

JPM ACOUSTICS

DEANSGATE SQUARE, MANCHESTER

NOISE IMPACT ASSESSMENT

OCTOBER 2025



DOCUMENT VERSION RECORD

	1	2	3
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Position	Associate	Associate	Associate
Date of Issue	30/09/25	01/10/25	20/10/25
Comment	Draft for comment	V1 issue	V2 issue

Report Reference	2025115-03
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1.0. INTRODUCTION

1.1. OVERVIEW

- 1.1.1. JPM Acoustics Ltd has been appointed to undertake a noise impact assessment to support a planning application for the proposed temporary marquee at Deansgate Square, Owen Street, Manchester. The site falls within the administrative boundary of Manchester City Council (MCC).
- 1.1.2. This assessment has been undertaken based on the results of a noise survey on the site and details suitable noise level limits for the proposed development, based on the baseline noise survey data and the results of acoustic modelling.
- 1.1.3. This report is necessarily technical in nature. Therefore, to assist the reader, a glossary of acoustic terminology is provided in **Appendix A**.

1.2. SITE LOCATION AND PROPOSED DEVELOPMENT

- 1.2.1. At present, the site comprises an open area within a plaza in Manchester City centre. To the north and east is plaza space beyond the site boundary; to the south is Deansgate Square North Tower; and to the west are commercial premises at Deansgate Square/Owen Street.
- 1.2.2. The development proposals include for a 400 capacity temporary venue, which will feature amplified music, and will operate between 10 am and 11 pm each day over a 3.5 month period.
- 1.2.3. The event space will be of modular construction using a combination of aluminium / timber clad framing and tensioned PVC roofing.
- 1.2.4. **Figure 1.1** shows the proposed development site location (outlined in red).

Figure 1.1: Proposed site location plan



2.0. STANDARDS AND GUIDANCE

2.1. MANCHESTER CITY COUNCIL: PLANNING AND NOISE TECHNICAL GUIDANCE

- 2.1.1. The Planning and Noise Technical Guidance (MCC Guidance) includes MCCs noise assessment criteria for proposed entertainment venues which are structurally detached from noise sensitive premises.
- 2.1.2. The relevant text from Section 3.7.1.2 *Entertainment Venues* is reproduced below for reference.

“A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be ‘audible’ in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

‘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’.”

3.0. BASELINE NOISE SURVEY

3.1. OVERVIEW

- 3.1.1. A baseline noise survey has previously been undertaken by Fisher Acoustics to determine the prevailing noise climate at the nearest noise sensitive receptor (NSR), Deansgate Square North Tower apartments, for a neighbouring development.
- 3.1.2. Table 1 of assessment document *Deansgate Square, Commercial Unit 2a, Planning Conditions 24 & 27*¹ (Fisher Acoustics, 2024) provides the maximum permissible external noise levels, per octave band, at the North Tower apartments, based on the survey data. These noise levels have been set in accordance with MCC Guidance. These results have been reproduced in **Table 3.1** below.

Table 3.1: Maximum recommended external noise levels at North Tower apartments

Date and Start time	Sound Pressure Level (dB L _{eq}) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
Deansgate Square 07:00 to 23:00	55	46	46	45	47	40	31

¹ https://pa.manchester.gov.uk/online-applications/files/635180DC9FF86454C6C2AFC842ECBC20/pdf/CDN_24_0631-ACOUSTIC_REPORT_UNIT_2A-2573011.pdf

4.0. ASSESSMENT

4.1. OVERVIEW

- 4.1.1. This section presents an assessment of potential noise impacts from the proposed temporary event space at the nearest NSR, North Tower, in accordance with MCC Guidance.

4.2. ACOUSTIC MODEL

- 4.2.1. In order to predict the noise levels from the event space, a 3D acoustic model of the site and surrounding area has been generated using the acoustic modelling software CadnaA®. The model was generated applying the following methodology:
- The model was set to apply the noise prediction methodology set out in ISO 9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors*.
 - Topographical data for the ground levels across the site and surrounding area, obtained from LIDAR data of 1 m resolution, publicly available from the Department for Environment Food and Rural Affairs (DEFRA) were used within the model.
 - The model was set to include second order reflected noise from solid structures. All buildings were set to be acoustically reflective.
 - The heights of existing buildings surrounding the site have been determined using online mapping sources.
 - Ground cover has been assumed to have an absorption coefficient of 0 to account for the acoustically reflective conditions across the site and surrounding area.
 - For the prediction of noise levels at the nearest NSR, receiver points within the model have been set at 1.5 m above each apartment floor level, starting at the first residential storey, above the double-height atrium space in North Tower.
- 4.2.2. It is likely that the most significant source of noise from the event space at the nearest noise sensitive receptor would be amplified music. As the NSR is located broadly above the event space, it is anticipated that noise transmitted through the tensioned PVC roof would be dominant, as this is also the construction element which provides the least sound insulation.
- 4.2.3. Noise measurements previously obtained 1 m from the dancefloor of a venue with approximately 400 occupants, have been used to inform this assessment. The dominant sources of noise during these measurements were electronic music (house music) and general patron noise. The measured equivalent continuous sound pressure level was 92 dB $L_{Aeq,T}$. The measurement data are presented in octave band values in **Table 4.1**.

Table 4.1: Measured source noise data

Description	Sound Pressure Level (dB L _{eq}) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
House music and patron noise. 400 people. 1 m from dancefloor.	86	86	84	89	88	83	78

4.2.4. Using the measured source noise data, the sound power level of noise radiating through the pitched roof has been calculated. As sound insulation performance data could not be provided for the proposed tensioned PVC roof, surrogate octave band noise data have been used for a waterproof membrane roof which is considered to be representative. These data are provided in **Table 4.2** along with the predicted octave band noise levels at the nearest NSR and the maximum permissible octave band noise levels in accordance with MCC Guidance.

Table 4.2: Predicted octave band noise levels at NSR

Description	Sound Pressure Level (dB L _{eq}) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
Waterproof Membrane Roof Transmission Loss	6	6	9	14	19	24	30
Predicted external noise level at NSR (A)	69	70	65	65	59	49	37
Maximum permissible noise levels based on MCC Guidance (B)	55	46	46	45	47	40	31

Difference (B-A)	14	24	19	20	12	9	6
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- 4.2.5. The results in **Table 4.2** indicate that, based on typical noise levels from a venue of similar capacity, playing amplified music, the maximum permissible octave band noise levels would be exceeded by up to 24 dB.
- 4.2.6. It is therefore recommended that amplified music is limited to ensure that the maximum permissible octave band levels can be met.
- 4.2.7. **Table 4.3** shows the proposed octave band noise limits for amplified sound within the event space, which are predicted to meet the maximum permissible noise levels at the nearest NSR. This is based on the assumed transmission loss for the waterproof membrane roof as shown in **Table 4.2**.

Table 4.3: Proposed octave band noise limits for amplified music within the event space

Description	Sound Pressure Level (dB L _{eq}) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
Internal noise limits for amplified music	72	62	65	69	76	74	72
Predicted external noise level at NSR	55	46	46	45	47	40	31
Maximum permissible noise levels based on MCC Guidance	55	46	46	45	47	40	31

- 4.2.8. The results in **Table 4.3** show that should the proposed internal noise limits for amplified music be met, the permissible noise levels based on MCC Guidance can be achieved.

5.0. CONCLUSION

- 5.1.1. JPM Acoustics Ltd has been appointed to undertake a noise impact assessment to support a planning application for the proposed temporary marquee at Deansgate Square, Owen Street, Manchester. The site falls within the administrative boundary of Manchester City Council (MCC).
- 5.1.2. This assessment has been undertaken based on the results of a noise survey on the site and details suitable noise level limits for the proposed development, based on the baseline noise survey data and the results of acoustic modelling.
- 5.1.3. A noise limit has been recommended for amplified music within the event space, in order to meet the maximum permissible external noise levels at the nearest NSR, in accordance with MCC guidance. Consequently, noise need not be a significant factor in the determination of this application.

APPENDIX A: GLOSSARY

Table A.2: Acoustic terminology

Terminology	Description
A-weighting, dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Decibel, (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Façade	At a distance of 1 m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting (F)	Averaging time constant used in sound level meters and commonly used in the measurement of environmental noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period, T. L_{90} may be thought of as the "average minimum" noise level. Generally used to describe background noise.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period, T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period, T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure. Measured in pascals (Pa).
Sound Pressure Level (Sound Level), L_p	The sound level is the sound pressure on a decibel scale, relative to a reference value of 20×10^{-6} Pascals.

