

MPF/PR0661/L04

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Dear Peter

D2 TRINITY ISLANDS, MANCHESTER, PLANNING CONDITION 163

I write to confirm the results of sound transfer measurements conducted between the amenity areas and residential apartments at D2 Trinity Islands, Manchester. The measurements have been conducted to respond to condition 163 of the planning permission for the building and to demonstrate that the operation of the gym and amenity areas will not affect residential amenity.

INTRODUCTION

The planning permission for D2 Trinity Islands includes a condition which requires that post-completion noise measurements are carried out in relation to internal activity noise transfer and activity noise egress from the residents lounge, co-working spaces and gymnasium within the building.

Fisher Acoustics Ltd has been commissioned by Renaker Build Ltd to measure the levels of noise transfer from the residents lounge, co-working spaces and gymnasium to the apartments above and to external areas, and to advise on compliance with the requirements of the planning permission for the development.

PLANNING CONDITION

Planning condition 163 of the planning permission for D2 Trinity Islands (planning application number 132429/FO/2021, dated: 14 December 2021) states:

- *163) (a) Notwithstanding Chapter 11 - Noise and Vibration Matt Fisher Acoustics of the ES stamped as received by the City Council, as Local Planning Authority, on the 7 December 2021, prior to the first use of residents lounge, co working spaces and gymnasium in phase D2 as indicated on drawings D2-SHP-G200-PL-GRD-B5D801 P01, D2-SHP-G200-PL-01-B5D801 P01, D2-SHP-G200-PL-02-B5D801 P01 and D2-SHP-G200-PL-03-B5D801 P01 stamped as received by the City Council, as Local Planning Authority, on the 7 December 2021, a scheme of acoustic insulation for those spaces shall be submitted for approval in writing by the City Council, as Local Planning Authority.*

Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 5dB 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 63 Hz and 125 Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47 dB and 41 dB (Leq,5min), respectively

The approved noise insulation scheme shall be completed before the use of the gym commences. The approved details shall be implemented and remain in place for as long as the unit is in use.

(b) Prior to the first use of those spaces within phase D2, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. A verification report and measures shall be agreed until such a time as the development complies with part (a) of this planning condition.

Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority. Any measures shall thereafter retained and maintained in situ

Reason - In order to limit the outbreak of noise from the commercial premises pursuant to policies SP1 and DM1 of the Core Strategy (2007) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995).

RESIDENTS LOUNGE, GYM, STUDIO AND CO-WORKING

The residents lounge, gym, studio and co-working at D2 Trinity Islands are for the sole use of residents of the building. The residents lounge is located on Level 1 of the building, as identified in Figure 1. The gym, studio and co-working are located on Level 3, as identified in Figure 2. The lowest floor level on which residential apartments are located is Level 4.

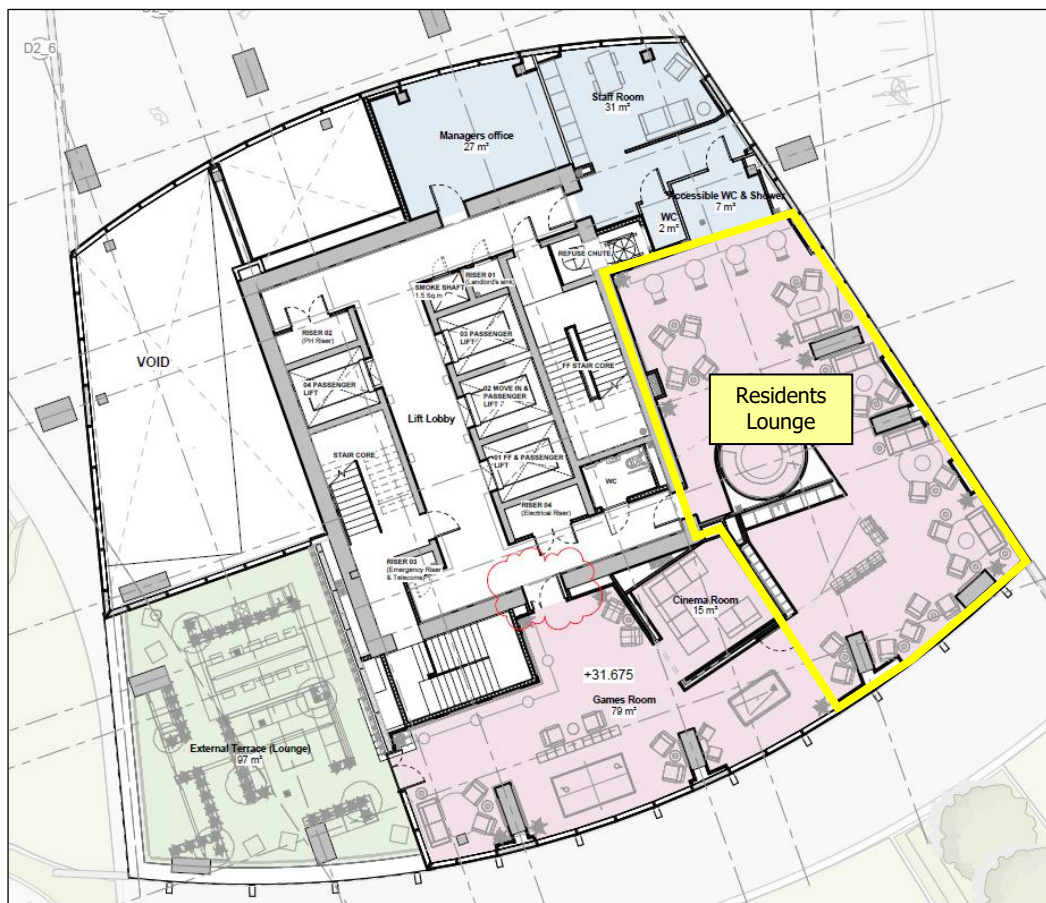


Figure 1: Location of residents lounge – Level 1, D2 Trinity Islands

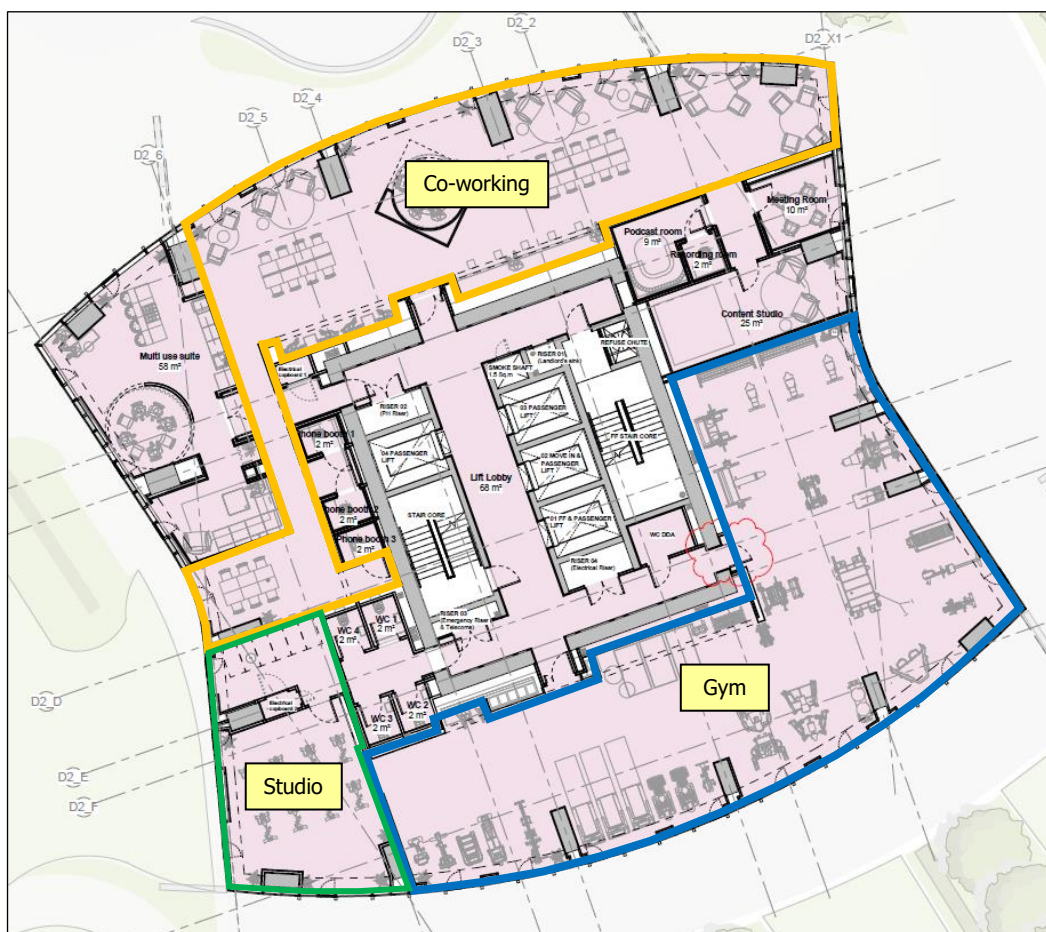


Figure 2: Location of gym, studio and co-working – Level 3, D2 Trinity Islands

INTERNAL NOISE TRANSFER - AIRBORNE NOISE

There are residential apartments on Level 4 of the building that are located directly above the Level 3 amenity areas. There is therefore the possibility of internal noise transfer between the amenity areas and the apartments above via the separating floor.

As stated in condition 163, internal noise levels at structurally adjoined residential properties in the 63 Hz and 125 Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47 dB and 41 dB (Leq,5min), respectively

The gym, studio and co-working spaces are to be provided with sound systems that can play background music.

Planning condition 163 does not stipulate allowable noise levels at frequency bands above 125 Hz. However, section 3.7.1.2 'Entertainment Venues' of 'Planning & Noise, Technical Guidance' issued by Manchester City Council in June 2022 states that in relation to entertainment noise 'the [NR15] curve may be too stringent at mid and higher frequencies'. It is therefore suggested that at frequency bands above 125 Hz, the allowable noise level in apartments due to activity noise from adjoining amenity spaces lies between NR15 and NR20.

With reference to the above, in order to comply with the requirements of condition 163, it is recommended that the internal noise levels within an apartment due solely to music replay in the gym, studio and co-working do not exceed the values given in Table 1.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Apartments above Gym, Studio & Co-working	47	41	26	20	17	15	12

Table 1: Maximum recommended noise levels in residential apartments due to music replay in Gym, Studio and Co-working

The sound level difference between the amenity spaces in question and the apartments directly above each space has been measured. From the measurements, the maximum allowable activity noise levels, including music replay, in the amenity spaces has been determined.

Table 2 identifies the maximum music noise levels that could be generated in the amenity spaces without exceeding the noise limits given in Table 1. The overall dB(A) level of the identified sound spectrum is provided for information only.

Location	Sound pressure level (dB Leq) @ Octave Band Centre Frequency (Hz)							dB(A)
	63	125	250	500	1k	2k	4k	
Studio	80	88	82	78	82	88	91	94
Gym	86	82	77	75	81	88	90	94
Co-working	88	86	80	77	88	90	91	96

Table 2: Maximum allowable noise levels in D2 Trinity Islands gym, studio and co-working re internal noise transfer

The allowable octave band noise levels identified in Table 2 for the various non-residential spaces would allow relatively high levels of music noise to be accommodated, appropriate for each intended room use.

Reference must also be made to the section below relating to noise egress.

NOISE EGRESS FROM GYM, STUDIO, CO-WORKING AND RESIDENTS LOUNGE

The Noise & Vibration section of the Environmental Statement compiled by Fisher Acoustics as referenced by condition 163(a), identifies the maximum allowable external noise levels at the closest noise sensitive receptors due to activity noise breakout from the gym, studio, co-working and residents lounge.

The noise levels given in the Environmental Statement are based on achieving music noise levels at external receptors that are 10 dB below the prevailing background noise levels. Manchester City Council now requires that music noise levels at external receptors are at least 5 dB below the prevailing background noise levels. The allowable music noise levels at external receptors have been revised accordingly.

The maximum allowable external noise levels at the nearest noise sensitive facades (in this instance the apartments of D2 Trinity Islands) are given in Table 3.

Period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00 to 23:00)	63	57	55	53	55	49	42
Night time (23:00 to 07:00)	50	44	44	44	47	41	28

Table 3: Maximum allowable external music noise levels due to gym, studio, co-working and residents lounge

The sound breakout levels from the gym, studio, co-working and residents lounge have been measured by Fisher Acoustics. From the measurements, the allowable internal noise levels to ensure compliance with the external noise limits identified in Table 3 have been determined. In particular, sound breakout from the above spaces to the open window/purge panel of the apartment directly above each space has been measured.

Table 4 identifies the maximum music noise levels that could be generated in the identified amenity spaces without exceeding the noise limits given in Table 3.

Location	Sound pressure level (dB Leq) @ Octave Band Centre Frequency (Hz)							dB(A)
	63	125	250	500	1k	2k	4k	
Studio (07:00 to 23:00)	91	94	95	95	90	87	87	96
Studio (23:00 to 07:00)	80	81	85	86	82	79	73	87
Gym (07:00 to 23:00)	94	96	97	95	89	86	91	97
Gym (23:00 to 07:00)	81	83	86	86	81	78	77	87
Co-working (07:00 to 23:00)	93	94	97	97	90	89	95	100
Co-working (23:00 to 07:00)	80	81	86	88	82	81	81	89
Residents Lounge (07:00 to 23:00)	96	96	102	100	94	91	97	103
Residents Lounge (23:00 to 07:00)	83	83	91	91	86	83	83	92

Table 4: Maximum allowable noise levels in D2 Trinity Islands gym, studio, co-working and residents lounge re noise egress

Given compliance with the noise limits given in Table 4, it is expected that the amenity spaces within the development will be able to operate as intended without causing disturbance to existing and future residential receptors.

It will be noted that the allowable daytime internal noise levels detailed in Table 4 are typically greater than those in Table 2. The applicable internal noise limits for the gym are the lower of the values in Tables 2 and 4.

For ease of reference, Table 5 identifies the maximum allowable noise levels in the gym, taking into account internal noise transfer to the apartments above and noise egress to noise sensitive receptors.

Location	Sound pressure level (dB Leq) @ Octave Band Centre Frequency (Hz)							dB(A)
	63	125	250	500	1k	2k	4k	
Studio (07:00 to 23:00)	80	84	82	78	82	87	87	92
Studio (23:00 to 07:00)	80	81	82	78	82	79	73	85
Gym (07:00 to 23:00)	86	82	77	75	81	86	90	93
Gym (23:00 to 07:00)	81	82	77	75	81	78	77	85
Co-working (07:00 to 23:00)	88	86	80	77	88	89	91	95
Co-working (23:00 to 07:00)	80	81	80	77	82	81	81	87
Residents Lounge (07:00 to 23:00)	96	96	98	96	94	91	95	100
Residents Lounge (23:00 to 07:00)	83	83	91	91	86	83	83	92

Table 5: Maximum allowable noise levels in the D2 Trinity Islands gym, studio, co-working and residents lounge re noise breakout & noise transfer

Compliance with the requirements of condition 163 is fully expected in relation to both noise transfer to the residential accommodation above the gym, studio, co-working and residents lounge and noise breakout to external receptors.

INTERNAL NOISE TRANSFER - IMPACT NOISE FROM GYM

There is the potential for disturbance of residents due to the dropping of weights on the floor in the free weights area of the gym. There is no statutory performance requirement in relation to the transfer of noise from gyms to residential areas. However, guidance has been jointly published by the Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health. In particular, 'ProPG: Gym Acoustics Guidance', published in March 2023, provides suggested maximum noise levels in residential dwellings due to both airborne and impact noise transfer from gyms.

The guidance relates to all gyms, including commercial gyms. It could therefore be argued that the guidance is necessarily more onerous than needs to be the case for a gym that is solely for the use of the residents of the building, as the users of the residents-only gym within D2 can be instructed in the safe use of weights such that the dropping of weights on the floor does not occur frequently.

In addition, the ProPG publication post-dates both the planning submission date for the development and the date of the granting of planning permission.

On this basis, it is not proposed to design for the impact noise targets of the ProPG. However, reasonable and practicable measures have been implemented to mitigate occasional weight drops by users, as described below.

Bedroom 1 of apartment D2.04.01 and the Living Room of apartment D2.04.10 on Level 4 of the building are the closest apartment rooms to the free weights area of the gym.

Measurements of the impact noise levels in these apartment rooms have been undertaken, involving the dropping of a 20 kg kettlebell from a height of 500 mm and the measurement of the subsequent maximum noise level in the rooms.

The proprietary gym flooring installed in the free weights area of the gym is as follows:

- GenieMat FIT70 (70 mm thick) on GenieMat FF25 (25 mm thick) by Pliteq

Figure 3 shows the approximate locations employed for the weight drop tests. The drop locations were at the locations of the free weights benches in the vicinity of a structural column.

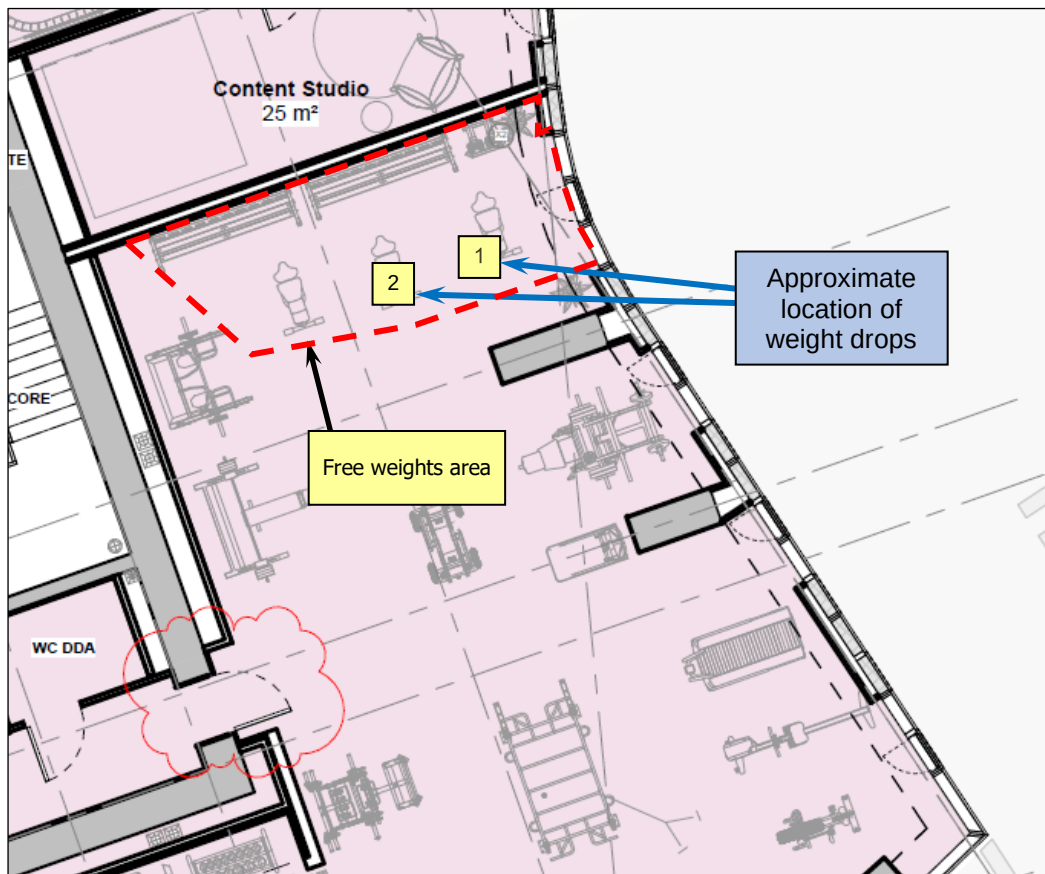


Figure 3: Approximate location of weight drops – D2 Trinity Islands Gym, Level 3

The apartment rooms were not furnished at the time of the measurements. Upon furnishing, the reverberation time of the rooms will reduce which will in turn reduce the resultant noise levels in the room. The measured noise levels have therefore been corrected to determine the expected noise levels upon furnishing of the rooms using the relationship:

$$\text{dB correction} = 10 \log (T_{\text{complete}}) / (T_{\text{tested}})$$

where T_{complete} = expected reverberation time in fully furnished room
 T_{tested} = measured reverberation time in room as tested

Table 6 identifies the applicable dB correction for the apartment bedroom under test.

Room	One-third Octave Band Centre Frequency (Hz)														
	<63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k
Bedroom, assumed when furnished	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Bedroom, as tested	-	0.6	0.8	0.6	0.8	0.9	0.7	0.5	0.4	0.5	0.6	0.7	0.8	0.9	0.8
dB correction	0	0.9	1.8	0.6	1.8	2.5	1.5	0.4	0*	0	0.6	1.7	1.9	2.6	1.9

Table 6: Derivation of noise reduction following full furnishing of bedroom

**Correction applied if measured RT is greater than Actual when complete*

Table 7 identifies the applicable dB correction for the apartment living room under test.

Room	One-third Octave Band Centre Frequency (Hz)														
	<63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k
Living Room, assumed when furnished	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Living Room, as tested	-	0.6	0.6	0.6	0.8	1.3	1.3	1.22	1.4	1.4	1.4	1.7	1.9	2.0	2.1
dB correction	0	0.7	0.8	0.9	2.2	4.0	4.1	3.9	4.4	4.4	4.4	5.2	5.8	6.1	6.2

Table 7: Derivation of noise reduction following full furnishing of living room

Figure 4 shows the typical measured maximum noise level (L_{fmax}) in Bedroom 1 of apartment D2.04.01 directly above the gym due to 20 kg kettlebell drops on the installed floor covering and also identifies the G25 curve from the ProPG document. The G25 curve gives the maximum recommended daytime impact sound levels (L_{fmax}) in residential rooms suggested in the ProPG guidance document referenced above.

Figure 5 shows the measured noise levels (L_{fmax}) in the apartment D2.04.10 Living Room directly above the gym due to kettlebell drops onto the installed floor covering and also identifies the G25 curve from the ProPG document.

The typical measured maximum L_{fmax} noise level in the rooms in the absence of noise from the gym is also plotted on the charts. These typical 'ambient' maximum noise levels were due to external road traffic with the windows/purge panels closed.

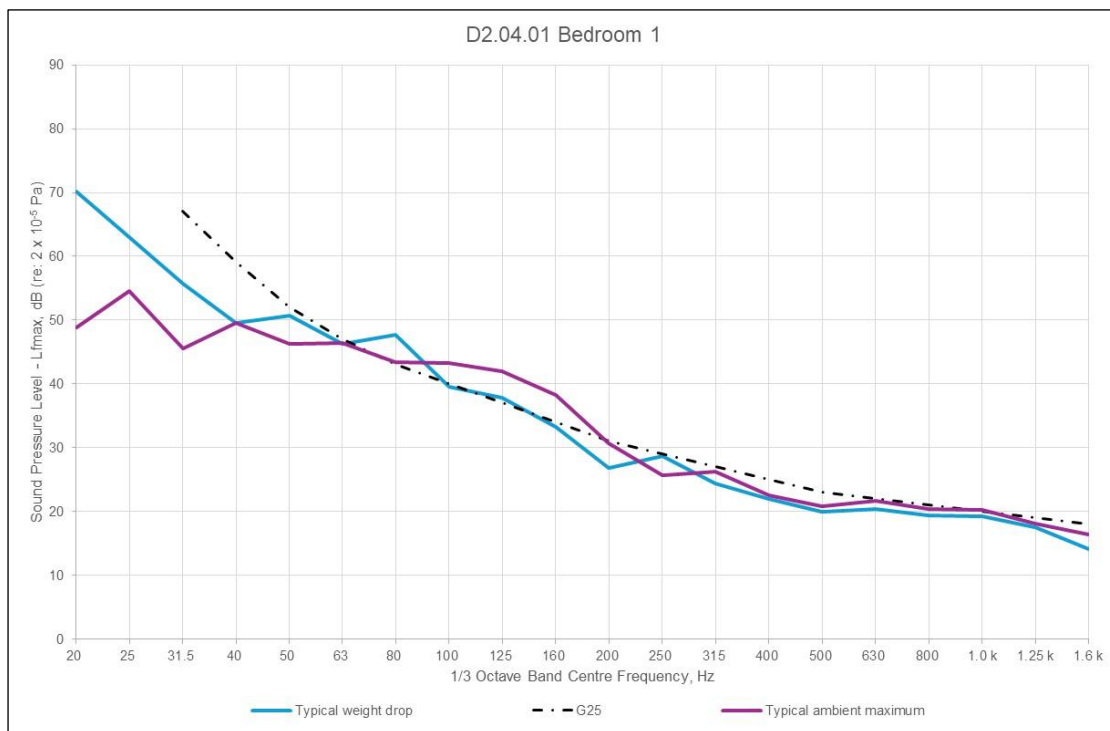


Figure 4: Measured gym impact noise levels in D2.04.01 Bedroom 1 - 20kg kettlebell

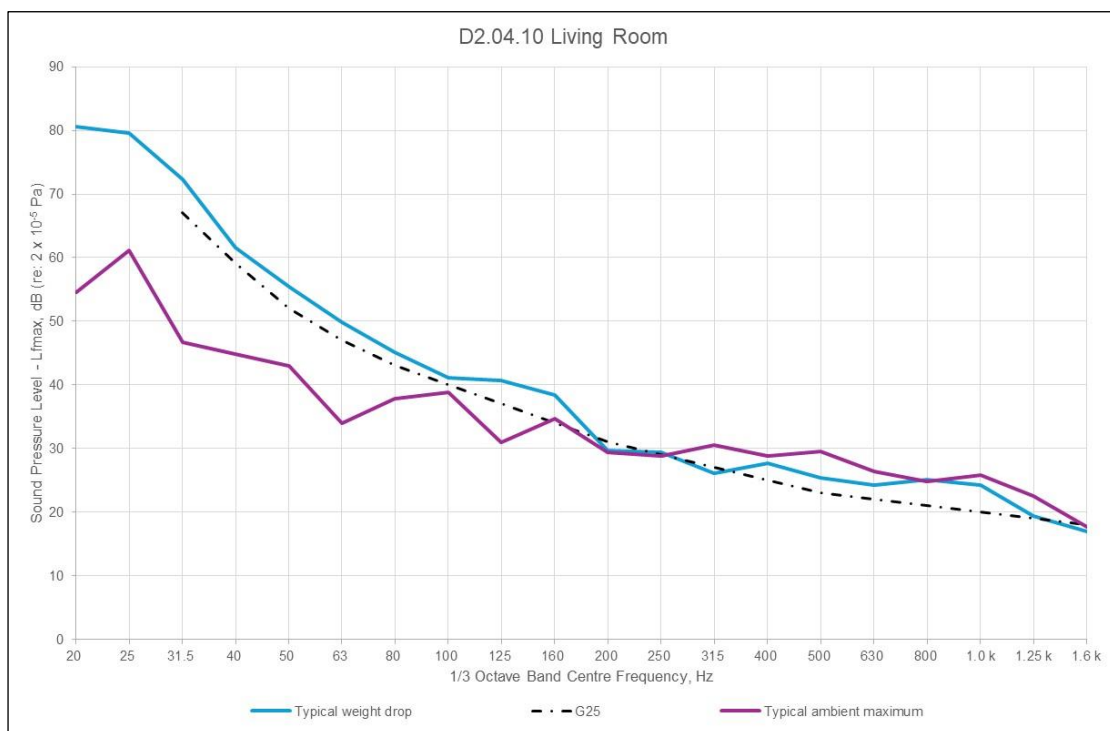


Figure 5: Measured gym impact noise levels in D2.04.10 Living Room - 20kg kettlebell

It can be seen that the typical measured maximum impact noise level in the bedroom exceeds the G25 curve in only one 1/3 octave band by 4dB. The excess over the G25 is similar to the excess over the curve generated by typical maximum noise events due to road traffic. The excesses over the G25 above 250Hz were caused by traffic movements that occurred during the measurements of weight drops.

It can also be seen that the typical measured maximum impact noise level in the living room exceeds the G25 curve by between 1dB and 3.5 dB between 31.5 Hz and 160 Hz. These exceedances are not considered to be significant.

It is considered that the measured impact noise levels are consistent with the maintenance of residential amenity and therefore compliant with the requirements of planning condition 163.

It should also be noted that the gym is for the use of residents only. Therefore users of the gym are expected to be instructed in the safe use of weights such that the dropping of free weights is minimised as far as possible.

CONCLUSION

With reference to the assessments detailed above, compliance with the requirements of condition 163 of the planning permission for Trinity Islands Plot D2, Manchester is expected, such that the residents lounge, gym, studio and co-working within the development will be able to operate as intended whilst maintaining residential amenity at residential receptors both within and external to the building.

If there are any aspects that you would like to discuss, please do not hesitate to contact the undersigned.

