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Manchester Royal Infirmary

Technical Note – Wards 7 & 8 Rooftop Plant Noise Verification

1.0 Introduction and Design Aim

1.1 Vinci IHP has instructed Acoustic and Engineering Consultants Limited (AEC) to undertaken verification noise measurements of the installed rooftop building services plant relating to the refurbished Wards 7 & 8 at Manchester Royal Infirmary (MRI).

1.2 The rooftop plant items include:

- Air Conditioning Unit Condenser
- Air Handling Unit (AHU)
- Chiller Unit

1.3 Previously, AEC has measured the typical baseline noise levels at the nearest residential receptors, and, based on the Manchester City Council's (MCC) noise limit requirements, set maximum permissible noise levels from each item of plant on the roof. The location of the plant and the nearest noise sensitive receptor are presented in Figure A.1 in Appendix A.

1.4 MCC's noise limit requirement is below:

> Manchester City Council's Noise Policy Guidance
>
> Section 3.7.1.5 of the "*Planning & Noise Technical Guidance*" (PNTG) document issued by Manchester City Council (MCC) in October 2022 states the following:
>
> *"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (LA90) level at the nearest noise sensitive location.*
>
> *By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages."*

1.5 The measured typical background noise levels at the residential receptors, as reported in AEC previous technical note (ref: P4171/L04a/DMT, dated 23 Sept 2025) are:

- 57dB$L_{A90,15min}$ – Daytime (0700-2300h)
- 49dB$L_{A90,15min}$ – Night-time (2300-0700h)

1.6 Therefore, the design aim for the plant was to not exceed 44dB$L_{Aeq,T}$ external to the nearest receptor.

1.7 Based on the distance to the receptors, the noise limit relating to each individual item of rooftop plant is:

- Air Conditioning Unit Condenser – **65dBA @ 1 metre**
- AHU (intake, exhaust & break-out) – **76dBA @ 1 metre**
- Chiller Unit – **73dBA @ 2 metres**

1.8 The verification measurements, site observations are presented in Section 2.0 below.

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2.0 NOISE VERIFICATION MEASUREMENTS

2.1 Verifctaion measurements were undertaken using a Type 1 integrating sound level meter on Monday 09 February 2026. Full details are provided in Appendix B.

2.2 The findings of the verification survey are as follows:

Condenser

Manufacturer: Mitsubishi

Model: PUZ-ZM71VHA2

Measured Noise Level: **60dBA @ 1 metre**

Comments: Some noise contribution from other rooftop plant.

Has the noise level limit been met? Yes

AHU

Manufacturer: AHS

Model: Air Flex AHU

Measured Noise Levels: Intake = 59dBA @ 1 metre
Exhaust = 63dBA @ 1 metre
Casing Break-out = 61dBA @ 1 metre

Comments:
Large atmosphere side attenuators (att.) on the supply intake and the extract exhaust. As pictured below.

Has the noise level limit been met? Yes

Chiller

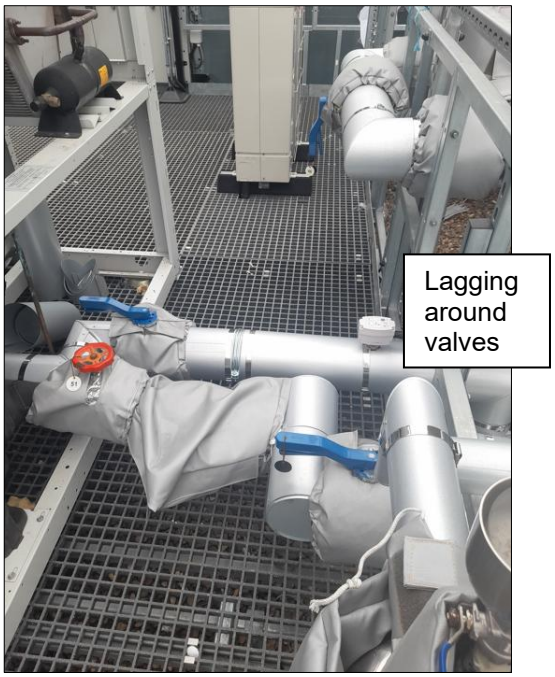
Manufacturer: TRANE

Model: CGAF 060 HE XLN EC R454B

Measured Noise Level: 69dBA @ 2 metres based on manufacturer data sheets

Comments:
The unit was not operational and could not be measured. Noise levels are based on manufacturer test data. AEC was informed by an engineer on-site that the unit will only operate to cool the wards in warmer weather.

Has the noise level limit been met? Yes



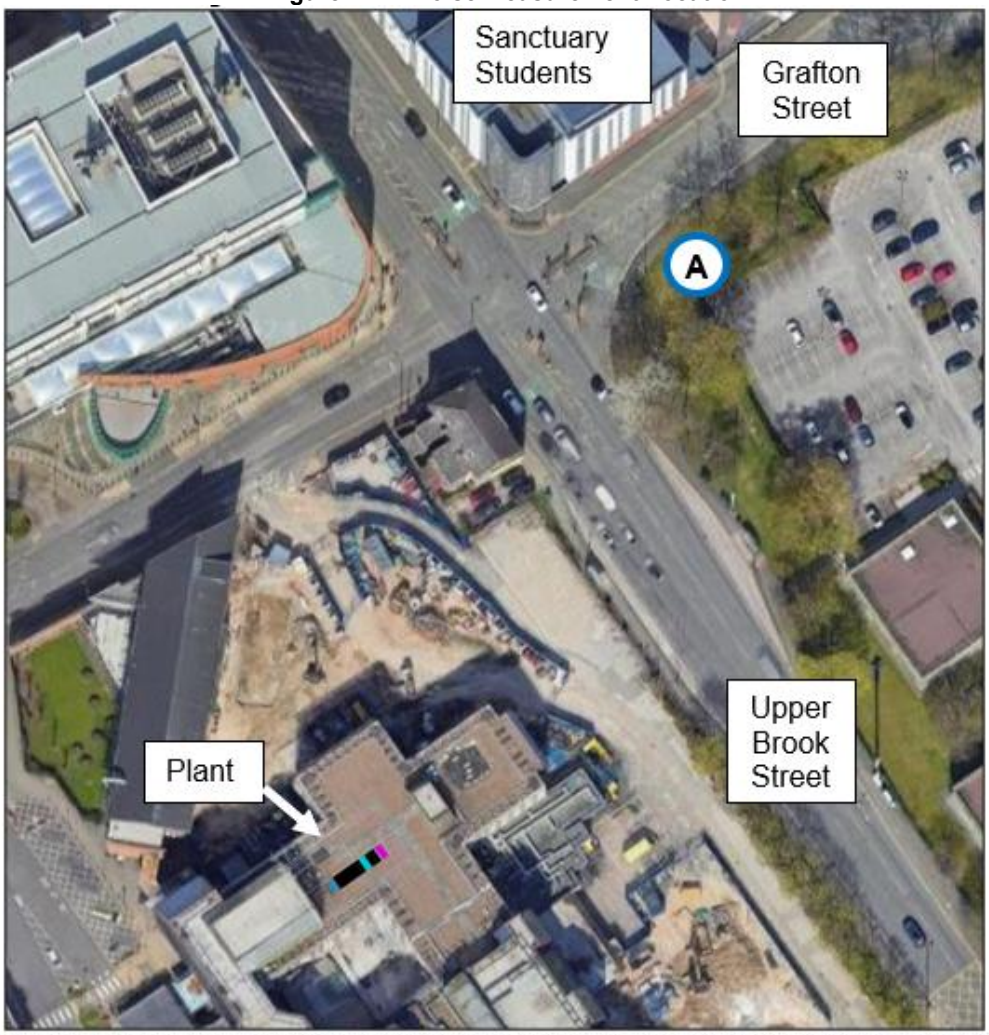
2.3 In addition to the measurements undertaken on the roof, a 15-minute measurement was undertaken external to the nearest residential receptors (indicated in Figure A.1 in Appendix A). A background noise level of 56dB$L_{A90,15min}$ was measured which was all due to road traffic. The hospital plant was not audible.

3.0 SUMMARY / CONCLUSION

3.1 Based on the verification measurements, observations and assessments outlined above, the individual rooftop units comply with their noise level limits. In addition, the total plant noise levels are below 44dB$L_{Aeq,T}$ at the residential receptors and hence compliant with the requirements of MCC presented in Paragraph 1.4.

APPENDIX A – Noise Survey Details

Figure A.1 – Noise Measurement Location



Imagery @2024 Google, Imagery @2024 Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data @2024

APPENDIX B – Noise Survey Details

Date & Time of Survey:	Day - Monday 10 February 2026, 1350 to 1430h.					
Personnel:	David Terry (AEC).					
Equipment Used:	B&K 2250 Real Time Analyser (AEC Kit 1).					
Calibration:	The sound level analyser, which conforms to BS EN 61672-1: 2003 *'Electro acoustics – sound level meters - Part 1 Specifications'* for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	**Date**	**Period**	**Wet/Dry**	**Temp**°C	**Wind Speed & Direction**	**Cloud Cover**
	10/02/2026	Day	Dry	10°C	Negligible	20%
Measurement Locations:	Attended measurements were undertaken at Location A, as indicated on Figure A.1 and described below. A – 8m from nearest edge of Grafton Street. Several rooftop measurements taken in proximity to the plant items, as indicated in the photos in Section 2.0					
Measurement Details:	Measurements were undertaken over various periods in terms of L_{eq}, $L_{90,}$ and L_{max}.					
Façade / Free-Field:	Free-field.					
	Full results for the attended measurements are available on request					
Measured Data:	Full octave band and 1/3 octave band centre frequency data was obtained for all measurements.					

Table A.1 – Measured Daytime Noise Levels at Location A – (Monday 09/02/2026)

Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A	1415 – 1430	66.8	70.5	55.7	79.8	Road traffic dominant. Maximum noise level due to from road traffic. Plant not audible.