurement location were determined by existing neighbouring plant in the area and distant road traffic noise.

5.9 With reference to the above survey data and the requirements of Camden Council (not to exceed 10 dB below the background noise level) it is proposed that cumulative noise from the new plant does not exceed the following levels outside nearby residential properties:

- 29 dB $L_{Aeq,\ 1hour}$ during MVHR operating times (08:00 to 18:00 hours)
- 25 dB $L_{Aeq,\ 15minr}$ during condenser operating times (24-hours)

6.0 PLANT NOISE ASSESSMENT

Proposed Services Plant

6.1 Manufacturer supplied noise data for the proposed MVHR units is described in Table 3.

Unit		Single Octave Band (Hz) Sound Power Level, dBA								dBA
		63	125	250	500	1k	2k	4k	8k	
MVHR 1 Helios AIR1 RH 3000	Supply Inlet	73	77	59	60	56	49	39	24	64
	Extract Exhaust	76	73	75	74	74	76	71	66	81
	Breakout	62	57	53	47	45	44	38	28	52
MVHR 2 Helios AIR1 HR 5000	Supply Inlet	62	67	59	61	53	47	37	29	61
	Extract Exhaust	67	64	72	74	75	73	69	68	79
	Breakout	54	48	53	50	49	45	39	33	53

Table 3: Manufacturer's Noise Data

6.2 MVHR 1 will be located in a lower ground plant room (MVHR Room 2) and vented to the undercroft of the lightwell. MVHR 2 will be located inside the communications room on the lower ground floor at the opposing end of the lightwell. Both units will be programmed to operate during office hours only (08:00 to 18:00 Monday to Friday).

6.3 The condenser unit is a Toshiba RAS-10ABVG-E1 with a manufacturer's quoted sound pressure level of 46 dBA at one metre (hemispherical radiation). The condenser unit will be placed in the undercroft outside MVHR Room 2.

6.4 The nearest and most affected residential properties are at the Russell Chambers building to the west and east of the site (as shown in Figures 1 and 2). The most exposed windows at the Russell Chambers building are on the 2nd floor at an approximate distance of 8 to 12 m from the nearest items of plant.

Noise Mitigation Measures

6.5 Preliminary calculations identified the need for attenuation measures. Inline attenuation shall be fitted to the MVHR units and specified to meet the minimum overall insertion losses specified in Table 4 (reference Allaway attenuation schedule 13593321Q3, dated 14th November 2023).

Location	Silencer Insertion Loss (dB) per Octave Band Centre Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Helios 3000 fresh air	8	15	25	37	44	39	34	20
Helios 3000 exhaust	8	15	28	45	54	51	43	27
Helios 5000 fresh air	10	17	25	34	43	33	27	19
Helios 5000 exhaust	6	13	24	41	55	53	51	31

Table 4: Minimum Atmospheric Silencer Insertion Losses

6.6 To control noise breakout, all external ductwork shall be lagged with a composite lagging material with minimum mass per unit are of 5 $^{kg/m2}$.

6.7 The condenser unit will be installed within a louvred enclosure with roof (or provided with a similar attenuation package) that is built and specified to achieve the minimum sound transmission losses described in Table 5.

Location	Minimum Sound Transmission Loss (dB) per Octave Band Centre Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Condenser	2	3	4	8	13	11	9	8

Table 5: Condenser Enclosure Minimum Sound Transmission Loss

Noise Assessment

6.8 Based on the manufacturers' noise data, minimum silencer insertion losses and condenser enclosure losses, calculations have been undertaken to determine noise from proposed plant at the nearest residential properties. Calculations include corrections for distance, attenuation, reverberant conditions and screening, as appropriate.

6.9 The calculated cumulative noise levels from the proposed plant at the nearest residential properties are shown in Table 6.

Receptor (Russell Chambers)	Maximum Plant Noise Level, dB	
	Office Hours, $L_{Aeq, 1\ hour}$ (08:00 – 18:00)	**24 Hours, $L_{Aeq, 15\ min}$ (08:00 – 18:00)**
1 (West)	22	< 20
2 (East)	29	< 20
Plant Noise Criterion	**≤ 29**	**≤ 25**

Table 6: Calculated Plant Noise Levels.

6.10 Noise from the proposed plant is not expected to present tonal or other noticeable characteristics at the receptor locations.

6.11 The predicted noise levels achieve the maximum plant noise levels required by Camden Council and are therefore acceptable.

7.0 CONCLUSIONS

7.1 24 Acoustics Ltd has been instructed by RWE Central Ltd, to undertake a noise assessment for new plant at 24-28 Bloomsbury Way, London.

7.2 Environmental noise measurements have been undertaken at the site to determine existing noise background noise levels in the area.

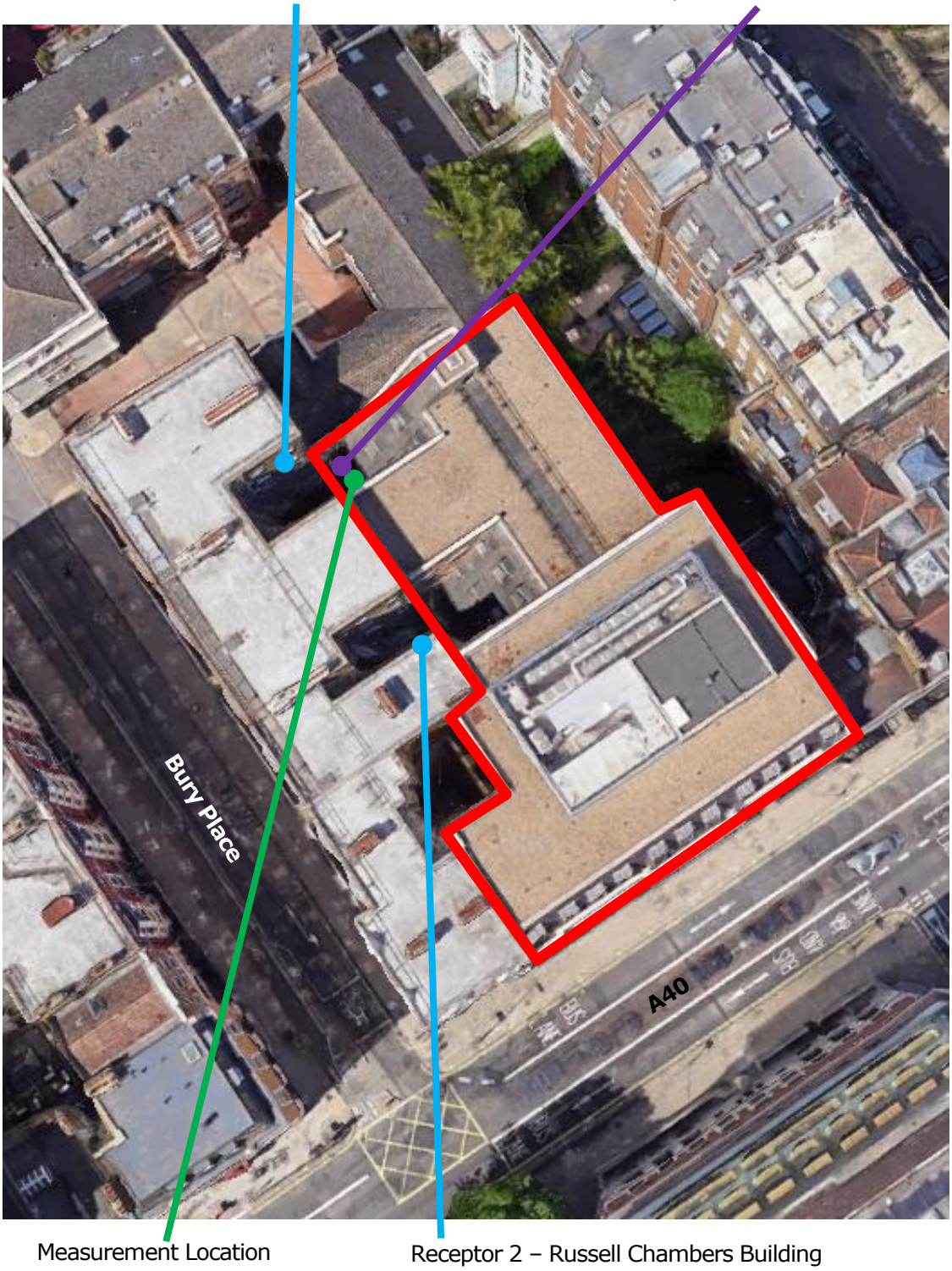
7.3 Calculations have been undertaken to demonstrate that, with the recommended attenuation measures, the proposed plant will achieve Camden Council's criterion for noise emissions and is, therefore, acceptable.

REFERENCES

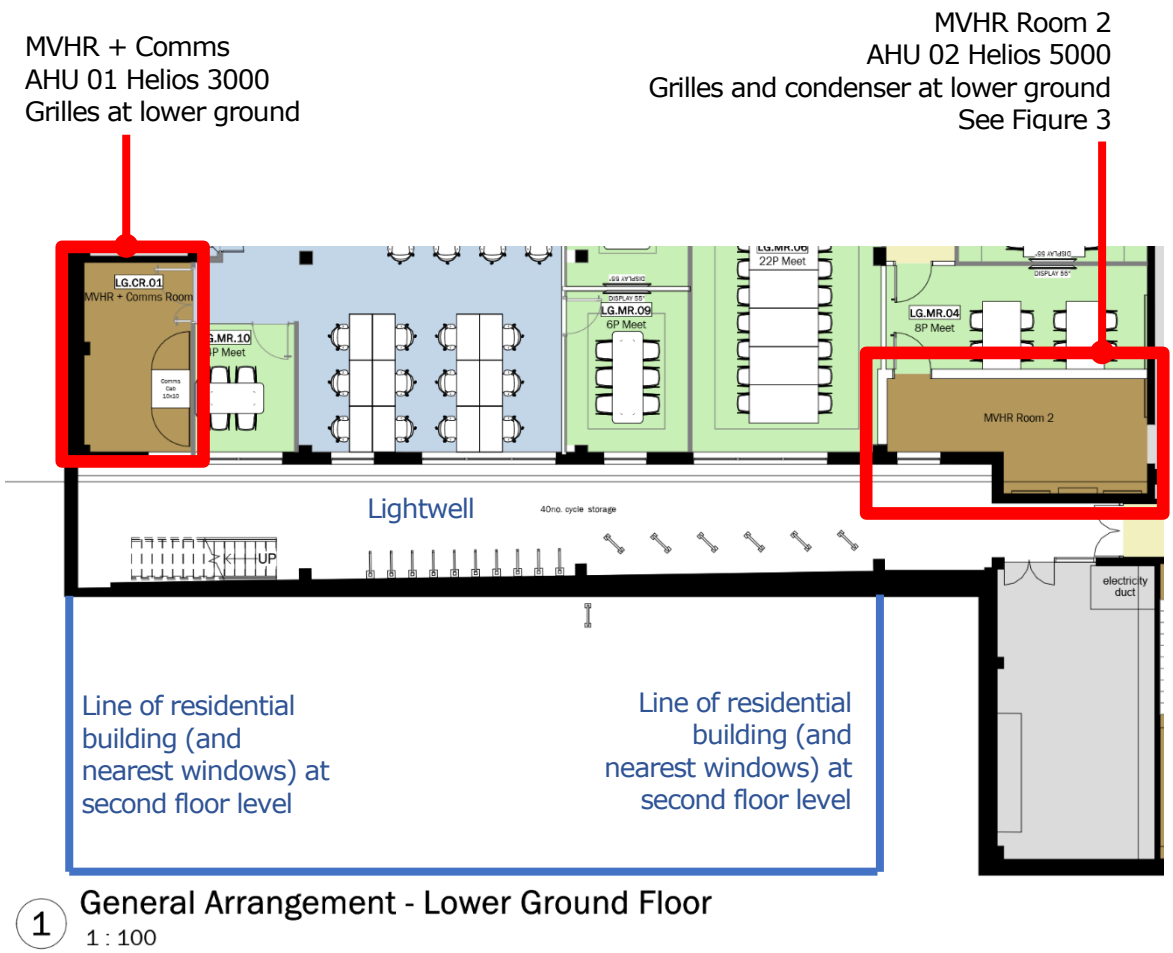
1. Camden Local Plan, Adoption Version, June 2017.

2. British Standards Institution. British Standard 4142:2014. Methods for Rating Industrial and Commercial Sound, 2014.

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

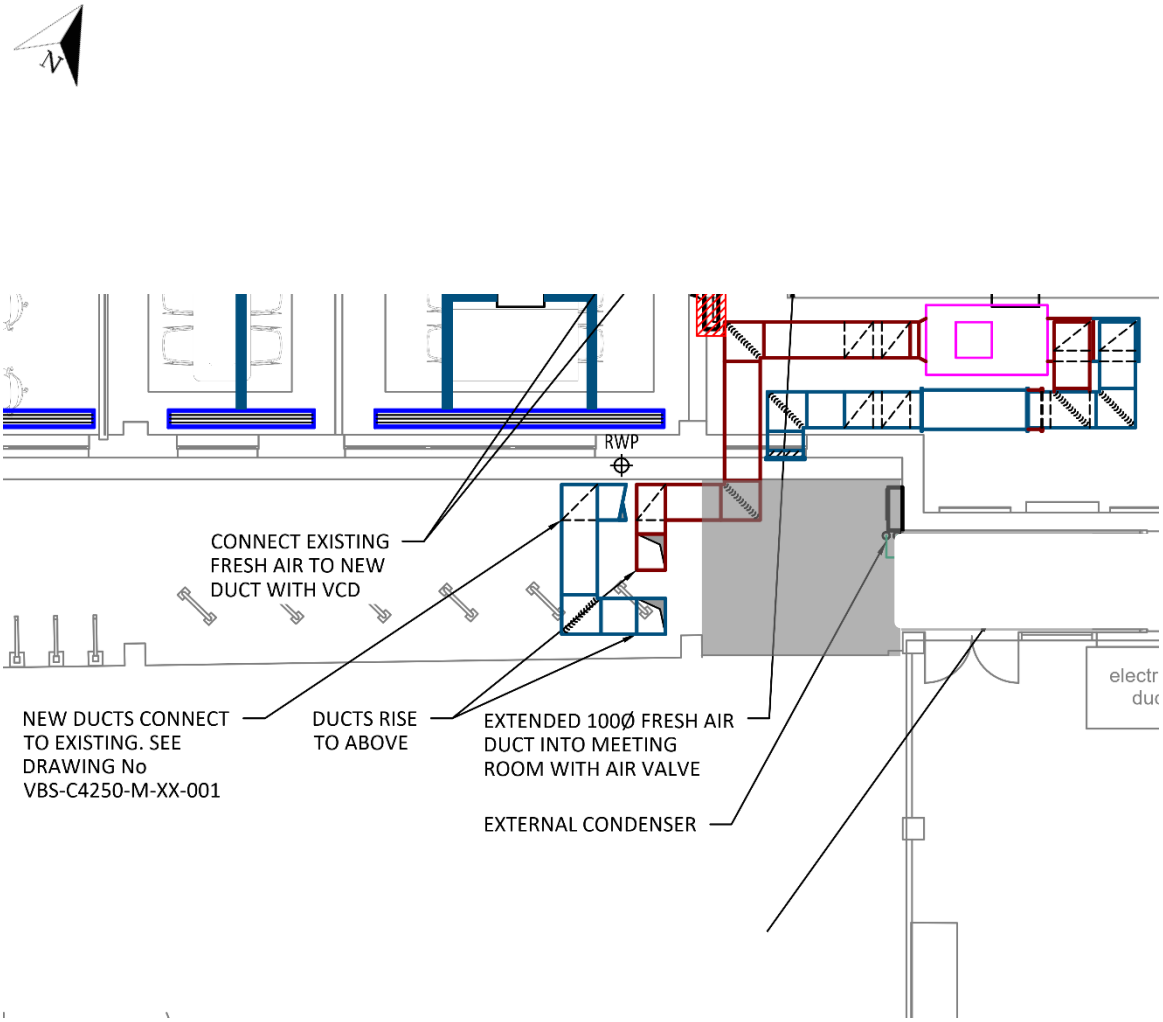


Project: 24-28 Bloomsbury Way	**Title:** Site Plan		
DWG No: Figure 1	**Scale:** N.T.S.	**Rev: -**	
Date: February 2024	**Drawn By:** NM	**Job No:** 10180	



1 General Arrangement - Lower Ground Floor
1 : 100

Project: 24-28 Bloomsbury Way	**Title:** Lower Ground Lightwell	
DWG No: Figure 2	**Scale:** N.T.S.	**Rev: -**
Date: February 2024	**Drawn By:** NM	**Job No:** 10180



Project: 24-28 Bloomsbury Way, London	**Title**: MVHR Room 2 and Condenser	
DWG No: Figure 3	**Scale:** N.T.S.	**Rev**: -
Date: February 2024	**Drawn By:** NM	**Job No**: 10180

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 – NOISE SURVEY RESULTS