

Design note.

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Noise break-out validation measurements.

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	13/03/2024	Initial issue	AP	PM	PM

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1. Summary.

Acoustic commissioning measurements were undertaken at Diecast, Manchester on 8 March 2024 to assess the level of noise emissions from amplified music. Details of the measurements and assessment of noise emissions to the nearby sensitive premises are provided below.

Music noise level was produce around the internal amplified music noise limits previously provided which was not subjectively audible in the vicinity of the noise sensitive premises at the time of the testing.

The 3D noise model has been calibrated to the level of noise breakout measured during the validation testing at close proximity to the building envelope. Based on this, specific internal noise limits have been set which will ensure compliance with the Manchester City Council requirements at the nearby sensitive receptors. The limits will need to be maintained at all times, typically achieved through installation of sound limiters to all sound reproduction systems.

2. Criteria.

2.1 Planning conditions.

Condition 4 is provided below for reference:

'Prior to any commencement of the use/s hereby approved, a verification report will be required to validate that the work undertaken throughout the development conforms to the recommended noise levels and acoustic insulation requirements, relating to information as set out in Sections 6.3 and 6.5, as well as Tables 7, 8 and 9 of the Planning Noise Assessment report prepared by Hoare Lea (Reference REP-1013578-5A-AP-20220203-PlanningNoiseAssessment-Rev03 dated 24/03/22) - Received by the Council 13/04/22, in order to achieve and adhere to the acceptable noise limits relating to both the breakout of noise (including entertainment noise) and plant equipment noise. The report shall also undertake a suitable amount of post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity with the recommendations in the approved report shall be detailed along with the measures required to ensure compliance with the agreed noise criteria.

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 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively.'

2.2 Entertainment noise limits.

An environmental noise survey and noise impact assessment was undertaken by Hoare Lea as detailed in the report REP-1013589-5A-AP-20220203-Planning noise assessment-Rev03.

Based on the results of the noise survey and MCC criteria, the following noise limits are to apply at the nearby residential receptors.

Table 1 Amplified sound noise limits at nearby residential receptors

Amplified sound noise limits	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
<i>Noise limits to Store Street side (i.e. Oxygen, Piccadilly Village)</i>								
Daytime / evening (07:00 - 23:00), L_{eq} (dB)	52	42	37	37	37	30	18	10
Night (23:00 - 07:00), L_{eq} (dB)	47	37	32	31	30	22	10	9
<i>Noise limits to Ducie Street / courtyard side (i.e. Junction Works, Whittles Croft)</i>								
Daytime / evening (07:00 - 23:00), L_{eq} (dB)	50	40	35	34	33	26	13	10
Night (23:00 - 07:00), L_{eq} (dB)	47	37	31	30	29	19	8	9

3. Commissioning measurements.

A sample of noise measurements were undertaken on 8 March 2024 to quantify the level of sound break-out from the venue while music was playing internally.

The internal music noise level was set to the approximate levels that were previously stipulated by Hoare Lea. This was achieved by manually setting the volume on the Soundsystem; however, it should be noted that it would have been possible to play the music louder than set during the measurements. Subjectively, the music level inside during the measurements was loud enough such that it was necessary to shout to understand someone stood nearby.

The external measurement positions are summarised in Figure 1. Continuous, synchronised internal noise measurements were also carried out inside the venue areas.

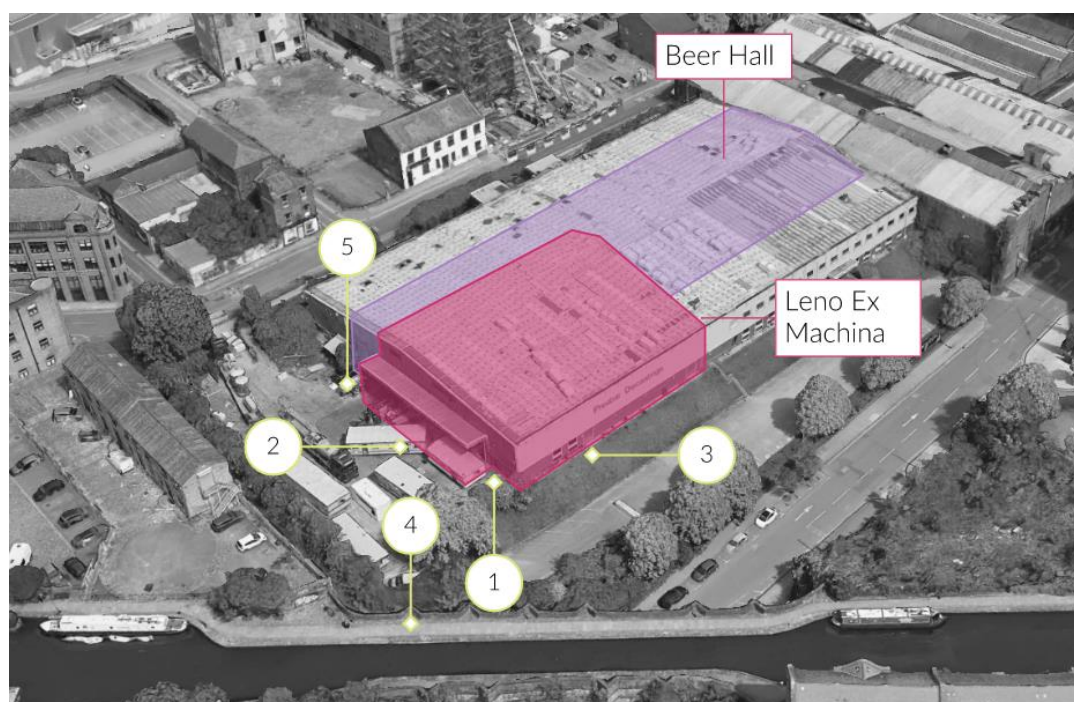


Figure 1 External measurement location

External measurements were also carried out without any music playing to obtain background noise levels when there are no contributions from the music.

All measurements were made over 10 second periods with around 3 measurements per external position. A summary of the noise levels measured is provided in Table 2.

It was not possible to safely access the roof during the measurements. However, the sound insulation performance of the roof has been determine following the validation measurements carried out in August 2023 when roof access was possible. This has been used as the basis of the 3D noise modelling for the roof.

Table 2 Noise measurements summary

Leq noise level, dB	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L _{Aeq}
<i>Music being generated inside Leno Ex Machina</i>									
Internal within Leno Ex Machina (averaged over 30 mins)	88	80	73	77	77	75	67	62	81
Position 1 – Fire Exit	62	58	48	49	50	46	35	23	53
Position 2 – Lobby to external area	64	54	49	46	46	40	29	17	50
Position 3 – Side wall / windows	64	54	48	48	46	41	29	17	50
Position 4 – Canal tow path	63	56	53	54	52	48	37	27	56
<i>Music being generated inside Beer Hall</i>									
Internal within Beer Hall (averaged over 20 mins)	81	84	76	76	78	76	65	62	82
Position 4 – Canal tow path	61	55	51	51	51	46	34	25	54
Position 5 – Outside roller shutter	63	63	52	51	47	46	34	26	54
<i>Background environmental noise, no music playing</i>									
Position 1 – Fire Exit	59	53	48	48	49	42	31	19	52
Position 2 – Lobby to external area	63	54	50	49	45	39	28	18	50
Position 3 – Side wall / windows	59	53	48	48	49	42	31	19	52
Position 4 – Canal tow path	69	60	55	55	54	49	40	29	58
Position 5 – Outside roller shutter	64	57	52	47	46	43	35	27	51

The background corrected music noise levels are presented in Table 3.

Table 3 Background corrected music noise levels

Leq noise level, dB	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L _{Aeq}
<i>Music noise breakout from Leno Ex Machina</i>									
Position 1 – Fire Exit	60	56	38	38	43	43	32	21	48
Position 2 – Lobby to external area	59	42	40	39	37	31	21	8	42
Position 3 – Side wall / windows	62	46	38	38	39	32	21	9	43
Position 4 – Canal tow path ¹	53	46	43	44	42	38	27	17	46
<i>Music noise breakout from Beer Hall</i>									
Position 4 – Canal tow path	51	45	41	41	41	36	24	15	44
Position 5 – Outside roller shutter	54	62	44	49	41	42	25	17	50

¹ The noise levels presented for the tow path are completely background limited, so the background corrected levels are simply 10 dB below the measured noise levels. The actual music noise is likely to be lower than presented.

It should be noted that bass noise was only audible during the measurements when in close proximity to the building envelope. Music noise was not audible in the vicinity of the nearby sensitive receptors or on the canal tow path.

4. Assessment.

The 3D noise model of the site has been updated and calibrated to be representative of the level of music noise break-out measured during the validation testing. The music internal noise levels as represented by the model have then been adjusted to ensure that the planning noise limits set in Table 1 are not exceeded.

Based on this, the internal noise limits set in Table 4 should apply to ensure compliance with Planning Condition 4. The same noise limits apply in both Leno Ex Machina and the Beer Hall assuming music may be played in both spaced simultaneously.

Table 4 Maximum permissible internal amplified sound levels

Leq,5min music noise limit, dB	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L _{Aeq,5min}
Daytime (07:00 – 23:00)	84	81	84	88	88	79	80	85	92
Night (23:00 – 07:00)	81	78	80	84	84	72	75	84	88



5. Management strategy.

The internal amplified sound noise limits set in Table 4 will need to be maintained at all times. This is typically achieved by installing a sound limiter to the sound system / PA, and should not be overridden by musicians / DJs. The noise limits will not permit the performance of live bands.

Conversation and activity noise from patrons will need to be suitably managed via the 'Security and Crowd Management Plan'.