

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Memo: M001-A

Date: 1 August 2024

Project: 024609

Pages: 10

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Reviewer: Mark Howarth

AP House, 35 King Street, Manchester

Noise assessment for Planning Condition 5a

As required for Planning Condition 5a, this memo provides a review of the building envelope sound insulation and sets operational noise limits for internal sound amplification systems.

Basis

This memo is based on the following information:

- 1368_AP Manchester - 2F Ceiling Details
- P.01.302 PROPOSED - REAR ELEVATION
- AV installation information received 29 July 2024 via email.

Acoustic criteria

Manchester City Council (MCC)

Manchester City Council stipulates the following in regard to noise from entertainment noise:

‘Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location’

Based on the results of noise survey detailed in Sandy Brown report *024609-R01-B Noise planning report*, typical background noise levels at all nearby noise sensitive receptors during daytime and nighttime are summarised in Table 1.

Table 1 Typical spectral background noise levels at noise sensitive receptors

Time of day	Sound pressure level (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00-23:00)	46	45	43	40	37	32	24
Nighttime(23:00-07:00)	43	42	40	38	33	28	18

The nearest noise sensitive receptor to the site during the daytime are offices in the upper floors of 37 King St, highlighted in yellow.

The nearest residential noise sensitive premises are 55-68 King Street, approximately 10 m south of the site, highlighted in pink. St Ann' Square Apartments is also a residential receptor approximately 50 m north of the site, which is highlighted in dark red.

An aerial view of the site is provided in Figure 1.

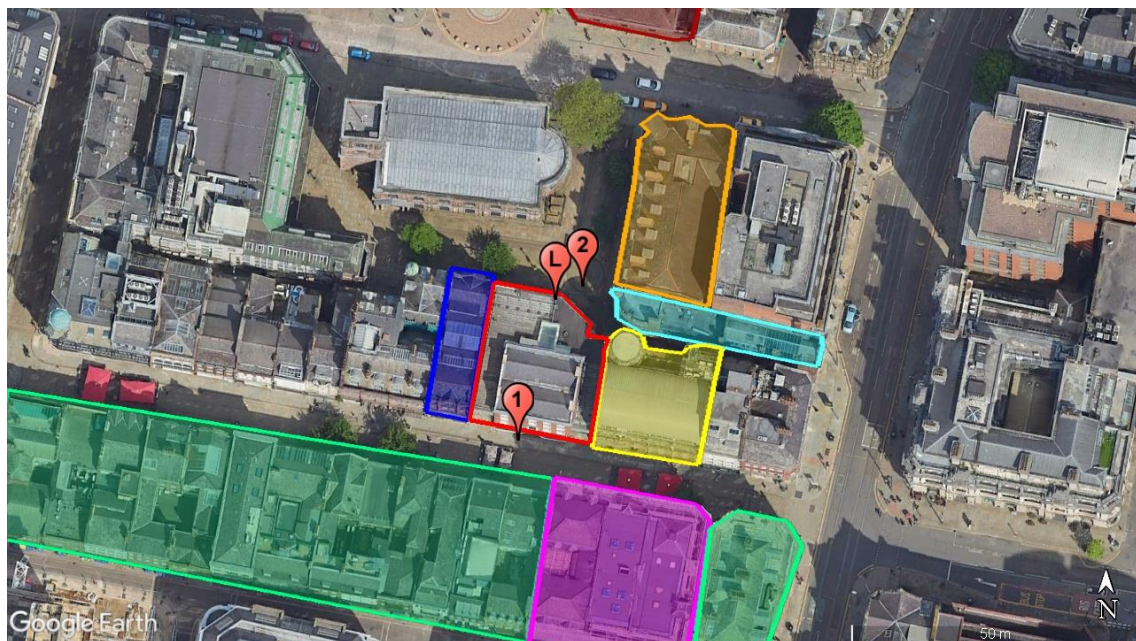


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

Planning condition 5a

Planning condition 5a states the following requirement:

‘Prior to the first use of the ancillary bar and entertainment areas of the building, a scheme to acoustically insulate the internal areas of the premises and control the noise levels on the external terrace to limit the breakout of noise shall be submitted for approval in writing by the City Council as Local Planning Authority. The scheme

shall be implemented in full before the first use of bar and entertainment areas of the building.'

Description of building envelope

The 'building envelope' refers to the facade, windows, roof, roof-lights, ventilation openings, and any other external envelope element of the buildings.

The existing facade is made up of approximately 400 mm thick blockwork.

The existing sash windows contain 4 mm thick single glazing. They are to be refurbished and made good as part of the proposed works. An existing glazed canopy is understood to be retained with part of the structure being cut back.

There are no proposed works to the existing slate roof.

Assessment

Noise limits outside nearby noise sensitive receptors

Based on the requirements of MCC and noise survey data, the spectral entertainment noise limits at nearby noise sensitive receptors are shown in Table 2.

Table 2 Spectral noise limits at 1 m from noise sensitive receptor

Time period	Sound pressure level limit at 1 m from noise sensitive receptor, L_{Aeq} (dB)						
	Octave band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00-23:00)	41	40	38	35	32	27	19
Nighttime (23:00-07:00)	38	37	35	33	28	23	13

Noise egress levels from internal areas will depend on the sound insulation of the building envelope, the distance from the building envelope to the receptor and internal amplified sound levels.

Sound insulation of building envelope

The expected sound insulation performance of each element of the facade is summarised in Table 3.

The door proposed from the level 2 gallery to the external terrace is understood to be a metal-framed glass door. It has been assumed that the doorset will achieve at least the same sound insulation performance as the existing single glazed windows.

Table 3 Expected sound insulation performance of facade elements

Element	Expected sound insulation performance, R_w (dB)						
	Octave band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
400 mm existing blockwork	37	37	42	51	58	58	58
Single sash glazed windows	10	14	19	23	28	26	32
Metal framed glazed doorset	10	14	19	23	28	26	32

Operational noise limits

The nearest affected facade during the daytime is to the 4th floor office of 37 King Street, which overlooks the terrace. The nearest night-time noise sensitive premises is 58-66 King Street, which has recently changed in use to a residential property.

Control of noise transfer to 37 King Street

The nearest internal space within the development is a gallery on the second floor. This has a door which opens to the terrace which is approximately 15m from the nearest office window in 37 King Street, as shown in Figure 2. Ceiling mounted loudspeakers are proposed for the gallery space to play background music.

Limits for background music in the gallery space have been calculated on the basis that the door to the terrace could be open or closed. The calculations are provided in Appendix A. Recommended limits within the gallery space are provided in Table 4.

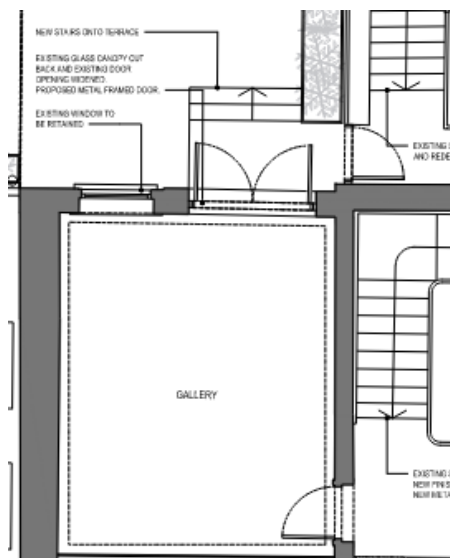


Figure 2 Layout of Level 2 gallery with external door to terrace

Control of noise transfer to St Ann's apartments

Due to distance attenuation, the levels incident at 1 m from St Ann's Square apartments are expected to be approximately 34 dB lower than those outside of 37 King Street offices and will therefore be significantly lower than the required criteria. As a result, both the daytime and nighttime limits are expected to be achieved based on the limits set in

Table 4 being adhered to.

Control of noise transfer to 58-66 King Street

A lounge/music room is proposed on the first floor of the property along the King Street facade. This will contain an audio-visual equipment for watching television and listening to music. The proposed layout is shown in Figure 3. The audio equipment in this space is intended to be capable of achieving higher sound levels than in other rooms. As such, limits have been set specifically for this space in

Table 4.

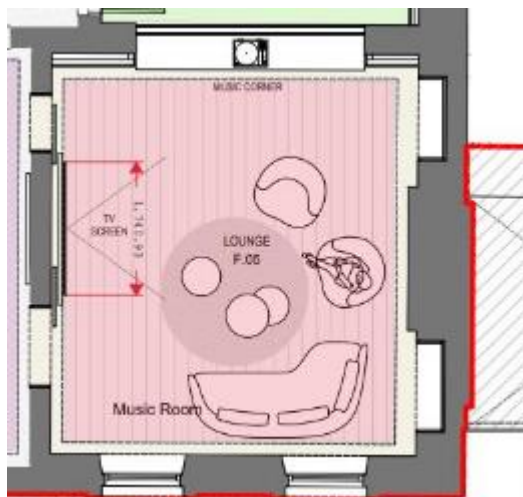


Figure 3 Proposed music room along King Street facade

It is understood that the apart from the lounge/music room, all amplified music will be background music, which can be controlled room by room to adjust levels. It should be made sure that background music levels in all other gallery spaces are 10 dB below the noise limits set for the lounge/music room.

For all spaces, we advise password-protected electronic limiters be used to control noise levels to meet the recommended limits. These should be set during commissioning of the audio systems.

The internal amplified noise limits during are set out in Table 4. Example calculations demonstrating compliance with noise limits within each octave band at 58-66 King Street and Level 4 offices in 57 King Street in Appendix A

Table 4 Internal amplified sound limits

Space	Maximum amplified noise limits, $L_{eq,5min}$ (dB)							
	Octave band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
<i>Daytime</i>								
Music room (windows closed)	76	79	82	82	84	78	76	67
All other spaces (windows & external doors closed)	66	69	72	72	74	68	66	57
Level 2 rear gallery (door open)	66	62	62	61	63	58	56	48
<i>Nighttime</i>								
Music room	73	76	80	80	81	74	70	66
All other spaces (windows & external doors closed)	66	69	71	65	61	60	55	50
Level 2 rear gallery (door open)	62	58	59	59	59	54	50	46

Appendix A

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Project name	AP House	Project number	024609
Calculation revision		Date created	01/08/2024
Engineer	JP	Date checked	
Checked by			

Calculation description Calculation of breakout from music room to 58-66 King St at daytime (07:00-23:00)

Item	Notation	Octave band centre frequency (Hz)								dBA/Xw	NR
		63	125	250	500	1000	2000	4000	8000		
Source 1 Lw	Lw1									#VALUE!	0
Source 2 Lw	Lw2									#VALUE!	0
Source 3 Lw	Lw3									#VALUE!	0
Source 4 Lw	Lw4									#VALUE!	0
Source 5 Lw	Lw5									#VALUE!	0
Source 6 Lw	Lw6									#VALUE!	0
Total Lw	Lw									#VALUE!	#VALUE!
Source room RT	RT										
Room SPL (calculated)		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Room SPL (if known)		76	79	82	82	84	78	76	67	86.9	84
Room SPL	SPL	76.0	79.0	82.0	82.0	84.0	78.0	76.0	67.0	86.9	84
<i>Masonry/Blockwork</i>											
Element SRI	R'w2	37.0	37.0	42.0	51.0	58.0	58.0	58.0	57.0		
Element source	Lwe1	44.2	47.2	45.2	36.2	31.2	25.2	23.2	15.2	40.0	36
Distance attenuation	At1	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0		
Directivity (offset) correction	Dc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac1	3	3	3	3	3	3	3	3		
Total level at receiver	SPL1	19.2	22.2	20.2	11.2	6.2	0.2	-1.8	-9.8	15.0	9
<i>Single glazing</i>											
Element SRI	R'w2	10.0	14.0	19.0	23.0	28.0	26.0	32.0	31.0		
Element source	Lwe2	65.1	64.1	62.1	58.1	55.1	51.1	43.1	35.1	60.5	56
Distance attenuation	At2	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0		
Directivity (offset) correction	Dc2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac2	3	3	3	3	3	3	3	3		
Total level at receiver	SPL2	40.1	39.1	37.1	33.1	30.1	26.1	18.1	10.1	35.5	31
Total level at NSP	SPL(r)	40.2	39.2	37.2	33.2	30.1	26.1	18.2	10.2	35.6	31

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Project name	AP House	Project number	024609
Calculation revision		Date created	01/08/2024
Engineer	JP	Date checked	
Checked by			

Calculation description Calculation of breakout from music room to 58-66 King St at nighttime (23:00-07:00)

Item	Notation	Octave band centre frequency (Hz)								dBA/Xw	NR
		63	125	250	500	1000	2000	4000	8000		
Source 1 Lw	Lw1									#VALUE!	0
Source 2 Lw	Lw2									#VALUE!	0
Source 3 Lw	Lw3									#VALUE!	0
Source 4 Lw	Lw4									#VALUE!	0
Source 5 Lw	Lw5									#VALUE!	0
Source 6 Lw	Lw6									#VALUE!	0
Total Lw	Lw									#VALUE!	#VALUE!
Source room RT	RT										
Room SPL (calculated)		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Room SPL (if known)		73	76	80	80	81	74	70	66	83.8	81
Room SPL	SPL	73.0	76.0	80.0	80.0	81.0	74.0	70.0	66.0	83.8	81
<i>Masonry/Blockwork</i>											
Element SRI	R'w2	37.0	37.0	42.0	51.0	58.0	58.0	58.0	57.0		
Element source	Lwe1	41.2	44.2	43.2	34.2	28.2	21.2	17.2	14.2	37.6	34
Distance attenuation	At1	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0		
Directivity (offset) correction	Dc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac1	3	3	3	3	3	3	3	3		
Total level at receiver	SPL1	16.2	19.2	18.2	9.2	3.2	-3.8	-7.8	-10.8	12.6	7
<i>Single glazing</i>											
Element SRI	R'w2	10.0	14.0	19.0	23.0	28.0	26.0	32.0	31.0		
Element source	Lwe2	62.1	61.1	60.1	56.1	52.1	47.1	37.1	34.1	57.9	53
Distance attenuation	At2	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0		
Directivity (offset) correction	Dc2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac2	3	3	3	3	3	3	3	3		
Total level at receiver	SPL2	37.1	36.1	35.1	31.1	27.1	22.1	12.1	9.1	32.9	28
Total level at NSP	SPL(r)	37.2	36.2	35.2	31.2	27.1	22.1	12.2	9.2	32.9	28

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Consultants in Acoustics, Noise & Vibration

Project name	AP House	Project number	024609
Calculation revision	A		
Engineer	JP	Date created	30/07/2024
Checked by		Date checked	

Calculation description Calculation of Level 2 gallery limits (door open)

Item	Notation	Octave band centre frequency (Hz)								dBA/Xw	NR
		63	125	250	500	1000	2000	4000	8000		
Source 1 Lw	Lw1									#VALUE!	0
Source 2 Lw	Lw2									#VALUE!	0
Source 3 Lw	Lw3									#VALUE!	0
Source 4 Lw	Lw4									#VALUE!	0
Source 5 Lw	Lw5									#VALUE!	0
Source 6 Lw	Lw6									#VALUE!	0
Total Lw	Lw									#VALUE!	#VALUE!
Source room RT	RT										
Room SPL (calculated)		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Room SPL (if known)		69	65	65	64	66	61	59	51	69.3	66
Room SPL	SPL	69.0	65.0	65.0	64.0	66.0	61.0	59.0	51.0	69.3	66
<i>Masonry/Blockwork</i>											
Element SRI	R'w2	37.0	37.0	42.0	51.0	58.0	58.0	58.0	57.0		
Element source	Lwe1	34.3	30.3	25.3	15.3	10.3	5.3	3.3	-3.7	20.5	15
Distance attenuation	At1	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9		
Directivity (offset) correction	Dc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac1	0	0	0	0	0	0	0	0		
Total level at receiver	SPL1	3.4	-0.6	-5.6	-15.6	-20.6	-25.6	-27.6	-34.6	-10.4	-19
<i>Glazing</i>											
Element SRI	R'w2	10.0	14.0	19.0	23.0	28.0	26.0	32.0	31.0		
Element source	Lwe2	53.0	45.0	40.0	35.0	32.0	29.0	21.0	14.0	38.4	33
Distance attenuation	At2	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9		
Directivity (offset) correction	Dc2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Screening loss	Sc1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac2	0	0	0	0	0	0	0	0		
Total level at receiver	SPL2	22.1	14.1	9.1	4.1	1.1	-1.9	-9.9	-16.9	7.5	2
<i>Open door</i>											
Insertion loss	Di3	0.0	0.0	3.0	7.0	12.0	10.0	16.0	15.0		
Element source	Lwe3	69.0	65.0	62.0	57.0	54.0	51.0	43.0	36.0	60.0	55
Distance attenuation	At3	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9		
Directivity (offset) correction	Dc3	3.0	6.0	6.0	8.0	8.0	6.0	6.0	6.0		
Screening loss	Sc3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Facade reflection	Fac3	0	0	0	0	0	0	0	0		
Total level at receiver	SPL3	41.1	40.1	37.1	34.1	31.1	26.1	18.1	11.1	36.2	32
Total level at NSP	SPL(r)	41.2	40.1	37.1	34.1	31.1	26.1	18.1	11.1	36.2	32