

Technical Note: Renolds Building, ID Manchester

Project	Renold Building, ID Manchester		
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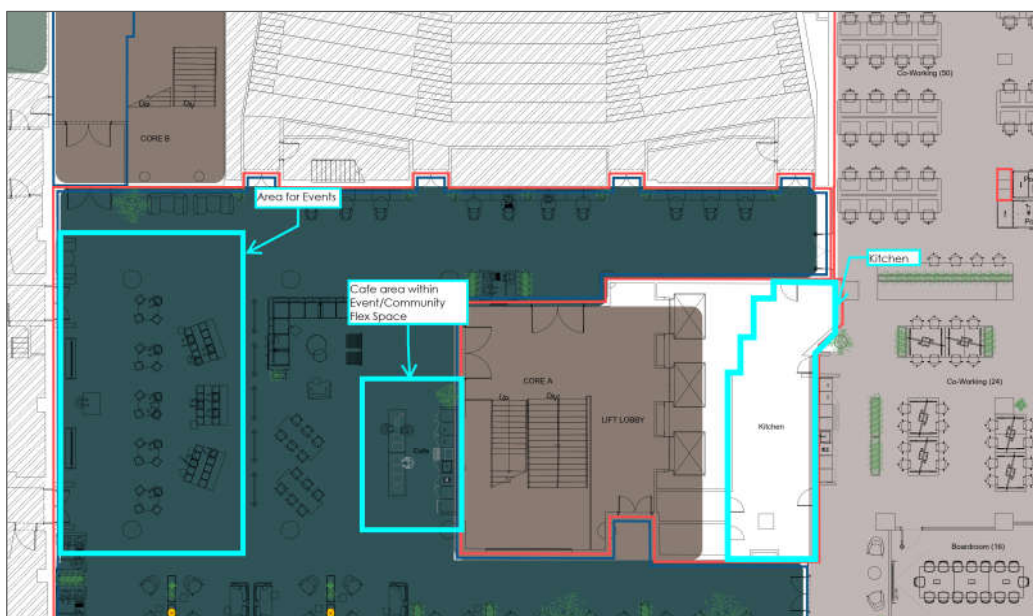
1. INTRODUCTION

- 1.1 BWB Consulting Limited has been appointed by ID Manchester Limited to provide acoustic advice to control noise transfer from kitchen areas into adjoining office and event/community flex spaces.
- 1.2 An assessment of noise transfer from kitchen areas is required following pre-application comments by Manchester City Council requiring a noise impact assessment of the kitchen to support the planning application for the development.

Proposed Spaces

- 1.3 The proposed kitchen areas are located on the upper ground floor of the building. The kitchen is surrounded by the co-working space, stair core and peripheral areas of the event/community flex space. The event/community flex space will also have a small 'café' area.
- 1.4 The locations of these areas on the upper ground floor are presented in **Figure 1.1**.

Figure 1.1 Kitchen and Café areas on Upper Ground Floor



Source: Excerpt of Space Invader Design RIBA Stage 2 report (ref: IDMB2-SID-MW-XX-GD-ZZ-23035_Workstage 2 Report_01)

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- 1.5 It is understood that the kitchen and café areas will have the following equipment: ovens, electric/induction (not gas) hobs, fridge/freezer (existing walk-in fridge and new freezer), worktop area for food prep, sink and dishwasher.
- 1.6 A centralised extract ventilation system will be provided to tea points, café area and WCs. The existing HVAC services will be retained in the existing Kitchen.
- 1.7 The Event/Community Flex Space is intended to be a space for collaboration, informal meetings and presentations while the use of the Co-Working Space is expected to reflect that of most other open plan offices.

2. GUIDANCE AND CRITERIA

Manchester City Council

- 2.1 MCC have developed their own noise guidance on which all planning applications will be assessed against to determine if the proposals are in line with their planning policy. The guidance draws on national and local planning policy; national and international standards to provide assessment criteria for the following uses and applications:
 - Internal noise limits for residential properties
 - Limits on low frequency noise from entertainment venues (eg. noise from recorded music, live bands, or karaoke) to be achieved within habitable rooms which are structurally connected to an entertainment venue.
 - Noise limits on noise from entertainment venues to be achieved at residential properties which are not structurally connected a residential property.
 - Noise limit for industrial/commercial noise (eg. loading/unloading of goods) at noise sensitive receptors.
 - Noise limits for fixed plant, equipment and machinery at noise sensitive receptors.
- 2.2 MCC guidance does not cover specific criteria or guidance for noise transfer into adjoining commercial or event/community space uses, therefore bespoke guidance will be developed.

Guidance for Internal Noise Levels in Offices

- 2.3 It is considered that along with the Co-Working Space, the Event/Community Flex Space will be used in a similar way as any other commercial office space and as such, the noise environment should be conducive to speech, telephone conversations and, in the case of the co-working space concentration while working. To develop specific guidance for the proposed uses, reference has been made to BS 8233:2014¹, which recommends suitable internal ambient noise levels (IANL) within commercial buildings to ensure the acoustic environment within different room spaces are appropriate to their function.

¹ The British Standards Institution (2014) BS8233 Guidance on sound insulation and noise reduction for buildings

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Table 2.1 Internal Noise Criteria in Unoccupied Spaces

Room Space	BS8233 $L_{Aeq,T}$ Design Range	Criterion
Executive Offices	35-40	Reasonable conditions for study and work requiring concentration
Meeting Rooms, Staff Rooms, Training Rooms	35-45	
Open Plan Offices	45-50	Reasonable acoustic privacy in shared spaces
Concourse/Reception, Corridors, Toilets	45-55	Reasonable speech or telephone conversations
Kitchen	50-55	

- 2.4 The guidance levels out in **Table 2.1** are applicable to steady external noise sources and building services noise serving the spaces but excluding any noise produced by the occupants and their activities, which would include use of kitchen equipment. The time period, T, should be appropriate for the activity involved, which would usually be the typical working day for commercial uses.

Noise Within Occupied Spaces: Co-working Space and Event/Community Flex Space

- 2.5 The guidance set out above relates to noise within unoccupied spaces from other sources of noise. It is expected that when any office space is in use, the noise level will increase and 'activity noise' (speech/telephone conversations, noise from equipment et.) dominate the noise climate. While excessive noise can be distracting, a reasonable level of activity noise is expect from users of the space and can even be beneficial for users by masking intruding speech.
- 2.6 Noise within occupied offices vary greatly and depend heavily on the type of work carried out. Guidance on offices² puts noise levels within offices at around L_{Aeq} **60 dB**.

Internal Noise Levels for Kitchens

- 2.7 As with offices, noise within kitchens can vary and as such guidance on internal noise level of an occupied kitchen does not exist. Further discussion of noise within kitchens and the café area are presented in the following section.

² Finishes and Interiors Sector (2015) A Guide to Office Acoustics

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3. ASSESSMENT

Operational Noise in Kitchen

- 3.1 For most types of kitchen, the most persistent and noticeable source of noise will be extract/make up air systems, which will operate whenever the kitchen is in use. **Table 3.1** presents predicted noise levels for a commercial kitchen with extract fans turned on with a mid-frequency reverberation time of T_{mf} 1.5s within the kitchen.

Table 3.1 Predicted Operational Noise in Kitchen

Description	Octave Band Sound Pressure Levels (L_{eq} dB)						dB(A)
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Commercial kitchen with extract fans on, Reverberant level	76	73	70	67	62	56	72

Separating Constructions

- 3.2 The existing partitions and doors will be retained. It is understood that the partitions around the kitchen are a concrete construction however the exact composition is unknown. As a worst case, it is assumed that the partitions are formed from lightweight concrete blocks with a plaster skim finish, which will be made good.
- 3.3 The existing doors are understood to be of reasonable quality, consisting of a solid door leaf with a glazed vision panel and robust frames and jambs. The composition of the door is unknown however the door is fire-rated so it is assumed that it is relatively robust with seals. **Figure 3.1** presents an example of the doors in-situ.

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Figure 3.1 Existing Door In-situ



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3.4 The assumed sound insulation performance of the retained constructions are presented in **Table 3.2**.

Table 3.2 Assumed Sound Insulation Performance of Separating Constructions

Description	Octave Band Sound Reduction Indices (R, dB)						R _w
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Solid breeze or clinker blocks, plastered both sides (145 kg/m ²)	27	33	40	50	57	56	44
Solid door with glazed vision panel	22	27	33	26	29	29	28

Noise Transfer from Kitchen to Adjacent Spaces

3.5 The following assumptions have been made when carrying out the assessment:

- Partitions extend the full height from slab to soffit.
- Floor to ceiling height of 3m.
- Reverberation time within the co-working space and event/community flex space of T_{mf} 1.5s.

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3.6 **Table 3.3** presents the sound assessment of noise into the adjoining spaces from the kitchen.

Table 3.3 Preliminary Noise Transfer Predictions

Description	Octave Band Noise Levels (dB)						dBA
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Noise Transfer into Co-Working Space							
Commercial kitchen with extract fans on, Reverberant level, L _p	76	73	70	67	62	56	72
Composite SRI of 35.4m ² blockwork wall with No. 2 doors, R	26	32	39	36	39	39	-
Reverberant noise level in co Working Space, L _p	56	48	38	37	29	23	48
Noise Transfer into Event/Community Flex Space							
Composite SRI of 10.2m ² blockwork wall with No. 1 door, R	26	31	38	34	37	37	-
Reverberant noise level in co Working Space, L _p	53	45	35	35	27	21	46

3.7 The predicted noise level when the kitchen is in use within both the co-working space and event/community flex space is L_{Aeq} 48 dB and L_{Aeq} 46 dB respectively. This noise level is below the noise level guidance for unoccupied open plan office spaces and the expected noise level within an occupied office of L_{Aeq} 60 dB. It is an indication that that noise from the kitchen is likely to be a low impact to users within the co-working space and the Event/Community Flex Space.

3.8 It should be noted that noise from the kitchen may still be audible with the use of acoustic doors.

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- 3.9 While the assessments indicate that noise from the kitchen within the co-working space and event/community flex space is likely to be within acceptable levels, it is dependent on the performance of the retained doors. Further discussion of on ensuring that the sound insulation of the doors is maintained is provided in **Section 4**.

Noise Transfer from Café to Event/Community Flex Space

- 3.10 The café area will be open to the Event/Community Flex Space so careful consideration must be given to how this space is used with respect to rest of the space.
- 3.11 The informal nature of the Event/Community Flex Space means that users of informal seating will be significantly more tolerant of noise from noise generated from other areas of the space, including the café.
- 3.12 The area of the space intended to be used for presentations will be the most sensitive part of the space. With this in mind, practical measures which can be implemented to the space are discussed in **Section 4**.

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4. MITIGATION

- 4.1 The assessment presented in **Table 3.3** show that noise from the kitchen can be sufficiently mitigated with the existing doors and indicates that noise from the kitchen is likely to be a low impact to users within the co-working space and the Event/Community Flex Space.
- 4.2 The following section presents practical advice to minimise noise transfer between the spaces.

Workmanship and Remedial Work on Retained Elements

Sound Insulation of Doors

- 4.3 The performance of doors are highly sensitive to poor workmanship or damage from wear-and-tear. Furthermore, The sound insulation data used in the assessment was measured in an acoustic laboratory where workmanship would be closely monitored to ensure that seals worked as intended.
- 4.4 It is recommended that an inspection of the doors are carried out to check for defects in the door or seals such as:
- Seals are present along entire perimeter and are free from damage,
 - Door compresses seals around the entire door perimeter on door jambs form a seal,
 - Drop seals on door threshold do not leave gaps with the floor,
 - Ideally rubber 'bubble' type seals are used around perimeter, rather than older 'brush' type.
- 4.5 Changes to seals must be checked with the project fire consultant to ensure that the door is still capable of meeting the required fire compartmentation requirements.

Remedial Works for Concrete Partitions

- 4.6 To maximise the sound insulation performance of the retained partition, the following remedial measures should be implemented:
- Partitions should have a plaster skim on the full height of the partition on both sides
 - If a deflection head is required, this should be formed using compressed mineral wool 'fire-stop' bats and sealed with non-hardening acoustic mastic.
 - Penetration formed within the wall must be minimised so that they fit the services without excessive space around the services and wall. The penetration must be sealed with compressed mineral wool 'fire-stop' bats on both sides and sealed with non-hardening acoustic mastic.

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Noise Transfer from Café Within Event/Community Flex Space

- 4.7 This section presents practical mitigation measures which can be implemented to reduce noise transfer from the café area to the events/community spaces.

Offering Alternative Spaces

- 4.8 The lecture theatre proposed within the Renolds Building will act as mitigation for noise disturbance as users looking to book an event will be able to use a dedicated space which will be less affected by extraneous noise. It is therefore reasonable to assume users of the event/community flex space will expect higher levels of noise within the space.

Acoustic Treatment

- 4.9 Applying acoustic treatment in the form of wall panels or hanging rafts or baffles will absorb sound and make the space less echoic. The effect of this will be reducing the overall sound level within the space which may otherwise intrude users of the events space. The locations of treatment should particularly focus on areas which are generating unwanted noise such as seating areas. Treatment should be located as close to the café area as possible, without impacting on hygiene.

Effective Management of Space

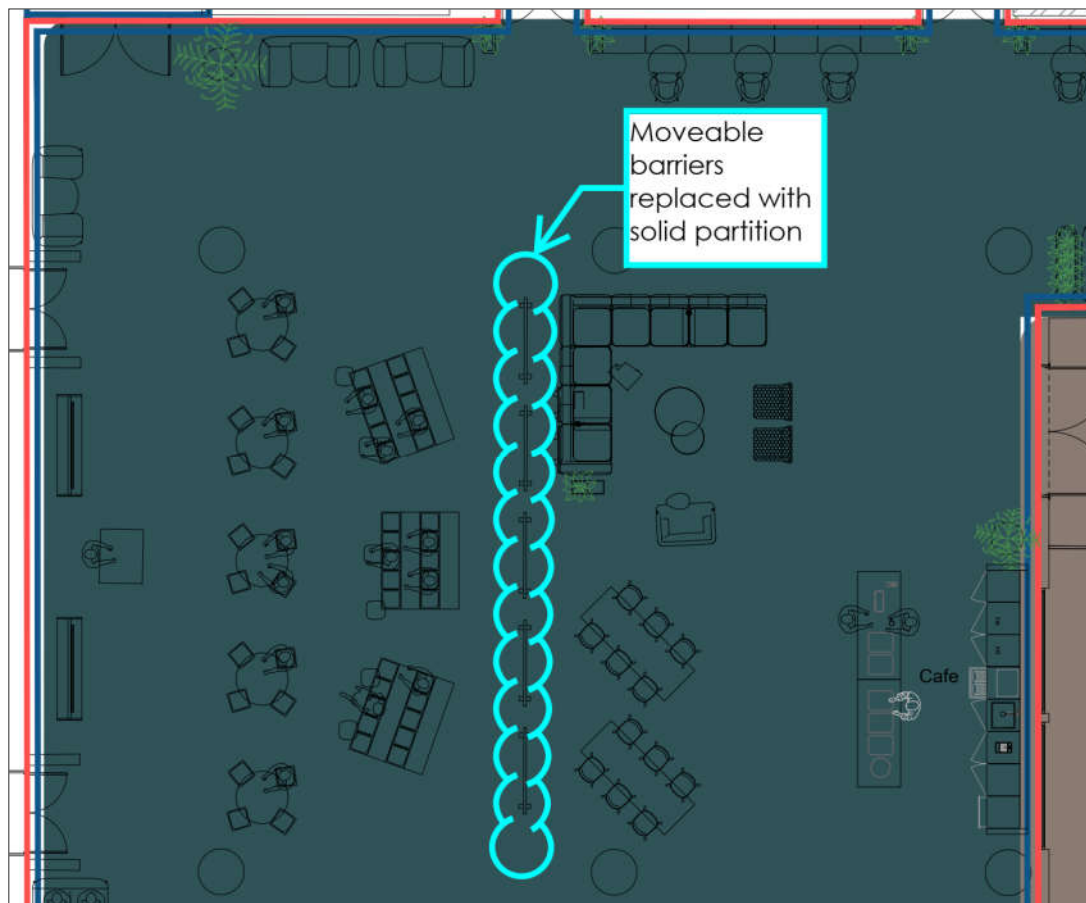
- 4.10 Managing the use of the café will be the most effective method of mitigating noise transfer. This will include, but not limited to the following:
- Avoid running dishwashers and extract hoods while events are on,
 - General consideration to other user uses when cleaning the café or moving stock,
 - Scheduling larger or more noise sensitive events outside of café operating times,
 - Limiting access to seating area or café operation to allow events, where appropriate.

Providing a Barrier

- 4.11 Moveable barriers shown on plans could be replaced by a solid, free standing partition extending as high and as long as practicable, as shown below. This option will reduce the flexibility of the space which will need to be considered against the viability of the event/community flex Space as a whole.

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Figure 4.1 Location of Partition



Source: Excerpt of Space Invader Design RIBA Stage 2 report (ref: IDMB2-SID-MW-XX-GD-ZZ-23035_Workstage 2 Report_01)

- 4.12 It should be noted that noise from the café is likely to still be audible within the event area with any of the above measures in place.

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5. CONCLUSIONS

- 5.1 BWB Consulting Limited has been appointed by ID Manchester Limited to provide acoustic advice to control noise transfer from kitchen areas into adjoining office and flexible event spaces.
- 5.2 A desktop assessment of noise transfer has been carried out, which considers the predicted sound insulation of the retained walls and doors which separate the kitchen from adjacent spaces and noise transfer across the flexible event space from the café within.
- 5.3 Predicted noise levels are expected to be within acceptable levels but is likely to be audible at workstations/seating areas located closest to the kitchen.
- 5.4 Acoustically rated doors have been recommended to reduce noise transfer from the kitchen. Noise predictions indicate that noise transfer can be significantly reduced by using acoustic doors.
- 5.5 Through the use of practical noise reduction techniques, noise from the café area within the event/community flex space.