



BRAIDEN ACOUSTICS LTD

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

NOISE IMPACT ASSESSMENT

Prepared For : JCT Building Services (NW) Ltd

Date : 1 Nov 2023

Site : Rear of 309 Dickenson Road, Longsight

Report No. : 11177revB

1 INTRODUCTION

Braiden Acoustics has been commissioned by JCT Building Services (NW) Ltd to undertake an acoustic survey at the site of Rear of 309 Dickenson Road, Longsight in order to discharge a noise condition from planning application 130197/FO/2021 which proposes:

Erection of 2 dwellings fronting Honor Street creation of new access onto Honor Street, re-instatement of access onto Birch Lane, car parking, landscaping and associated facilities on land to the rear of 309 Dickenson Road.

Condition 6 states:

6) a) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from surrounding roads shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises or plant associated with commercial premises. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied. Noise survey data must include measurements taken during a rush-hour period and night time period to determine the appropriate sound insulation measures necessary.

b) Upon completion of the development and before first occupation of the residential units, a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the internal noise criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to policies SP1, H1 and DM1 of the

The above condition is in two parts:

- a) Initial noise impact assessment and
- b) verification study once the property is built to check compliance with noise levels

This report deals with the first part of the Condition.

1.1 AIM

The aim of the report is to describe the site and its surroundings with regards to potential noise sources affecting the site. The noise assessment will suggest relevant recommendations, if required, in order that future occupants are not disturbed by noise.



2 DESCRIPTION OF SITE

The site is currently an empty green space on the corner of Birch Lane and Honor Street in Longsight, as shown in Figure 1.



Figure 1
Street view of site

2.1 SITE LOCATION AND NEIGHBOURING USES

The site is bounded by Birch Lane to the west and Honor Street to the north. Existing housing on Honor Street is to the east and the rear of 309 Dickenson Road is to the south.



Figure 2
Site location showing monitoring location (ML) and surrounding uses

2.2 PROPOSED USE

It is proposed to erect 2no. 3-storey semi-detached houses.



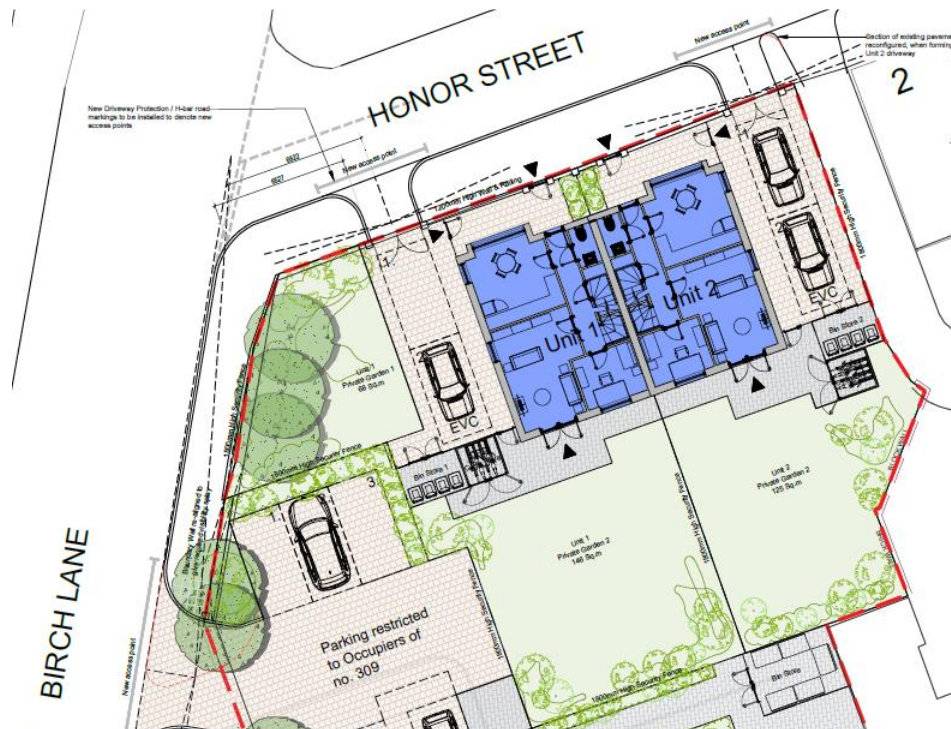


Figure 3
proposed site layout

3 ACOUSTIC CRITERIA AND METHODOLOGY

This is a residential development that may be susceptible to environmental noise, such as road traffic noise and/or noise from local industry. Recommended noise levels due to environmental noise are taken from BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” [1] which, in turn, takes guidance from the research-based World Health Organisation “Guidelines for Community Noise.” Where necessary, mitigation measures have been recommended so that the noise level thresholds are not breached.

Noise levels are usually given separately 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.

The L_{Amax} criterion is used where the level is not exceeded more than 10 times during the night time period.

3.3 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [2] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (specific noise level), L_{Aeq} , to the background noise level, L_{A90} , at the nearest sensitive receptor (NSR).

When measuring the Background Noise Level, the Standard states:

Choose outdoor measurement locations that will give results that are representative of the ambient sound and residual sound at the assessment location(s). Make the measurement of the ambient sound level, the residual



sound level and the background sound level at a height of 1.2 m to 1.5 m above the ground, unless there is a specific reason to use an alternative height (which should be justified), and under similar conditions, e.g. similar influence of reflections and measurement height above the ground. Where practical, minimize the influence of reflections by making the measurements at least 3.5 m from any reflecting surface other than the ground.

Where it is necessary to undertake measurements above ground floor level, choose a location which is approximately 1 m from the facade on the relevant floor of the building if it is not practical to make the measurements at least 3.5 m from the facade at this elevation. *NOTE* When measurements for distant sources are made at 1 m from a facade, the measured level can be adjusted to an equivalent free-field level by subtracting a 3 dB correction factor. For sources that are relatively close or not perpendicular to the facade the correction may be 1 dB or 2 dB, in which case the reasons for not using a correction of 3 dB ought to be explained.

Essentially, background noise measurement should be made free field. If measurements are made at the façade, then a correction should be made in order to represent the free field.

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [3]. Whereas the old standard added 5dB ‘penalty’ to the Specific Noise Level (SNL) if the noise source has a ‘character’ that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise ‘character’. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the rating level. The new Standard gives the guidance for the following types of noise character:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source’s tonal and/or impulsive characteristics could also vary with time.

Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency



When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the Rating Level.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

3.4 COUNCIL NOISE CRITERIA

There are two issues of potential noise emanating from the site:

1. Environmental noise break in

3.4.1 Residential noise criteria

For residential developments, the noise thresholds are taken from BS8233:

- Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB LAmax,F by more than 15 times)
- Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq
- Gardens and terraces (daytime) 55 dB LAeq

4 MONITORING DETAILS

4.1 MONITORING OVERVIEW

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

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

Weather 14- 18degC, <5m/s wind, 40-60% cloud

Time / Date: Thursday 25th May 2023 at 13:52:30 for almost 19 hours

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

Monitoring was unmanned.

Background noise (L_{A90}), ‘average’ noise levels (L_{Aeq}) and maximum noise levels (L_{Amax}) were taken in 15 minute intervals.

4.2 MONITORING LOCATION

The monitoring location was at least 1.5m from the ground in the location marked in Figure 2. The location is nearer to the junction of Dickenson Road and Birch Lane, which is the main noise source.



4.3 MONITORING RESULTS

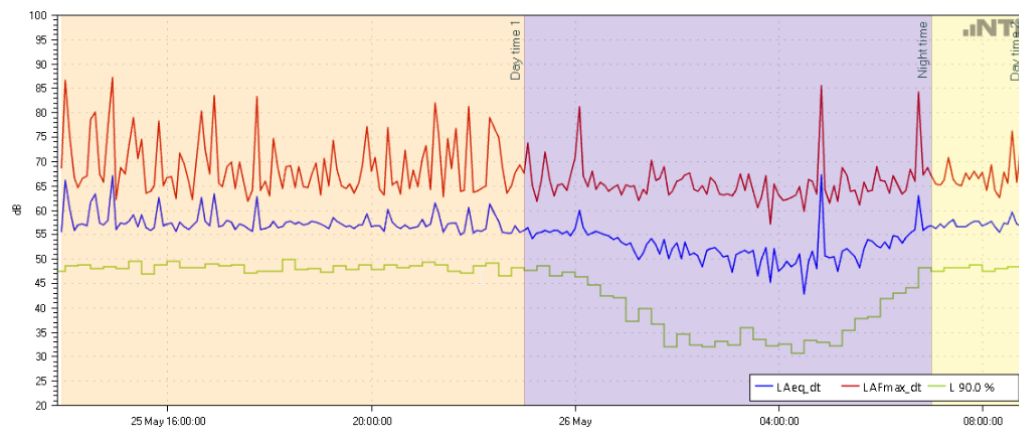


Figure 4
Time history

The noise climate was predominantly road traffic noise, especially at the junction of the Birch Lane and Dickenson Road.

There was no industrial noise present in the vicinity.

Day	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Thurs/Fri	13:52:30	23:00:00	09:07:30	day	48.1	58.3	87.2
	23:00:00	07:00:00	08:00:00	Night	34.7	54.5	85.4
	07:00:00	08:48:43	01:49:43	day	48	57.2	76.2

Table 2
Summary of noise monitoring results

The overall free field¹ noise levels are as follows:

$$L_{Aeq}(\text{night}) \quad 58 - 3 = 55 \text{ dB(A)}$$

$$L_{Aeq}(\text{day}) \quad 55 - 3 = 52 \text{ dB(A)}$$

4.3.1 Maximum noise levels

A comment from the EHO states that maximum noise levels should also be assessed:

"...confirmation is needed that individual noise events do not exceed 45 dB $L_{Amax,F}$ by more than 15 times."

Below is night time noise data showing maximum levels not exceeding 15 times during the night time period.

Figure 5 shows that 68 dB L_{Amax} is not exceeded more than 15 times during the night time period.

¹ Monitoring was made 1m from a façade.



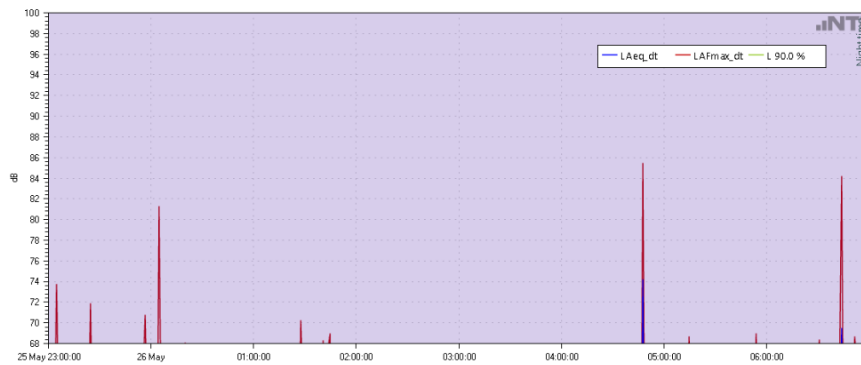


Figure 5
Maximum levels showing no more than 15 events during the night time period.

5 ACOUSTIC ASSESSMENT

5.1 ENVIRONMENT NOISE BREAK IN

Given the external noise levels, the initial glazing scheme can be suggested. However, it should be noted that this assumes windows closed in order to achieve the internal noise levels based on BS 8223.

The amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014 whereby the sound insulation index (SRI) of the glazing (the weakest element of the building façade, acoustically) is determined by simply deducting the required internal noise level from the external free field noise level.

5.1.1 Façade effect

A -3dB façade correction was necessary as the noise monitoring was not free-field.

5.1.2 Distance correction

There was a no distance correction applied even though the monitoring location was placed closer to the main noise source, the junction of Dickenson Road and Birch Lane, than the proposed properties .

5.1.3 Barrier effect

There is no barrier correction due to direct line of sight to the noise sources for the facades / windows facing Birch Lane and Dickenson Road.

5.1.4 BS 8233 assessment

The weakest structural element is the glazing. The required glazing was calculated using recommended internal values. The Table below shows the required Sound Reduction Indices (SRI) for the bedrooms (night) and living areas (day) on each relevant elevation.

Noise levels will be attributed to all elevations as a worst-case scenario.



Façade	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L_{Aeq} (dB)	L_{Amax}^2 (dB)	L_{Aeq} (dB)	L_{Amax} (dB)	SRI ($R_w + C_{tr}$)	Example Spec ³
ALL	night	bedroom	52	68	30	45	23	4 (16) 4
	day	lounge	55		35		20	4 (16) 4

Table 3
Calculated SRI values and recommended glazing

All glazing for habitable rooms can achieve adequate internal noise levels with standard 4mm double glazing.

5.2 GARDENS

There are proposed gardens.

The daytime noise level of 55 dB has not been breached, so mitigation is not necessary. However, the following is recommended:

The boundary treatment to the gardens should be close boarded timber fencing with a surface density of at least 10 kgm⁻².

5.3 VENTILATION

In order to keep internal noise levels within suitable levels, a Mechanical Ventilation Heat Recovery (MVHR) system has been proposed as an alternative to opening windows.

Such systems can introduce both internal and external noise; both of which shall be assessed here.

5.3.1 Internal noise

Noise in a habitable room due to the MVHR (Mechanical Ventilation with Heat Recovery) unit is determined by first knowing the sound power level of the inlets/outlets of the MVHR unit. The MVHR system will vent to the outside for fresh intake air and to expel 'dirty' extract air.

An example of such a system is shown in Figure 6.

² not exceeded more than 15 times.

³ Example glazing build up and performance from BS 12354-3 – table in Appendix. Other glazing build-ups available.



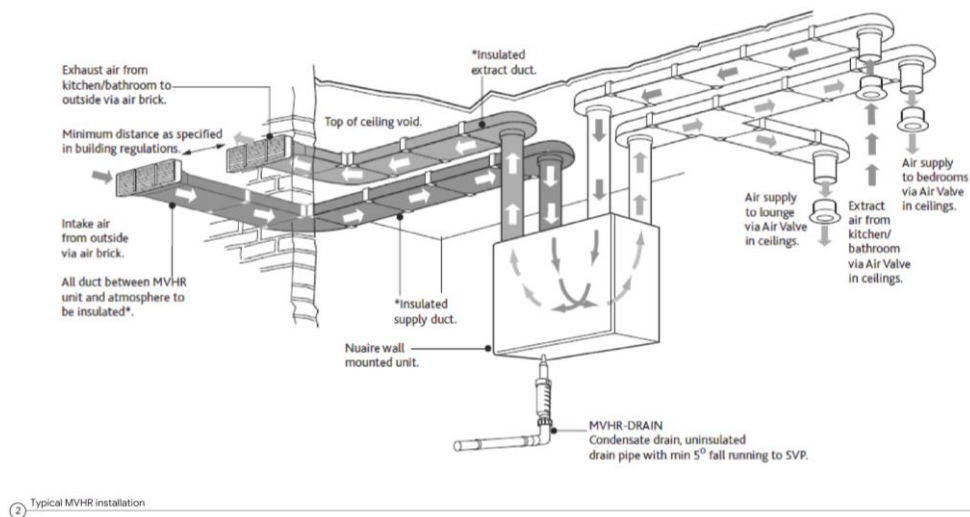


Figure 6
Typical MVHR system layout

The MVHR unit will be a Vent Axia Sentinel Kinetic High Flow with both an acoustic enclosure and acoustic top box. Details and specifications are shown in the Appendix.



Figure 7
Sentinel Kinetic High Flow MVHR unit

The proposed ventilation will have the MVHR unit in the loft space and vent to atmosphere, as shown in Figure 8.



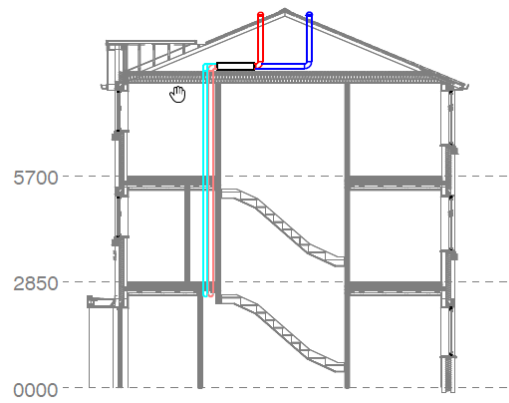


Figure 8
Section drawing showing MVHR unit in the loft space

The second-floor ductwork layout is shown in the figure below.

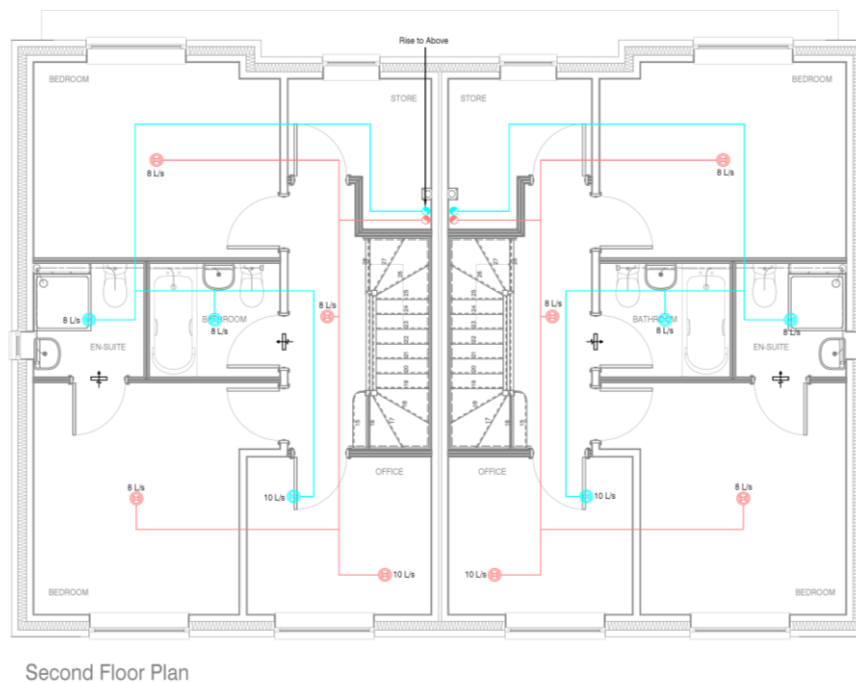


Figure 9
Ventilation layout

Noise levels will be calculated for both the internal outlets and external grilles. External noise due to the ventilation system shall be dealt with in the next section.

The sound power at the termination is calculated using the following parameters:

- sound power of unit,
- length and type (circular or rectangular) of duct,
- branches (duct take offs),
- silencer attenuation and
- end reflection.

Once the sound power at the outlet (internal) grille is known then the reverberant sound pressure level in the room is determined using a modified version of Equation 5.5 from Woods [4].



$$SPL_{rev} = SWL_{grille} - 10 \log \left(\frac{A}{1 - \frac{A}{S}} \right) + 6 \quad (1)$$

where SWL_{grille} = sound power the outlet grille, dB

S = the surface area of the room, m²

A = is the equivalent absorption area of the receiving room being considered, m²

6 = diffuse to reverberant field correction.

Internal noise levels were calculated for the second-floor rear bedroom (nearest to MVHR unit) and the second-floor office, with noise levels for the unit operating at 100%, as a worst-case scenario. Full details of the calculations are given in the Appendix.

The internal noise level for the nearest bedroom, due to duct noise from the MVHR unit, was 29.3 dB(A).

The process was repeated for the office, although the office has both an extract and supply vent.

When the MVHR is running at 100% duty (i.e. overheating 'boost' mode), the calculated noise limits are as follows:

Bedroom 29.3 dB (Overheating Limit 35dB)

Office 29.6 dB (Overheating Limit 40dB).

All other habitable rooms should also be within limit, as the two most sensitive rooms have been assessed as a worst-case scenario.

NB The above noise levels include a Nuaire PVCSIL-1500 rectangular silencer on the atmosphere side of the fan. Full details of which are given in the Appendix.**

5.4 EXTERNAL PLANT NOISE

The extract and supply ducts will vent via the roof, as shown in the figure below.

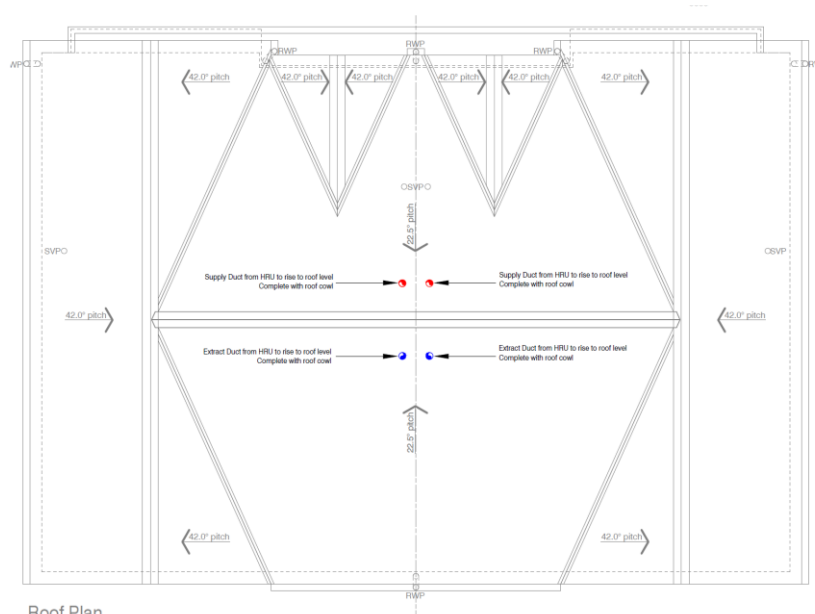


Figure 10
Roof plant showing ventilation ducts



The nearest potential sensitive receptor, with direct line of sight to the ventilation duct cowls (bearing in mind that the house will be three stories high), is the rear of 309 Dickenson Road, which is approximately 9m from the proposed properties.

5.4.1 Calculation method

Noise from the ventilation external cowls needs to be assessed as ‘external plant’. The sound power of the cowl is calculated in the same way as in the previous section. However, noise is now being propagated externally and not into a room.

$$SPL_{ext} = SWL_{grille} - 20 \log r + DI(\theta) - 11 \quad (2)$$

where SWL_{grille} = sound power the outlet grille, dB

r = distance from grille to reception point, m.

θ = angle from grille to reception point,

11 = diffuse to reverberant field correction.

The method of determine the directivity index (DI) accounts for the area of the grille and the angle to the reception point. Page 98 of Woods [4] explains the method as the DI will also depend upon frequency.

If the reception point is at a façade, then a 3dB addition is factored in.

5.4.2 Background Noise Levels

In order to determine the ‘typical’ background noise levels at the night (most noise sensitive period), a histogram was plotted for the broadband L_{A90} 15-minute levels.

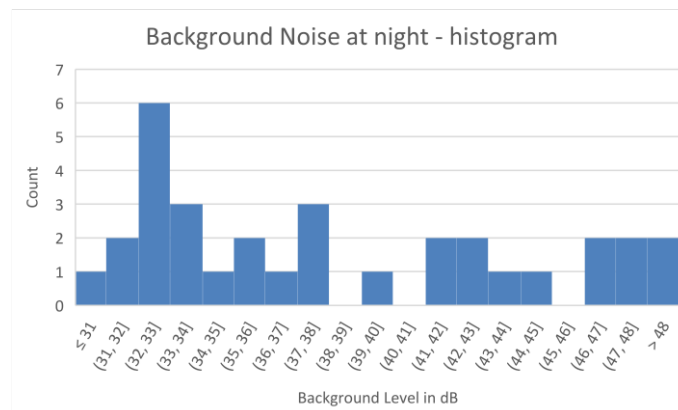


Figure 11
histogram of L_{A90} values - night

The lowest typical background noise level at the front for the night time period was 33dB L_{A90} .

5.4.3 Assessment

The cowl has the following dimensions:

diameter 0.06m

The nearest habitable window will be approximately 9 m from either cowl, which is approximately 80deg from the grille horizontally.

The full calculation can be seen in the Appendix.



The broadband noise level of 16dB(A)⁴ is used for a BS4142 assessment using the night time (worst case) typical background noise level (see Section 5.4.2).

NB The above noise level includes a Nuaire PVC SIL-1500 rectangular silencer on the atmosphere side of the extract and intake fans. Full details of which are given in the Appendix.**

For the BS 4142 assessment, there is a penalty for tonality as well as intermittency.

BS 4142 Noise Assessment (external exhaust)	Value	dB
Total Specific Noise Level @ NSR		16
BS 4141		
Tonality	0/2/4/4	2
Impulsivity	0/3/6/9	0
Intermittency	0/3	3
Rating Noise Level		21
Background Noise Level		33
Rating minus Background	✓	-12

Table 4
BS 4142 Assessment for external exhaust at night

Table 4 clearly shows that the Rating Level from the external cowls of the ventilation system are well below the Background Level and thus compliant with the Council's noise requirements.

6 CONCLUSION

An acoustic survey has taken place at Rear of 309 Dickenson Road, Longsight to support a planning application for residential dwellings.

Ventilation

This is an updated report to include an assessment of internal and external noise due to a whole house ventilation system. **The following is recommended:**

- **Nuaire PVC SIL-1500 silencer on ALL inlets and outlets of the MVHR unit**
- **Acoustic Enclosure is required**
- **Acoustic Top Box is also required.**

Noise break in

The main issue of noise was passing vehicles on the surrounding road network which resulted in modest noise levels.

Adequate internal noise levels can be achieved with standard 4mm double glazing.

External amenity areas

No acoustic mitigation is required. However, the following is recommended:

The boundary treatment to the gardens should be close boarded timber fencing with a surface density of at least 10 kgm⁻².

7 REFERENCES

⁴ The supply fan is 7 dB less.



- [1] BS8233: 2014
Guidance on sound insulation and noise reduction for buildings
British Standards Institute, 2014.
- [2] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.
- [3] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.
- [4] Ian Sharland
FLÄKT WOODS PRACTICAL GUIDE TO NOISE CONTROL
Fläkt Woods Limited, Colchester, England, 2005.



Appendix

A1 BS12354-3 – GLAZING SPEC

Table B.1 - Examples of the sound reduction index of glazing

Glazing type	Sound reduction index (dB)						
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	R_w (C; C _{tr}) dB
Single panes (mm)							
3	14	19	25	29	33	25	28 (-1; -4)
4	17	20	26	32	33	26	29 (-2; -3)
5	19	22	29	33	29	31	30 (-1; -2)
6	18	23	30	35	27	32	31 (-2; -3)
8	20	24	29	34	29	37	32 (-2; -3)
10	23	26	32	31	32	39	33 (-2; -3)
12	27	29	31	32	38	47	34 (0; -2)
Laminated panes (mm) + plastic laminate (0,5 to 1) mm							
6+	20	23	29	34	32	38	32 (-1; -3)
8+	20	25	32	35	34	42	33 (-1; -3)
10+	24	26	33	33	35	44	34 (-1; -3)
Double pane units with single or laminated panes (mm); air filled cavity from (6 to 16) mm							
4-(6-16)-4	21	17	25	35	37	31	29 (-1; -4)
6-(6-16)-4	21	20	26	38	37	39	32 (-2; -4)
6-(6-16)-6	20	18	28	38	34	38	31 (-1; -4)
8-(6-16)-4	22	21	28	38	40	47	33 (-1; -4)
8-(6-16)-6	20	21	33	40	36	48	35 (-2; -6)
10-(6-16)-4	24	21	32	37	42	43	35 (-2; -5)
10-(6-16)-6	24	24	32	37	37	44	35 (-1; -3)
6-(6-16)-6+	20	19	30	39	37	46	33 (-2; -5)
6-(6-16)-10+	24	25	33	39	40	49	37 (-1; -5)
NOTE 1 This selection and the values are in accordance with prEN 12758-1. The single number ratings are deduced from results in 1/3-octave bands and therefore single number ratings deduced from the given octave band data might result in values which differ 1 dB at the most.							
NOTE 2 Though it is known that for a given double pane unit the sound reduction increases with increasing cavity width, this effect has been found to be too small to take into account here for air filled cavities in the light of the inherent spread in results for nominally identical units.							



A2 MVHR SPECIFICATIONS

SAP PCDB Test Results

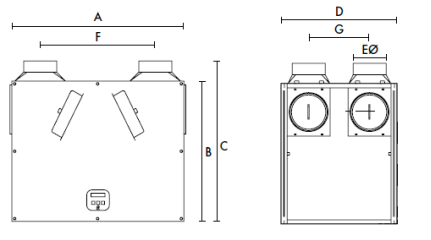
	SAP 2009		SAP 2012	
	Thermal Efficiency %	SFP (W/l/s)	Thermal Efficiency %	SFP (W/l/s)
K + 1	88	0.65	88	0.58
K + 2	88	0.54	90	0.55
K + 3	90	0.52	91	0.60
K + 4	90	0.55	91	0.69
K + 5	91	0.6	90	0.78
K + 6	91	0.66	90	0.92
K + 7	90	0.74	90	1.09

SEC Rating

Model	SEC Class
Kinetic High Flow	A

Dimensions (mm)

Unit



A	B	C	D	EØ	F	G
785	635	722	550	180/200	520	275

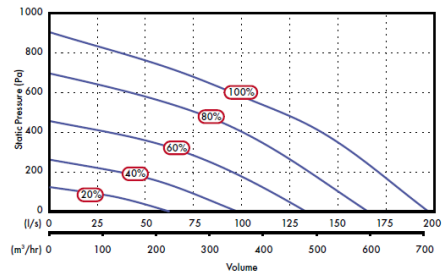
Weight: 31kg

Sound Data (Unit only)

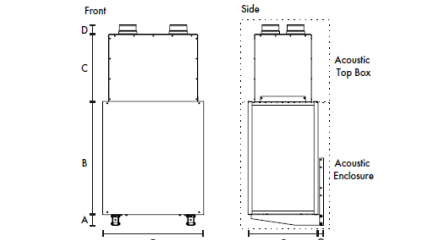
Flow %	Test Mode	Octave band, Hz, dB SWL								SPL dB(A)	
		63	125	250	500	1K	2K	4K	8K	LwA	@ 3m
20	Supply	55.1	65.9	55.2	53.8	44.4	37.4	25.3	24.9	66.8	34.1
	Extract	58.2	57.4	48.0	45.6	43.8	34.5	20.0	24.5	61.3	27.9
	Breakout	43.3	46.6	44.9	44.7	41.8	30.4	21.6	22.5	51.6	25.1
40	Supply	63.1	69.0	67.1	64.0	55.0	51.6	39.7	32.4	64.2	43.7
	Extract	58.6	58.4	60.0	53.7	41.9	41.5	31.7	25.1	54.9	34.3
	Breakout	55.4	49.6	60.6	53.8	46.5	41.5	33.2	27.4	55.4	34.8
60	Supply	70.3	74.3	81.4	71.5	63.6	59.9	49.6	43.1	74.8	54.3
	Extract	64.4	64.2	72.6	59.1	48.7	45.7	37.8	29.3	64.9	44.4
	Breakout	62.8	54.6	65.7	57.2	55.5	49.2	41.4	36.4	61.0	40.5
80	Supply	75.3	77.9	88.1	78.7	68.4	65.1	56.0	50.1	81.4	60.9
	Extract	71.1	68.2	73.6	61.8	51.9	49.5	42.7	37.6	66.4	45.9
	Breakout	66.2	59.0	73.4	61.8	57.0	54.6	47.3	43.1	66.8	46.2
100	Supply	90.9	80.9	84.4	80.1	71.5	68.0	59.3	54.5	80.7	60.1
	Extract	92.4	71.8	78.1	67.4	54.9	51.5	44.6	41.4	72.2	51.7
	Breakout	69.3	62.9	74.9	67.5	59.2	56.6	49.1	44.7	69.3	48.8

Tested according to BS EN 13141-7:2010. Breakout quoted spherical. Supply and Extract quoted hemispherical.

Performance



Acoustic Solution



A	B	C	D	E	F	G	kg	kg	Spigot
80	733	501	71	855	583	40	17	33	180

Sound Data (Unit with Acoustic Enclosure)

Flow %	Test Mode	Octave band, Hz, dB SWL								SPL dB(A)	
		63	125	250	500	1K	2K	4K	8K	LwA	@ 3m
20	Supply	55.2	57.0	46.1	38.8	24.0	15.4	18.0	23.2	43.6	26.1
	Extract	50.4	53.6	37.0	32.3	18.2	15.1	18.0	23.2	38.7	21.2
	Breakout	41.3	51.8	39.2	32.3	20.5	15.8	18.1	23.2	37.7	17.2
40	Supply	64.1	59.6	59.7	51.9	35.5	22.8	19.9	23.5	53.3	35.8
	Extract	56.6	50.7	49.0	41.9	24.5	17.7	18.1	23.2	43.3	25.8
	Breakout	46.7	50.5	53.0	44.8	32.2	22.2	18.5	23.3	45.6	25.1
60	Supply	67.3	64.0	67.7	58.6	43.2	30.6	26.5	25.9	61.0	43.5
	Extract	61.6	56.7	55.5	49.0	32.2	25.3	19.7	23.4	50.2	32.7
	Breakout	53.0	54.4	60.2	48.8	40.6	33.2	23.4	23.4	53.0	32.5
80	Supply	70.3	67.7	74.6	61.8	48.5	36.2	33.0	31.4	67.5	50.0
	Extract	66.7	60.0	67.2	50.9	38.1	32.8	24.0	24.1	59.7	42.2
	Breakout	58.0	58.0	64.7	52.4	45.7	39.9	31.2	24.3	58.7	38.2
100	Supply	73.0	70.1	77.1	65.1	51.4	39.5	37.0	36.4	70.1	52.6
	Extract	69.6	62.5	67.3	56.2	41.7	37.0	28.1	25.3	60.5	43.0
	Breakout	61.0	61.2	65.9	57.7	48.5	43.8	36.3	26.3	60.7	40.2



A3 FULL CALCULATIONS

A3.1 Bedroom

Honor Street, Longsight		Duct Calculation		Bedroom Rear (Second Floor)		Octave band centre frequency							
Term	Quantity	Description	Details	63	125	250	500	1000	2000	4000	Total level		
L_w		Sound Power Level of unit	Sentinel Kinetic High Flow w/ Acoustic Solution - 100% L_w out	73.0	70.1	77.1	65.1	51.4	39.5	37.0	79.3		
	5.95 m	Duct Length in metres	Rectangular 150 x 150	-3.9	-3.9	-3.0	-2.1	-2.1	-2.1	-2.1			
	4	Number of bends	150mm round bend	0	0	-4	-8	-12	-12	-12			
	3600 mm	Branch area	$10\log(\text{branch+duct mm}^2/\text{duct mm}^2)$	-3	-3	-3	-3	-3	-3	-3			
		Silencer attenuation (1)	PVCSIL-1500	-5	-6	-16	-20	-32	-47	-35			
		Silencer attenuation (2)	no silencer or n/a	0	-6	0	0	0	0	0			
		Att due to end reflection	125 mm end reflection	-17	-12	-8	-4	-1	0	0			
		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			
		Sound power at termination		17.9	23.1	34.5	24.8	1.3	0.0	0.0	35.3		
R_c		Room Constant	$R_c = A / [1 - (A/S)]$	-9.39	-10.91	-12.10	-12.78	-12.78	-12.45	-12.45			
	6	Numerical correction	$SPL = SWL - 10\log R_c + 6$ (Eq 5.5 Woods)	6.00	6.00	6.00	6.00	6.00	6.00	6.00			
		SPL(A) at NSR	$L_{pA,NSR}$	14.5	18.2	28.4	18.0	0.0	0.0	0.0	29.3	dB	

A3.2 Office

Honor Street, Longsight		Duct Calculation		Second Floor Office		Octave band centre frequency							
Term	Quantity	Description	Details	63	125	250	500	1000	2000	4000	Total level		
L_w		Sound Power Level of unit	Sentinel Kinetic High Flow w/ Acoustic Solution - 100% L_w out	73.0	70.1	77.1	65.1	51.4	39.5	37.0	79.3		
	8.32 m	Duct Length in metres	Rectangular 150 x 150	-5.4	-5.4	-4.2	-2.9	-2.9	-2.9	-2.9			
	4	Number of bends	150mm round bend	0	0	-4	-8	-12	-12	-12			
	3600 mm	Branch area	$10\log(\text{branch duct mm}^2/\text{main duct mm}^2)$	-3	-3	-3	-3	-3	-3	-3			
		Silencer attenuation (1)	PVCSIL-1500	-5	-6	-16	-20	-32	-47	-35			
		Att due to end reflection	125 mm end reflection	-17	-12	-8	-4	-1	0	0			
		Louvre attenuation	no acoustic louvre or n/a	0	0	0	0	0	0	0			
		Sound power - SUPPLY		42.6	43.7	41.9	27.2	0.5	-25.4	-15.9	47.6		
L_w		Sound Power Level of unit	Sentinel Kinetic High Flow w/ Acoustic Solution - 100% L_w in	69.6	62.5	67.3	56.2	41.7	37.0	28.1	72.2		
	4.679 m	Duct Length in metres	Rectangular 150 x 150	-3.0	-3.0	-2.3	-1.6	-1.6	-1.6	-1.6			
	2	Number of bends	150mm round bend	0	0	-2	-4	-6	-6	-6			
	3600 mm	Branch area	$10\log(\text{branch duct mm}^2/\text{main duct mm}^2)$	-3	-3	-3	-3	-3	-3	-3			
		Silencer attenuation (1)	PVCSIL-1500	-5	-6	-16	-20	-32	-47	-35			
		Att due to end reflection	125 mm end reflection	-17	-12	-8	-4	-1	0	0			
		Louvre attenuation	no acoustic louvre or n/a	0	0	0	0	0	0	0			
		Sound power - EXTRACT		41.5	38.4	36.0	23.6	-1.9	-20.6	-17.5	44.1		
		Sound power in room		45.1	44.8	42.9	28.7	2.4	-19.4	-13.6	49.2		
		A weighting	yes	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0			
R_c		Room Constant	$R_c = A / [1 - (A/S)]$	-9.63	-11.26	-12.57	-13.33	-13.33	-12.96	-12.96			
	6	Numerical correction	$SPL = SWL - 10\log R_c + 6$ (Eq 5.5 Woods)	6.00	6.00	6.00	6.00	6.00	6.00	6.00			
		SPL(A) at NSR	$L_{pA,NSR}$	15.3	23.5	27.7	18.2	0.0	0.0	0.0	29.6	dB	



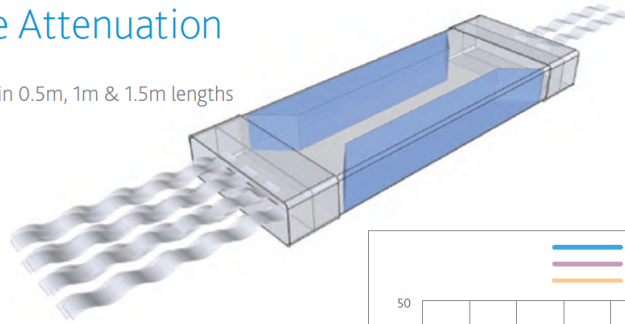
A3.3 External – extract

Honor Street, Longsight		Duct Calculation	External extract	Octave band centre frequency								Total level
Term	Quantity	Description	Details	63	125	250	500	1000	2000	4000		
L_w		Sound Power Level of unit	Sentinel Kinetic High Flow w/ Acoustic Solution - 100% L_w out	73.0	70.1	77.1	65.1	51.4	39.5	37.0	79.3	
	2 m	Duct Length in metres	Round 100 – 300	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.0		
	1	Number of bends	150mm round bend	0	0	-1	-2	-3	-3	-3		
	mm	Branch area	$10\log(\text{branch+duct mm}^2/\text{duct mm}^2)$	0	0	0	0	0	0	0		
		Silencer attenuation (1)	PVCSIL-1500	-5	-6	-16	-20	-32	-47	-35		
		Silencer attenuation (1)	no silencer or n/a	0	0	0	0	0	0	0		
		Att due to end reflection	125 mm end reflection	-17	-12	-8	-4	-1	0	0		
		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		
		Sound power at termination	A weighted	24.6	35.8	43.3	35.9	15.4	-9.3	0.0	44.7	
r	9 m	Distance attenuation	$20*\log_{10}(r)$	-19.1	-19.1	-19.1	-19.1	-19.1	-19.1	-19.1		
Q	1	Reflections - additional surface(s)?	0 surfaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
DI		Directivity - area of and angle from grille	0.05m ² @ 80° - 0 surface	0	-1	-2	-4	-4	-7	-7		
	-11	Numerical correction	$SPL = SWL - 20\log(r) + DI(\theta) - 11$	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00		
	3	façade correction	yes	3.00	3.00	3.00	3.00	3.00	3.00	3.00		
		SPL(A) at NSR	$L_{pA,NSR}$	0.0	7.7	14.2	4.8	0.0	0.0	0.0	15.9	dB



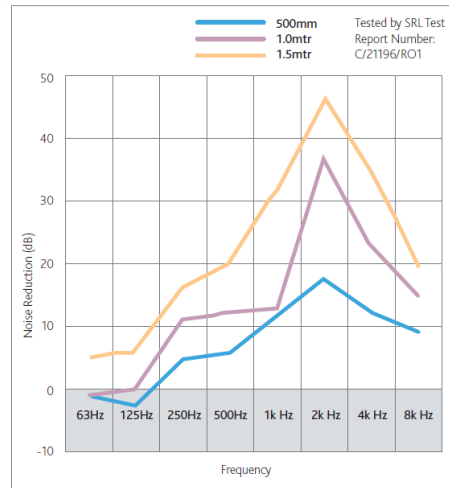
Inline Attenuation

Available in 0.5m, 1m & 1.5m lengths



Features

- Regulation driven to reduce duct noise for designers "Domestic Compliance Guide 2010" & noise requirements Part F 2010
- Corrosion Proof - Lightweight PVC removes the risk of corrosion
- Reduce cross talk room to room noise
- Prevents noise ingress for inner city development
- Space Saving - Slim line low profile design for integration within your ducting system



PRODUCT RANGE

Silencer Code	Description	Width	Length	Height
PVCSIL-500	System 204 Duct Silencer x 500mm	204mm	580mm	65mm
PVCSIL-1000	System 204 Duct Silencer x 1.0mtr	204mm	1080mm	65mm
PVCSIL-1500	System 204 Duct Silencer x 1.5mtr	204mm	1580mm	65mm

THE LEVEL OF SOUND ABSORPTION

Silencer Length	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
500mm	-3	5	6	12	18	12	9
1.0mtr	0	11	12	13	37	23	15
1.5mtr	6	16	20	32	47	35	20

STATIC PRESSURE DROP IN PASCALS (PA) VERSUS FLOW RATE (L/S)

Approximate l/s		15	30	60	90	120	150
PVCSIL-500	pa	10.5	18.5	100	213	371	576
PVCSIL-1000	pa	10.4	17.2	107	234	373	578
PVCSIL-1500	pa	8.2	23.5	107	230	412	595

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