SANDY BROWN

Consultants in Acoustics, Noise & Vibration

23264-R07-A

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No 3 Circle Square (GMI)

Acoustic planning condition 17 discharge report

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Summary

Sandy Brown has been commissioned by GMI to provide acoustic advice in relation to the proposed development at No.3 Circle Square in Manchester.

Attended measurements were undertaken on 6 and 8 May 2025 with the purpose of determining the noise generating by the installed plant at roof top level. Assessment of the results has been carried out to determine the external noise levels outside the nearest noise sensitive receptors.

This report sets out relevant information to discharge Planning Condition 17 imposed by Manchester City Council as per planning reference 134288/FO/2022.

The assessment indicates that normally operating plant day noise criteria at the nearest noise sensitive premises are met. Plant is to be switched off during the night.

Emergency plant noise criteria at the nearest noise sensitive premises are met.

As such, it is considered that Planning Condition 17 can be discharged.

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1 Introduction

Sandy Brown has been commissioned by GMI to carry out noise measurements of the installed rooftop plant at No.3 Circle Square, Manchester.

Attended measurements were undertaken on 6 and 8 May 2025 with the purpose of determining the noise generating by the installed plant. Assessment of the results has been carried out to determine the external noise levels outside the nearest noise sensitive receptors.

This report sets out relevant information to discharge Planning Condition 17 imposed by Manchester City Council as per planning reference 134288/FO/2022.

2 Site description

The Site is bound by Newman Street (formerly Brancaster Road) to the north, Princess Street to the east, Premier Inn and MSCP, and Mancunian Way to the south and Manchester Technology Centre to the West.

2.1 The site and its surroundings

The existing site location in relation to its surroundings is shown in Figure 1. The proposed site boundary is outlined in red.

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

The site is adjacent to residential premises Vita Students (shown in orange in Figure 1) to the North, Princess House (shown in green in Figure 1) to the North. Directly to the South of the site above a 6 storey carpark is Premier Inn (shown in purple in Figure 1).

Office premises near the site include Manchester Institute of Biotechnology (shown in yellow in Figure 1) and Manchester Technology Centre (shown in blue in Figure 1).

3 Acoustic criteria

3.1 Local Authority criteria

Planning Condition 17 (134288/FO/2022) outlined by Manchester City Council requires the following to be submitted prior to occupation:

'A scheme for the acoustic insulation of any plant including externally mounted ancillary equipment, lift equipment, substation and any emergency plant associated with the development to ensure that it achieves a background noise level of 5 dB below the existing background (L_{A90}) 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 completed before the premises is occupied and a verification report submitted for approval by the City Council as local planning authority and any non compliance suitably mitigated in accordance with an agreed scheme prior to occupation. The approved scheme shall remain operational thereafter.'

3.2 Plant noise egress limits

3.2.1 Normally operating plant

In line with Sandy brown 23264-R04-A *Acoustic planning report* dated 29 April 2024, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 1.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB.

In this case these limits would apply at the Manchester Institute of Biotechnology and Manchester Technology Centre during the daytime, and at Vita Students, Princess House and Premier Inn during the day and night.

Table 1 Plant noise limits at 1 m from the nearest noise sensitive premises

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Vita Students, Princess House, Premier Inn	59	49
Manchester Institute of Biotechnology, Manchester Technology Centre	59	-

The limits set out in Table 1do not include any attention catching features. The penalty corrections for attention catching features may be significant, and are summarised in Appendix A.

3.2.2 Emergency plant

From e-mail correspondence with environmental health at Manchester City Council on 20 October 2023, a relaxation of the limits to 10 dB above the existing background noise level has been accepted. On this basis, the proposed limits for emergency plant are provided in Table 2.

Table 2 Emergency Plant noise limits at 1 m from the nearest noise sensitive premises

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Vita Students, Princess House, Premier Inn	74	64
Manchester Institute of Biotechnology, Manchester Technology Centre	74	-

3.3 Plant information

A rooftop plan layout of the installed new rooftop normally operating and emergency plant at this development is shown in Figure 2. The installed plant items include the following:

- 12 no. Mitsubishi EAHV-M1800YCL-N (normally operating)
- 2 no. Mitsubishi Climaveneta NX-Q-G06(normally operating)
- 1 no. Smoke extract fan (Emergency)

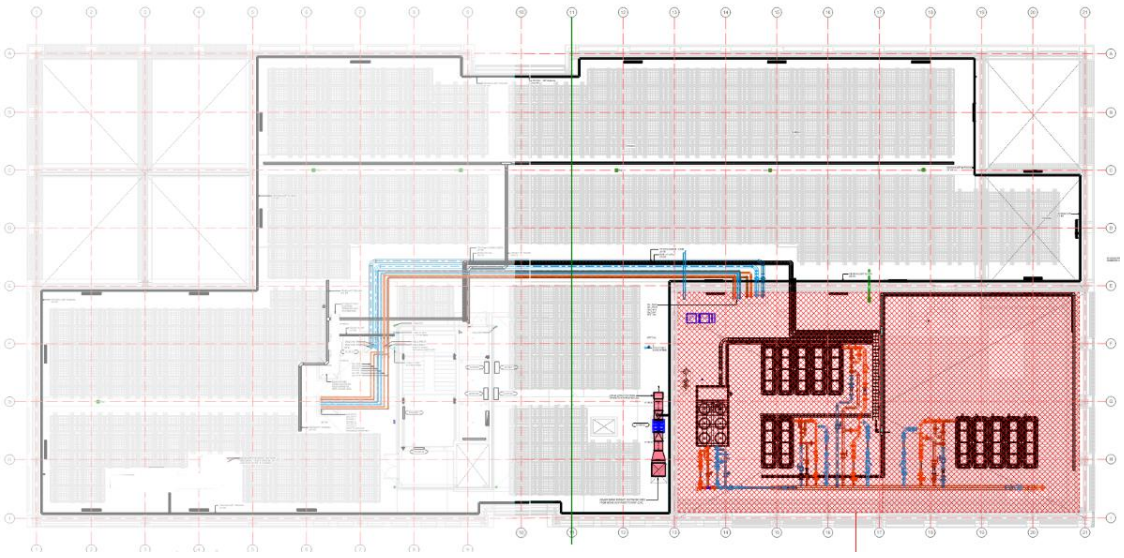

Figure 2 Rooftop plant layout (as built) and measurement location

4 Measurements

4.1 Attended measurements

Attended sample measurements were carid out at 1m from the installed plant item.

All rooftop plant was set to operate under normal duty conditions by the MEP team, and sample measurements of the installed units were carried out at 1 m on the sides of the units and 1.5 m above the roof level.

Measurements of the smoke extract fan measurements were carried out at 1 m from the exhaust and 1.5 m above the rooftop level.

The measurement locations are indicated in Figure 3

In all cases, measurements were carried out such that plant in operation was the dominant source.

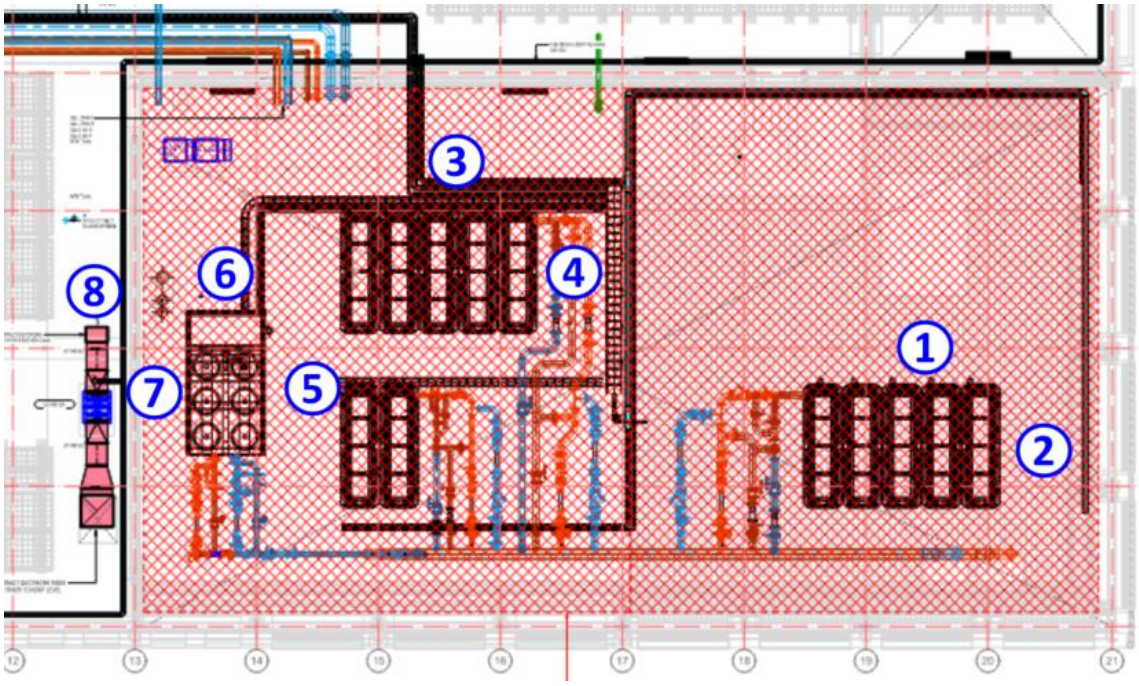

Figure 3 Measurement locations

2 x 1 min measurements were carried out at each of the measurement positions. The results are detailed in Table 3.

Table 3 Attended Measurement results

	Measured sound pressure level at 1 m (dB) Octave-band centre frequency (Hz)							
Measurement positions	63	125	250	500	1000	2000	4000	8000
1	80	73	74	73	68	65	64	55
	80	73	74	73	69	66	64	55
2	78	74	73	72	68	64	61	55
	75	70	68	67	64	59	56	49
3	84	75	75	73	69	63	65	53
	84	76	75	73	69	63	64	53
4	79	75	74	73	70	64	63	55
	79	75	74	73	70	65	64	55
5	80	74	73	73	69	66	63	57
	81	73	73	73	69	66	63	58
6	79	73	73	74	68	64	60	51
	79	74	73	73	68	64	60	51
7	87	73	71	72	68	64	58	54
	87	74	71	72	68	65	59	54
8	75	73	71	65	66	67	64	-
	76	73	70	66	66	67	65	-

Subjectively, no attention catching features were observed during the measurements (with reference to BS4142).

5 Environmental noise modelling

An assessment has been carried out to predict plant noise egress associated with the installed normally operating plant selections and emergency plant at the nearby noise sensitive premises.

A 3D environmental noise model of the site has been produced using the computational acoustic modelling package CadnaA (version 2025).

The software carries out calculations using a ray tracing technique, and considers the effects of topography, reflections, screening and distance attenuation for noise sources to predict noise

levels in three dimensions. Calculations are carried out in accordance with ISO 9613 *Attenuation of sound during propagation outdoors*.

5.1 Normally operating plant noise egress assessment

Calculations are based on all normally operating plant items running at design duty simultaneously and are therefore considered worst-case for these plant items.

A screenshot of the model is presented in Figure 4.

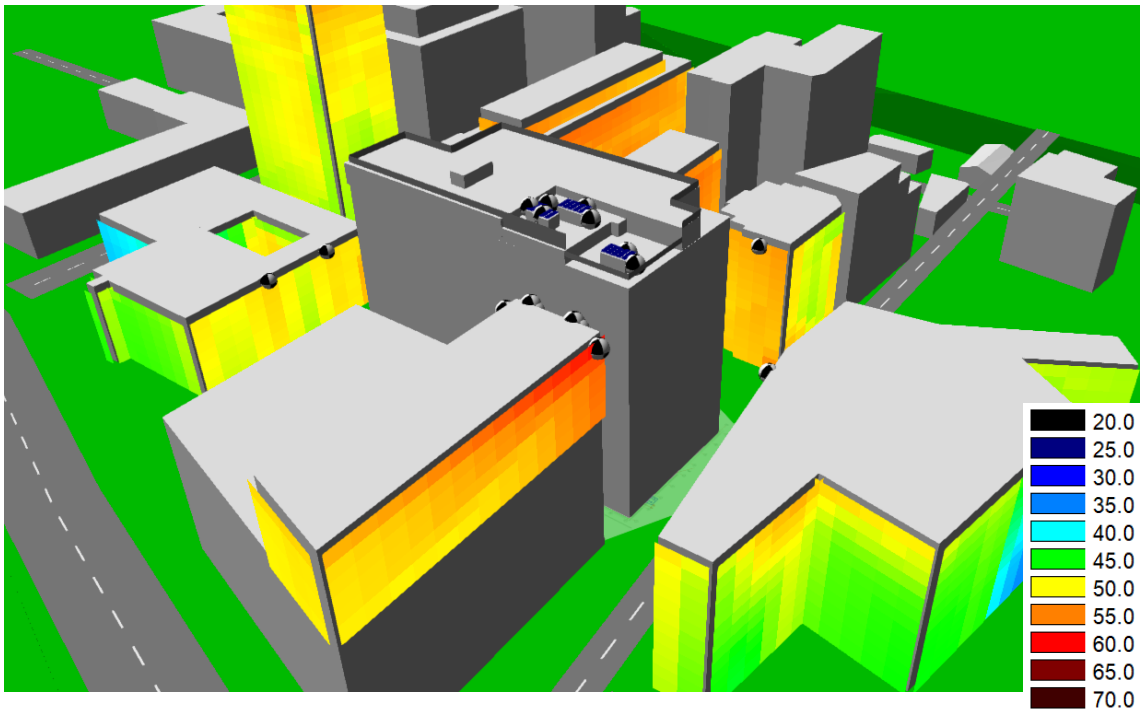

Figure 4 Screenshot of the 3D model of plant noise egress – Day normally operating plant

5.1.1 Results

The predicted cumulative noise levels from the installed rooftop plant in normal operation at the worst affected windows of the nearest noise sensitive premises are set out in Table 4.

Table 4 Predicted sound pressure level at 1 m from the windows of the nearest noise sensitive receptors

Noise sensitive receptor	Predicted plant noise egress level, L_{Aeq} (dB)
Vita Students	57
Princess House	55
Premier Inn	58
MIB	54
MTC	53

The predicted noise egress levels at the nearest noise sensitive premises meet the day limits. At night, the plant will be switched off to achieve compliance with the night criteria.

Based on the above, Planning Condition 17 imposed by Manchester City Council as per planning references 134288/FO/2022 can be discharged.

5.2 Emergency plant noise egress

Calculations are based on the installed smoke extract fan running at design duty. A screenshot of the model is presented in Figure 5

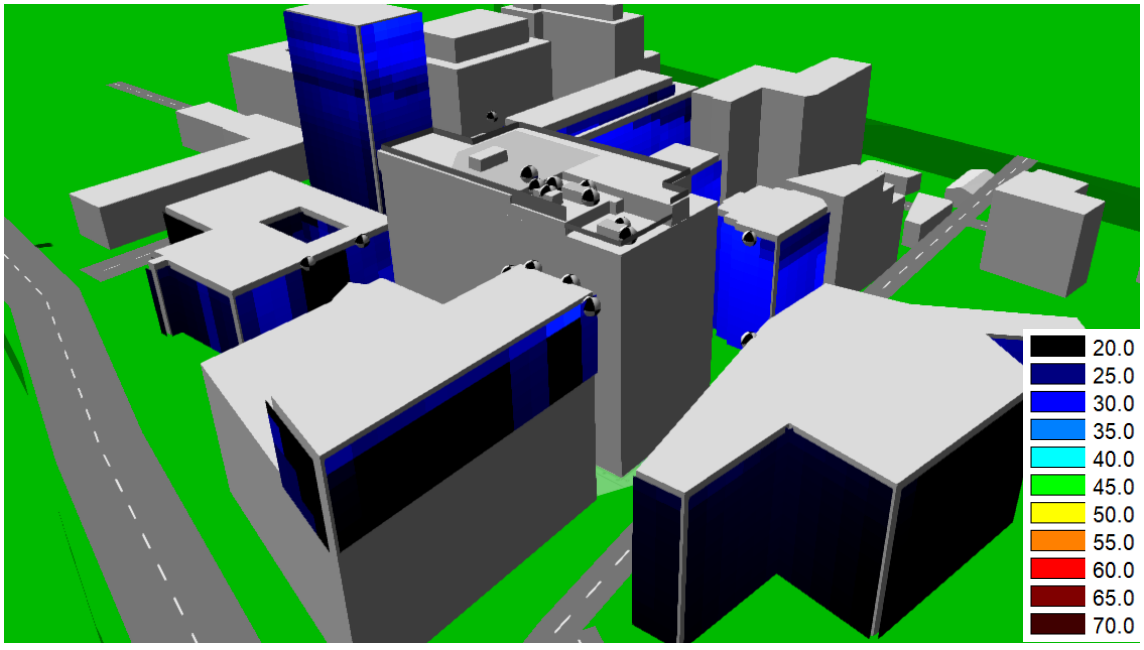

Figure 5 Screenshot of the 3D model of plant noise egress – Emergency plant

The results from the emergency plant noise egress model are presented in Table 5.

Table 5 Predicted sound pressure level at 1 m from the windows of the nearest noise sensitive receptors

Noise sensitive receptor	Predicted emergency plant noise egress level, L_{Aeq} (dB)
Vita Students	31
Princess House	31
Premier Inn	24
MIB	31
MTC	28

The predicted emergency noise egress levels at the nearest noise sensitive premises meet the day and night emergency limits.

Based on the above, Planning Condition 17 imposed by Manchester City Council as per planning references 134288/FO/2022 can be discharged.

Appendix A

Survey details

Equipment

The unattended and attended noise measurements were taken using a Svantek SV307 sound level meter and a Brujel & Kier 2250 sound level meter, respectively.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
2250 (F)				
Sound level meter	2250/3011964	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Microphone	4189/3100176	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Pre-amp	ZC0032/26376	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Calibrator	4231/3019123	Brüel & Kjær	14 April 27	UCRT25/1603
NTi XL3				
Sound level meter	XL3/ A3A-01221-F0	NTi	2 Dec 26	UCRT24/2613ATR UCRT24/2615
Microphone	MC230A/A28047	NTi	2 Dec 26	UCRT24/2613ATR
Pre-amp	MA220-230/14610	NTi	2 Dec 26	UCRT24/2613ATR
Calibrator	SV30A/10567	Svantek	20 Sep 26	UCRT24/2251

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{A1,T}$ The A-weighted sound pressure level exceeded for 1% of the measurement period.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Weather conditions

During the attended noise measurements, the weather was generally clear and dry and no rain occurred. Wind speeds each position and varied between 0 m/s and 2 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.