

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Memo: M001-B

Date: 9 March 2023

Project: 22368

Pages: 8

From: Skylar Clark

Reviewer: James Atha

ABC Manchester, L9 private office and L3 Dome

Noise breakout assessment to discharge Planning Condition 8

This memo presents an assessment of amplified noise breakout from the Level 03 Dome of ABC Manchester.

Planning condition 8

MCC Planning Condition 8 states:

“The development shall be acoustically insulated in accordance with the Noise Assessment prepared by Sandy Brown dated 8 March 2018, Plant Noise Egress Assessment dated 31 October 2018 and Noise Breakout Assessment dated 31 October 2018, as approved on 28 October 2019.

The development shall also be carried out in accordance with Sandy Brown memo reference M041-A dated 9th July which was submitted to address the noise breakout from the dome revision. Table 3 in that memo includes the maximum noise limits to be played inside the dome. A Validation Report shall be submitted to confirm that noise breakout and maximum noise limits are satisfactory, and in accordance with Table 3. All vents / windows and doors will remain closed during any occasion when amplified sound takes place. Noise levels will be controlled by means of an electronic limiter.”

The maximum noise limits outlined in Sandy Brown Memo M041-A *Dome pavilion amplified noise egress assessment* dated 3 July 2020 are provided in Table 1.

Table 1 Amplified noise egress limits for the Level 3 dome

	Maximum amplified music sound pressure levels, L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Pavilion amplified noise egress limits at 1 m from the windows of nearby residential receptors (07:00-23:00)	48	41	49	39	38	34	30
Maximum internal sound pressure level (during typical office hours – 08:00-18:00)	67	59	68	71	78	79	68
Maximum internal sound pressure level - (outside of typical office hours but up to 23:00)	80	72	81	84	91	92	81

Measurements

Measurements were undertaken on 11 August 2022 to determine the sound insulation performance of the dome, and the effects of reflection and environmental attenuation on the overall noise breakout.

Measurements were taken at four different positions, as shown in Figure 1.

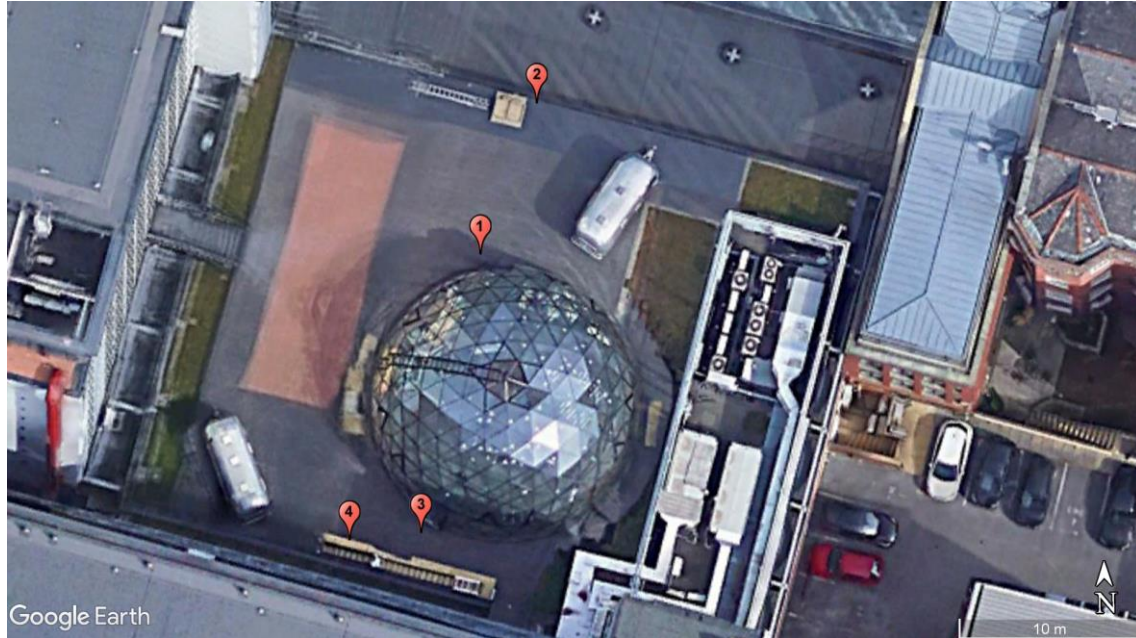


Figure 1 Location of measurement positions (image courtesy of Google Earth Pro)

Measurements were taken both with a pink noise sound source, and music sound source to compare the breakout properties of both source types.

The reverberant level of the source room ranged from L_{Aeq} 85 dB to L_{Aeq} 90 dB.

Results

Table 2 presents the results of the breakout measurements.

Table 2 Results of the breakout measurements

Measurement position	Measured sound pressure level, L_{Aeq} (dB)	
	Pink noise	Music
1	61	59
2	50	45
3	62	57
4	56	56

Assessment

The results outlined in Table 2 were used to predict the overall amplified noise egress at the nearest noise sensitive receptors. These have been identified as Cobden House Chambers, and One Spinningfields during office hours, and Rosetti Place outside of office hours.

The assessment takes into account attenuation due to distance, and additional contributions due to reflections.

Provided that the internal reverberant sound pressure limits outlined in Table 1 are not exceeded, the predicted maximum amplified noise egress from the Level 3 dome are provided in Table 3. The limits at 1 m from the windows of the nearest noise sensitive receptors are also provided for reference.

Table 3 Predicted amplified noise egress at nearest noise sensitive receptors

	Maximum predicted amplified sound pressure levels						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Cobden House Chambers	19	10	19	17	24	27	16
One Spinningfields	30	14	22	19	21	28	14
Rosetti Place – Outside of office hours and before 23:00	40	25	32	30	32	39	25
Pavilion amplified noise egress limits at 1 m from the windows of nearby residential receptors (07:00-23:00)	48	41	49	39	38	34	30

These levels are lower than the amplified noise egress limits at the nearest noise sensitive premises.

On this basis, Planning Condition 8 can be discharged.

It is noted that no house PA system has been installed. As such, if any future events with amplified sound are proposed, the organisers will need to be made aware of the limits outlined in Table 1.

Detailed calculations are provided at the end of this memo.

Operational policy

The tenant has issued the following response in response to the operational noise assessment:

All Work & Social management will monitor and manage the sound levels inside ABC Level 3 Dome to ensure maximum amplified music sound pressure levels, outlined in Table 1 of the

'Noise breakout assessment to discharge Planning Condition 8' document from Sandy Brown, are not exceeded, in the following ways:

1. Organisers will be made aware of the maximum amplified music sound pressure levels, outlined in Table 1, during the booking process.

2. Before the start of an event with amplified sound, the AWAS manager on duty will conduct a sound test with the client and/or AV team. Using a decibel meter, the level will be tested to ensure sound levels inside the dome fall within the levels outlined in Table 1.

3. During the event, AWAS management will conduct at least one decibel reading inside the dome ensuring levels fall within the limits set out in Table 1.

4. If at any point during the event, the AWAS manager on duty feels the sound level has increased beyond agreed levels, further decibel readings will be taken to ensure that the levels are still within the maximum amplified music sound pressure levels, outlined in Table 1.

This action is considered suitable in mitigation operational noise egress to nearby noise sensitive receptors.

Noise egress calculations

Comments	Octave band centre frequency (Hz)								Rating 1	Rating 2
	63	125	250	500	1k	2k	4k	8k		
22368 ABC Dome amplified sound breakout calculations										
Skylar Clark										
Testing conducted 2022-08-11										
Sound insulation testing of dome building envelope										
Sample measurements L_{eq} (dB):										
Measurement 1 (inside dome)	84.9	87.5	87.5	88.0	85.5	81.6	81.8		$L_A =$	90.5
Measurement 2 (inside dome)	79.5	88.3	86.0	85.4	83.5	79.5	79.8		$L_A =$	88.4
Average, L_{eq} (dB)	83.0	87.9	86.8	86.9	84.6	80.7	80.9		$L_A =$	89.6
Internal limits (08:00-18:00)	67.0	59.0	68.0	71.0	78.0	79.0	68.0		$L_A =$	82.6
L_{eq} (dB)										
Internal limits (18:00-23:00)	80.0	72.0	81.0	84.0	91.0	92.0	81.0			
L_{eq} (dB)										
Difference between internal limits and measured level (dB)										
(08:00-18:00)	-16.0	-28.9	-18.8	-15.9	-6.6	-1.7	-12.9			
(18:00-23:00)	-3.0	-15.9	-5.8	-2.9	6.4	11.3	0.1			
Egress measurements L_{eq} (dB):										
Position 1										
Distance from envelope = 1 m										
Breakout	66.8	64.9	62.7	58.3	56.3	53.5	52.9		$L_A =$	62.1
Background	65.9	60.2	55.9	53.0	50.8	45.5	37.9		$L_A =$	55.6
Background corrected	59.3	63.1	61.7	56.8	54.9	52.8	52.8		$L_A =$	61.1
Position 2										
Distance from envelope = 9.5 m										
Breakout	63.7	59.3	56.2	53.1	51.7	47.1	41.2		$L_A =$	56.2
Background	64.2	57.1	53.9	51.8	51.5	45.6	37.6		$L_A =$	55.1
Background corrected	57.7	55.1	52.4	47.0	39.6	41.7	38.8		$L_A =$	49.8
Position 3										
Distance from envelope = 1 m										
Breakout	61.8	64.1	61.8	57.9	57.5	53.4	55.0		$L_A =$	62.6
Background	61.4	55.1	53.6	50.8	50.0	45.8	39.7		$L_A =$	54.2
Background corrected	50.8	63.5	61.1	56.9	56.6	52.6	54.9		$L_A =$	61.9
Position 4										
Distance from envelope = 3.8 m										
Breakout	61.0	60.1	59.1	54.6	52.1	50.1	48.9		$L_A =$	58.3
Background	62.5	57.6	54.7	51.7	50.4	45.9	38.6		$L_A =$	54.8
Background corrected	55.0	56.4	57.2	51.5	47.1	48.0	48.5		$L_A =$	55.7

Background corrections in red are a maximum of -6 dB as the background measurement is higher than the breakout measurement

Noise egress calcs:

Cobden House Chambers

Main envelope contributions:

Position 1 L_{eq} (dB)	59.3	63.1	61.7	56.8	54.9	52.8	52.8	
16 m distance attenuation from overall envelope (ref 1m) from position 1 measurement	-24.1	-24.1	-24.1	-24.1	-24.1	-24.1	-24.1	
Main envelope contribution L_{eq} (dB)	35.2	39.1	37.6	32.7	30.8	28.7	28.7	$L_A = 37.0$
Difference between internal limits and measured level (dB)	-16.0	-28.9	-18.8	-15.9	-6.6	-1.7	-12.9	
Predicted level when internal limits are met, L_{eq} (dB)	19	10	19	17	24	27	16	$L_A = 30.0$
Operational noise egress 1 m from NSP facade, L_{eq} (dB)	48	41	49	39	38	34	30	$L_A = 44.2$

One Spinningfields

Main envelope contributions:

Position 2 L_{eq} (dB)	57.7	55.1	52.4	47.0	39.6	41.7	38.8	
38 m distance attenuation from overall envelope (ref 9.5 m) from position 2 measurement	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	
Main envelope contribution L_{eq} (dB)	45.7	43.1	40.3	34.9	27.5	29.7	26.7	$L_A = 37.7$
Difference between internal limits and measured level (dB)	-16.0	-28.9	-18.8	-15.9	-6.6	-1.7	-12.9	
Predicted level when internal limits are met, L_{eq} (dB)	30	14	22	19	21	28	14	$L_A = 30.2$
Operational noise egress 1 m from NSP facade, L_{eq} (dB)	48	41	49	39	38	34	30	$L_A = 44.2$

Rosetti Place

Main envelope contributions:

Position 2 L_{eq} (dB)	57.7	55.1	52.4	47.0	39.6	41.7	38.8	
49 m distance attenuation from overall envelope (ref 9.5 m) from position 2 measurement	-14.2	-14.2	-14.2	-14.2	-14.2	-14.2	-14.2	
Main envelope contribution L_{eq} (dB)	43.5	40.9	38.1	32.7	25.3	27.4	24.5	$L_A = 35.5$
Difference between internal limits and measured level (dB)	-3.0	-15.9	-5.8	-2.9	6.4	11.3	0.1	
Predicted level when internal limits are met, L_{eq} (dB)	40	25	32	30	32	39	25	$L_A = 41.0$
Operational noise egress 1 m from NSP facade, L_{eq} (dB)	53	46	54	44	43	39	35	$L_A = 49.2$