

ARR/C/3937.01

23rd June 2025

Mr A Simpson, Flat 9 (applicant) and,
■■■■■ Flat 10 (neighbour and potential objector)
1 Chapel House
Turnstone Avenue
Didsbury
M20 2EQ

Dear Sirs

Proposed Aircon Unit at Flat 9, 1 Chapel House, M20 2EQ.

ADC was initially asked by ■■■■■ of Flat 10 to carry out a review of the proposed aircon unit at Flat 9, with regards to its potential noise impact on his immediately adjacent terrace and facade.

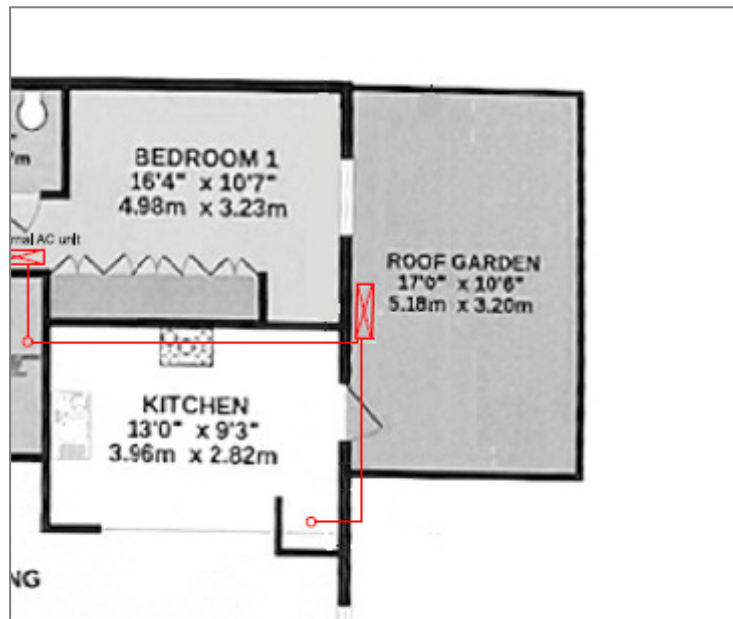
The basic conclusion was that a noise impact assessment did not seem to have been carried out and the proposed location on the boundary fence was likely to be unsuitable. We understand that ■■■■■ subsequently submitted an objection.

Since then, the location of the proposed unit has been moved to a position further away from the boundary fence which will inevitably be an improvement. It was agreed by Mr Simpson, and ■■■■■ to instruct ADC to carry out an assessment of the impact. To be clear, we are instructed jointly by the applicant and closest neighbour, with equal duty of care to each party. For this reason, it was agreed that a simple and pragmatic scope and semi-formal assessment would be adequate, with a short and to-the-point report. Note that this scope deals primarily with airborne noise. Structure-borne noise and vibration in general is discussed in outline form.

Proposed Location

The current proposal is to move the proposed unit away from the boundary fence and to locate it on the wall between Flat 9's bedroom window and kitchen door. We have not been given any formal drawings of the new location and the image below is an illustration¹.

¹ It is based on the original drawing with the location of the aircon unit amended by hand for illustrative purposes only.



The fence between the two terrace areas is a double sided “hit and miss” type and is unlikely to have any worthwhile acoustic properties (2-3 dB at most). The terraces to both sides are timber decking. The deck boards themselves do not run under the boundary fence. It was impossible to tell if the joists underneath the boards ran through. We suspect that they do not but there will almost certainly be rigid connection between the two sides. There is a metal capping on the boundary fence, presumably for structural purposes as there appears to be very little to anchor the feet of the posts.

The centre of the proposed unit is assumed to be around 0.75 m above the decking and roughly central between the bedroom window and kitchen door.

Proposed Unit

We have been provided with a datasheet for Mitsubishi MSZ AP/AY units. The copy we have has the model MSZ-AY25VGK highlighted with a red box, as shown in the image below, presumably indicating the proposed model. It should be noted that this is the indoor unit. No outdoor unit was highlighted, and noise levels range from 59 to 65 dB L_{AW} (A-weighted sound power level). The outdoor equivalent of the highlighted indoor unit is the MUZ-AY25VG and is rated at 59 L_{AW} . We have added a green box in the image below and this is the unit we have used in our assessment, but the applicant should seek confirmation.



MSZ-AP / MSZ-AY INDOOR UNITS		MSZ-AP15VGK	MSZ-AP20VGK	MSZ-AY25VGK	MSZ-AY35VGK	MSZ-AY42VGK	MSZ-AY50VGK	MSZ-AP60VGK	MSZ-AP71VGK
CAPACITY (kW)	Heating (nominal)	1.7 (1.2-3.0)	2.5 (0.5-3.5)	3.2 (1.0-4.1)	4.0 (1.3-4.6)	5.2 (1.3-6.0)	5.5 (1.4-7.3)	6.8 (2.0-8.6)	8.0 (2.2-10.3)
	Cooling (nominal)	1.5 (0.9-2.7)	2.0 (0.6-2.7)	2.5 (0.9-3.4)	3.5 (1.1-3.8)	4.2 (0.9-4.5)	5.0 (1.4-5.4)	6.1 (1.4-7.3)	7.1 (2.0-8.7)
	Heating (UK)	-	2.06 (0.4-2.9)	2.64 (0.8-3.4)	3.3 (1.1-3.8)	4.45 (1.1-4.9)	4.78 (1.2-6.0)	5.6 (1.6-7.1)	6.68 (1.8-8.6)
	Cooling (UK)	-	1.98 (0.6-2.7)	2.48 (0.9-3.4)	3.47 (1.1-3.8)	4.17 (0.9-4.5)	4.95 (1.4-5.3)	6.05 (1.4-7.2)	7.04 (2.0-8.6)
SHF (nominal)		-	0.80	0.92	0.88	0.77	0.74	0.83	0.77
COP / EER (nominal)		-	4.17 / 4.35	4.10 / 4.17	3.88 / 3.54	3.74 / 3.23	3.74 / 3.24	4.07 / 3.84	3.82 / 3.53
SCOP / SEER (BS EN14825)		-	4.10 / 8.60	4.80 / 8.70	4.70 / 8.70	4.70 / 7.90	4.70 / 7.50	4.60 / 7.40	4.40 / 7.20
ERP ENERGY EFFICIENCY CLASS	Heating/Cooling	-	A+ / A+++	A++ / A+++	A++ / A+++	A++ / A++	A++ / A++	A++ / A++	A+ / A++
AIRFLOW (l/s)	Heating - SLo-Lo-Mid-Hi-SHi	62-73-83-100-113	62-73-83-100-122	67-83-110-133-197	67-83-110-133-197	73-90-116-143-215	80-95-121-151-215	180-223-257-290-338	170-192-220-255-320
	Cooling - SLo-Lo-Mid-Hi-SHi	58-65-77-92-107	58-65-77-92-115	60-83-105-130-175	60-83-105-130-185	75-95-116-140-175	86-106-125-151-195	157-183-220-267-315	160-192-220-255-310
PIPE SIZE mm (in)	Gas	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	12.7 (1/2")	12.7 (1/2")
	Liquid	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")
SOUND PRESSURE LEVEL (dBA)	Heating - SLo-Lo-Mid-Hi-SHi	21-26-30-35-40	21-26-30-35-42	18-24-34-39-45	18-24-31-38-45	21-29-35-40-45	20-33-38-43-48	30-37-41-45-48	30-37-41-45-51
	Cooling - SLo-Lo-Mid-Hi-SHi	21-26-30-35-40	21-26-30-35-42	18-24-30-36-42	18-24-30-36-42	21-29-34-38-42	28-33-36-40-44	30-37-41-45-48	30-37-41-45-49
SOUND POWER LEVEL (dBA)		59	60	57	57	57	58	65	65
DIMENSIONS (mm)	Width x Depth x Height	760 x 178 x 250	760 x 178 x 250	798 x 245 x 299	798 x 245 x 299	798 x 245 x 299	798 x 245 x 299	1100 x 257 x 325	1100 x 257 x 325
WEIGHT (kg)		8.2	8.2	10.5	10.5	10.5	10.5	16	17
ELECTRICAL SUPPLY		Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)		6	6	6	6	6	6	6	6
INTERCONNECTING CABLE No. CORES		4	4	4	4	4	4	4	4
MUZ-AP / MUZ-AY OUTDOOR UNITS		MULTI-SPLIT ONLY	MUZ-AP20VG	MUZ-AY25VG	MUZ-AY35VG	MUZ-AY42VG	MUZ-AY50VG	MUZ-AP60VG	MUZ-AP71VG
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	-	48 / 47	48 / 47	50 / 49	51 / 50	52 / 52	57 / 56	55 / 55
	Cooling	-	59	59	61	61	64	65	65
SOUND POWER LEVEL (dBA)		-	31	31	31	34	40.5	40	55
WEIGHT (kg)		-	31	31	31	34	40.5	40	55
DIMENSIONS (mm)	Width x Depth x Height	-	800 x 285 x 550	800 x 285 x 550	800 x 285 x 550	800 x 285 x 550	800 x 285 x 714	800 x 285 x 714	840 x 330 x 880
ELECTRICAL SUPPLY		-	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz
PHASE		-	Single	Single	Single	Single	Single	Single	Single
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	-	0.60 / 0.46	0.78 / 0.60	1.03 / 0.99	1.39 / 1.30	1.47 / 1.54	1.67 / 1.59	2.12 / 2.01
	Heating/Cooling (UK)	-	0.52 / 0.38	0.70 / 0.50	0.93 / 0.83	1.25 / 1.08	1.32 / 1.28	1.51 / 1.33	1.91 / 1.68
STARTING CURRENT (A)		-	3.2	3.6	4.7	6.1	6.9	7.4	9.3
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	-	3.2 / 2.6 [7.0]	3.6 / 2.9 [7.06]	4.7 / 4.5 [8.46]	6.1 / 5.8 [9.9]	6.5 / 6.9 [13.8]	7.4 / 7.1 [14.0]	9.3 / 8.8 [16.4]
FUSE RATING (BS88) - HRC (A)		-	10	10	10	10	16	16	20
MAINS CABLE No. CORES		-	3	3	3	3	3	3	3
MAX PIPE LENGTH (m)		-	20	20	20	20	20	30	30
MAX HEIGHT DIFFERENCE (m)		-	12	12	12	12	12	15	15
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t) - R32 (GWP 675) - 7m		-	0.55 / 0.38	0.55 / 0.37	0.55 / 0.37	0.70 / 0.47	1.00 / 0.68	1.05 / 0.71	1.50 / 1.02
MAX ADDITIONAL REFRIGERANT (kg) / CO ₂ EQUIVALENT (t) - R32 (GWP 675)		-	0.26 / 0.18	0.26 / 0.18	0.26 / 0.18	0.26 / 0.18	0.26 / 0.18	0.30 / 0.21	0.30 / 0.21

Site Survey

The purpose of the site survey was to the assess *representative background sound level* for the assessment, as well as other features of the noise climate.

The survey work was carried out by Andrew Raymond, from the mid-evening of 16th June 2025, through to the mid-afternoon of the following day. The measurements were generally unattended and we are advised that the terraces of Flats 9 and 10 were not occupied at any time.

The position was central on the terrace of Flat 10 approximately 1.3 m above the decking.

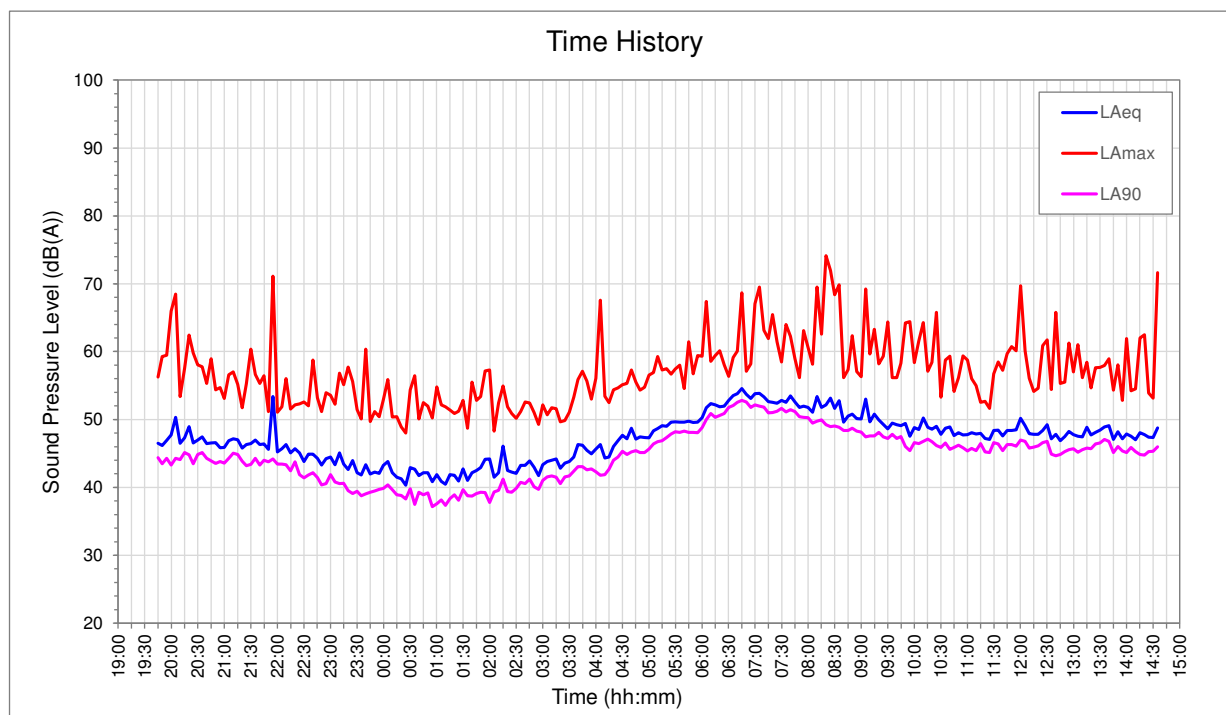
Instrumentation was a Rion NL-52 Class I sound level meter. It holds a current calibration certificate and was filed calibrated before and after with no drift noted. It was set up to measure continuous 5-minute samples of L_{eq}. L_{max} and L₉₀ in overall A-weighted terms and in octave bands across the frequency spectrum. See Definitions of Acoustic Terms in Appendix 1.

We have no reason to believe that conditions were other than normal and representative, characterised by middle distance traffic, and more local sporadic sources such as passing cars and occasional dog barks. Weather conditions were as follows:-

Rain : none, dry roads
 Cloud : 0%
 Temperature : 12 to 23 Celsius
 Wind : negligible

Background Sound Levels

Basic results are shown graphically as follows:-



The daytime, evening and night time levels are summarised in Appendix 2. The main results for the *representative background sound levels* are shown below.

<i>Background Levels</i>	<i>Index</i>	<i>dB(A)</i>
Daytime	L90	46
Evening	L90	43
Nighttime	L90	39

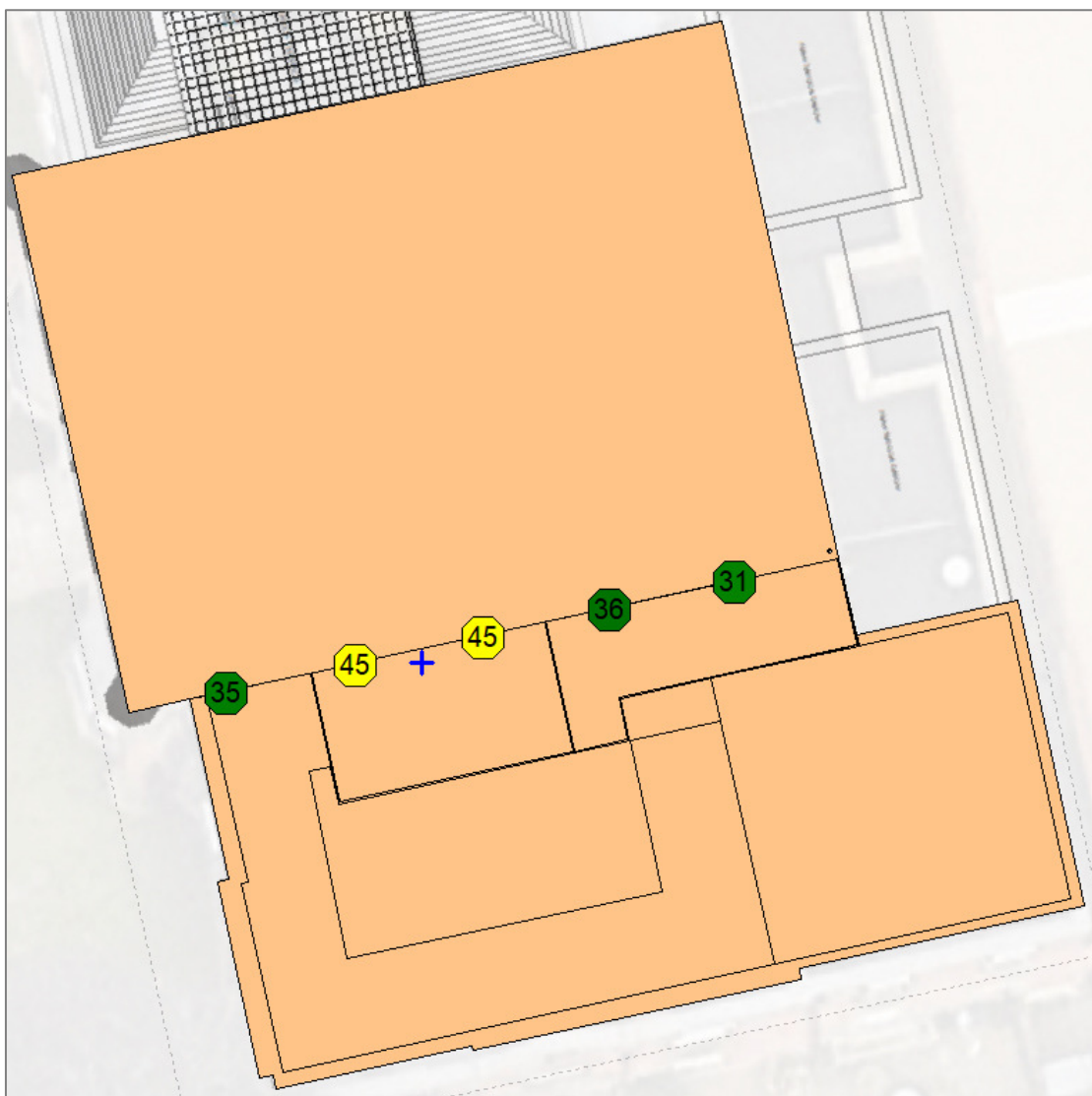
We understand that the aircon system will include bedrooms. For that reason, this assessment will concentrate on the night time assessment, although, for context, the terrace of Flat 10 is clearly more likely to be used in the daytime and evening and the closest window is a room which is not currently used as a bedroom.

Predicted Levels

We have used the well-established CadnaA modelling software which calculates noise propagation based on the processes of *ISO 9613 : Acoustics – Attenuation of sound during propagation outdoors*. Obviously, modelling software is reliant on the inputs and assumptions. The keys ones are:-

1. The surrounding buildings are mainly reflective (0.5 dB loss on reflection assumed).
2. The fencing and decking are also mainly reflective (1 dB loss on reflection assumed). The double sided hit-and-miss fencing is assumed to have 50% acoustic transparency.
3. Calculations are based on two orders of reflections.
4. The source data is based on manufacturers' literature. This is entered into the model as a sound power level for appoint source.
5. All unit is assumed to run continuously.

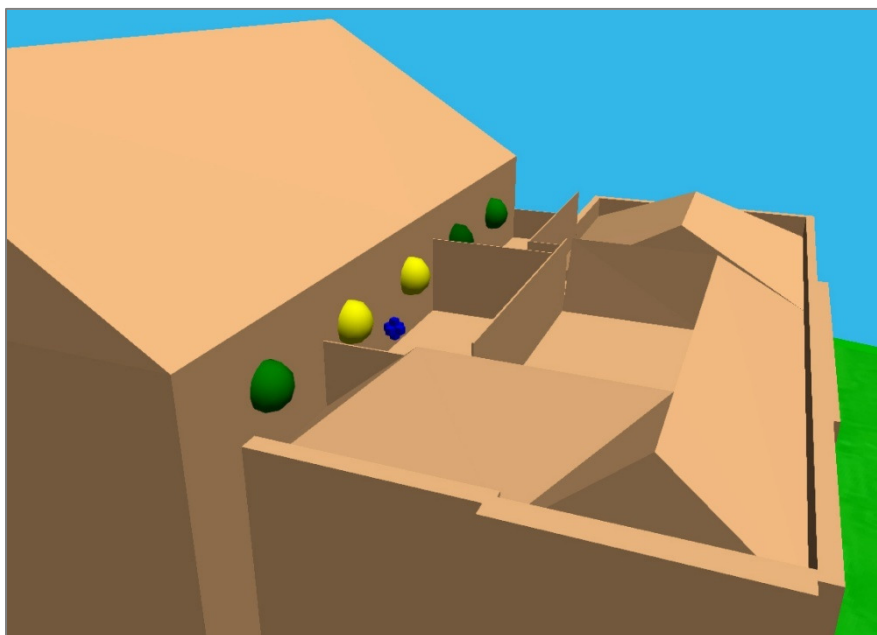
The result of the modelling is shown below:-



Note that:-

- The beige shapes are surrounding buildings and fencing.
- The blue cross is the point source or the proposed aircon unit.
- The coloured numbers are the noise levels at the windows of residential facades. Note that, for planning purposes, only the impact on Flat 10 is relevant but the impact on Flat 9 is also shown.

The following 3D view should help to visualise the model.



Assessment

As stated in the introductory paragraphs, this report covers a semi-formal assessment and is based on the processes of BS 4142. Note that BS 4142 is a standard for assessing sources specifically of industrial and commercial sound and not sources of residential sound. However, it is reasonable to consider an aircon outdoor unit as being of an industrial nature (it is essentially a fan and a compressor) and so the basic approach is used here in outline form. The basic approach is to compare the source under investigation and its characteristics with the background levels. The difference between the two represents the likely impact. For instance where the Rating Level (the basic noise levels at the receiver position, adjusted as necessary for characteristic features) is below the background level, this indicates “*low impact depending on the context*”. Note that consideration of context is crucial and often neglected or misunderstood.

The MCC guidance document “Planning and Noise” also requires a BS 4142 assessment in its section on “*Industrial / commercial developments*”. It sets a criterion of the Rating Level 5 dB *below* the background level and no consideration of context. No justification is given for their criterion, although the document does appear to allow a degree of judgement to be used where the criterion cannot be met, perhaps equivalent to a consideration of context.

The semi-formal BS 4142-type assessment is as follows:-

Predicted Level at the Receiver	36 dB L _{Aeq}
Feature Corrections ²	
tonality	0 dB
impulsivity	0 dB
intermittency	0 dB
other	0 dB
Rating Level	36 dB L _{Ar}
Background Sound Level	39 dB L _{A90}
Rating Level Excess re. Background	-3 dB

This is below what a BS 4142 initial estimate rates as “*low impact depending on the context*”. It is just the MCC criterion of 5 dB below background.

The main aspect of the context is that the terrace area of Flat 10 is most likely to be used in the daytime and evening and the closest window is not currently used as a bedroom and unlikely to be used as such in normal circumstances. The daytime and evening background levels are much higher and the MCC criteria should easily be met at those times.

We would suggest that the impact overall would be very low.

Structure-Borne Noise

The above assessment covers airborne noise only. This is a safe assumption as long as the unit is adequately isolated from the structure it is fixed to.

These units are routinely located on solid ground via basic anti-vibration mounts (AV mounts) or fixed to a building wall, again via basic AV mounts. If this unit is fixed to the wall of Flat 9, then the structure should be solid enough for basic AV mounts to perform perfectly well. However, we understand that there have been concerns about fixing the unit to the wall with respect to Building Conservation issues. It is not for us to comment on this, other than to say that wall mounting is likely to be the best option in terms of the control of structure-borne noise.

If the unit is to be mounted on the floor, there is a much higher risk of transfer through the decking. It is not insurmountable by any means, but it is difficult to predict and guarantee the outcome, as basic AV mount selection by non-specialists is normally based on the assumption of a basic base as opposed to “springy” decking. We recommend that you (or the supplier) contact specialists such as Mason UK (www.mason-uk.co.uk). They are a major industrial and architectural supplier but we have always found them more than willing to assist very small jobs as well. They should not be particularly expensive.

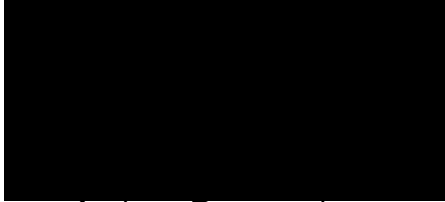
² The unit is extremely unlikely to be tonal or impulsive as long as it is well maintained. It will be intermittent to a degree at source but, at the receiver position, the intermittency is extremely unlikely to be “*readily distinctive against the residual acoustic environment*”, as BS 4142 describes it. In any case, the noise is likely to be barely audible at the receiver positions and so no character corrections apply.

Conclusion

The existing background levels are not especially low. The impact of the proposed unit in the new location is likely to have low impact on Flat 10, as long as structure-borne noise and vibration is effectively eliminated. Whichever way the unit is to be mounted, we strongly recommend you involve a specialist supplier of AV mounts to ensure this.

I hope this covers everything but please call me with any queries.

Yours sincerely



Andrew Raymond

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Appendix 1

Definition of Acoustic Terms

The Decibel

The decibel is the basic unit of noise measurement and is denoted dB. Technically, it is a means of expressing the difference in noise level between the measured noise and a standard level of noise. Most often the threshold of human hearing is used as the standard reference but it really should be stated. The threshold of human hearing is a sound pressure of 20 μ Pa or a sound power of 1pW.

A sound pressure level or SPL should be expressed in dB(re. 20 μ Pa). A sound power level or SWL should be expressed in dB(re. 1pW). If the reference levels are omitted, it will often (but not always) be safe to assume that they are referenced to the threshold of human hearing.

A-Weighting and dB(A)

The human hearing system responds differently to different frequencies. The A-weighting system takes account of this by emphasising mid and high frequencies more than low frequencies to give an overall level. An A-Weighted noise level, therefore, reflects the way normal, healthy hearing would perceive the overall level of the noise. The basic unit is dB(A), although other systems of expressing an A-weighted levels are discussed below.

Other weighting systems, such as C-Weighting, denoted dB(C), reflect the human hearing system's response at higher noise levels.

Equivalent Continuous Sound Level, L_{eq}

This can be simplistically described as a way of expressing the average noise level.

The unit is dB L_{eq} . For A-weighted levels the unit is dB(A) L_{eq} or, in more modern units, dB L_{Aeq} .

Maximum Level, L_{max}

This is the maximum level reached (usually for a fraction of a second) in the measurement period.

The unit is dB L_{max} . For A-weighted levels the unit is dB(A) L_{max} or, in more modern units, dB L_{Amax} .

Statistical (Percentile) Levels, L_n

During a measurement of fluctuating noise, it is often useful to establish the levels exceeded for a percentage of the time. L_n is the index representing the level exceeded for n% of the measurement period.

The unit is dB L_n . For A-weighted levels, the unit is dB(A) L_n or, in more modern units, dB L_{A_n} .

Common examples are as follows :-

dB L_{A90} is the A-weighted level exceeded for 90% of the time and is often used to describe the underlying background noise.

dB L_{A50} is the A-weighted level exceeded for 50% of the time. Mathematically, it is the median, another kind of average.

dB L_{A10} is the A-weighted level exceeded for 10% of the time and has traditionally been used to describe the intermittent highs in the noise climate such as passing cars or aircraft.

Frequency Analysis

Here the audible frequency range is divided up into bands and the noise level is expressed in each frequency band from low pitches to high pitches.

Octave Band analysis is where the frequency range is divided into 8 bands from 63 Hz to 8kHz, or sometimes into 10 bands from 31.5 Hz to 16kHz.

1/3 Octave Band analysis provides more detailed subdivision into 24 bands from 50 Hz to 10kHz, or sometimes into 30 bands from 20Hz to 20kHz.

Narrow Band analysis takes this further with the possibility of many thousands of bands, possibly only 1Hz wide, or even less.

In all types of frequency analysis, the level in each band can be expressed in terms of L_{eq} , L_{max} , L_n , etc. as defined above.

Appendix 2

Measurement Summaries

<i>Daytime</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Lowest	Leq	48	59	46	46	44	45	37	30	22
	Lmax	63	79	53	54	48	50	47	42	31
	L90	45	48	44	44	42	43	33	24	16
Highest	Leq	47	53	48	48	46	46	37	29	21
	Lmax	54	64	61	58	54	55	46	43	33
	L90	45	48	45	46	44	45	33	23	15
Mean	Leq	47	55	48	47	44	45	36	29	22
	Lmax	53	69	62	59	53	51	47	42	34
	L90	45	48	44	44	42	43	33	24	16
Mode	Leq	49	54	47	46	44	45	36	28	22
	Lmax	72	66	61	58	54	48	45	40	31
	L90	46	48	44	44	42	43	33	23	16

<i>Evening</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Lowest	Leq	43	50	45	42	39	41	32	20	14
	Lmax	51	66	53	52	48	47	40	33	23
	L90	40	44	41	39	37	38	25	15	13
Highest	Leq	47	53	51	47	42	45	36	27	18
	Lmax	57	64	66	61	49	49	47	45	33
	L90	45	47	45	44	41	43	32	23	15
Mean	Leq	46	51	47	45	42	43	34	23	15
	Lmax	54	66	60	55	50	49	43	35	26
	L90	43	45	42	41	39	41	29	18	13
Mode	Leq	46	52	47	45	42	43	34	23	15
	Lmax	54	66	60	55	50	49	43	35	26
	L90	43	45	42	42	39	41	29	18	13

<i>Nighttime</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Lowest	Leq	41	45	40	40	38	38	28	18	14
	Lmax	50	60	51	53	48	45	39	27	20
	L90	37	40	36	36	34	35	24	15	13
Highest	Leq	44	48	44	43	41	41	32	21	14
	Lmax	56	66	58	57	53	52	46	36	23
	L90	40	42	39	38	37	38	25	15	12
Mean	Leq	42	46	42	41	39	39	28	17	13
	Lmax	52	58	54	53	50	48	39	32	21
	L90	39	41	38	37	36	37	24	14	12
Mode	Leq	42	46	42	41	39	39	28	17	13
	Lmax	52	58	54	53	50	48	39	32	21
	L90	39	41	38	37	36	37	24	14	12

<i>Background Levels</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Daytime	L90	46	48	44	44	42	43	33	23	16
Evening	L90	43	45	42	42	39	41	29	18	13
Nighttime	L90	39	41	38	37	36	37	24	14	12