ACOUSTIC REPORT

Forever 22, 5 Nobel Way, Manchester

Client: Forever 22
Project: Forever 22, 5 Nobel Way, Manchester
ACA Ref: 240703-R001
Report date: August 9, 2024
Author: Tommy Burn BSc (Hons) MIOA

Acoustic Commissioning Assessment of Installed Mechanical Services Equipment and Internal Sound Insulation

Following installation of mechanical services equipment and the fit-out of the interior of the ground floor commercial unit at 5 Nobel Way, Manchester, ACA Acoustics have visited site to undertake commissioning testing.

The assessment is required to discharge two conditions issued by Manchester City Council.

Condition 19 relates to noise from mechanical services equipment:

> *Condition 19: Prior to occupation of the development a scheme for the acoustic insulation of any externally mounted ancillary equipment to ensure that it achieves a background noise level of 5dB below the existing background (LA90) in each octave band at the nearest noise sensitive location 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 equipment. The approved scheme shall be implemented prior to occupancy and shall remain operational thereafter.*

It is understood that Manchester City Council require the installed mechanical plant to not exceed a rating level 5dB below the measured background sound level when assessed in accordance with the methodology of BS 4142:2014+A1:2019.

Condition 28 relates to operational noise as follows:

> *Condition 28: The Commercial Units shall be acoustically insulated in accordance with the Recommendations in Deloitte, Noise Impact, Phase 1B Circle Square dated January 2016 by Fisher Acoustics and the specifications in relation to structure bourne noise as set out in Fisher Acoustics letter dated 6th April 2016 with the implementation of these approved works to be confirmed within a Verification Report to be submitted to and approved in writing by the City Council as Local Planning Authority prior to occupation of any part of the development. The approved measures shall remain in situ whilst the use or development is in operation. For the avoidance of doubt any changes to the approved the structure are prohibited at any time without written approval of the planning authority.*

The Deloitte, Noise Impact, Phase 1B Circle Square report details requirements of operational noise levels as follows:

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, 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.

Sound Level Survey

Assessment of Installed Mechanical Plant

ACA Acoustics have assessed the sound levels from the installed plant at the nearest and most sensitive windows as shown in Figure 1 below.

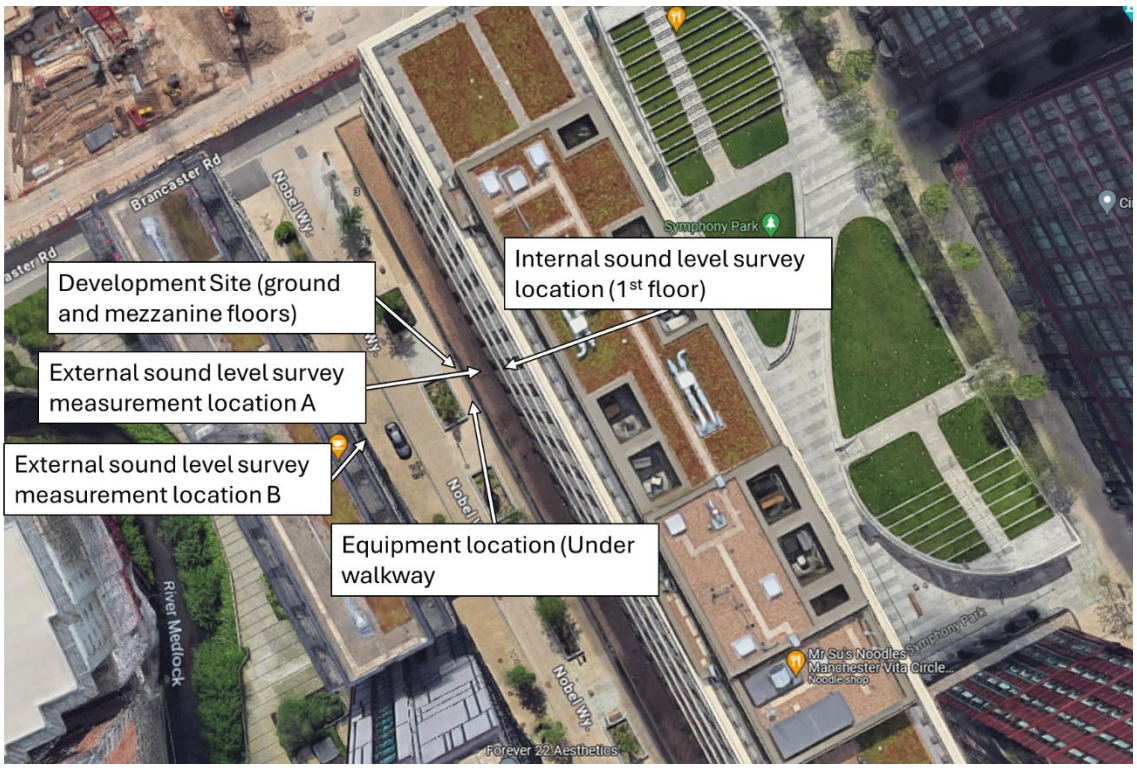


Figure 1: Sound level survey measurement location

Tommy Burn of ACA Acoustics visited site to undertake the commissioning survey during the evening of the 18th July 2024. Sound levels were measured while the plant was operating, and after the plant powered off during the evening period.

The following equipment was used during the survey; the sound level meter was calibrated before the survey and checked after with no deviation noted.

Equipment	Serial Number
NTi Audio Class 1 sound level meter type XL2-TA	A2A-16877-E0
Svantek calibrator type SV33B. Compliant to IEC 60942:2003	57595

Table 1: Equipment used for the sound level survey

Summary results are shown in the table below.

Sound Level Survey	Description	Equipment Operation	Level at Receptor
4th July 2024	Installed equipment operating measured at external position A	All equipment powered on	LAeq 56dB LA90 54dB
		All equipment powered off	LAeq 56dB LA90 54dB
	Installed equipment operating measured at external position B	All equipment powered on	LAeq 56dB LA90 54dB
		All equipment powered off	LAeq 56dB LA90 54dB

Table 2: Measured sound level survey results

At each measurement location, the LAeq and LA90 sound levels do not change with the equipment running and powered off. Due to the continuous running nature of the installed mechanical plant, the LA90 sound level not changing is a good indication that the specific sound levels are at least 10dB below the measured LA90 sound level. This correlates with the subjective opinion of the author; the equipment was subjectively inaudible over the prevailing acoustic climate. Noise levels from the equipment are at least 10dB below the measured background sound level of LA90 54dB at all external noise sensitive windows.

Assessment of the calculated rating levels in accordance with BS 4142:2014+A1:2019 is provided in Table 3 below.

Description	All Equipment Operating	Relevant Clause	Commentary
Measured ambient sound level at receptor	LAeq 54dB		All equipment operating as witnessed by ACA Acoustics' consultant
Measured residual sound level at receptor	LAeq 54dB		All equipment powered off
Calculated specific sound level to receptor	LAeq ≤44dB	7.1 7.3.6	Measured residual sound level subtracted from the measured ambient sound level

Description	All Equipment Operating	Relevant Clause	Commentary
Background sound level	LA90 54dB	8.1.3 8.3	Measured representative background sound level.
Acoustic feature correction	0dB	9.2	The equipment was inaudible at the receptor locations and there are no tonal/impulsivity/intermittency components.
Rating level	LAr ≤44dB	9.2	
Excess of rating level over background sound level	**≤-10dB**	**11**	**Assessment indicates low likelihood of adverse impact**

Table 3: BS 4142:2014+A1:2019 Assessment

Measured rating levels with the plant operating are significantly below the measured background sound levels and comfortably achieve the requirements of Manchester City Council and Condition 19 may be discharged.

Assessment of Operational Noise

Sound insulation tests were carried out between the existing unit and adjoining residential flat number 104. Tests were conducted in accordance with the methodology of BS EN ISO 16283-1:2014.

Summary results are shown in the table below. Full results graphs from the sound insulation tests are shown in Appendix A.

Source Room	Receiving Room	Weighted Level Difference D,w (dB)	Low Frequency Level Difference D (dB)	
			63Hz D (dB)	125Hz D (dB)
Mezzanine Treatment Room	Flat 104 Living Room	75	46	55
Mezzanine Treatment Room	Flat 104 Bedroom	76	47	60
Open Mezzanine Circulation Space	Flat 104 Living Room	66	44	52
Open Mezzanine Circulation Space	Flat 104 Bedroom	67	43	54
Open Mezzanine Circulation Space	External Façade	35		

Table 4: Sound insulation test results

The sound insulation results confirm that the separating floor is providing an excellent standard of insulation.

The proposed operators are a beauty clinic where only background music will be played at a low level. Based on the measured sound insulation performance, and anticipated proposed operation, sound levels from entertainment noise will be significantly below the required sound levels of LAeq 47dB and 41dB at 63Hz and 125Hz respectively, meeting the requirements of Condition 28.

Performance of the sound insulation through the open mezzanine circulations space floor are lower than those from the treatment room. This is likely to be due to a more direct transmission path to the rooms above from the circulation space.

The client has proposed that only background music will be played within the ground and mezzanine level unit, and as such sound levels will be subjectively inaudible within the first-floor residential flats

While on site the acoustic performance of the external façade was measured at Dw 35dB. The full graph is shown in Appendix A.

Internal sound levels within the unit are not anticipated to exceed a sound level of LAeq 70dB. This has been measured in similar retail units with background music. At this level, based on the measured façade sound insulation, external sound levels will not exceed LAeq 37dB, which is 17dB below the measured background sound level of LA90 54dB, and meets the requirements of Condition 28.

Noise emissions from the proposed use will be inaudible to inside or outside any nearby noise-sensitive properties and it is recommended that Condition 28 may be discharged.

Appendix A

Sound Insulation Results

Level Difference Measured in Accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Project Name	Forever 22, 5 Nobel Way, Manchester	**Client**	
Project Reference	240703	**Test Date**	31/07/2024

240703-ASI-AF01

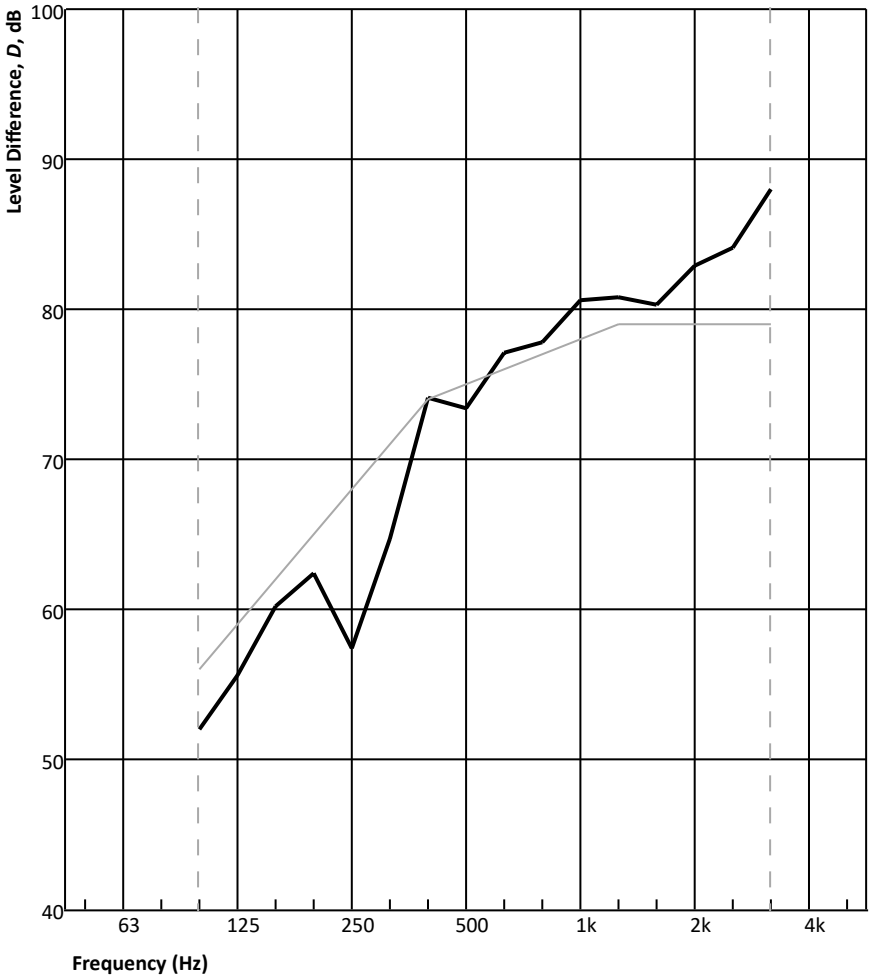
Test on Floor between Mezzanine Treatment Room and Flat 104 Living Room

Description and identification of the building construction:

Source Room Volume (m^3) -

Receive Room Volume (m^3) -

	D (one-third octave) dB
50	-
63	-
80	-
100	52.0
125	55.6
160	60.2
200	62.4
250	57.4
315	64.7
400	74.1
500	≥ 73.4
630	≥ 77.1
800	≥ 77.8
1k	≥ 80.6
1,25k	≥ 80.8
1,6k	≥ 80.3
2k	≥ 82.9
2,5k	≥ 84.1
3,15k	≥ 88.0
4k	-
5k	-



Rating according to ISO 717-1

D_w (C ; C_{tr}) = 75 (-3 ; -8) dB;

$C_{50\text{-}3150}$ = -4 dB; $C_{50\text{-}5000}$ = -3 dB; $C_{100\text{-}5000}$ = -2 dB

$C_{tr,\ 50\text{-}3150}$ = -12 dB; $C_{tr,50\text{-}5000}$ = -12 dB; $C_{tr,100\text{-}5000}$ = -8 dB

Evaluation based on field measurement results obtained by an engineering method

Date: 12/08/2024

Name of Test Institute: ACA Acoustics

Report Reference: 240703 R1

Signature: Tommy Burn

ACA Acoustics Limited
Head Office: 12 Sheep Street, Highworth, Wiltshire, SN6 7AA Tel: 01793 766 324
London Office: 3 Shortlands, Hammersmith, London, W6 8DA Tel: 0203 609 8733

www.aca-acoustics.co.uk

Level Difference Measured in Accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Project Name	Forever 22, 5 Nobel Way, Manchester	**Client**	
Project Reference	240703	**Test Date**	31/07/2024

240703-ASI-AF02

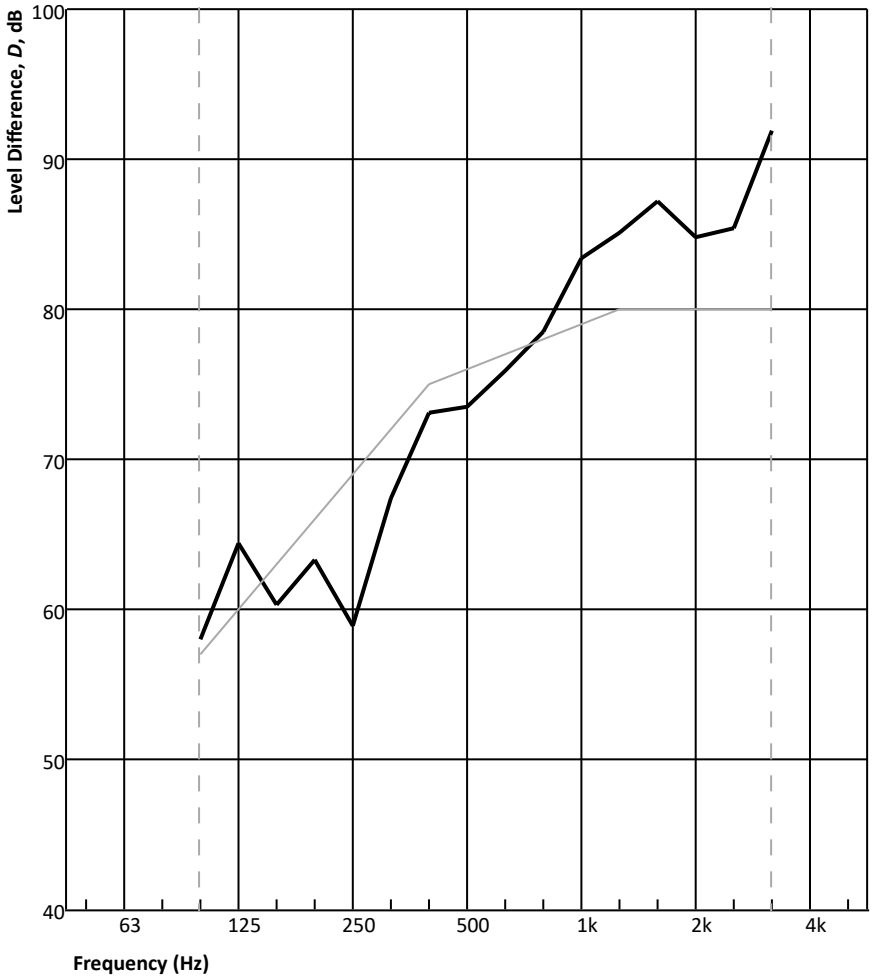
Test on Floor between Mezzanine Treatment Room and Flat 104 Bedroom

Description and identification of the building construction:

Source Room Volume (m^3) -

Receive Room Volume (m^3) -

	D (one-third octave) dB
50	-
63	-
80	-
100	58.0
125	64.4
160	60.3
200	63.3
250	58.9
315	67.4
400	73.1
500	73.5
630	75.9
800	78.5
1k	83.4
1,25k	85.1
1,6k	≥ 87.2
2k	84.8
2,5k	85.4
3,15k	≥ 91.9
4k	-
5k	-



Rating according to ISO 717-1

D_w (C ; C_{tr}) = 76 (-2 ; -6) dB;

$C_{50\text{-}3150}$ = -3 dB; $C_{50\text{-}5000}$ = -2 dB; $C_{100\text{-}5000}$ = -1 dB

$C_{tr,\,50\text{-}3150}$ = -11 dB; $C_{tr,50\text{-}5000}$ = -11 dB; $C_{tr,100\text{-}5000}$ = -6 dB

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Level Difference Measured in Accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Project Name	Forever 22, 5 Nobel Way, Manchester	**Client**	
Project Reference	240703	**Test Date**	31/07/2024

240703-ASI-AF03

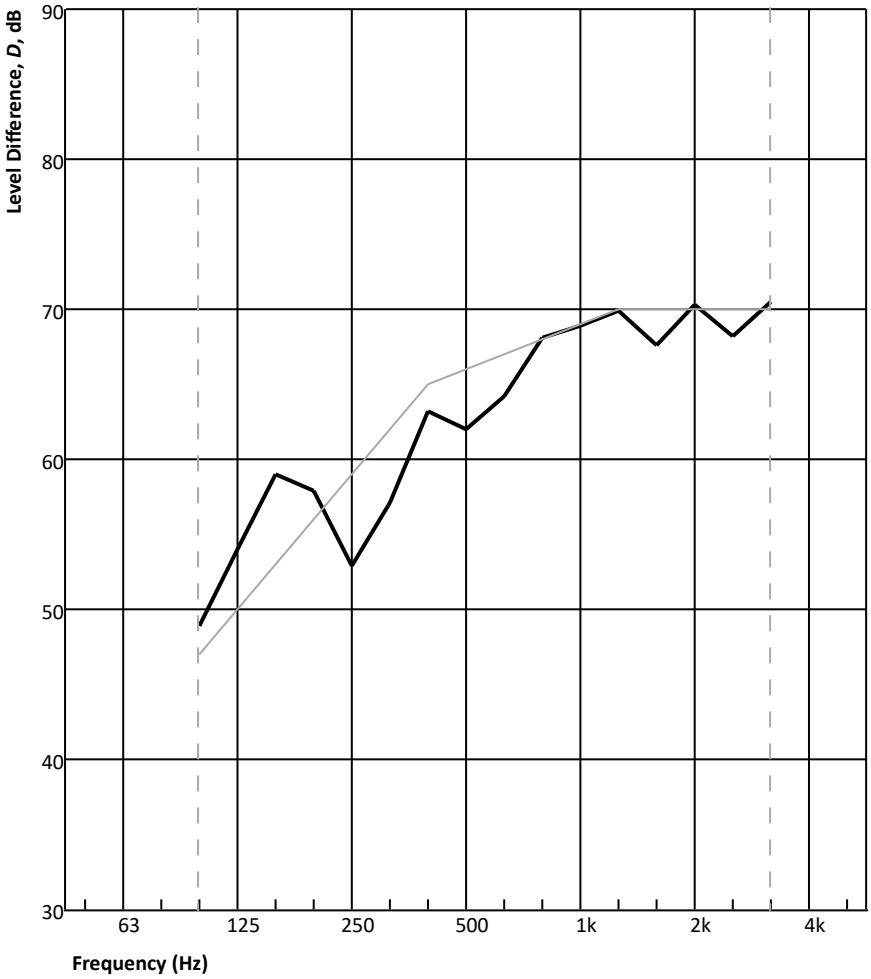
Test on Floor between Mezzanine Open Space and Flat 104 Living Room

Description and identification of the building construction:

Source Room Volume (m^3) -

Receive Room Volume (m^3) -

	D (one-third octave) dB
50	-
63	-
80	-
100	48.9
125	54.0
160	59.0
200	57.9
250	52.9
315	57.1
400	≥ 63.2
500	62.0
630	64.2
800	≥ 68.1
1k	≥ 68.9
1,25k	≥ 69.9
1,6k	≥ 67.6
2k	≥ 70.3
2,5k	68.2
3,15k	70.5
4k	-
5k	-



Rating according to ISO 717-1

D_w (C ; C_{tr}) = 66 (-1 ; -4) dB;

$C_{50\text{-}3150}$ = -1 dB; $C_{50\text{-}5000}$ = 0 dB; $C_{100\text{-}5000}$ = 0 dB

$C_{tr,\,50\text{-}3150}$ = -7 dB; $C_{tr,50\text{-}5000}$ = -7 dB; $C_{tr,100\text{-}5000}$ = -4 dB

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Level Difference Measured in Accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Project Name	Forever 22, 5 Nobel Way, Manchester	**Client**	
Project Reference	240703	**Test Date**	31/07/2024

240703-ASI-AF04

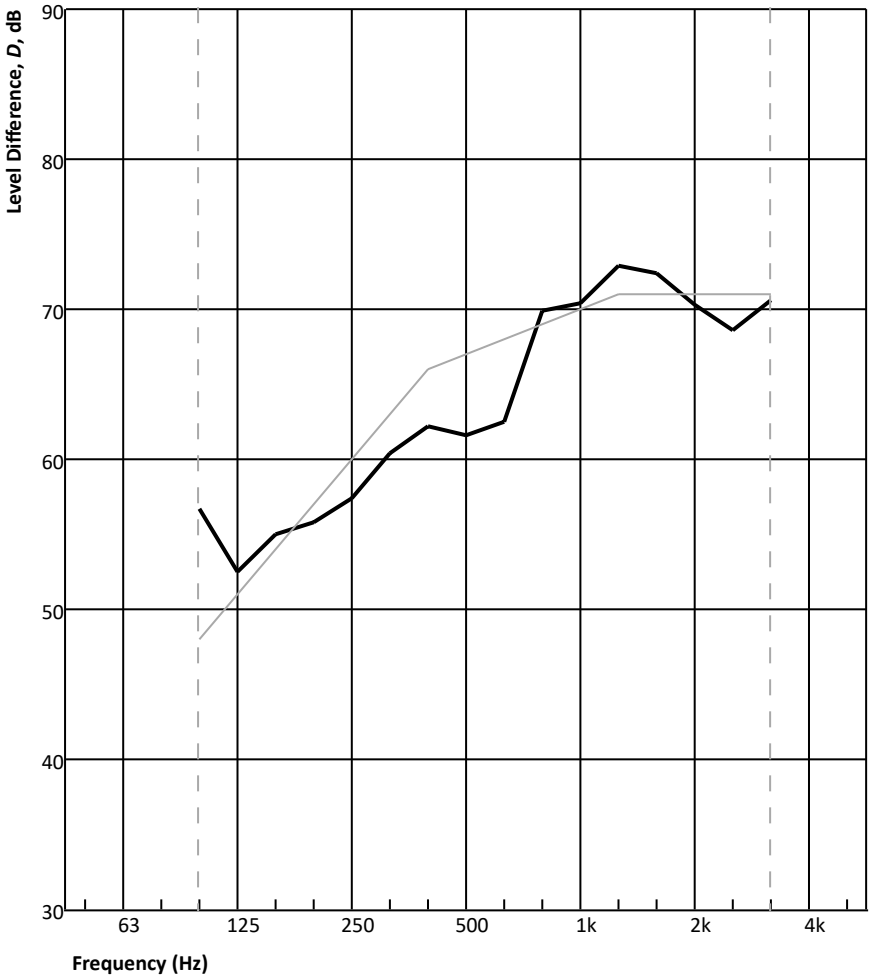
Test on Floor between Mezzanine Open Space and Flat 104 Bedroom

Description and identification of the building construction:

Source Room Volume (m^3) -

Receive Room Volume (m^3) -

	D (one-third octave) dB
50	-
63	-
80	-
100	56.7
125	52.5
160	55.0
200	55.8
250	57.4
315	60.4
400	62.2
500	61.6
630	62.5
800	69.9
1k	70.4
1,25k	72.9
1,6k	72.4
2k	70.3
2,5k	68.6
3,15k	70.6
4k	-
5k	-



Rating according to ISO 717-1

D_w (C ; C_{tr}) = 67 (-1 ; -4) dB;

$C_{50\text{-}3150}$ = -1 dB; $C_{50\text{-}5000}$ = 0 dB; $C_{100\text{-}5000}$ = 0 dB

$C_{tr,\,50\text{-}3150}$ = -7 dB; $C_{tr,50\text{-}5000}$ = -7 dB; $C_{tr,100\text{-}5000}$ = -4 dB

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Level Difference Measured in Accordance with ISO 140-4

Field measurements of airborne sound insulation between rooms

Project Name	Forever 22, 5 Nobel Way, Manchester	**Client**	
Project Reference	240703	**Test Date**	31/07/2024

240703-ASI-AW01

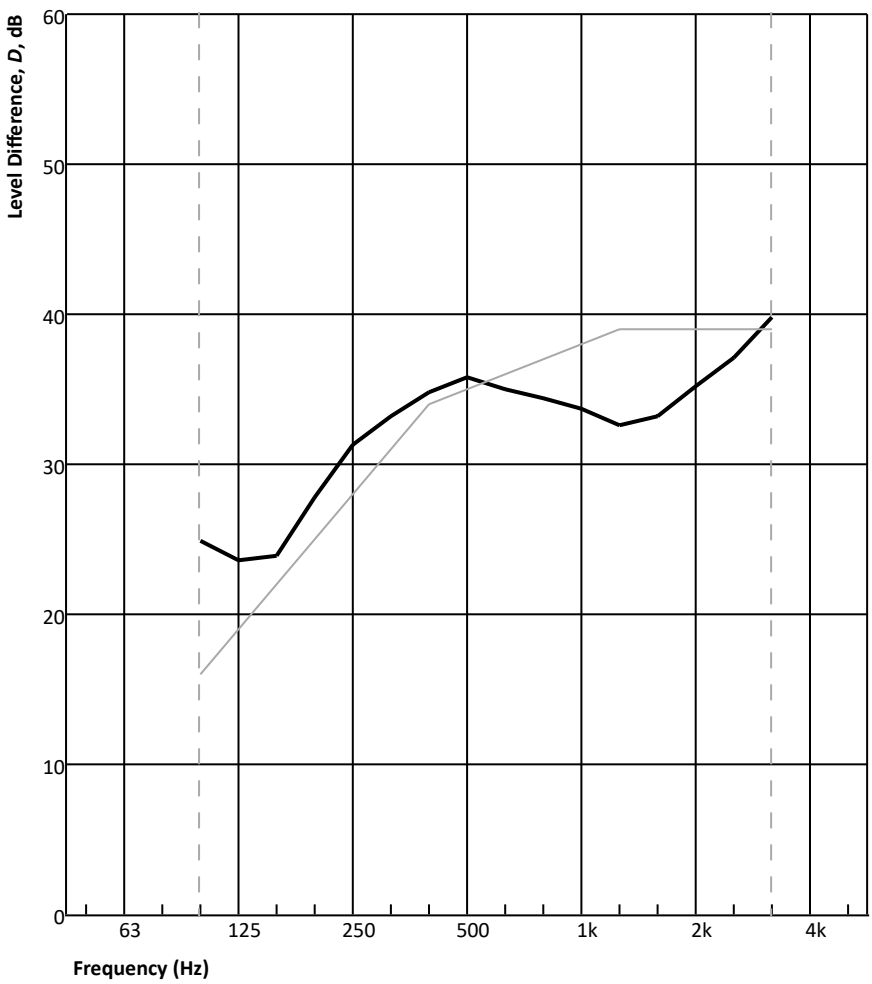
Test on Wall between Mezzanine Open Space and Front facade

Description and identification of the building construction:

Source Room Volume (m^3) -

Receive Room Volume (m^3) -

	D (one-third octave) dB
50	-
63	-
80	-
100	24.9
125	23.6
160	23.9
200	27.8
250	31.3
315	33.2
400	34.8
500	35.8
630	35.0
800	34.4
1k	33.7
1,25k	32.6
1,6k	33.2
2k	35.2
2,5k	37.1
3,15k	39.8
4k	-
5k	-



Rating according to ISO 717-1

D_w (C ; C_{tr}) = 35 (-1 ; -2) dB;

$C_{50\text{-}3150}$ = -1 dB; $C_{50\text{-}5000}$ = 0 dB; $C_{100\text{-}5000}$ = 0 dB

$C_{tr,\ 50\text{-}3150}$ = -3 dB; $C_{tr,50\text{-}5000}$ = -3 dB; $C_{tr,100\text{-}5000}$ = -2 dB

Evaluation based on field measurement results obtained by an engineering method

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