

Project	70 Great Bridgewater Street – Planning Condition 15C		
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1 Introduction

1.1 This Technical Note has been prepared by BWB Consulting Limited (BWB) in relation to the proposed mixed-use development at 70 Great Bridgewater Street. This report constitutes a verification report as required by Planning Condition 15 Part C. Parts A and B of the condition have already been discharged.

1.2 The wording of Planning Condition 15 Part C is included below for ease of reference:

“c) Within one month of the completion of the development and before first occupation of the completed development hereby approved, a verification report shall be undertaken 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 above criteria is met. Any instances of nonconformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the noise criteria. This report shall be submitted to and approved in writing by the City Council as local planning authority before the use becomes operational along with a timescale that confirms when any necessary changes will be implemented.”

1.3 It is evident from Part B of the condition, and the noise impact assessment prepared for the discharge of Part B (the previous report), that the condition relates to noise breakout from the gym at ground floor level to offices above.

1.4 The noise impact assessment report submitted to discharge Part B of the condition included predictions for noise break-out from the gym space. The table below details the sound insulation performances for the separating floor (300 mm concrete floor slab) included in the previous report.

Table 1.1: Sound Insulation Performance of 300 mm Concrete Floor Slab

Octave Band (Hz) Sound Reduction Index (dB)							$R_w + C_{tr}$ (dB)
63	125	250	500	1000	2000	4000	
48	47	54	61	67	71	76	59

1.5 It can be seen from **Table 1.1** that the single figure performance of the floor detailed in the previous report was 59 dB $R_w + C_{tr}$. As the predictions undertaken accounting for this performance were accepted by the local authority when discharging Part B of the condition, 59 dB $R_w + C_{tr}$ has been adopted as a performance requirement.

2 On-Site Testing

2.1 In order to determine whether this performance was achieved on site, sound insulation testing was undertaken within the completed development.

- 2.2 The sound insulation performance of the floor between the gym and offices above was tested on 11th April 2024. The testing was undertaken in accordance with BS EN ISO 16283-1:2014: *Acoustics — Field measurement of sound insulation in buildings and of building elements Part 1: Airborne sound insulation* (ISO16283-1:2014). The measurement equipment used is detailed in **Table 2.1**.

Table 2.1: Measurement Equipment

Equipment	Make and Model	Serial Number	Calibration Due Date
Sound Level Meter	SVAN 971A	113221	21/02/2026
Microphone	ACO 7052E	80629	
Preamplifier	SV18	113722	
Calibrator	Svantek SV33A	90275	21/02/2025

- 2.3 The results of the sound insulation testing are included in **Appendix A**.
- 2.4 From the results in **Appendix A**, it can be seen that an on-site performance of 59 dB $R'_w + C_{tr}$ was achieved between the gym and office spaces above. Therefore, the performance requirement of 59 dB $R_w + C_{tr}$ from the previous report was achieved on site.
- 2.5 The gym/yoga room is at basement level with no external windows, therefore, no requirement for noise breakout via the building structure to the outside was included in the previous report.

3 Dialogue with Manchester City Council

- 3.1 Following submission of the above information, the Environmental Protection Department of Manchester City Council (MCC) requested additional information to be able to discharge Condition 15c. MCC stated by e-mail on June 11th 2024 that BWB "have only provided sound insulation testing of the slab and not the internal noise levels in the offices directly above the gym. They provided estimated noise levels for the offices in their initial acoustic report (table 4.5) so they need to validate that these are being achieved."
- 3.2 On 28th November 2024 the following further comments were provided by MCC by e-mail.

"They have presented the testing results for the concrete slab in Appendix A as one third octave bands, whereas the criteria in Table 1 are in octave bands. Adding the one third octave bands indicates that on an octave band basis the slab does not meet the proposed criteria. This combined with the playback of music in the Yoga Studio could result in noise breakout to the offices above. As such the validation testing for noise break out to the offices above is required to show that the internal noise levels on the floor above are being met with the gym in use. This needs to include receiver sound levels on the floor above and details of the source type/levels in the Yoga Studio, not just airborne testing. Methodologies for noise testing have been presented in the ProPG Gym Acoustic Guidance (March 2023).

We asked for the additional testing as the concrete slab did not seem to meet the proposed criteria. We do need to see validation testing including noise break out to the offices above. Methodologies are given in the ProPG Gym acoustic guidance."

4 Further Analysis and Assessment

- 4.1 The ProPG: Gym Acoustics Guide (GAG) provides a suggested methodology for in-situ testing for re-radiated noise from weight-drops in a gym which could affect neighbouring properties, but in terms of airborne noise transfer the GAG recommends absolute noise level limits (by way of a G-Curve) in a receiver room, and suggests that airborne sound insulation testing is undertaken to determine the performance of the separating floor.
- 4.2 Therefore, using an assumed source noise level in the source room (i.e. the yoga studio), we can then use the measured sound insulation performance of the separating floor slab to calculate the resultant noise level in the receiving room (i.e. the offices). We can then compare the calculated noise level in the office against the relevant G-Curve from the GAG to determine if compliance is achieved.
- 4.3 **Table 4.1** below presents an assessment of noise transfer from the studio space to offices above. The assumed source noise level is taken from 1/3 octave band data measured in a gym during a group cross fit class set to music. The criteria in the office has been based on the G25 curve from the GAG. The GAG suggests that noise levels in commercial offices as a result of airborne noise transfer from Gyms should be between G25 - G35.
- 4.4 The values presented in **Table 4.1** shows that noise levels in the office due to airborne noise transfer from the studio below comfortably meet the GAG criteria in offices, even with an assumed activity noise level measured from a Cross Fit class. In reality, noise levels in a Yoga studio are likely to be significantly lower than those assumed in the assessment above.
- 4.5 An alternative way of looking at this would be to determine the maximum noise level that could be realised in the studio space before noise levels in the office exceed the G25 reference curve from the GAG. The derived noise level limit in the studio space is presented in **Table 4.2**. Values presented in **Table 4.2** confirm that noise levels in the Studio could reach 97 dB(A) while still remaining compliant with the lower threshold limit from the GAG in the adjacent offices. Noise levels could reach 102 dB(A) whilst achieving compliance with the upper threshold from the GAG (G35). In reality, noise levels in a Yoga studio would be extremely unlikely to reach such a level.
- 4.6 The assessment presented above should be sufficient to provide comfort that noise transfer from the studio to the office is adequately controlled by the floor slab.

Table 4.1: Assessment of Noise Levels in Offices due to Airborne Noise Transfer from the Studio Below

	Sound Pressure Level (dB) per Octave Band (Hz)																				
	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	dB(A)
Assumed Noise Level in Studio [A]	63	66	70	71	76	72	72	71	70	70	72	72	70	69	68	69	68	66	66	64	79
Measured Sound Insulation Performance of Separating Floor, R [B]	45	42	39	46	44	49	52	53	60	63	63	65	72	65	68	68	67	66	68	69	-
Resultant Noise Level in Office [C] = [A] - [B]	18	24	31	25	32	23	20	19	10	7	9	7	-2	4	0	1	1	0	0	0	20
G25 Curve Criteria in Office [D]	52	47	43	40	37	34	31	29	27	25	23	22	21	20	19	18	17	16	15	14	34
Compliant? [is [D] ≥ [C]]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4.2: Noise Limit in Studio to Comply with G25 in Offices

	Sound Pressure Level (dB) per Octave Band (Hz)																				
	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	dB(A)
Measured Sound Insulation Performance of Separating Floor, R [A]	45	42	39	46	44	49	52	53	60	63	63	65	72	65	68	68	67	66	68	69	-
G25 Curve Criteria in Office [B]	52	47	43	40	37	34	31	29	27	25	23	22	21	20	19	18	17	16	15	14	34
Noise Level Limit in Studio to Comply with G25 in Offices [C] = [A] + [B]	97	89	82	86	81	83	83	82	87	88	86	87	93	85	87	86	84	82	83	83	97

5 Further Dialogue with Manchester City Council

- 5.1 On 20th December 2024, MCC provided further comments to BWB, shown in red below. BWB provided the responses reproduced below.

"Are you suggesting that an assessment for re-radiated noise is not required? If you are, why is this?"

- 5.2 We acknowledge the importance of assessing re-radiated noise in gym environments. However, based on the guidance provided in the ProPG Gym Acoustic Guidance (2023), our approach aligns with industry best practices:

- The ProPG Gym Acoustic Guidance emphasizes the use of empirical assessments and predictive modelling when direct measurement is impractical.
- Given the nature of the proposed use (a yoga studio rather than a high-impact gym with weight drops), the likelihood of significant re-radiated noise issues is minimal.
- The G25 curve criteria have been met under higher activity noise assumptions, confirming compliance with acceptable noise limits.

- 5.3 On-site validation testing is primarily recommended for gyms with high-impact activities, such as free weights and cardio workouts.

- 5.4 The separating floor's tested airborne and structure-borne insulation properties already demonstrate compliance within the predicted noise environment. ProPG allows for prediction-based assessments where on-site testing isn't feasible, provided that robust assumptions are used, which our assessment has done.

- 5.5 While re-radiated noise can be a concern in some gym applications, the nature of this development, coupled with the provided predictive assessment, suggests that additional re-radiated noise testing is not required.

"We are still awaiting a response regarding the comments we made on the previously submitted test certificate. Please can you respond on this point?"

- 5.6 We appreciate the council's feedback and can confirm the following regarding the test certificate comments:

- The original submission presented sound insulation results in one-third octave bands, which offer greater resolution than octave bands.
- The ProPG recommends third-octave resolution for detailed noise assessments, as this better represents low-frequency behaviour.
- However, we acknowledge the council's request for octave band presentation and can provide converted octave band values for clarity and comparison (shown in **Table 5.1**).

Table 5.1: Resultant Noise Level in Office – Octave Bands

	Sound Levels/Sound reduction levels (Hz) at Octave band centre frequencies (Hz)							dBA
	63	125	250	500	1000	2000	4000	
Assumed Noise Level in Studio [A]	72	78	76	76	74	73	70	-
Measured Sound Insulation Performance of Separating Floor, R [B]	41	46	54	64	67	67	67	
Resultant Noise Level in Office [C] = [A] - [B]	31	32	22	12	7	6	3	19

5.7 Please note there is a 1 dB difference due to various rounding implications

5.8 Our assessment shows that even at higher assumed noise levels (e.g., CrossFit class rather than yoga), the noise levels remain within compliance limits of the G25 curve. The separating floor's measured performance aligns with ProPG best practices for mixed-use developments.

"The assumed levels in the gym space are very low (measured from a cross fit class with music the assumption is that these would be higher). The planner has confirmed that the proposed operation as a yoga studio will be restricted as part of any discharge approval to ensure higher noise activities are prohibited in this space."

5.9 This is noted.

5.10 On 3rd March 2025, MCC provided the following response.

"The concrete slab as installed does not meet the recommendations in the previously agreed acoustic report. However, they have shown that the slab is compliant with gym acoustic guidance and noise break out meets the G25 curve for office use above."

We can accept the post completion testing for the gym space being used as a Yoga Studio, it is unlikely to be suitable for a traditional gym with cardio machines/weights. So if this can be written into the approval we can recommend discharge of condition 15c."

5.11 On this basis it is considered that Condition 15c can be discharged.

Appendix A: Sound Insulation Test Results

Apparent sound reduction index measured in accordance with ISO 16283-1																																													
Field measurements of airborne sound insulation between rooms																																													
Client: Bridgewater Manchester (Luxembourg) Holding SARL	Date of test: 11/04/2024																																												
Description and identification of the building construction and test arrangement, direction of measurement: 300 mm Concrete Floor. Test from Office to Gym below.																																													
<table><tr><th>Frequency f Hz</th><th>R' (one-third octave) dB</th></tr><tr><td>50</td><td>45.0</td></tr><tr><td>63</td><td>42.4</td></tr><tr><td>80</td><td>38.9</td></tr><tr><td>100</td><td>45.8</td></tr><tr><td>125</td><td>44.4</td></tr><tr><td>160</td><td>49.0</td></tr><tr><td>200</td><td>51.9</td></tr><tr><td>250</td><td>52.8</td></tr><tr><td>315</td><td>59.6</td></tr><tr><td>400</td><td>62.8</td></tr><tr><td>500</td><td>63.3</td></tr><tr><td>630</td><td>65.0</td></tr><tr><td>800</td><td>71.9</td></tr><tr><td>1000</td><td>65.1</td></tr><tr><td>1250</td><td>68.1</td></tr><tr><td>1600</td><td>67.5</td></tr><tr><td>2000</td><td>66.6</td></tr><tr><td>2500</td><td>65.8</td></tr><tr><td>3150</td><td>68.4</td></tr><tr><td>4000</td><td>68.5</td></tr><tr><td>5000</td><td>69.6</td></tr></table>	Frequency f Hz	R' (one-third octave) dB	50	45.0	63	42.4	80	38.9	100	45.8	125	44.4	160	49.0	200	51.9	250	52.8	315	59.6	400	62.8	500	63.3	630	65.0	800	71.9	1000	65.1	1250	68.1	1600	67.5	2000	66.6	2500	65.8	3150	68.4	4000	68.5	5000	69.6	<p>Frequency range according to the curve of reference values (ISO 717-1)</p>
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5000	69.6																																												
Rating according to ISO 717-1																																													
$R'_w (C; C_{tr}) = 64 (-1; -5) \text{ dB}$																																													
Evaluation based on field measurement results obtained by an engineering method																																													
$C_{50-3150} = -2 \text{ dB}$	$C_{50-5000} = -1 \text{ dB}$																																												
$C_{tr,50-3150} = -9 \text{ dB}$	$C_{tr,50-5000} = -9 \text{ dB}$																																												
$C_{100-5000} = -1 \text{ dB}$	$C_{tr,100-5000} = -6 \text{ dB}$																																												
No. of test report: 0642024-001	Name of test institute: BWB																																												
Date: 03/05/2024	Signature: A Barr																																												