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NOISE, VIBRATION & VENTIALTION ASSESSMENT REPORT

Project: Watchhouse, 65 South End Road, London NW3

Client: Watchhouse Ltd

Date: 30th July 2024

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Our reference: 90708

Revision: 0

1. INTRODUCTION

1.1 A noise survey has been carried out adjacent to the Watchhouse Café at 65 South End Road, Hampstead Heath, London, NW3. The noise, vibration and ventilation report in support of planning application which is to be submitted to London Borough of Camden (LBC). The café is served by a single Toshiba air conditioning unit, which is located in the basement. Ventilation air for this unit is ducted from acoustic louvres/grilles located at low level in the Keats Grove façade. A kitchen extract system is also installed. Air from the extract hood is ducted to another acoustic louvre/grille which is also located in the Keats Grove façade. The mechanical plant operates ONLY during the café opening hours (6am to 7pm). The nearest neighbouring windows for assessment purposes are the windows in the Keats Grove façade of the residential flats above (Wentworth Mansions). These windows are 4m from the ventilation acoustic louvre and 3m from the kitchen extract louvre. As required by LBC, this report contains (a) *details of existing background noise levels measured over a 24-hour period (this includes the cumulative noise levels of all existing units)* (b) *details of proposed background noise levels (this includes the cumulative noise levels of all existing units)* (c) *any proposed measures to reduce noise, fume emissions and vibration* (d) *the system manufacturers specification of the proposed equipment to be installed, altered or replaced and* (e) *details of the method used to compile the report and examples of the calculations and assumptions made.* The site location and surroundings are given in Figure 1 below:

Figure 1: Site Location (© Google Maps)

1.2 The assessment shows that the installation will meet with the requirements of the requirements of London Borough of Camden (LBC) Environmental Noise Policy.

2. NOISE MEASUREMENTS

2.1 Environmental noise measurements were carried out from Wednesday 17th to Friday 19th July 2024. Sound level measurement equipment was installed the closest neighbouring windows and used to log noise levels over the two-day period. The instrumentation used for the survey is listed in Table 1 below:

Table 1. Environmental Noise Measurement Instrumentation

No	Description
1	Larson Davis Model LxT Class 1 Sound Level Meter with Model 377B02 ½" Diameter Condenser Microphone
2	Larson Davis Model CAL200 Sound Level Meter Calibrator.

2.2 All acoustic equipment conforms to the relevant parts of BS EN 60651:1994 (equivalent to BS 5969:1981) for the requirements of Type 1 acoustic accuracy. Additionally, the relevant equipment conforms to the specifications contained within BS EN 60804:1994 (equivalent to BS 6698:1976) for integrating sound level meters.

2.3 In order to verify the correct operation of the equipment on site, an acoustic calibrator was applied during the course of the measurements. A maximum change of 0.1 dB(A) was noted, this can be considered as an insignificant change. The calibrator complies with the specifications of IEC 942:2003. The instrumentation used was last laboratory calibrated in October 2023.

2.4 Fast meter response was used for all measurements carried out during the course of the survey.

2.5 Noise levels are expressed in terms of continuous equivalent noise levels (L_{Aeq}) over an appropriate time period. The use of L_{Aeq} allows non-steady and non-continuous noise to be assessed and compared to the existing

noise climate. L_{Aeq} is referred to as the ambient noise level. In addition to this background noise levels have also been measured and are expressed as L_{A90}. A full explanation of terminology commonly used in the measurement and assessment is given in Appendix B at the end of this report.

2.6 Measurements of noise from the ventilation air and extract louvres were also taken. All measurements were taken 1m from the respective louvre and corrected for background noise. Results were as follows:

	63	125	250	500	1k	2k	4k	8k	A
1. Kitchen Extract	55	50	48	45	42	39	35	25	48
2. AC unit exhaust	64	63	53	47	45	44	39	31	53

Table 2: Noise source measurements from ventilation & extract louvres

3. RESULTS

3.1 Noise level measurements were carried out at 15-minute intervals during the survey period. Ambient (L_{Aeq}) and background (L_{A90}) noise levels were measured. Minimum noise levels for the day-time (07:00 to 19:00 hrs), evening time period (19:00 to 23:00 hrs) and night time period (23:00 to 07:00 hrs) have been determined.

Table 2: Summary Results

	Day	Evening	Night
L_{AeqT}	55.2	53.1	49.6

3.2 Although the survey was not attended on a full-time basis, it was noted that during site visits that noise levels are dominated by traffic on nearby roads. A full listing of 15-minute interval data for the period is given in the graph at the end of this report (Figure A1). A photograph showing the noise monitor in position is shown in Figure A2. Figure A1 shows that environmental noise levels vary throughout the day and night. This is to be expected. The mechanical plant installed at the café ONLY operates during daytime (6am to 7pm) periods. To determine the representative daytime background noise levels, histograms are produced and shown in Figure 2 below.

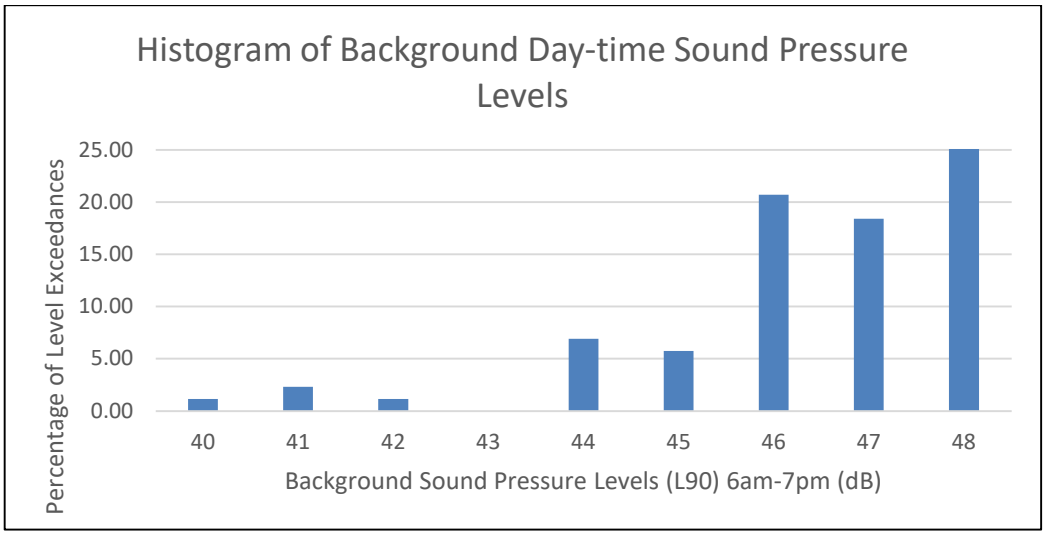

Figure 2: Background Noise Level Histograms

3.3 The resulting representative background noise levels, as required by BS4142:2014

Table 3: Representative Background Noise Levels

	Day
$L_{A90,15min}$ (dB)	46

3.3 The nearest neighbouring windows for assessment purposes are the windows in the Keats Grove façade of the residential flats above (Wentworth Mansions). These windows are 4m and 3m respectively from the ventilation acoustic louvres. Calculated noise levels for the proposed installation/layout are as follows:

Flats above in Wentworth Mansions

		63	125	250	500	1k	2k	4k	8k	A
1. AC Exhaust L_p at 1m		64	63	53	47	45	44	39	31	53
A-weighting		-26	-16	-9	-3	0	1	1	-1	
		38	47	44	44	45	45	40	30	53
Louvre Directionality		-1	-2	-3	-4	-7	-12	-12	-12	
Distance	4m	-12	-12	-12	-12	-12	-12	-12	-12	
Resultant SPL dB(A)		**25**	**33**	**29**	**28**	**26**	**21**	**16**	**6**	**36**

		63	125	250	500	1k	2k	4k	8k	A
1. Kitchen Extract L_p at 1m		55	50	48	45	42	39	35	25	48
A-weighting		-26	-16	-9	-3	0	1	1	-1	
		29	34	39	42	42	40	36	24	48
Louvre Directionality		-1	-2	-3	-4	-7	-12	-12	-12	
Distance	3m	-10	-10	-10	-10	-10	-10	-10	-10	
Resultant SPL dB(A)		**18**	**22**	**26**	**28**	**25**	**18**	**14**	**2**	**33**

3.4 The London Borough of Camden Local Plan (Adopted Version) Policy A4 "Noise and Vibration" states that *"The Council will seek to ensure that noise and vibration is controlled and managed"*. Furthermore, the policy states that *"Developments should have regard to Camden's Noise and Vibration Thresholds (Appendix 3)"*. Appendix 3; Table C "Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)" is listed below. In Table C;

- NOEL refers to "No Observed Effect Level"
- LOAEL refers to "Lowest Observed Adverse Effect Level"

- SOAEL refers to "Significant Observed Adverse Effect Level"

Each of these terms are described in greater detail in the National Planning Policy Framework and Planning Practice Guidance"

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Dwellings	Garden used for main amenity (free field) and outside living or dining or bedroom window (façade)	Day	"Rating level" 10dB* below background	"Rating level" between 9 dB below and 5 dB above background	"Rating level" greater than 5 dB above background
Dwellings	Outside bedroom window (façade)	Night	"Rating level" 10dB* below background and no events exceeding 57 dB L_{Amax}	"Rating level" between 9 dB below and 5 dB above background or noise events between 57 dB and 88 dB L_{Amax}	"Rating level" greater than 5 dB above background and/or events exceeding 88 dB L_{Amax}

** 10 dB should be increased to 15 dB if the noise contains audible tonal elements (day or night) …*

3.5 The proposed air conditioning equipment does not attract the + 5 dB(A) correction referred to in *"paragraph 8 of BS4142"* (i.e. contains no distinguishable discrete continuous note or distinct impulses). The café ventilation and air conditioning equipment are set on a timer and limited

to 6am to 7pm. During these times the lowest background noise level measured was 46 dB(A). The noise levels are shown to be below the LOAEL (Green).

3.6 Examination of the results shown in paragraph 3.3 above confirms that the mechanical plant is shown to meet with the specific requirements of LBC Environmental Noise Policy. No additional noise control measures are required.

4. VIBRATION

4.1 Table A in Appendix 3 of LBC Policy A4 "Vibration levels from uses such as railways, roads, leisure and entertainment premises and/or plant or machinery at which planning permission will not normally be granted" is reproduced below:

Vibration description and location of measurement Time Vibration Levels (Vibration Dose Values)	Period	Time	Vibration Levels (Vibration Dose Values)
Vibration inside critical areas such as a hospital operating theatre	Day, evening and night	00:00-24:00	0.1 VDV ms-1.75
Vibration inside dwellings	Day and evening	07:00-23:00	0.2 to 0.4 VDV ms-1.75
Vibration inside dwellings	Night	23:00-07:00	0.13 VDV ms-1.75

4.2 All the air conditioning and ventilation equipment at the café has anti-vibration mountings installed and as a result, vibration levels cannot be felt at within the café itself. It therefore follows that vibration levels in the flats above are significantly below the thresholds listed in the Table A.

5. FUME EMISSIONS

5.1 The kitchen at Watchouse Hampstead Health is only used for "light" cooking as such there is only a limited requirement for filtration of the kitchen extract air. The system is fitted with "Odourpleat" carbon pleated panels (as attached datasheet shown in Figure A5) in addition to the kitchen manufacturer's supplied grease filter which is located within the kitchen hood itself.

6. CONCLUSION

6.1 A noise measurement survey and assessment has been carried out for the mechanical plant installed at Watchhouse Hampstead Health, London NW3.

6.2 The installation is shown to meet with the London Borough of Camden's acoustic criteria.

APPENDIX A: GRAPHS AND FIGURES.

Figure A1: Environmental Noise Measurement Data – Wednesday 17th to Friday 19th July 2024

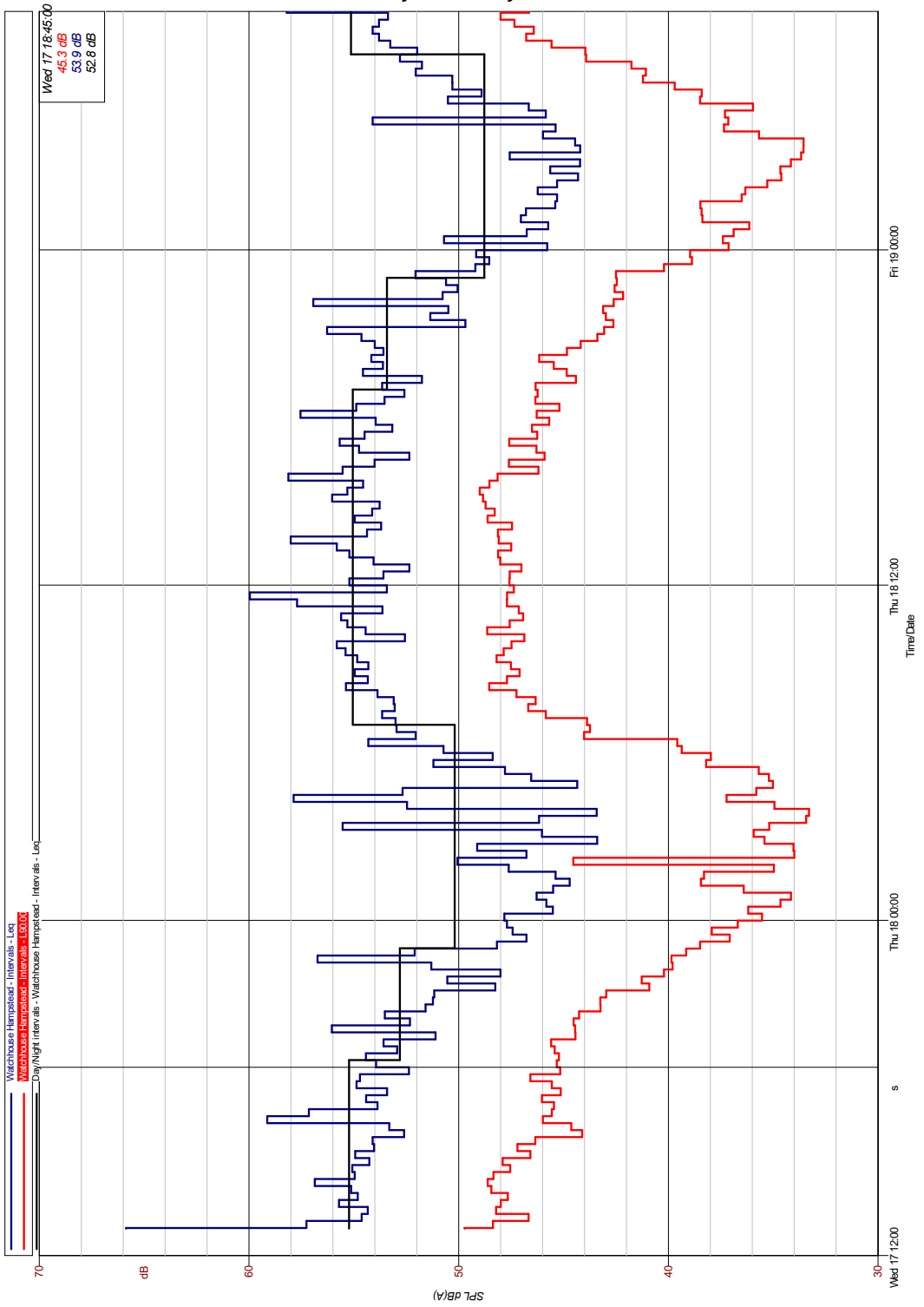

Figure A2: Noise Monitoring Equipment at Watchhouse, Hampstead Heath

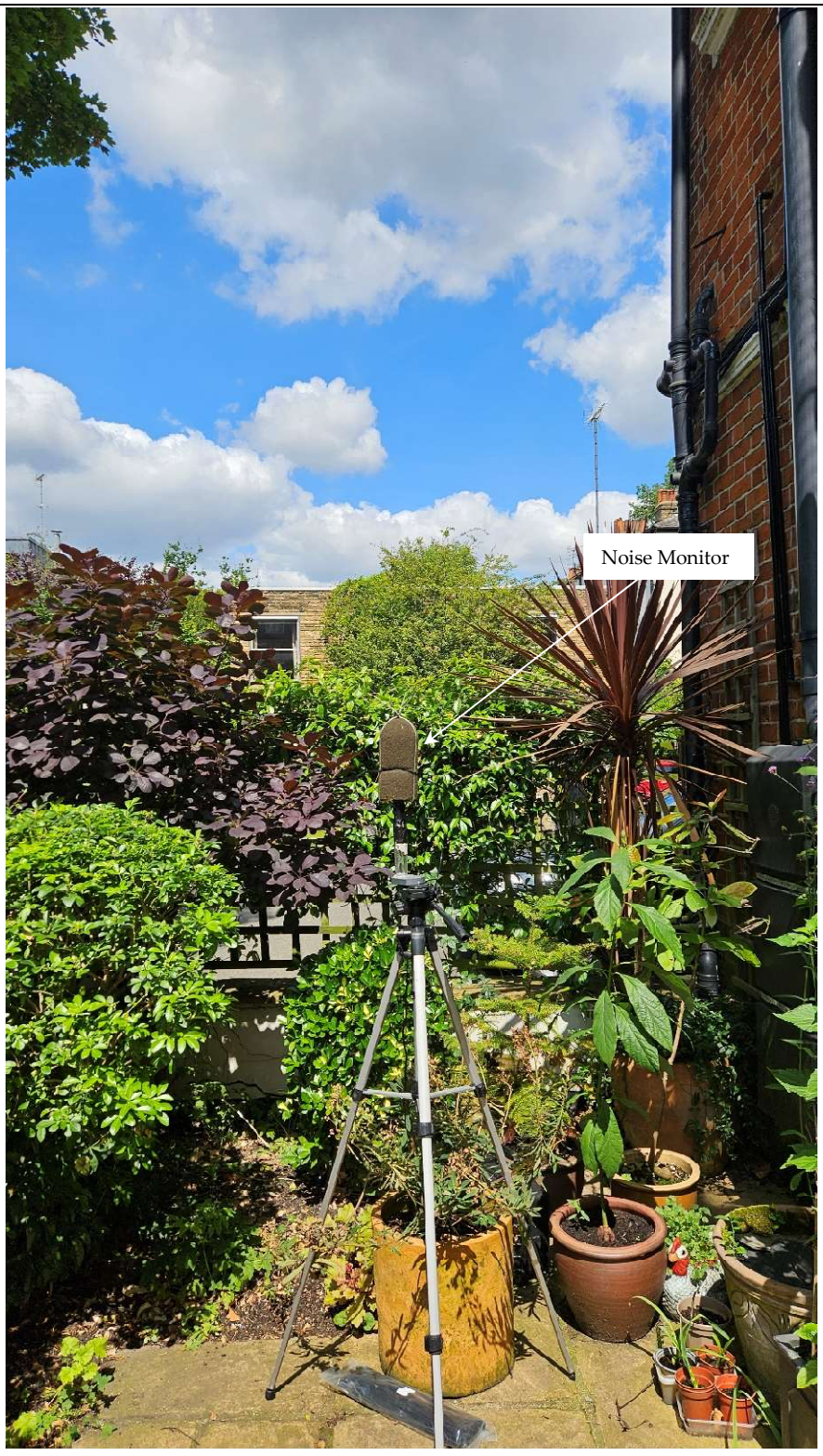

Figure A3: Equipment Noise Data

Toshiba MCY-MHP0806

Technical data			MCY-MHP0806HS8-E
Capacity code	HP		8
Cooling capacity	kW	❄	22,40
Power consumption (min./nom./max.)	kW	❄	6.67
Energy efficiency EER	W/W	❄	3,36
Energy efficiency SEER		❄	8,09
Energy efficiency ESEER		❄	8,09
Running current	A	❄	10,6
Heating capacity	kW	☀	22,40
Power consumption (min./nom./max.)	kW	☀	5,20
Energy efficiency COP	W/W	☀	4,31
Energy efficiency SCOP		☀	4,50
Running current	A	☀	8,2
Airflow	m^3/h		8460
Sound pressure level (low/med/high)	dB(A)	❄	58
Sound pressure level (low/med/high)	dB(A)	☀	59
Sound power level	dB(A)	❄	75
Sound power level	dB(A)	☀	75
Sound pressure level (night operation)	dB(A)		50 / 50

Figure A4: Layout Drawing

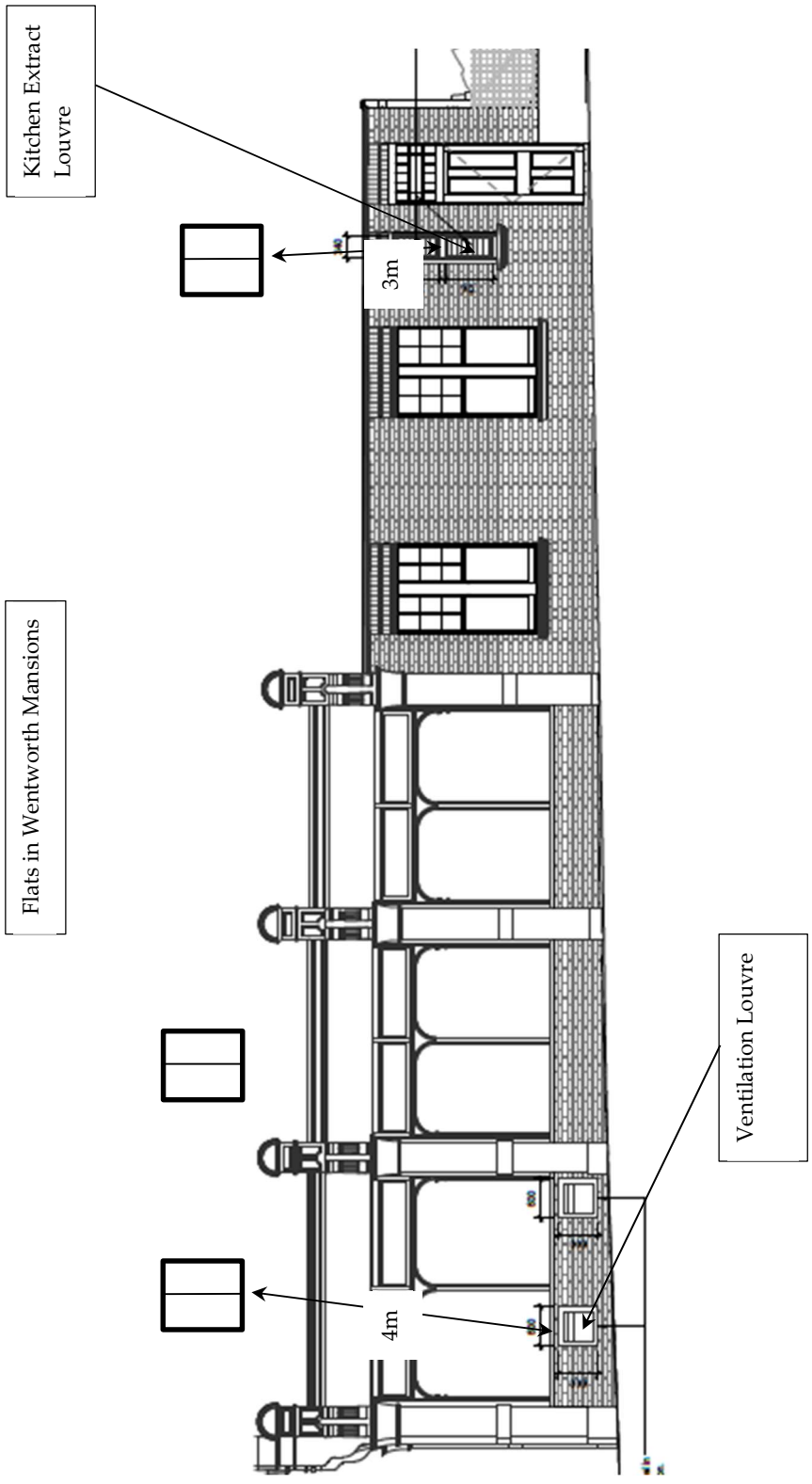

Figure A5: Kitchen Extract Filter Panels

APPENDIX B: GLOSSARY OF NOISE TERMS AND UNITS.

1.0 Noise

1.1 The sounds that we hear are as a result of successive air pressure changes. These air pressure changes are generated by vibrating sources, such as train engines or wheels, and they travel to a receiver, i.e. the human ear, as air pressure waves.

1.2. The human ear is capable of detecting a vast range of air pressures, from the lowest sound intensity that the normal ear can detect (about 10^{-12} watts/m^2) to the highest that can be withstood without physical pain (about 10 watts/m^2). If we were to use a linear scale to represent this range of human sensitivity it would encompass more than a billion units. Clearly this would be an unmanageable scale yielding unwieldy numbers.

1.3. The scale can be compressed by converting it to a logarithmic or Bel scale, the number of Bels being the logarithm to the base 10 of one value to another (as applied by Alexander Graham Bell to measure the intensity of electric currents). The Bel scale gives a compressed range of 0 to 12 units which in practice is a little too compressed. A more practical operating range of 0 to 120 is obtained by multiplying by 10, ie. 10 x Bel, which produces the scale units known as decibels or dB.

1.4. Examples of typical sound intensity levels within the decibel range of 0 to 120 dB are listed below:

Commercial four-engine jet aircraft at 100m	120dB
Riveting of steel plate at 10m	105dB
Pneumatic drill at 10m	90dB
Circular wood saw at 10m	80dB

Heavy road traffic at 10m	75dB
Male speech, average, at 10m	50dB
Whisper at 10m	25dB
Threshold of hearing, 100Hz	0dB

1.5. Due to this logarithmic scale noise levels have to be combined logarithmically rather than arithmetically. For example, two equal sound sources of 70 dB each, when operated simultaneously, do not produce a combined level of 140 dB but instead result in a level of 73 dB, ie. A rise of 3dB for each doubling of sound intensity. Subjectively, a 3dB change does not represent a doubling or halving of loudness; to make a sound appear twice as loud requires an increase in sound pressure level of about 10dB.

1.6. The subjective loudness of noise can be measured by applying a filter or weighting which equates to the frequency response of the human ear. This is referred to as an A-weighting and when applied results in noise levels expressed as dB(A).

1.7. dB(A) noise levels can be measured using a variety of noise indices. The index which correlates best with human response due to machinery noise is the L_{Aeq} this is the A-weighted L_{eq} which is referred to as the 'equivalent continuous noise level' and is a measure of the total sound energy generated by a fluctuating sound signal within a given time period.