



BRAIDEN ACOUSTICS LTD

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

NOISE IMPACT ASSESSMENT

Prepared For : Siddiq Horia Kheil

Date : 13 Jun 2024

Site : 251 Charlestown Road, Blackley

Report No. : 11242revB

1 INTRODUCTION

Braiden Acoustics has been commissioned by Siddiq Horia Kheil to undertake an acoustic survey at the site of the 251 Charlestown Road, Blackley in order to support planning permission 138572/FO/2023 which proposes:

Change of use of ground floor to laundrette (sui generis)

Planning permission was granted on 29 February 2024 with Conditions. The relevant noise Conditions are:

6) a) Any externally mounted ancillary plant, equipment and servicing to be installed shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to its installation, 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.

b) Prior to any externally mounted ancillary plant, equipment and servicing to be installed becoming operational, an approved verification report shall be submitted to and approved in writing by the City Council as Local Planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non - conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site, pursuant to saved policy DC26 of the Unitary Development Plan for the City of Manchester and policies DM1 and SP1 of the Manchester Core Strategy.

7) a) Notwithstanding details submitted, the premises shall be acoustically insulated and treated to limit the breakout of noise and noise transfer to the residential above the site in accordance with an updated 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.

b) Prior to occupation 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 have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of the building and occupiers of nearby properties.



Reason - To safeguard the amenities of the occupiers of nearby accommodation, pursuant to saved policy DC26 of the Unitary Development Plan for the City of Manchester and policies SP1 and DM1 of the Core Strategy. An updated assessment is required once the type and number of equipment has been selected the revised assessment will need to provide the cumulative noise level of all the equipment in operation and include breakout with doors open (if required for ventilation purposes). An update with regard to internal acoustic insulation measures will also be required.

Condition 6 deals with noise from external plant.

Condition 7 deals with noise break out.

1.1 AIM

This report will assess noise transmission via the separating floor as well as noise from external plant.

2 DESCRIPTION OF SITE

The proposed site is the ground floor of a two-storey semi-detached property that is part of a wider commercial parade.

The ground floor has been in commercial use with current residential use at first floor.



Figure 1
Proposed site street view

2.1 SITE LOCATION AND SURROUNDING AREA

The site is bounded by convenience store directly to the north, an access road to the east and west. Directly to the south is a parcel of green space, beyond which, is Charlestown Road.

To the north west are more commercial units at ground floor, with the rest of the surrounding area being predominantly residential.





Figure 2
Site and surrounding uses

2.1.1 Nearest sensitive receptor

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

2.2 PROPOSED USE

The application seeks to change the use of the ground floor into a laundrette, as shown in Figure 3.

The exact machines and any potential extract system(s) are not yet known. However, the following are likely to be installed;

- 6no. JLA 30 Tumble Dryers
- 5no. JLA Washing Machines
 - 2 x T20
 - 1 x T30
 - 2 x T40

The rear of the six dryers will connect to an extract ducted system and vent to the rear¹, as shown in the figure below.

¹ Due to on-site issues, the design has been changed so that the common extract duct now vents via a 450mm grille in the gable wall.



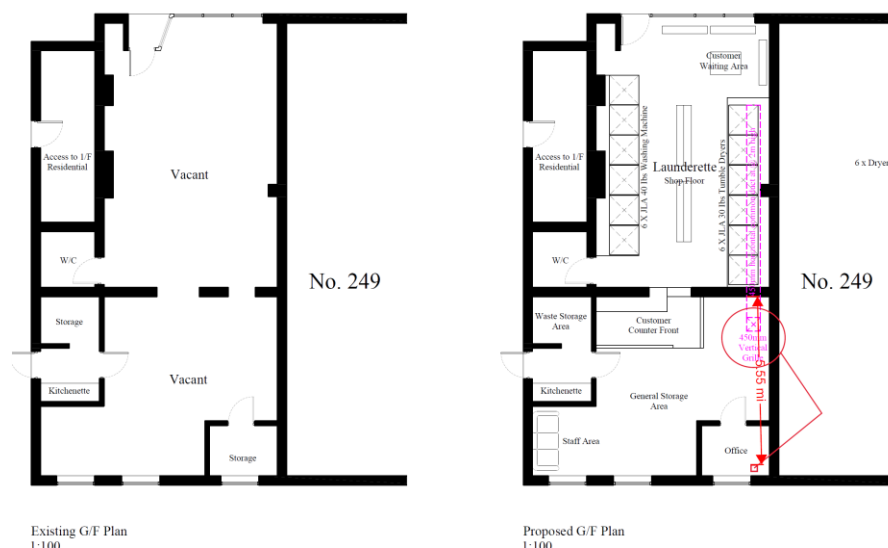


Figure 3
Plan drawing showing the existing and proposed layout

2.2.1 Building services

There will be a ducted extract system. The extract fan has not been nominated yet but the ductwork will be 450mm in diameter.

2.2.2 Opening hours

Monday to Saturday	09:00 – 18:00
Sunday	09:00 – 16:00

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:

- 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.*
- 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*
- 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 L_{Aeq} (16hr) from 0700 to 2300 within living rooms
- 30dB L_{Aeq} (8hr) from 2300 to 0700 within bedrooms
- 45dB L_{AFmax} (individual noise events shall not exceed 45 dB $L_{Amax,F}$ by more than 15 times) within bedrooms
- 50dB L_{Aeq} (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

4.1.1 Monitoring details

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

Weather: 8°C temperature; ~5ms⁻¹ wind; ~20-40% cloud;

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

Date: Sunday 17th December 2023.

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 location

The microphone was 1.2m from ground at 3.5m from the southern elevation.

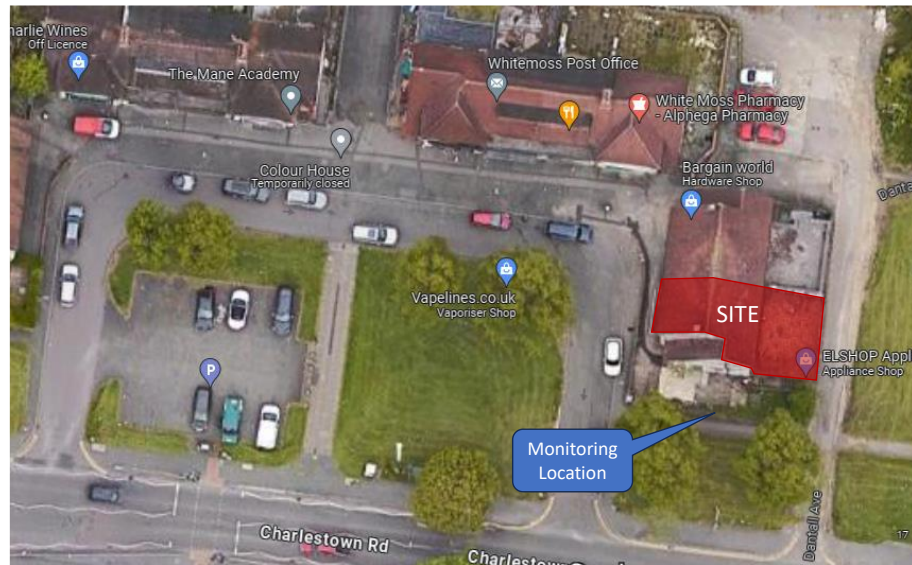


Figure 4
Site location showing monitoring location

4.1.3 Monitoring results

Noise levels were measured continuously for 15 minutes during a quiet time of the week when the site would be open – Sunday morning.

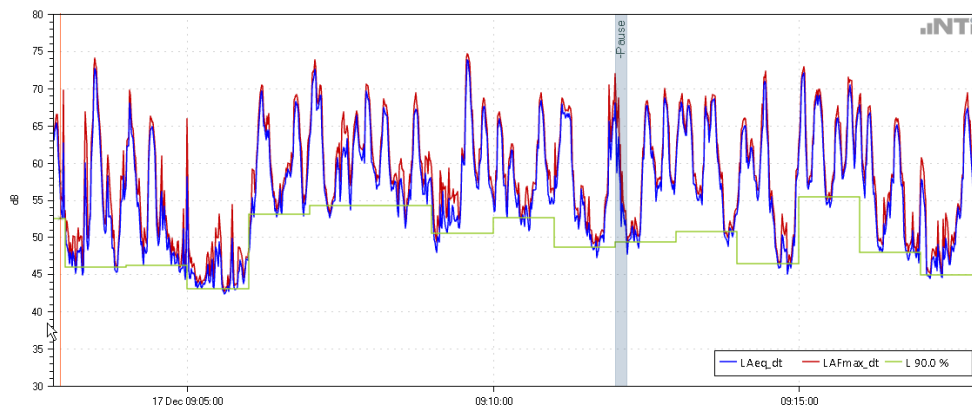


Figure 5
Time history

Noise levels in the area were relatively quiet. The only noise source of note was passing vehicles on Charlestown Road.

The typical Background Noise Level when the laundrette would be open is 43.4 dB L_{A90} .



Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
Start	Finish					
09:02:48	09:17:58	00:15:10	day	46.6	61.7	74.6

Table 2
Summary of noise monitoring results

5 ACOUSTIC ASSESSMENT

5.1 EXTERNAL PLANT

The current details of any external plant have yet to be finalised, although the basic design is shown in Figure 3.

The ductwork is 450mm, therefore, a 450mm diameter fan will be suggested here.

***NB The extract fan needs to be checked with a ventilation engineer.**

The combined Rating Level of any such equipment should not exceed 5 dB below the Background Noise Level. Therefore, the target Rating Level, at the nearest habitable room, is 41 dB(A).

A new acoustic fan could be the Helios Gigabox GBD 450/4/4. The new fan will sit internally within the horizontal section of the extract duct.

5.1.1 BS4142 assessment

The ventilation fan shall be assessed and compared to the Background Noise Level via a BS 4142 assessment.

5.1.1.1 Calculation method

Sound power levels are calculated at the termination of the ventilation duct run taking into account the following:

- sound power of the fan,
- length of type of duct (rectangular or circular),
- silencer insertion loss,
- bends,
- end reflection.

Once the sound power at the duct termination has been determined then the sound pressure at the nearest residential window is calculation using the following:

- directivity from cowl (duct termination),
- distance attenuation,
- air absorption,
- sound power to pressure numerical correction,
- barrier attenuation (where applicable).

The Specific Noise Level is calculated for duct noise.





Figure 6
Rear elevation showing kitchen extract cowl

The nearest habitable room with direct line of sight to the cowl is west just over 5m away, as shown in Figure 7.

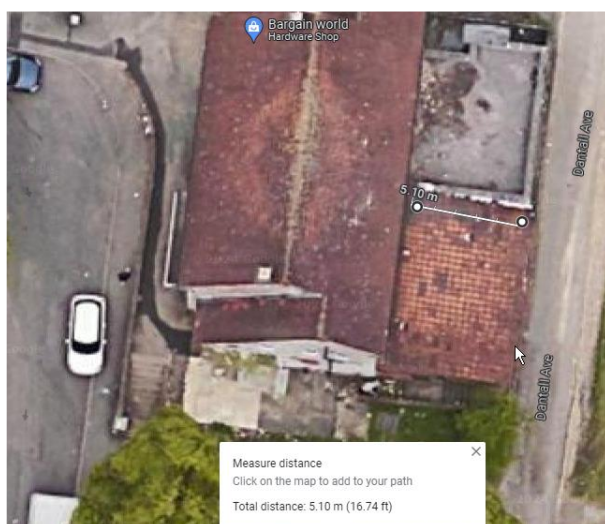


Figure 7
Distance from duct to nearest habitable room

5.1.2 Results

The Specific Noise Level (SNL) at the Nearest Sensitive Receiver (NSR) has been calculated using octave band frequencies with the full calculations shown in the Appendix. Once the SNL is known, this is used as the basis for the BS4142 assessment.



5.1.2.1 Duct termination

BS 4142 Noise Assessment		
Kitchen Extract - Duct		
	Value	dB
Total Specific Noise Level @ NSR		25
BS 4141		
Tonality	0/2/4/4	0
Impulsivity	0/3/6/9	0
Intermittency	0/3	3
Rating Noise Level		27
Target Noise Level		41
Rating minus Background		✓

Table 3
BS4142 assessment duct borne noise

Table 3 shows that noise from the end of the duct will meet the -5dB criterion. However, mitigation is required to meet the criterion.

NB the silencer on the atmosphere side of the fan is the Acoustica R02 - 2 - 1500**

Details of the silencer are shown in the Appendix.

5.2 INTERNAL NOISE TRANSFER

5.2.1 Internal noise level in laundrette

Noise measurements were taken in a very similar laundrette with the same equipment and approximate six of the unit.

Internal noise measurements were made at 302 Platt Lane, Manchester.

5.2.1.1 Location

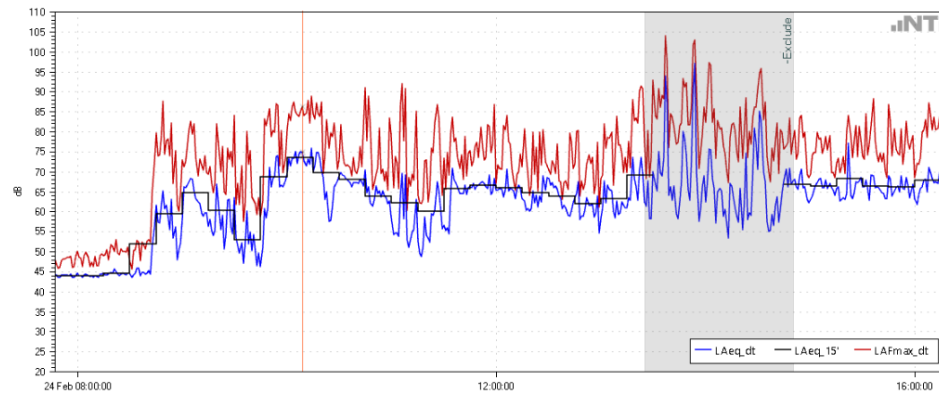
The microphone was placed in a location that was away from any nearby reflective surfaces as possible and about 0.7m from the side wall.

5.2.1.2 Results

Noise monitoring took place during a busy weekday.

The internal noise levels within the laundrette are shown in Figure 8.





Cursor: Position=2024-02-24 10:09:00 LAeq_dt=74.7 dB LAeq_15'=73.4 dB LAFmax_dt=86.1 dB

Figure 8
Internal time history – laundrette

The highest 15-minute noise level within the laundrette was:

73 dB(A).

5.2.2 Ground to First Floor

The existing separating floor is concrete that is assumed to be 150mm thick.

Using computer modelling software, the performance of the floor can be estimated.

It is advised that there should be the addition of an acoustic ceiling.

5.2.2.1 Proposed ceiling upgrade

It is proposed to remove with existing suspended ceiling to reveal the original ceiling. The original ceiling should be checked and 'made good/ where appropriate. Once made-good, there should be an independent ceiling underdrawn that conforms to Floor Treatment 1 in Approved Document E.

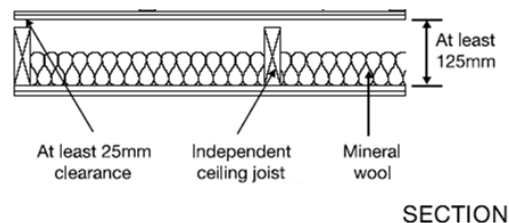


Figure 9
ADE Floor treatment 1 - Independent ceiling with absorbent material

The resistance to airborne and impact sound depends on the :

- the combined mass of the existing floor and the independent ceiling,
- the absorbent material,
- the isolation of the independent ceiling and
- the airtightness of the whole construction.

The construction of the separating floor is as follows:

- **make good original ceiling so that it is airtight;**



- the independent ceiling shall be supported by independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing ceiling.
 - If required, acoustic hangers can be used to support the independent ceiling from the soffit of the floor above.
- any supporting beams should sit within the cavity of the independent ceiling
- at least 2 layers of 15mm acoustic² plasterboard with staggered joints, minimum mass per unit area 20kg/m²;
- an absorbent layer of mineral wool laid on the ceiling , minimum thickness 100mm, minimum density of 10 kg/m³

NB The plasterboards attached to the underside of the independent ceiling should be below any beams, so that the beams are within the cavity of the independent ceiling. Please contact Braiden Acoustics for further information.**

There are several types of acoustic hangers, such as the Gypframe GAH2 Acoustic Hanger.

<https://www.british-gypsum.com/products/metal-products/gypframe-gah2-acoustic-hanger>

See above link for acoustic hangers.

For a concrete floor, it may be easier to fix timber batons to the underside of the concrete floor and then attach the acoustic hangers to the timber batons.



Figure 10
Acoustic hanger- Gypframe GAH2 Acoustic Hanger

For the acoustic insulation in the cavity, Isover APR 1200 is recommended. There should be a minimum of 100mm loosely laid in the cavity.

² Fireline board can also be used.





Figure 11
Isover APR1200 acoustic mineral wool

<https://www.british-gypsum.com/products/insulation-products/100mm-isover-acoustic-partition-roll-apr-1200>

The proposed overall floor / ceiling was modelled in the sound insulation software, insul.

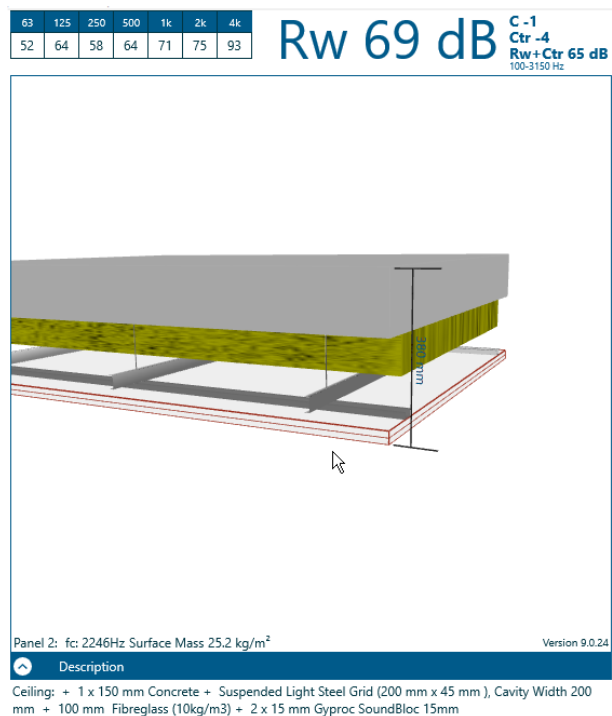


Figure 12
Acoustic modelling of proposed floor and ceiling

For services such as lights, smoke alarm etc. then there should be a sacrificial ceiling as shown below.



Sacrificial ceiling:
Metal ceiling system with a 100mm (min) void fixed to underside of primary ceiling. One layer of nominal 8kg/m² gypsum based board.

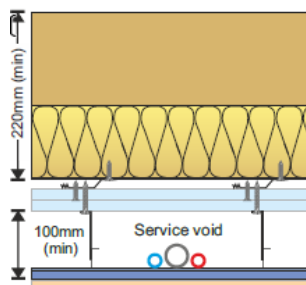


Figure 13
Typical sacrificial ceiling

The sacrificial ceiling should be directly screwed to the underside of the joists of the acoustic ceiling above.

The acoustic ceiling should create a minimum of 100mm cavity.

One layer of standard plasterboard is sufficient for the sacrificial ceiling, as it will have no real acoustic performance.

5.2.2.2 Noise transfer to first floor flat

The above construction described in Section 5.2.2.1 will give an on-site sound insulation performance of, at least, 50 dB. Considering that the likely upper noise level in the laundrette will be 70 dB(A), as described in Section 5.2.1, then the noise level in the first-floor accommodation will be $70 - 50 = 20$ dB. This is 15 dB below the 35 dB daytime internal noise limit in habitable spaces.

5.2.2.3 Vibration

All washing machines, dryers and ductwork should be connected to the building using anti-vibration mounts.

6 CONCLUSION

An acoustic survey has taken place at the 251 Charlestown Road, Blackley to discharge noise conditions relating to a planning application for the conversion to a laundrette.

An BS4142 assessment of noise from external plant has shown that the noise will be within acceptable noise limits pending the following fan and silencer installation:

- Helios Gigabox 450mm fan
- Acoustica Ro2 - 2 - 1500 silencer

The Rating Level of any external plant should exceed 41 dB(A).

Noise breakout from the ground floor unit to the flat above was also assessed

The construction of the separating floor should be as follows:

- **make good original ceiling so that it is airtight;**
- an independent ceiling shall be supported by independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing ceiling.
 - Acoustic hangers can be used to support the independent acoustic ceiling.



- any supporting beams should sit within the cavity of the independent ceiling;
- at least 2 layers of 15mm acoustic plasterboard with staggered joints, minimum mass per unit area 20kg/m²;
- an absorbent layer of mineral wool laid on the ceiling , minimum thickness 100mm, minimum density of 10 kg/m³

NB The acoustic ceiling shall NOT be penetrated, but if absolutely necessary than is shall be fully sealed using appropriate building methods. Contact Braiden Acoustics for further advise if need be.**

For services such as lights, smoke alarm etc. then there should be a sacrificial ceiling as described in the report.

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

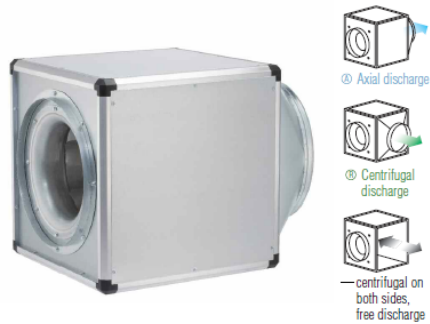
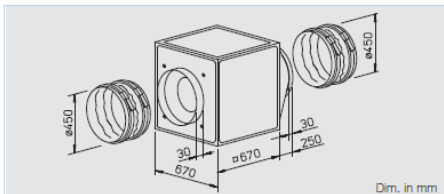
A1 EXTRACT FAN DETAILS

GigaBox centrifugal fan 450 mm Ø



Models GB..

Arbitrary installation position and flexible assembly by five possible discharge directions.



■ Special features of type GB.. T120

- Designed for moving dirty, humid and hot air volumes up to max. 120° C.
- Motor located outside of air flow.
- Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
- Easily accessible motor and impeller unit, removable without disassembling the system components.
- Inspection cover with handle, simply remove for cleaning and maintenance.
- Condensate collector with condensate spigot included in delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.

□ Assembly of types GB.. T120

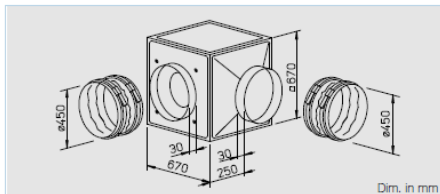
Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ Feature

□ **Assembly of types GB..**
Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter. For wall mounting the wall bracket (accessories) has to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

Models GB.. T120

Designed for moving dirty, humid and hot air up to max. 120° C.



■ Specification of both types

□ Casing

Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature consulting and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

□ Impeller

Smooth running backward curved centrifugal impeller highly efficient with polymer blades on galvanised steel disc (with GB.. T120 aluminium impeller), direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

□ Motor

Maintenance-free external rotor motor or IEC-standard motor protected to IP 44 or 54. With ball bearings and radio suppressed as standard.

□ Electrical connection

Standard terminal box (IP 54) fitted on the motor; with GB.. T120 fitted on the motor support plate.

Type	Ref. No.	Air flow volume (FID)	R.P.M.	Sound press. level case breakout	Motor power (nominal)	full load	Current speed controlled	Wiring diagram	Maximum air flow temperature full load	Nominal weight (net)	5 step transformer controller with motor protect. unit	Full motor protection unit using the thermal contacts
		V m³/h	min⁻¹	dB(A) at 4 m	kW	A	A	Nr.	°C	kg	Type Ref. No.	Type Ref. No.
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54												
GBW 450/4	5515	5450	1270	40	0.76	3.50	3.50	864	45	45	49	MWS 5 1949 TSW 5.0 1497 MW ⁽¹⁾ 1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ-wiring, protection to IP 54												
GBD 450/4/4	5516	4350/5450	880/1240	40	0.36/0.67	0.70/1.30	1.30	867	55	55	49	RDS 2 1315 TSD 1.5 1501 M4 ⁽²⁾ 1571
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54												
GBW 450/4 T120	5774	7110	1370	45	1.00	4.60	5.50	935	120	100	74	MWS 7.5 1950 TSW 7.5 1596 MW ⁽¹⁾ 1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ-wiring, protection to IP 54												
GBD 450/4/4 T120	5775	6210/7180	1100/1350	45	0.65/0.90	1.10/1.60	1.80	947	120	110	74	RDS 2 1315 TSD 3.0 1502 M4 ⁽²⁾ 1571

⁽¹⁾ Incl. operation switch

⁽²⁾ Incl. operation and 2 speed switch

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R02 Rectangular Silencers



R02 - 2 - Attenuator

Available in seven standard lengths R02 2 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 2 Silencers with a face velocity above 2.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.

- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request



Insertion Loss (dB) - Centre Band Frequency

Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 2 - 600	600	7	12	20	31	39	40	38	27
R02 - 2 - 900	900	9	16	25	42	50	50	50	41
R02 - 2 - 1200	1200	11	20	20	50	50	50	50	48
R02 - 2 - 1500	1500	13	24	25	50	50	50	50	50
R02 - 2 - 1800	1800	15	30	20	50	50	50	50	50
R02 - 2 - 2100	2100	16	33	25	50	50	50	50	50
R02 - 2 - 2400	2400	7	38	20	50	50	50	50	50

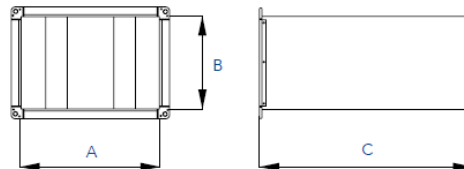
Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Dimensional Data

Code	A Min	A Max	B Min	B Max	C Min	C Max
R01 - 2	100	1200	100	1200	400	2400

Resistance to Airflow (Pa)

Product Code	1.0m/s	1.5m/s	2.0m/s	2.5m/s	3.0m/s
R02 - 2 - 600	9	29	52	80	108
R02 - 2 - 900	9	30	54	82	111
R02 - 2 - 1200	10	31	55	84	114
R02 - 2 - 1500	10	31	56	85	116
R02 - 2 - 1800	11	32	57	88	119
R02 - 2 - 2100	11	34	57	90	123
R02 - 2 - 2400	12	36	60	95	133



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