



BRAIDEN ACOUSTICS LTD

Innovation Forum // 51 Frederick Road // Salford // Manchester // M6 6FP

VENTILATION NOISE SURVEY

Prepared for : KMM Homes Ltd

Date : 21 May 2024

Site : 408 Oldham Road, Middleton

Report No. : 11284

1 INTRODUCTION

Braiden Acoustics has been commissioned by KMM Homes Ltd to undertake a Ventilation Noise Survey for the proposed residential scheme at the site of 408 Oldham Road, Middleton.

1.1 PLANNING PERMISSION

Planning application 21/00265/FUL proposed “Residential Development comprising the erection of 16 dwellings together with access, associated infrastructure and landscaping (Affordable Housing).”. The application was approved with conditions on the 8 April 2022.

The relevant condition(s) are:

18)

Internal noise levels within the habitable rooms of Plots 1, 2 and 14 shall not exceed the following noise levels:

- *35 dB(A) Leq (1 hour) in the bedrooms with windows shut and other means of ventilation provided between 7 am and 11pm;*
- *30dB(A) Leq 5mins in the bedrooms with windows shut and other means of ventilation provided between 11pm and 7am;*
- *35 dB(A) Leq (1 hour) in the living room/s with windows shut and other means of ventilation provided between 7 am and 11pm;*
- *40dB(A) Leq (1 hour) in other habitable rooms with windows shut and other means of ventilation provided at all times.*

No part of the development shall be occupied until such time as a report providing details of the implemented acoustic mitigation measures, and demonstrating that internal noise levels within habitable rooms meet the levels set out above, has been submitted to and approved in writing by the Local Planning Authority. The duly installed mitigation measures shall be retained thereafter.

Reason: In the interests of ensuring a satisfactory standard of residential amenity for future occupiers in accordance with adopted Rochdale Core Strategy policies DM1 and G9 and the National Planning Policy Framework

This report deals ambient internal noise with and without mechanical ventilation noise for Plots 1, 2 and 14.

1.2 AIM

This report details the assessment of internal noise due to the proposed mechanical ventilation.

Where necessary, mitigation measures will be proposed so the internal noise levels are within the guidelines given in the above Condition.

2 DESCRIPTION OF SITE

2.1 PROPOSED USE

The proposed layout of the site is shown in the Figure below with the pertinent plots 1, 2 & 14 highlighted.



Figure 1
Proposed site layout showing relevant plots

2.1.1 Proposed mechanical ventilation

Centralised Ventilation System (Bedrooms and Lounges)

- National Ventilation UMD 100SX Pro Inline Fan mounted *in attic and connected to roof vent*
- Blauberg BlauFast SR-160-75X8-01 75mm Metal Radial Duct 8 Port Manifold Box with 160mm Connection *in attic*
- Blauberg BlauFast RK 75/50 01 75mm Round Semi-Rigid Antibacterial/Antistatic Ducting *between manifold and each outlet*
- Blauberg BlauFast RPZ 125/75x2 01 75mm 2 Port Ceiling Vent Plenum Box *at each outlet*
- Blauberg FF-FRS-125 Metal Fire Rated Circular Supply Air Valve Damper Vent 125mm *at each outlet*

The layout of the above system differs between plot types.

2.1.1.1 Plot Type A

Plot Type A dwellings are over two floors and have two bedrooms.



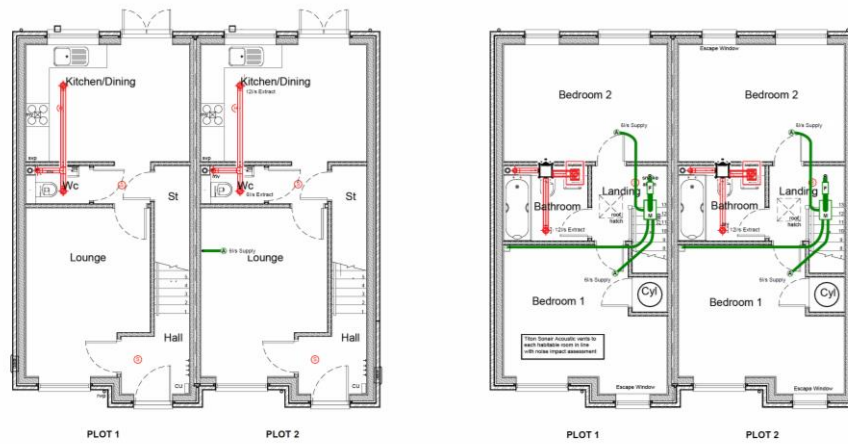


Figure 2
House Type A ventilation layout

The proposed supply ventilation layout, for habitable rooms,

2.1.1.2 Plot Type B ventilation

Plot Type B have three bedrooms over two floors.

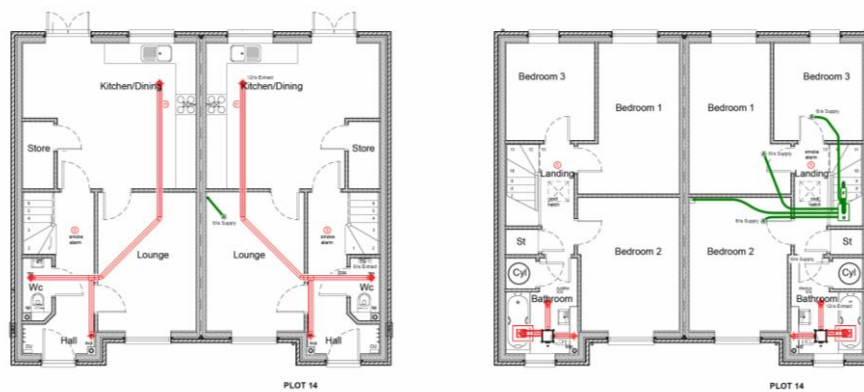


Figure 3
Proposed Type B ventilation layout

2.2 EXTRACT VENTILATION

There is also extract ventilation for the ‘wet’ rooms such as bathrooms and kitchens, i.e. non-habitable rooms. These systems will not be assessed as part of this survey as they are not within habitable rooms.

3 ACOUSTIC CRITERIA AND METHODOLOGY

This is a residential development that may be susceptible to environmental noise. Potential mitigation measures are determined by recommended indoor noise levels from BS 8233 “Sound insulation and noise reduction for buildings” [1] which, in turn, takes guidance from the research-based World Health Organisation “Guidelines for Community Noise”.

Noise level thresholds are usually given for the night-time – 2300-0700 hrs and day time – 0700-2300 hrs.

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 123 of the NPPF says that planning decisions should aim to:



- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 BS 8233: 2014

The British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” gives guidance on recommended indoor ambient noise levels for residential dwellings.

Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 1

Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Internal noise levels in habitable rooms are calculated using either the simple or rigorous method as described in Annex G in BS 8233:2104.

3.2.1 Noise levels in external living areas

For external living areas such as gardens and balconies, BS 8233:2014 § 7.7.3.2 recommends an upper limit of 55dB $L_{Aeq,day}$ although there is a caveat:

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

3.2.2 Maximum noise levels

In the 2014 edition of the Standard, the criterion of 45dB L_{AFMax} inside bedrooms has been removed although there is Note 4:

NOTE 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,P}$ depending on the character and number of events per night. Sporadic noise events could require separate values.



The use of the phrases 'may be set' and 'could require' imply that this is a discretionary criterion.

3.3 COUNCIL CRITERIA

It is usual that Councils adhere to noise levels given in BS 8233.

L_{Aeq} 35 dB 16 hours – indoors, daytime (07.00-23.00)

L_{Aeq} 30 dB 8 hours – indoors, night-time (23.00-07.00)

L_{Aeq} 55 dB 16 hours – indoors, daytime (07.00-23.00)

4 MONITORING DETAILS

4.1 MONITORING DETAILS

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

The sound level meter was calibrated before after the measurements with no significant drift reported.

4.2 INTERNAL NOISE MONITORING

Short term (5-minute) noise measurements were taken within a lounge and a bedroom of Plot 2 and Plot 14. It was not necessary to do Plot 1 as it is the exact layout as Plot 2 (also the supply ventilation system was not yet operational). Plot 14 does differ in layout, however.

Monitoring was manned and audio was recorded.

4.2.1 Location

The microphone was approximately 1.2 m from local ground and placed in the middle of a habitable room with the doors and windows closed but with trickle vents open. The MVHR unit was switched on and off via an isolation switch on the landing.

NB It should be noted that the room was unfurnished and without carpets so reverberation noise contributed to the measured noise levels. When the room is fully furnished then the reverberation noise will decrease and therefore the overall noise level in the rooms will also decrease.**

4.2.2 Results

Plot 2 is at the eastern flank of the site and is shown in Figure 1.

Plot 14 is to the western side of the site.



Plot	Room	MVHR status	Time		Duration	L_{Aeq} dB	L_{Amax} dB
			Start	Finish			
Plot 2	Bedroom	ON	15:31:00	15:36:00	0:05:00	43.2	45.5
	Bedroom	OFF	15:19:00	15:24:00	0:05:00	29.9	38.7
	Lounge	ON	15:39:00	15:44:00	0:05:00	40.8	43.8
	Lounge	OFF	15:49:00	15:54:00	0:05:00	24.0	41.6
Plot 14	Bedroom	ON	16:28:00	16:33:00	0:05:00	45.7	47.6
	Bedroom	OFF	16:21:00	16:26:00	0:05:00	30.1	36.9
	Lounge	ON	15:59:00	16:04:00	0:05:00	44.9	48.8
	Lounge	OFF	16:07:00	16:12:00	0:05:00	28.5	51.3

Table 2
Summary of internal noise monitoring results

Table 2 above shows that the ambient internal noise levels with the air supply turned off was in the range of 24 – 30 dB L_{Aeq} .

The above Table also shows internal noise levels when the air supply systems was switched on was in the range of 41 – 46 dB L_{Aeq} . An increase of approximately 16dB.

5 ACOUSTIC ASSESSMENT

5.1 INTERNAL NOISE LEVELS

Daytime equivalent noise levels should not exceed 35dB during the daytime period.

As the results in Table 2 shows, the internal noise levels within habitable rooms were adequate when the ventilation system was switched off. However, when the ventilation systems were switched on then the internal daytime noise level of 35 dB L_{Aeq} was breach on every occasion. Therefore, it was necessary to determine a solution to reduce the ventilation noise to within acceptable limits.

5.1.1 Mitigation

Octave band calculations (see Appendix) have revealed that the following silencer is required:

Sonex_85015090 (150mm dia & 900mm long).

Details of the silencer are given in the Appendix also.

When the above silencer is installed in between the fan unit and the manifold section in the loft of each of the pertinent plots, 1,2 & 14, then the internal noise are as follows:



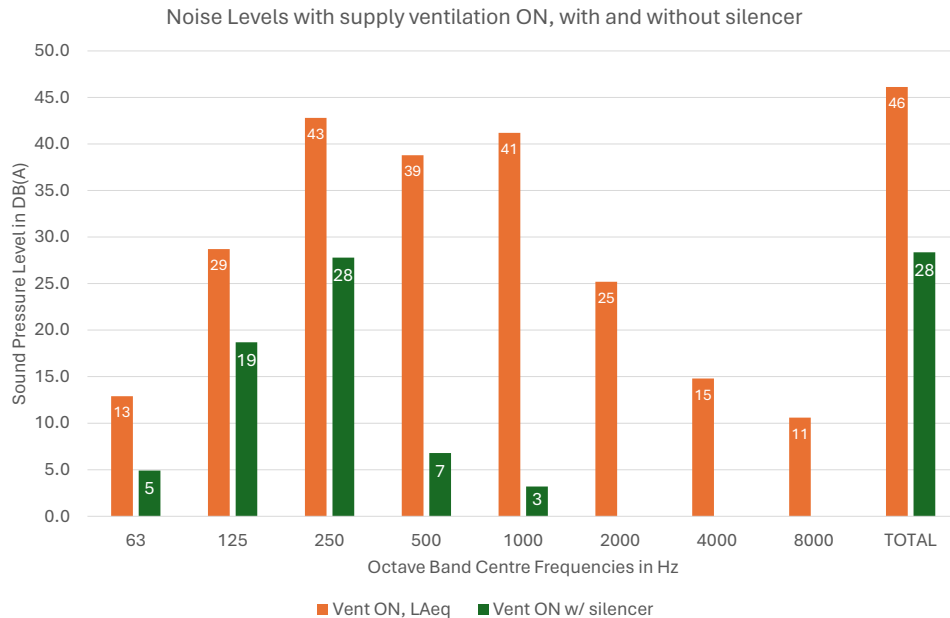


Figure 4
Octave band noise levels with and without silencer

Figure 4 above shows that the introduction of the aforementioned silencer will reduce the overall noise level by approximately 18dB. In the worst case (46 dB in Plot 14 bedroom) this will reduce the internal noise level below 30dB; hence meeting both the daytime and night time internal noise thresholds.

6 CONCLUSION

A verification acoustic survey has taken place at 408 Oldham Road, Middleton to discharge a noise condition of planning application 21/00265/FUL for the erection of residential dwellings.

It has been recommended that the following silencer be installed between the fan and manifold in plots 1,2 & 14:

Sonex_85015090 (150mm dia & 900mm long).

Pending the installation of the above attenuator, internal noise levels in habitable rooms, within the above plots, will be with the Councils limits specified in Condition 18.

7 REFERENCES

- [1] BS8233: 2014
Sound Insulation and noise reduction for buildings – Code of Practice,
British Standards Institute, 2014.



Appendix

A1 CALCULATION

408 Oldham Rd, Middleton		Duct Calculation	Air Supply	Octave band centre frequency								Total level
Item	Quantity	Description	Details	63	125	250	500	1000	2000	4000		
1a		Sound Pressure Level - reverb	Project Result LReq	39.1	44.8	51.4	42.0	41.2	24.0	13.8	53.1	
6		Silencer attenuation (1)	Sonex_85015090 (150mm dia & 90	-8	-10	-15	-32	-38	-37	-34		
7		Silencer attenuation (2)	no silencer or n/a	0	0	0	0	0	0	0		
8		Att due to end reflection	no end reflection or n/a	0	0	0	0	0	0	0		
9		Louvre attenuation	no acoustic louvre or n/a	0	0	0	0	0	0	0		
		A weighting	yes	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0		
10		Sound pressure at termination		4.9	18.7	27.8	6.8	3.2	0.0	0.0	28.4	



A2 SILENCER DETAILS

Application

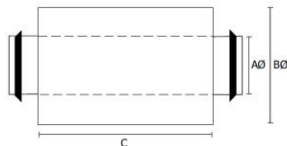
The effective and economic solution for sound attenuation in circular duct systems from 100 to 500mm diameter. With at least three models per size throughout the range the system designer is given complete flexibility of choice allowing a selection which is the best balance of attenuation, size and cost for any application. Sonex Attenuators are fitted with a patented duct seal which enables leak free 'plug-in' connection to rigid ductwork with consequent savings of installation costs. The excellent attenuation characteristics of the Sonex range are achieved without imposing undue system resistance. Pressure losses are little more than those which would occur over a comparable section of straight duct.

Construction

The attenuator consists of a perforated tubular liner manufactured from sheet steel. The liner is enclosed by a thick layer of mineral wool sound absorbing material. Casing and end plates are formed from galvanised sheet steel. Standard models have a 30 minute fire rating (60 minutes also available).

Dimensions, Weights & Insertion Loss

CODE	DIMENSIONS (MM)			ATTENUATION DB MID FREQUENCY HZ								
	AØ	BØ	C	KG.	63	125	250	500	1K	2K	4K	8K
83010030	100	200	300	2.4	3	3	9	17	23	26	25	13
83010060	100	200	600	4.1	6	9	15	34	40	40	37	18
83010090	100	200	900	6.6	10	13	21	40	45	39	36	16
83012030	125	225	300	2.6	3	3	7	16	20	24	22	17
83012060	125	225	600	4.5	5	8	13	29	35	35	32	22
83012090	125	225	900	7.6	10	12	19	37	40	38	34	32
83015030	150	260	300	2.9	3	3	6	13	19	23	22	16
83015060	150	260	600	5.8	5	7	12	24	30	35	31	20
83015090	150	260	900	9	8	10	15	32	38	37	34	29
83016030	160	260	300	2.9	3	3	6	13	19	23	22	16
83016060	160	260	600	5.8	5	7	12	24	30	35	31	20
83016090	160	260	900	9	8	10	15	32	38	37	34	29
83020060	200	300	600	7	4	6	10	20	27	33	19	17
83020090	200	300	900	10	8	9	14	28	32	35	28	25
83020120	200	300	1200	14	10	12	17	36	41	43	28	26
83025060	250	355	600	8.6	4	5	10	19	25	29	18	17
83025090	250	355	900	12.2	6	7	12	23	30	30	22	19
83025120	250	355	1200	18	8	10	15	32	37	38	26	20
83031060	315	400	600	9.8	4	5	8	15	20	22	17	15
83031090	315	400	900	15	5	7	10	20	30	29	18	16
83031120	315	400	1200	21	7	9	13	22	32	33	19	18
83040090	400	606	900	21	3	5	9	19	26	20	13	11
83040120	400	606	1200	27	6	8	14	24	30	28	17	9
83050090	500	711	900	29	3	4	9	15	23	17	12	11
83050120	500	711	1200	38	5	7	13	18	26	23	15	9



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