Project

DfE Dixons Academy
Planning Condition 5b

Prepared for

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Version History

Version	Date	Comments	Approved by
P1	07/09/2023	Initial Issue	Joe Bear BEng(hons) MIOA

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Summary

I have measured noise from fixed external plant associated with the temporary accommodation at Dixons Academy in line with the requirements of Planning Condition 5b.

Noise from plant and services was not measurable at the receptors above noise from other sources. However, using measurements close to the plant I have confirmed that the noise limits in Planning Condition 5a are met at all receptors.

I would therefore expect this report to be sufficient to discharge part 5b of the planning condition.

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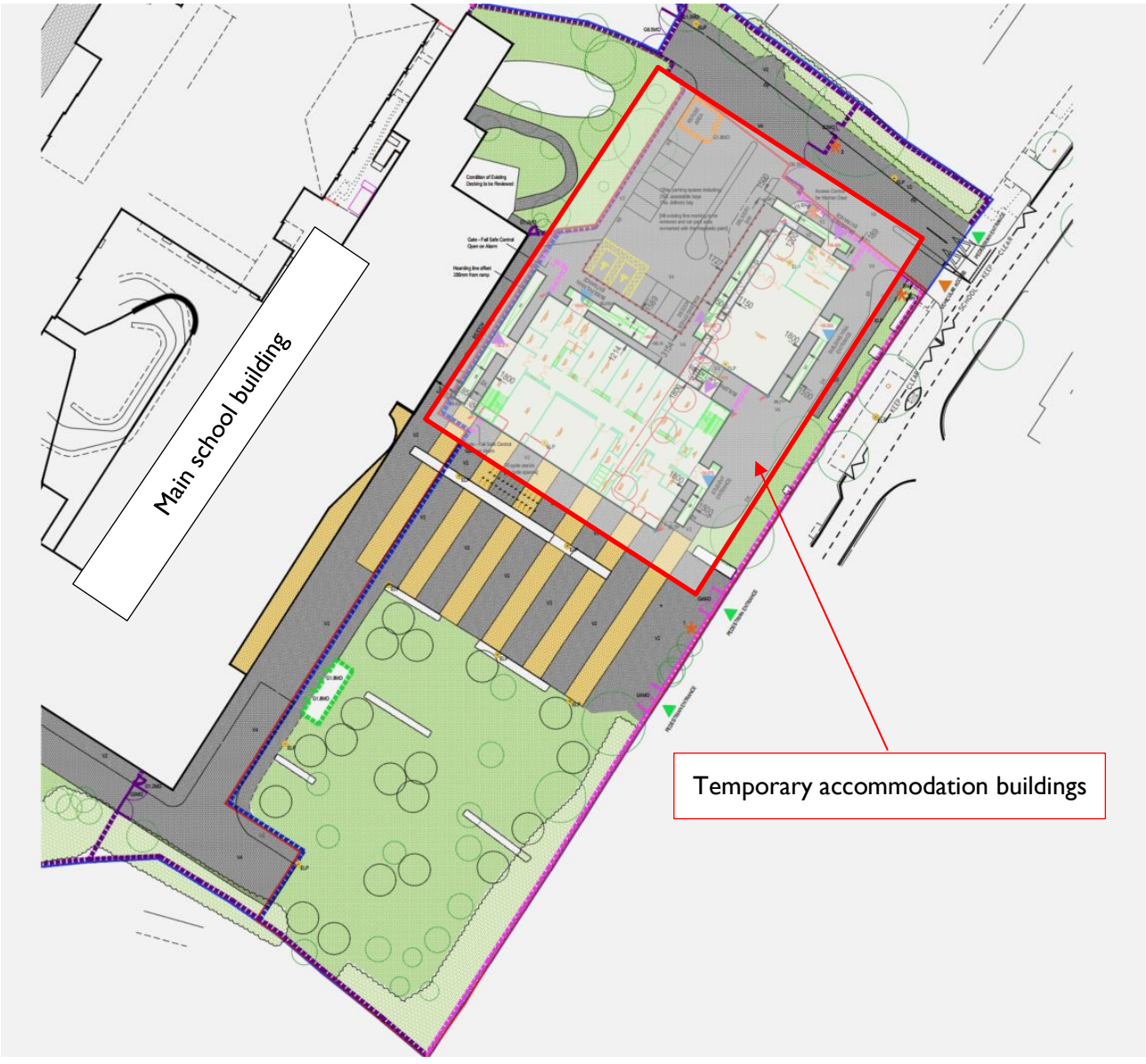
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1.0 Introduction

The existing building on the former Newall High School site on Greenbrow Rd, Manchester, M23 2SX is being redeveloped for the new Dixons Manchester Academy secondary school. While the refurbishment works are taking place in the main building the school will be housed in temporary accommodation on the site. The locations of the temporary accommodation buildings are shown in Figure 1 below.

Planning application 135845/FO/2022 relates to the erection of two temporary teaching and school accommodation buildings (Use Class F1) for a period of 3 years and has been approved with conditions. This includes a condition relating to noise levels from fixed mechanical plant associated with the temporary accommodation buildings. The condition is given in Section 2.0 below.

Figure 1 – Location of the temporary accommodation buildings



2.0 Criteria

2.1 Planning condition

Planning Condition 5 states that:

> *5 a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences.*
>
> *b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non- conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.*

The planning condition requires the rating level of noise from plant and services to be no higher than 5 dBA below the background noise levels at the location of nearby noise sensitive receptors.

Rating level is defined in BS4142:2014+A1:2019 (BS4142). Note that the rating level includes penalties for any noticeable characteristics of the noise including tonality, impulsivity and intermittency. BS4142 is applicable to assessing sound at residential buildings or buildings used for residential purposes.

2.2 Noise sensitive receptors

The locations of the nearby noise sensitive receptors are shown in Figure 2 below.

Figure 2 – Site location and nearby noise sensitive receptors – Site boundary approximate



Background noise levels were measured by Pace Consult in April 2022 (contained in report reference: PC-22-0086-RP1). We have used this noise data to develop appropriate plant noise limits during the quietest times that the building is expected to operate.

Table 1 shows the measured background noise levels at the noise sensitive receptors (NSRs) and the respective plant noise limits, in accordance with the requirements of Planning Condition 5.

Table 1 - Plant noise limits

NSR	Period	Measured Background Noise Level, dB L_{A90}	Plant Noise Limit, dB $L_{Ar,Tr}$
Neighbouring residential properties to the south or east of the site	Daytime (07:00 - 23:00)	41	36
	Night-time (23:00 - 07:00)	33	28[1]
Neighbouring residential properties to the north or west of the site	Daytime (07:00 - 23:00)	37	33
	Night-time (23:00 - 07:00)	30	27[1]

[1] These rating levels are considered to be low. Therefore, if it becomes difficult to achieve them in the final design, a relaxation may be appropriate in accordance with the Association of Noise Consultants guidance on applying BS4142 in practice.

3.0 Plant Items

The temporary accommodation buildings will have multiple external air handling condenser units located at ground floor level, wall mounted toilet extract fans, and kitchen extract and supply ventilation. The noise levels for these plant items are given in Appendix A and the overall A-weighed sound power levels are summarised in Table 2 below:

Table 2 - Plant items

Plant item	Number of units	Sound power level (SWL) per unit, dBA
AOYG45KBTB (External Condenser)	4	71
AOYG30KBTB (External Condenser)	4	69
AOYG24KMTA (External Condenser)	2	67
AOYG12KMCC (External Condenser)	4	65
Toilet extract fans	4	40
Kitchen extract fan outlet	1	82
Kitchen supply fan inlet	1	79
Kitchen extract fan casing breakout	1	60
Kitchen supply fan casing breakout	1	62

Noise data for the above units was provided by the supplier or obtained from the manufacturer, with the exception of fan casing breakout, which was estimated from the total sound power of the inlet and outlet fans breaking through typical 1mm galvanised steel.

The kitchen fans have a 1250 mm attenuator fitted directly onto the unit, which will reduce the noise levels further. The insertion loss for the 1250 mm attenuator specified on both the kitchen extract and supply fans is given below:

Table 3 – Kitchen fan attenuator insertion loss

	Insertion Loss, dB							
	63	125	250	500	1k	2k	4k	8k
1250 mm attenuator	9	14	18	28	28	20	18	15

We understand that none of the plant will operate in the night.

4.0 Design Stage Noise Assessment

A 3D noise model of the site and surrounding area was created using drawings and information provided by the design team.

The manufacturer noise data was input into the noise model for all the relevant plant items as discussed in Section 3.0.

The spread of noise from the plant items was then calculated at all nearby noise sensitive receptors in line with the requirements of Planning Condition 5a and the results are shown in Table 4 below.

Table 4 – Plant noise modelling results

Location	Period	Plant Noise Limit, dB $L_{Ar,Tr}$	Calculated Plant Noise Level, dB $L_{Ar,Tr}$[1]	Compliant?
'Worst-case' residential property to the south of the site	Daytime (07:00 – 23:00)	≤ 36	30	✓
'Worst-case' residential property to the east of the site	Daytime (07:00 – 23:00)	≤ 36	35	✓
'Worst-case' residential property to the west of the site	Daytime (07:00 – 23:00)	≤ 33	10	✓
'Worst-case' residential property to the north of the site	Daytime (07:00 – 23:00)	≤ 33	22	✓

The predicted plant noise levels are all at least 5 dBA below the background noise levels, as required by Planning Condition 5a for the temporary accommodation on site.

5.0 On-site Measurements – Condition 5b

We visited site on 15th August 2023 and again on 1st September 2023 to measure noise levels generated by the installed plant. The results of these measurements are shown in Appendix B – Noise Survey Details.

Following adjustments to the kitchen extract fans after our initial site visit, noise from the plant and services was not measurable at the nearest receptors. However, background noise levels were also substantially higher than those measured by Pace Consult in April 2022 and it was therefore not possible to determine from these measurements whether plant noise levels were below the limits set in Table 1.

Instead, to confirm this we have used measurements taken close to the installed plant and revised our existing computer noise model to recalculate the noise levels at all nearby receptors. A summary of the results is shown in Table 5 below.

Table 5 – Plant noise modelling results

Location	Period	Plant Noise Limit, dB $L_{Ar,Tr}$	Calculated Plant Noise Level, dB $L_{Ar,Tr}$[1]	Compliant?
'Worst-case' residential property to the south of the site	Daytime (07:00 – 23:00)	≤ 36	30	✓
'Worst-case' residential property to the east of the site	Daytime (07:00 – 23:00)	≤ 36	34	✓
'Worst-case' residential property to the west of the site	Daytime (07:00 – 23:00)	≤ 33	11	✓
'Worst-case' residential property to the north of the site	Daytime (07:00 – 23:00)	≤ 33	17	✓

[1] We did not note any acoustic features which would necessitate an acoustic character correction to be necessary in this case.

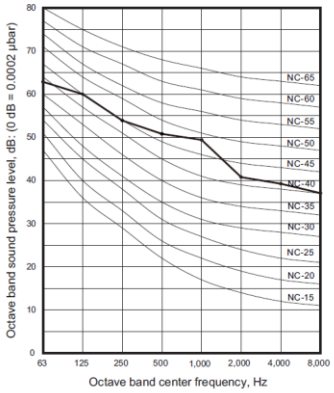
The plant noise levels are therefore all below the rating level limits. Therefore, the requirements of Planning Condition 5b are met.

Appendix A – Plant Noise Data

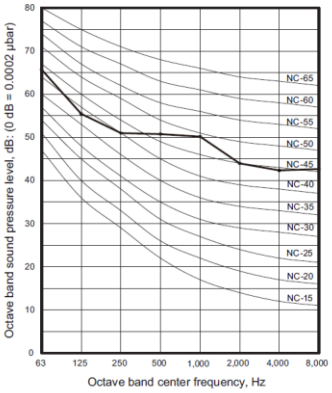
Air handling condenser units

■ Model: AOYG30KBTB

● Cooling

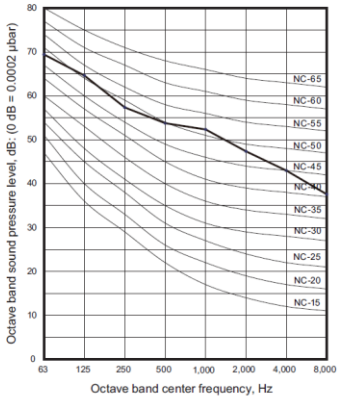


● Heating

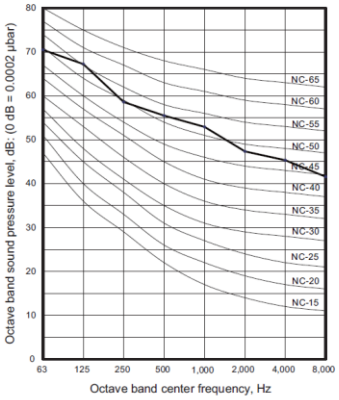


■ Model: AOYG45KBTB

● Cooling

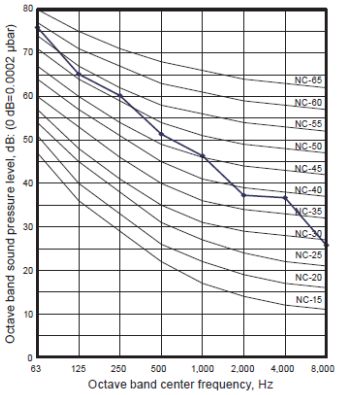


● Heating

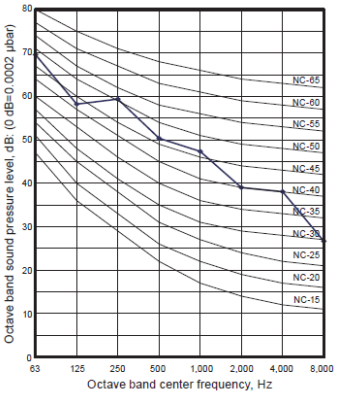


■ Model: AOYG24KMTA

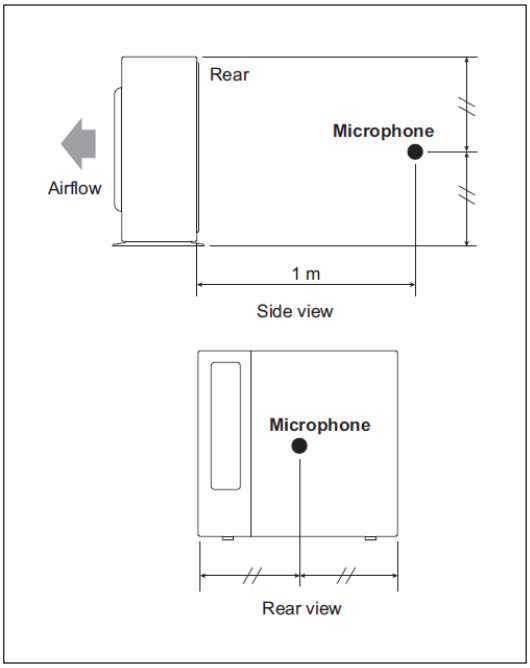
● Cooling



● Heating

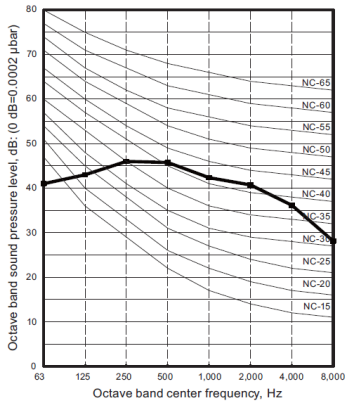


Measurement location

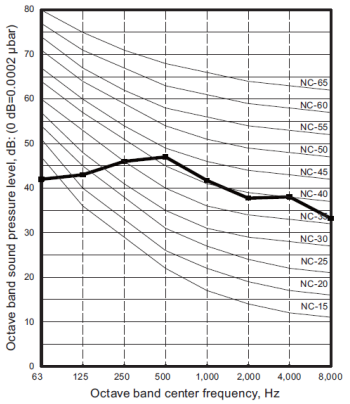


■ **Model: AOYG12KMCC**

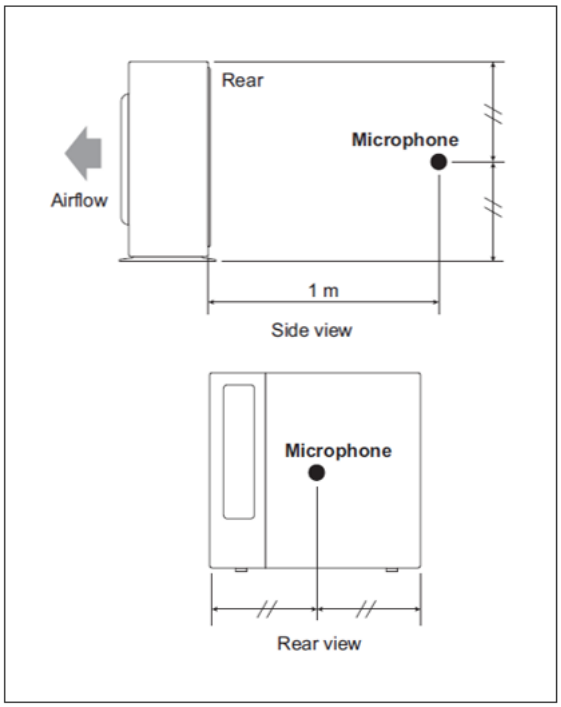
● **Cooling**



● **Heating**



Measurement location



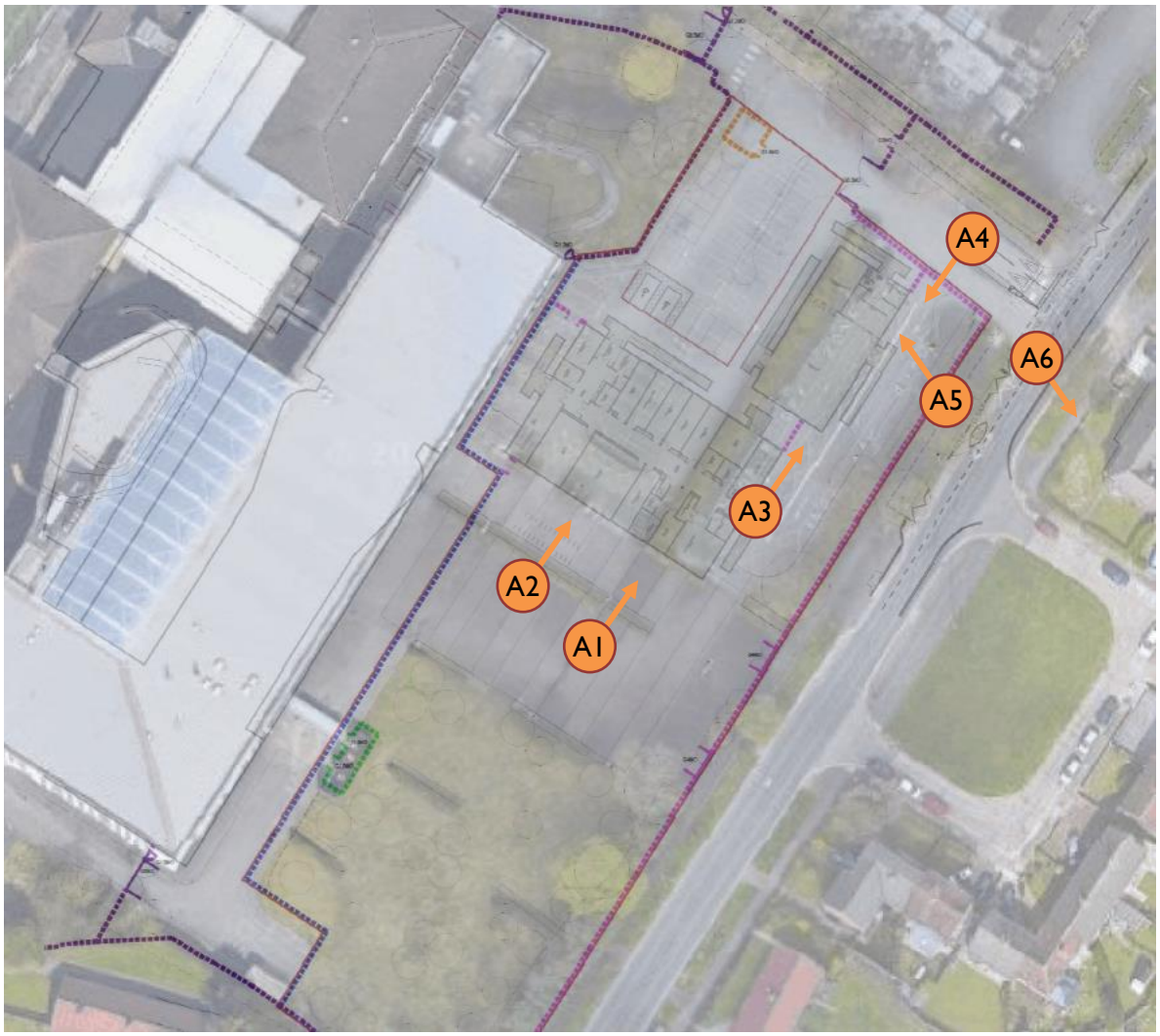
Kitchen extract and supply

EXTRACT FAN MOTOR - ACOUSTIC SOUND LEVELS										
MID FREQUENCY...										
	Hz	63	125	250	500	1K	2K	4K	8K	TOT
INLET	dB(A)	44	57	70	70	67	66	62	58	75
OUTLET	dB(A)	51	63	76	77	77	71	64	60	82
SILENCER LOSSES - 1250 LONG STRAIGHT THROUGH										
	dB(A)	-9	-14	-18	-28	-28	-20	-18	-15	
INLET DBA @ 3 MTR	33									
OUTLET DBA @ 3 MTR	38									

SUPPLY AIR FAN MOTOR - ACOUSTIC SOUND LEVELS										
MID FREQUENCY...										
	Hz	63	125	250	500	1K	2K	4K	8K	TOT
INLET	dB(A)	48	58	72	73	73	72	67	64	79
OUTLET	dB(A)	55	65	78	79	82	78	74	66	86
SILENCER LOSSES - 1250 LONG STRAIGHT THROUGH										
	dB(A)	-9	-14	-18	-28	-28	-20	-18	-15	
INLET DBA @ 3 MTR	38									
OUTEL DBA @ 3 MTR	45									

Appendix B – Noise Survey Details

A1. Measurement Locations



A2. Date & Time of Survey

15th August 2023 & 1st September 2023

A3. Personnel Present During Survey

Alex Clark BEng (hons) MIOA

A4. Weather Conditions during Survey

Weather conditions were suitable for measurements during the attended survey (i.e. medium/low wind speeds and no rain).

A5. Instrumentation

Bruel & Kjaer - Noise Meter AE2 for Attended Measurements

Description	SRL No.	Make	Type	S/N
Sound Level Meter (AE2, Purple)	519	Bruel & Kjaer	2250	2559287
Pre-amp	519	Bruel & Kjaer	ZC-0032	5419
Microphone	519	Bruel & Kjaer	4189	2689671
Calibrator	520	Bruel & Kjaer	4231	2482655

A6. Calibration Procedure

Before and after the survey measurements, the sound level meter was check calibrated to an accuracy of ±0.3 dB using a type 4231 Sound Level Calibrator and no significant calibration drift was found to have occurred.

A7. Measurement Results

Meas Position	Date/ Time	Meas period	Average level, dB $L_{Aeq,T}$	Background level, dB $L_{AF90,T}$	Maximum level, dB L_{AFmax}	Comments
A1	15/08/23 16:40	1 min	54	53	60	Measurement dictated by toilet extract fans with some influence from road and condensers
	15/08/23 16:59	1 min	54	53	57	
A2	15/08/23 17:05	1 min	49	47	54	Dictated by condensers and toilet extract, with influence from road
A3	15/08/23 17:15	30 secs	48	45	51	Dictated by condensers with influence from road
A4	15/08/23 17:19	1 min	69	68	71	Dictated by kitchen extract and intake fans (at wrong duty) with influence from road – closer to extract
	15/08/23 17:20	1 min	69	68	71	

Meas Position	Date/ Time	Meas period	Average level, dB $L_{Aeq,T}$	Background level, dB $L_{AF90,T}$	Maximum level, dB L_{AFmax}	Comments
A5	15/08/23 17:22	1 min	68	68	70	Dictated by kitchen extract and intake fans (at wrong duty) with influence from road – closer to intake
A6	15/08/23 17:31	1 min	51	50	55	At boundary of residential property closest to kitchen extract running (at wrong duty)
	15/08/23 17:50	5 min	61	52	74	At boundary of residential property closest to kitchen extract running (at wrong duty) – with more influence from cars
	15/08/23 18:05	5 min	61	46	73	At boundary of residential property closest to kitchen extract turned off
A3	15/08/23 18:14	40 secs	54	49	60	Dictated by condenser and road
A4	15/08/23 18:17	3 min	57	50	67	1m away from kitchen extract fan turned off
A6	15/08/23 18:37	5 min	65	47	94	At boundary of residential property closest to kitchen extract turned off
A4	31/08/23 11:06	2 mins	58	56	64	Dictated by kitchen extract fan running at correct duty, influenced by road
A6	31/08/23 11:13	1 min 39 secs	51	48	59	At boundary of residential property closest to kitchen

Meas Position	Date/ Time	Meas period	Average level, dB $L_{Aeq,T}$	Background level, dB $L_{AF90,T}$	Maximum level, dB L_{AFmax}	Comments
						extract running (at correct duty)
A4	31/08/23 11:27	2 mins	55	50	63	1m away from kitchen extract fan turned off
A6	31/08/23 11:29	5 mins	62	51	77	At boundary of residential property closest to kitchen extract turned off
	31/08/23 11:34	5 mins	63	55	79	At boundary of residential property closest to kitchen extract turned off, influenced by construction noise
	31/08/23 11:44	5 mins	62	50	75	At boundary of residential property closest to kitchen extract turned off
A4	31/08/23 12:25	1 min	57	56	62	1m away from kitchen extract fan turned off,
	31/08/23 12:35	1 min	59	48	69	1m away from kitchen extract fan turned off

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