



BRAIDEN ACOUSTICS LTD

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

NOISE IMPACT ASSESSMENT

Prepared For : Mr. Shakeel Ahmed

Date : 5 Sep 2022

Site : 105 - 107 Wilmslow Road, Rusholme

Report No. : 11047revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by Mr. Shakeel Ahmed to undertake an acoustic survey at the site of the 105 - 107 Wilmslow Road, Rusholme in order to support planning permission 126902/FO/2020 which proposes:

Erection of a two storey building to form ground floor retail shop (Use Class A1), basement storage space, office (Use Class B1) at first floor together with 1 no. self-contained flat following demolition of the existing building

The pertinent noise conditions are as follows:

8) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Wilmslow Road 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. 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 to determine the appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:

- *Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events shall not 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*

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 ensure compliance with the internal noise criteria.

Reason - To secure a reduction in noise in order to protect future residents from noise nuisance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.

9) 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 (L Aeq) below the typical background (L A90) level at the nearest noise sensitive location.

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Acoustic Consultant

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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 approved scheme shall be completed before the premises is occupied.

Upon completion of the development 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 report. The report shall also undertake post completion testing to confirm that the noise criteria has been met. Any instances of nonconformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy.

11) The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 10dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB respectively.

Upon completion of the development 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 acceptable criteria has 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.

Reason - To safeguard the amenities of the occupiers of the building and occupiers of nearby properties pursuant to policies SP1, H1 and DM1 of the Core Strategy.

The three noise conditions can be summarised as follows:

- Noise break-in to the accommodation from environmental noise, for example, road traffic noise from Wilmslow Rd,
- Noise from external plant,
- Breakout noise from the shop.

For all conditions, there will need to be follow-up noise assessments once the works have been completed, in the form of a verification study and report.

1.1 AIM

This report assesses potential noise impact on the proposed residential dwelling, focussing on the issues raised in the above conditions, so that they can be discharged.

2 **DESCRIPTION OF SITE**

The application site is currently occupied by a part two single, part two storey building; one half of which is occupied at the ground floor by a jewellers shop with office and storage space above and the other half by a hot food take-away with a self-contained two bedroomed flat above.





Figure 1
Proposed site street view

2.1 SITE LOCATION AND SURROUNDING AREA

The site sits at the junction of Wilmslow Road and Walmer Street East. The building is adjoined to the north by a two storey double fronted retail unit and on the opposite side of Walmer Street East there is a two-storey restaurant. The junction of Wilmslow Road with Walmer Street sits to the west either side of which are commercial properties. A two-storey restaurant sits immediately behind the site to the east, separate from the application side by a narrow alleyway to the rear.

2.1.1 Nearest sensitive receptor

The nearest sensitive receiver (NSR) is the proposed residential apartment on the first floor.

2.2 PROPOSED USE

The application seeks planning permission for the demolition of the existing building and its subsequent replacement with a two-storey building to accommodate a retail unit with ancillary office accommodation and store rooms at ground floor, and a basement storage area.

The first floor will be separated into two with one half providing further storage space, kitchen and W.C. facilities and office accommodation for the ground floor retail unit and the other half will comprise a one bedroom self-contained flat with access from Walmer Street East.

The proposed layout is shown below.



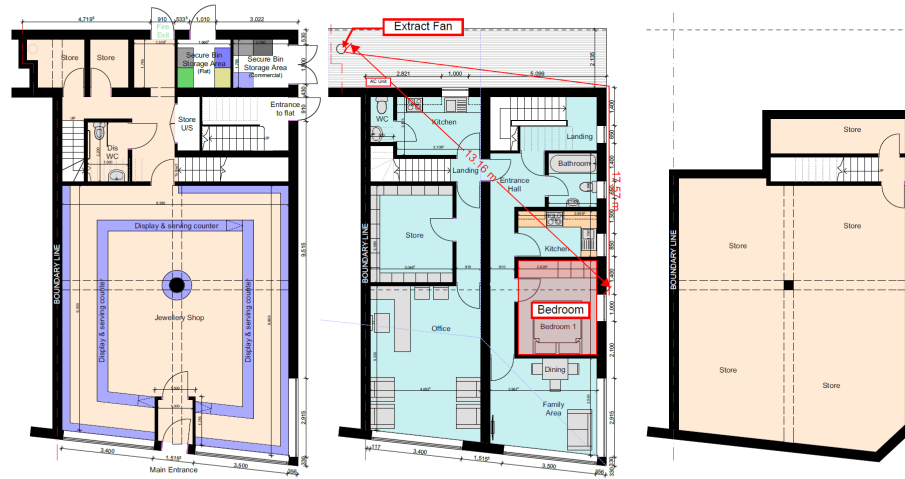


Figure 2
Proposed floor layouts

2.2.1 Building services

The external plant will comprise of an extract fan for melting gold etc. and a condenser unit for air conditioning.

Both of these mechanical services will only operate when the jewellers is open.

2.2.1.1 Extract ventilation

The specification is as follows:

The canopy is 1200mm x1200mm x400mm and is constructed out of stainless steel with 2 baffle type grease filters, these filters offer a Pascal resistance of 125. The canopy needs to extract 0.576m³/s. to achieve this we would recommend Fläkt Woods short case fan motor; this fan is 315 mm through a Pascal resistance of 100 and would achieve a face velocity of approx. 1.2 m/s.

The attenuators we use are 1DENP before and 2DENP after the fan.

The extract fan is as follows:

ESC40014 Short cased axial flow extract fan also known as ZAC400-41

<https://www.nfan.co.uk/store/p/esc40014>

The extract duct will penetrate the first floor flat roof at the rear, with the silencers and fan in the vertical ductwork and then continue vertically to the cowl that terminates at 1m above the roof eaves.





Figure 3
Proposed first floor showing bedroom in relation to extract duct and AC condenser unit

2.2.1.2 Condenser unit

There is likely to have 1no. air conditioning unit within the shop with a corresponding condenser unit to be installed to the rear on the flat roof near to the extract duct.

Exact details of the AC condenser unit are not yet known; nevertheless, a nominal and typical condenser unit for the size of property is the following:

Samsung AC90MXAD*H



Figure 4
Nominal AC condenser unit

The sound power details of the above unit have been used to determine the noise levels at the nearest sensitive receiver.



The AC condenser unit will be located on the flat roof to the rear, near to the extract duct, as depicted in Figure 4.

2.2.2 Opening hours

Condition 5 of the planning permission states that the permitted opening hours are:

9.00am to 9.00pm seven days a week

3 ACOUSTIC CRITERIA AND METHODOLOGY

Potential mitigation measures are determined by recommended indoor noise levels from BS 8233 “Sound insulation and noise reduction for buildings” [i] 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 daytime – 0700-2300 hrs.

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 180 of the revised NPPF states:

180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Paragraph 180 refers to the Noise Policy Statement for England which shall be briefly discussed in the next Section.

3.2 NOISE POLICY STATEMENT FOR ENGLAND

The main aim of the Noise Policy Statement is to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Therefore, the NPSE is mainly concerned with environmental noise.

The document sets out categories in order to help distinguish if there is an adverse effect due to noise and if there is, how significant it is.

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur



It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

3.3 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [ii] 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).

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [iii]. 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 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.

3.4.1 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.

3.4.2 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.



3.5 COUNCIL CRITERIA

3.5.1 Residential noise levels

The noise criteria from condition 8 are as follows:

- 35dB LAeq (16hr) from 0700 to 2300 within living rooms
- 30dB LAeq (8hr) from 2300 to 0700 within bedrooms
- 45dB LAFmax (individual noise events shall not exceed 45 dB LAmax,F by more than 15 times) within bedrooms
- 50dB LAeq (16hr) from 0700 to 2300 for outdoor living areas

3.5.2 Industrial noise levels

The noise criterion from condition 9 are as follows:

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 (L Aeq) below the typical background (L A90) level at the nearest noise sensitive location.

4 MONITORING DETAILS

4.1 SITE VISIT 1 – FRONT

4.1.1 Monitoring details

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

Weather: 6-13°C temperature; ~5ms⁻¹ wind; ~20-40% cloud;

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

Date: Friday 6th May 2022.

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

Monitoring was unmanned with audio recorded.

4.1.2 Monitoring locations

Monitoring took place one metre from a first-floor window on the corner of Walmer Street and Wilmslow Road.



4.1.3 Results

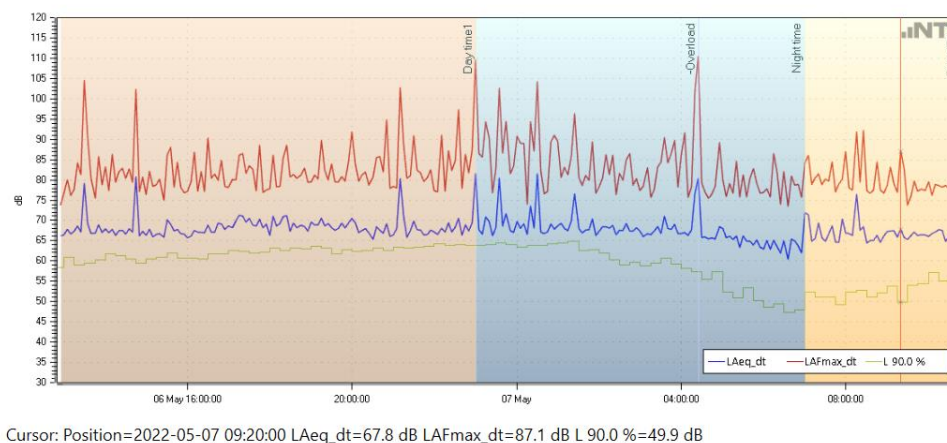


Figure 5
Time history at location 1

The lowest background level, when the shop would be open, is 49.9 dB L_{A90} .

Day	Time Start	Time Finish	Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
Fri 06/05/22	12:52	23:00	10:07:38	day	61.9	70.1	104.2
1	23:00	07:00	08:00	night	55.4	69.6	109.6
	07:00	10:44	3:44:46	day	52.5	67.6	92.2

Table 2
Summary of noise monitoring results –FRONT

The noise levels were high as Rusholme is a busy area with late night restaurants.

The overall free field¹ noise levels are as follows:

$$L_{Aeq}(\text{night}) \quad 70 - 3 = 67 \text{ dB(A)}$$

$$L_{Aeq}(\text{day}) \quad 69 - 3 = 66 \text{ dB(A)}$$

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 8223:1999.

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.

¹ a 3 dB correction was made for façade monitoring.



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 no distance correction applied as the monitoring locations were representative of the location proposed residential dwellings.

5.1.3 Barrier effect

There is no barrier correction due to direct line of sight to the noise sources.

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.

The same noise levels are applied to both the side and front elevations, as a worst-case methodology.

Façade	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L_{Aeq} (dB)	L_{Amax} (dB)	L_{Aeq} (dB)	L_{Amax} (dB)	SRI ($R_w + C_{tr}$)	Example Spec ²
FRONT / SIDE	night	bedroom	67		30		37	10 / 16 argon / 8.8 mm Pilkington Optiphon™
	day	lounge	66		35		31	10 / (6 - 16) / 6 mm

Table 3
Calculated SRI values and recommended glazing

All habitable rooms, especially bedrooms, will require the minimum sound reduction indices:

Bedrooms 37 dB $R_w + C_{tr}$.

Living rooms 31 dB $R_w + C_{tr}$.

5.1.5 Ventilation

Due to the high noise levels there will need to be alternative ventilation.

5.1.5.1 Mechanical acoustic vent

The Sonair by Titon is a mechanical acoustic vent.

The brochure (see Appendix) states:

Sonair provides mechanical input ventilation when switched on, when switched off provides background trickle ventilation which includes a controllable shutter.

² Example glazing build up and performance from Pilkington – table in Appendix. Other glazing build-ups available.





Figure 6
In-situ Titon Sonair acoustic vent

The Sonair unit provides a minimum sound reduction index of 50 dB $D_{n,e,w} + C_{tr}$ – this is clearly achieving the minimum required of 37 dB.

The unit can also clean the air via filters. More details can be found at:

https://www.titon.com/uk/products/ventilation-systems/supply_ventilation/sonair/

This unit should be installed in all habitable rooms.

5.2 BS4142 ASSESSMENT

5.2.1 Condenser unit(s)

The typical AC condenser unit has been assessed against Bs4142 criteria with a summary below.

BS 4142 Noise Assessment AC CONDENSER UNIT	Value	dB
Total Specific Noise Level @ NSR		28
BS 4141		
Tonality	0/2/4/4	0
Impulsivity	0/3/6/9	0
Intermittency	0/3	31
Rating Noise Level		31
LAF90_day		50
Rating minus Background		-19
Target Met?		✓

Table 4
BS4142 assessment – Extract

The BS4142 assessment shows that the Rating Level of the condenser unit, at the nearest resident, is a 19dB less than the background and hence well within acceptable limits.



5.2.2 Extract fan

Duct noise calculations have included the fans' sound power level, type and length of duct, bends, attenuators and end reflection.

Noise propagation has taken account for distance and barrier attenuation due to any shielding, where appropriate.

The assessment location is the nearest residential window to the extract fan. It must be noted that the nearest habitable window is on the side elevation and the extract fan is on the rear elevation.

Full noise propagation calculations are shown in the Appendix.

BS 4142 Noise Assessment EXTRACT	Value	dB
Total Specific Noise Level @ NSR		11
BS 4141		
Tonality	0/2/4/4	0
Impulsivity	0/3/6/9	0
Intermittency	0/3	3
Rating Noise Level		14
LAF90_day		50
Rating minus Background		-36
Target Met?		✓

Table 5
BS4142 assessment – Extract

The BS4142 assessment shows that the Rating Level of the extract duct, at the nearest resident, is a 36 dB less than the background and hence well within acceptable limits.

5.3 INTERNAL NOISE TRANSFER

5.3.1 Ground to First Floor

As the ground floor unit is only A1 retail, then there will only be a modest amount of noise generated in the commercial space. However, the separating floor will need to past Building Regulations Part E due to the first floor flat above.

The proposed floor build up is as follows:

- 30mm Karma Masspanel (18mm sanded cement bonded particle board with 12 mm wood fibre integral resilient layer) on
- 18mm T&G chipboard or plywood deck
- 200mm joists with 150mm acoustic mineral wool insulation between joists.
- The ceiling to the underside consists of 2 layers of 15mm Soundbloc on resilient bars.

Details of the Karma Masspanel product are given in the Appendix. More details can be found at:

<https://www.cmsdanskin.co.uk/refurbishment-noisy-neighbours/floors/karma-masspanel-with-tnf-70-fire-retardant-slab/>



6 CONCLUSION

An acoustic survey has taken place at the 105 - 107 Wilmslow Road, Rusholme to discharge noise conditions relating to a planning application for the erection of a new building with A1 retails at ground floor and storage and a flat on first floor level.

Condition 8 – Noise break-in to residential accommodation

The assessment has recommended the following mitigation:

- Bedroom windows 10 / 16 argon / 8.8 mm Pilkington Optiphon™
- Living room windows 10 / (6 - 16) / 6 mm
- All habitable rooms The Sonair mechanical acoustic vent by Titon.

Condition 9 – Noise from external plant

Only details of the extract ventilation systems are known at the time of writing. However, a typical AC condenser unit has been proposed and assessed

- No additional mitigation is required for the extract ventilation system.
- No additional mitigation is required for the AC condenser unit.

Condition 11 – Noise breakout from the retail unit

As the ground floor is proposed to be a retail unit, then there will be no issues of noise breakout. However, to be prudent, the following floor building up is recommended.

- 30mm Karma Masspanel (18mm sanded cement bonded particle board with 12 mm wood fibre integral resilient layer) on
- 18mm T&G chipboard or plywood deck
- 200mm joists with 150mm acoustic mineral wool insulation between joists.
- The ceiling to the underside consists of 2 layers of 15mm Soundbloc on resilient bars.

Pending the recommendations above, condition 8, 9 & 11 can be partly discharged.

7 REFERENCES

[i] BS8233: 2014

Sound Insulation and noise reduction for buildings – Code of Practice,
British Standards Institute, 2014.

[ii] BS 4142: 1997

Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.

[iii] BS 4142: 2014

Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.



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.							



KARMA Acoustic MassPanel

Karma Acoustic MassPanel is a high performance acoustic floor panel with an exceptional performance to height ratio.

Comprising an 18mm tongued and grooved cement bonded particle board laminated to a 12mm woodfibre resilient layer, Karma Acoustic MassPanel provides excellent impact and airborne sound insulation in a single product. It can be used on an existing floor or directly to joists making it an ideal product for refurbishment projects.



KARMA ACOUSTIC MASSPANEL (SITE TESTED BY INDEPENDENT UKAS ACCREDITED ACOUSTIC CONSULTANT)	IMPACT SOUND Ln1,w	AIRBORNE SOUND DnT,w+Ctr
Laid on 15mm OSB deck, on 235mm I joists with 100mm quilt (minimum of 10kg/m ²) between joists. With a ceiling of Resilient Bar and 2 layers of 15mm Sound Plasterboard	56 dB	60 (-7) dB

Acoustic Performance: Acoustic Test No. - RMP No R-5775-MR-CS

Dimensions

Panel Size	1200 x 600 x 30mm	Edge Detail	T&G4
Floor Coverage	1200 x 600 (0.72m ²)	Weight	20kg

Benefits

- Excellent impact and airborne sound performance
- Can be used with any floor finish
- Non load bearing partitions can be built off the finished floor surface
- Can be used on existing subfloors or direct to joist
- Fire rating of top layer – Class 1 surface spread of flame to BS 476

Typical Applications

- Refurbishment projects
- Improving existing structures where access is only available from above
- When height restrictions exist but reliable performance is still required

For further information and sales enquiries please call: 0870 950 9992



www.karma-acoustics.co.uk

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A3 EXTRACT DUCT CALCULATION

105 - 107 Wilmslow Road		Duct Calculation	Kitchen Extract	Octave band centre frequency							
Item	Quantity	Description	Details	63	125	250	500	1000	2000	4000	Total level
1a		Sound Pressure Level @ Xm	SWL data used	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1b		Sound Power Level of unit	ZAC400-41, Lw out	70.0	72.0	67.0	66.0	65.0	65.0	64.0	76.4
2		PLENUM Insetion Loss	no								
4	0	Number of bends	500mm round bend	0	0	0	0	0	0	0	
3	2 m	Duct Length in metres	Rectangular 600 x 600	-1.3	-1.3	-0.7	-0.3	-0.3	-0.3	-0.3	
5	mm	Branch area	10log(branch mm2/duct mm2)	0	0	0	0	0	0	0	
6		Silencer attenuation (1)	2DENP (315-560mm dia) 2D no po	-4	-8	-12	-17	-23	-17	-12	
7		Silencer attenuation (2)	no silencer or n/a	0	0	0	0	0	0	0	
7		Silencer attenuation (2)	no silencer or n/a	0	0	0	0	0	0	0	
8		Att due to end reflection	500 mm end reflection	-8	-4	-1	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 power at termination		56.7	58.7	53.3	48.7	41.7	47.7	51.7	62.4
11	Q 1	Directivity**	0 surfaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
12	15 m	Distance Attenuation	20*log10(r)	-23.52	-23.52	-23.52	-23.52	-23.52	-23.52	-23.52	
		Air absorption	15°C; 80% humidity	0.00	0.00	-0.02	-0.04	-0.06	-0.12	-0.36	
		Numerical correction	SPL = SWL - 20log(r) +DI - 11	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00	
	δ 4.41	Barrier	yes	-15.5	-18.3	-21.2	-24.1	-27.1	-30.1	-33.1	
		SPL(A) at NSR	Lp,NSR	6.7	5.9	0.0	0.0	0.0	0.0	0.0	11.3 dB

A4 PILKINGTON GLAZING

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						R _w (C; C _e)	R _w	R _w + C	R _w + C _e
	125	250	500	1000	2000	4000				
Single glazing										
6.8 mm Pilkington Optiphon™	22	26	31	37	40	40	36 (-1; -4)	36	35	32
8.8 mm Pilkington Optiphon™	27	29	34	38	40	43	37 (0; -2)	37	37	35
10.8 mm Pilkington Optiphon™	26	30	35	39	40	46	38 (-1; -3)	38	37	35
12.8 mm Pilkington Optiphon™	29	32	36	41	42	51	40 (-1; -3)	40	39	37
16.8 mm Pilkington Optiphon™	31	33	38	41	43	54	41 (-1; -3)	41	40	38
Insulating glass units										
6 mm / 16 mm argon / 6.8 mm Pilkington Optiphon™	21	28	37	48	48	54	40 (-2; -6)	40	38	34
6 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	25	27	38	48	47	55	41 (-2; -6)	41	39	35
8 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	21	30	39	47	50	55	42 (-3; -8)	42	39	34
10 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™	28	31	42	45	50	58	44 (-2; -6)	44	42	38
10 mm / 20 mm argon / 8.8 mm Pilkington Optiphon™	28	36	43	47	49	58	46 (-2; -6)	46	44	40
8.8 mm Pilkington Optiphon™ / 16 mm argon / 12.8 mm Pilkington Optiphon™	28	36	45	53	56	64	48 (-2; -7)	48	46	41
10.8 mm Pilkington Optiphon™ / 24 mm argon / 16.8 mm Pilkington Optiphon™	35	41	48	53	55	65	52 (-2; -6)	52	50	46
12.8 mm Pilkington Optiphon™ / 20 mm argon / 16.8 mm Pilkington Optiphon™	35	45	49	50	54	65	51 (-1; -4)	51	50	47



Sonair
Acoustic (sound attenuating) filtered air supply units



For use fitted through walls

Sonair provides mechanical input ventilation when switched on, when switched off provides background trickle ventilation which includes a controllable shutter.

Sonair is a wall mounted input fan featuring touch control with an LCD display.

- Sonair F+ ventilates and cleans the air
- Independently tested by the BRE
- Exceptional sound attenuation (up to 56dB*)
- Air cleaning
- Low energy



Features & Benefits

- Meets guidelines for occupant accessibility
- Increase occupant awareness of system operation
- Discreet design
- Supplied with a flexible cable and a 13 amp plug

Performance

Full test details available on request
Input airflow rate (m³/h) – 28-225

Acoustic D_{n,e,w} (*/.) – 55/56* (Sonair F+).

*depends on filter

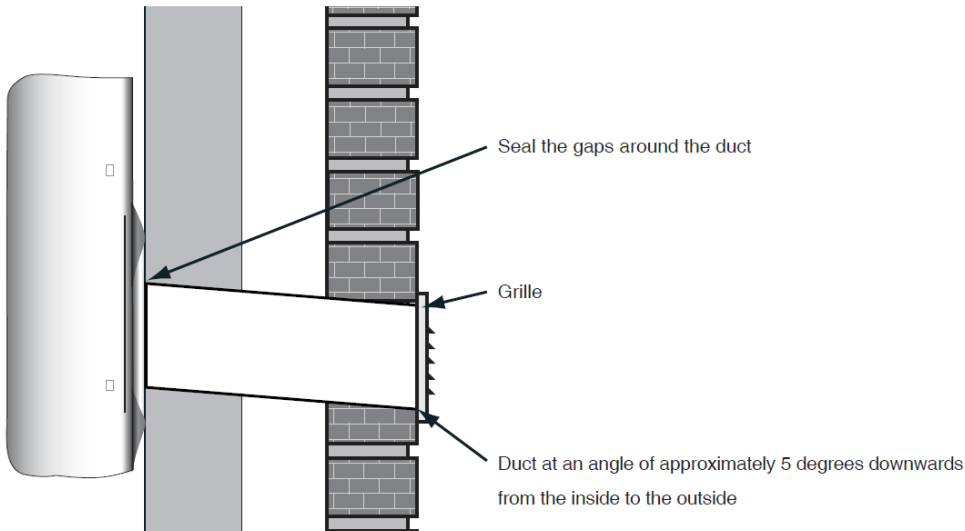
Tested to the 'Noise Insulation Regulations'.

Background ventilation rate of 2500EA when the unit is switched off and the shutter is open.

Product	Product Code
Sonair F+ including G3 Filter	S103SAUK
Sonair Filter G3	F211
Sonair Filter F6	F209



Installation



Acoustics

Acoustics is becoming a more important factor in more densely populated areas, therefore the requirement for sound attenuating ventilators has increased. As standard/acoustic trickle ventilators cannot provide the attenuation levels necessary, more sophisticated solutions are required. The Sonair achieves acceptable noise reducing levels.

Sound Production

Sound pressure level, LpA; 10 m² according to ISO 3741

Capacity	Sonair F+	
	G3 Filter	F6 Filter
30 m ³ /h	<11.5	<19
45 m ³ /h	<18.5	27
60 m ³ /h	23.5	33
90 m ³ /h	34	41.5
140 m ³ /h	43.5	51.5
Sound Attenuation according to ISO 140-10		
D _{1,0,10} , dB (A)	56	55

Independently tested to requirements of noise insulation regulations.

Dimensions

445 (H) x 310 (W) x 134 (D)

Housing

Plastic ABS white RAL 9003

Voltage

220-240V/50 Hz

Energy Consumption

Max. 13 Watt at 17 l/s (60 m³/hour)
Max. 43 Watt at 62.5 l/s (225 m³/hour)

Ventilation Capacity

Max. 62.5 l/s (225 m³/hour) with a G3 filter

Duct

100 mm (standard)

More information

www.titon.com or 01206 814879



A6 EXTRACT FAN DATA

Acoustic Information

	63	125	250	500	1k	2k	4k	8k	Total	dB(A)@3m
Inlet	70	72	67	66	65	65	64	56	76	56
Outlet	70	72	67	66	65	65	64	56	76	56
Breakout	-	-	-	-	-	-	-	-	-	-

Sound Power Level Spectra dB (re 10^{-12} Watts) shown @ free air.

Electrical Information

Watts	290
Supply Voltage	220-240V/1/50Hz
Full Load Current	1.45 A
Starting Current	2.4 A
Starting Method	D.O.L
Motor Poles	4
Insulation	F
Motor IP Rating	IP54
Speed Controllable	Yes

