MANCHESTER METROPOLITAN UNIVERSITY

PROPOSED MECHANICAL PLANT INSTALLATION

DALTON BUILDING, CHESTER STREET, MANCHESTER

NOISE IMPACT ASSESSMENT

R2515-REP01-JW

29 July 2026

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REPORT DETAILS

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SUMMARY

Red Acoustics has been commissioned by Manchester Metropolitan University to assess the noise impact associated with the proposed roof mounted installation of four condenser units and one air handling unit at the existing John Dalton Building on Chester Street, Manchester.

The existing sound climate has been measured at a location representative of the nearest noise sensitive dwellings. An assessment has subsequently been undertaken in accordance with BS 4142:2014+A1:2019.

This report presents the results of sound propagation modelling undertaken for the proposed plant installation, based on manufacturer supplied sound data for the specified plant items.

The assessment concludes that the noise impact associated with the typical operation of the proposed plant is expected to be low and no additional mitigation is proposed.

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1.0 INTRODUCTION

Red Acoustics has been commissioned by Manchester Metropolitan University to assess the noise impact associated with the proposed roof mounted installation of four condenser units and one air handling unit at the existing John Dalton Building on Chester Street, Manchester.

Red Acoustics has been commissioned by Manchester Metropolitan University to conduct the following assessments:

- Assess the existing background sound climate at positions representative of nearby noise sensitive receptors.
- Based on the measured existing background sound levels, determine target noise limits for the proposed externally mounted mechanical plant items.
- Prepare a 3D computer sound propagation model to predict the impact of environmental sound from the proposed air handling unit.
- Advise as necessary on the level of mitigation required to support an application for planning approval for the proposed plant installation.

This report presents the results of an environmental sound survey and details an assessment of environmental noise impact from the proposed installation.

2.0 DETAILS OF THE PROPOSED DEVELOPMENT

The proposed condensers and air handling unit will be installed at roof level on part of the John Dalton Building, as indicated in Figure 2.1 below. Figure 2.1 also identifies the nearest noise sensitive properties (NSP), which are located directly adjacent to the site on Chester Street.

Figure 2.1: Site & Proposed Plant Location in Relation to the Surrounding Area

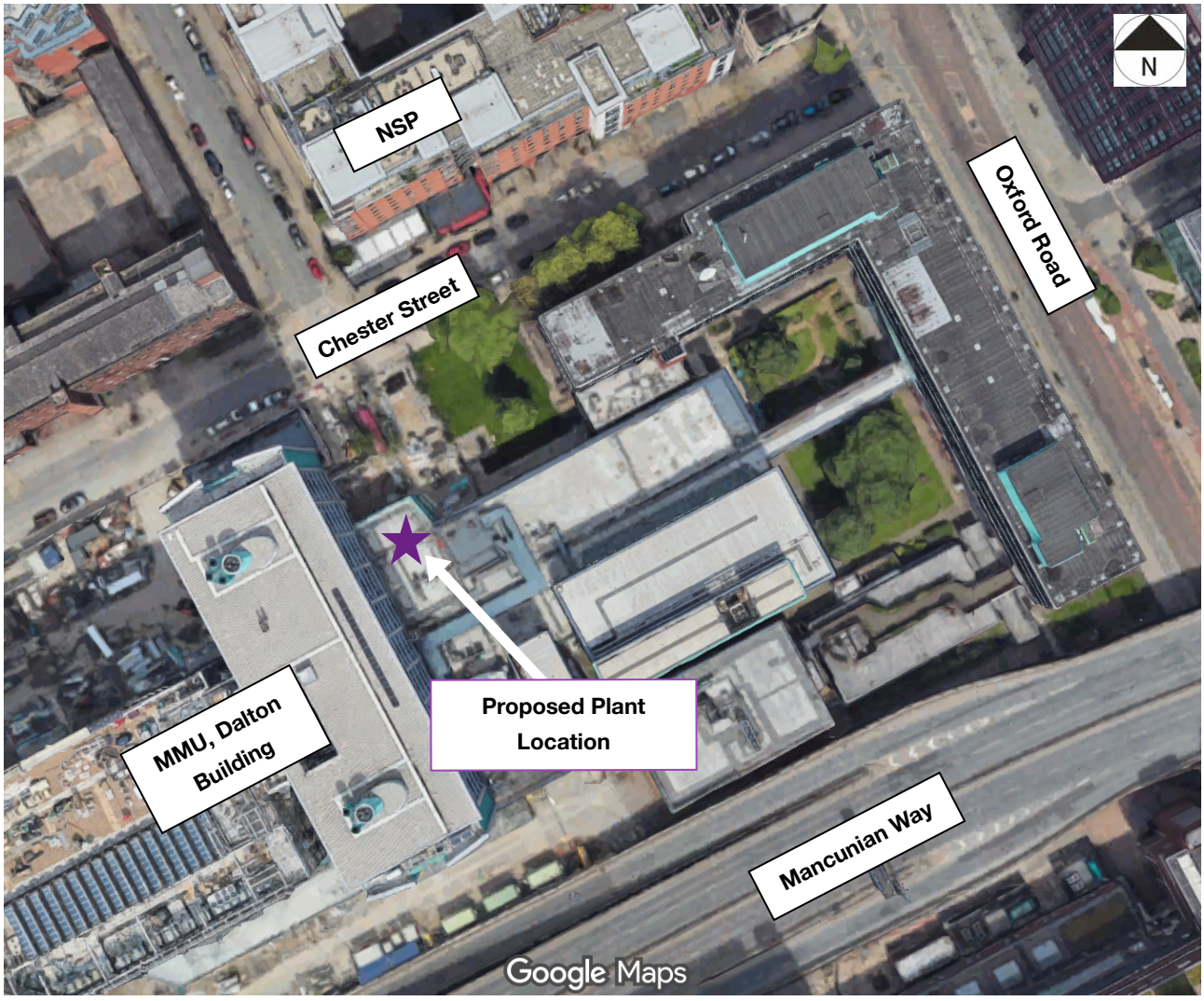
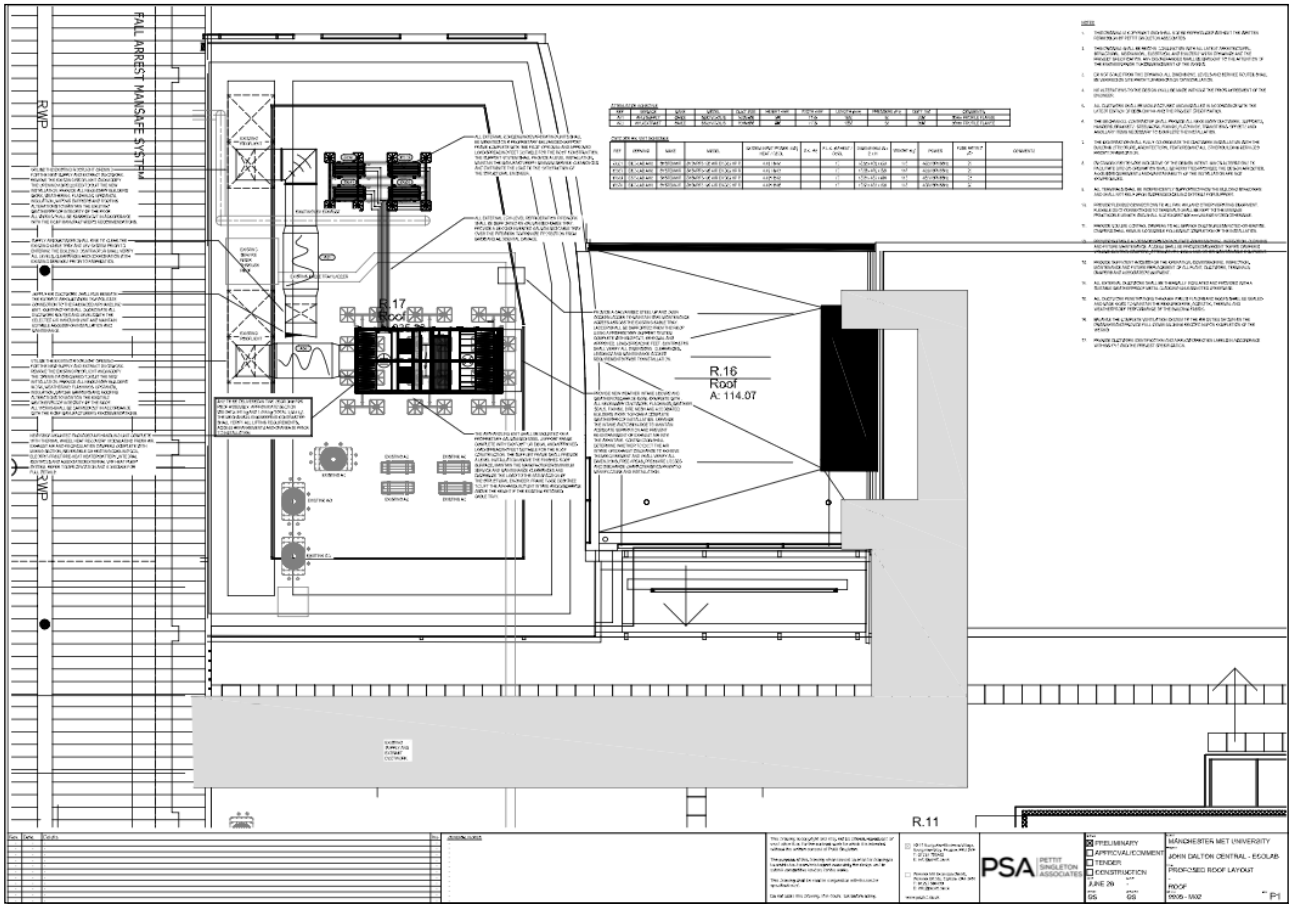


Figure 2.2 below shows the proposed layout of the mechanical plant at roof level on the John Dalton Building.

Figure 2.2: Proposed Rooftop Mechanical Plant Layout



Proposed Roof Mounted Mechanical Plant

The proposal comprises the installation of four condenser units and one air handling unit (AHU) at the roof mounted location shown above. It is understood that the plant will operate as required to serve the Eco Lab within the John Dalton Building. As the anticipated demand and operating hours have not been specified, the assessment assumes continuous 24 hour operation as a worst case scenario.

The four proposed condenser units are Systemair SYSVRF3 180 AIR EVO32 HP R models and the proposed AHU is a Systemair Geniox 20. Figures 2.3 and 2.4 below present the sound data for the proposed condenser units and AHU, respectively, as provided by the client.

The assessment is based on the sound level information provided and any inherent assumptions and error margins. It will be the responsibility of the client to ensure that the information provided is accurate and this assessment is limited by the accuracy of the information provided and any assumptions made in determining the provided sound levels.

Figure 2.4: Proposed Condenser Units Sound Data

Sound data		
Sound pressure level	58	dB(A)
Sound power level	73	dB(A)

Figure 2.5: Proposed Air Handling System Sound Data

Frequency band [Hz] / Sound power level	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1K [dB]	2K [dB]	4K [dB]	8K [dB]	Total [dB(A)]
Supply air	70	81	74	75	73	65	58	51	77
Outdoor air	62	79	70	68	57	51	43	35	68
Exhaust air	68	80	72	73	69	62	57	49	74
Extract air	64	74	70	65	58	53	49	43	66
Sound break out	63	69	56	53	50	43	37	21	57

3.0 PLANNING POLICY & DESIGN TARGETS

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF[1]) sets out the Government's planning policies for England and how these should be applied. Where issues of noise impact are relevant the NPPF provides guidance. NPPF it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution'.

NPPF also advises:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NSPE) which reinforces and supplements the NPPF guidance.

Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This vision is supported by the following aims:

- Avoid Significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

The NPSE describes the following levels at which noise impacts may be identified:

[1] National Planning Policy Framework. Department for Levelling Up, Housing & Communities (2023)

[2] Noise Policy Statement for England - Department for Environment, Food & Rural Affairs (2010)

- NOEL - No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL - Lowest Observed Adverse Effect Level : This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level : This is the level above which significant adverse effects on health and quality of life occur.

According to the explanatory notes in the statement, where a noise level falls between LOAEL and a level which represents SOAEL then:

'all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur'.

Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) - Noise[3] is an online www.gov.uk resource (last updated 2019) to provide additional guidance on the NPPF. It discusses:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur and;*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, inline with the NPSE, no objective noise levels are provided although the PPG states that:

'the subjective nature of noise means that there is not a simple relationship between noise levels and impact on those effected. This will depend on how various factors combine in any particular situation'

Table 3.1 below summarises the PGG noise expose hierarchy.

[3] Planning Practice Guidance on Noise (https://www.gov.uk/guidance/noise--2). Ministry of Housing, Communities & Local Government

Table 3.1: Explanation of Noise Exposure Hierarchy - PPG

Perception	Examples of Outcomes	Increasing Effect Levels	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

British Standard 4142

BS 4142:2014+A1:2019[4] presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. In order to assess impact using BS 4142, the Rating Level of the new sound source is compared with the existing contextual Background Sound Level.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.

The Rating Level is determined by assessing the Ambient Sound Level, distinguishing the Specific Sound Level from the Residual Sound Level and applying any sound specific penalties for acoustic features that would subjectively cause the sound to be perceived differently.

The Specific Sound Level of the commercial / industrial sound source is determined by either; measurement or calculation with regard to the appropriate reference time interval (for daytime or nighttime periods). The standard requires separate analysis for daytime and nighttime periods, evaluating the Rating Level over an appropriate reference time interval (T_r) of: 1hr for daytime (07:00-23:00 hrs) and 15min for nighttime (23:00-07:00 hrs). The Specific Sound Level is defined as equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T* (determined either by calculation or deducting the measured Residual Sound Level from the measured Ambient Sound Level).

'Ambient sound' is defined as the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far (The ambient sound comprises the residual sound and the specific sound when present).

'Residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

[4] BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

Where appropriate, a rating penalty can be applied to the specific sound level to account for the character of the sound, namely: tonality, impulsivity and intermittency. Such acoustic feature corrections can be added together linearly.

Tonality can be determined objectively (using adjacent third octave band analysis or the Joint Nordic method) or subjectively as described below:

- +2dB penalty: Just perceptible
- +4dB penalty: Clearly perceptible
- +6dB penalty: Highly perceptible

Impulsivity can be determined objectively (using Fast Fourier Transform analysis) or subjectively as described below:

- +3dB penalty: Just perceptible
- +6dB penalty: Clearly perceptible
- +9dB penalty: Highly perceptible

Where intermittency is present, a +3dB penalty can be applied. Where the acoustic feature characteristics are neither tonal nor impulsive, but are clearly distinguishable against the residual sound, a +3dB penalty can be applied.

Manchester City Council Guidance

Manchester City Council has published comprehensive guidance in relation to noise impact due to new development. The MCC Planning and Noise Technical Guidance document was updated in October 2022 and discusses the assessment of environmental noise from new development of plant items in the vicinity of nearby noise sensitive uses. The published guidance forms the basis for the decision making process when assessing planning applications within the Council's boundaries and provides design targets. With regard to fixed plant items the guidance states:

'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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

The guidance further states that the assessment of impact from fixed plant items should be undertaken in accordance with the guidance in BS4142:2014+A12019 and the assessment advice within the MCC guidance document.

4.0 ENVIRONMENTAL SOUND SURVEY

To determine the prevailing background sound levels at the site at a position representative of the nearest noise sensitive receptors, attended sound measurements were undertaken on 27 and 28 July 2026. Measurement position MP1 was selected to measure the existing ambient and background sound levels outside the nearest noise sensitive residential property. A three hour daytime measurement was undertaken between 13:00 and 16:00 hours. It should be noted that the university summer holiday period had commenced and most students and staff were absent from the normally busy university campus. A three hour nighttime measurement was also undertaken between 03:45 and 06:45 hours.

During both the daytime and nighttime measurement periods, the sound climate was dominated by local road traffic and existing mechanical plant noise.

Figure 4.1: Sound Survey Measurement Locations



Position MP1 was located in free field conditions, with the microphone mounted on a tripod at a height of approximately 1.5 m above ground level.

Figures 4.2 and 4.3 below summarise the measured data at position MP1 used to establish the typical background sound levels.

Figure 4.2: Daytime Survey Measurement Results - MP1

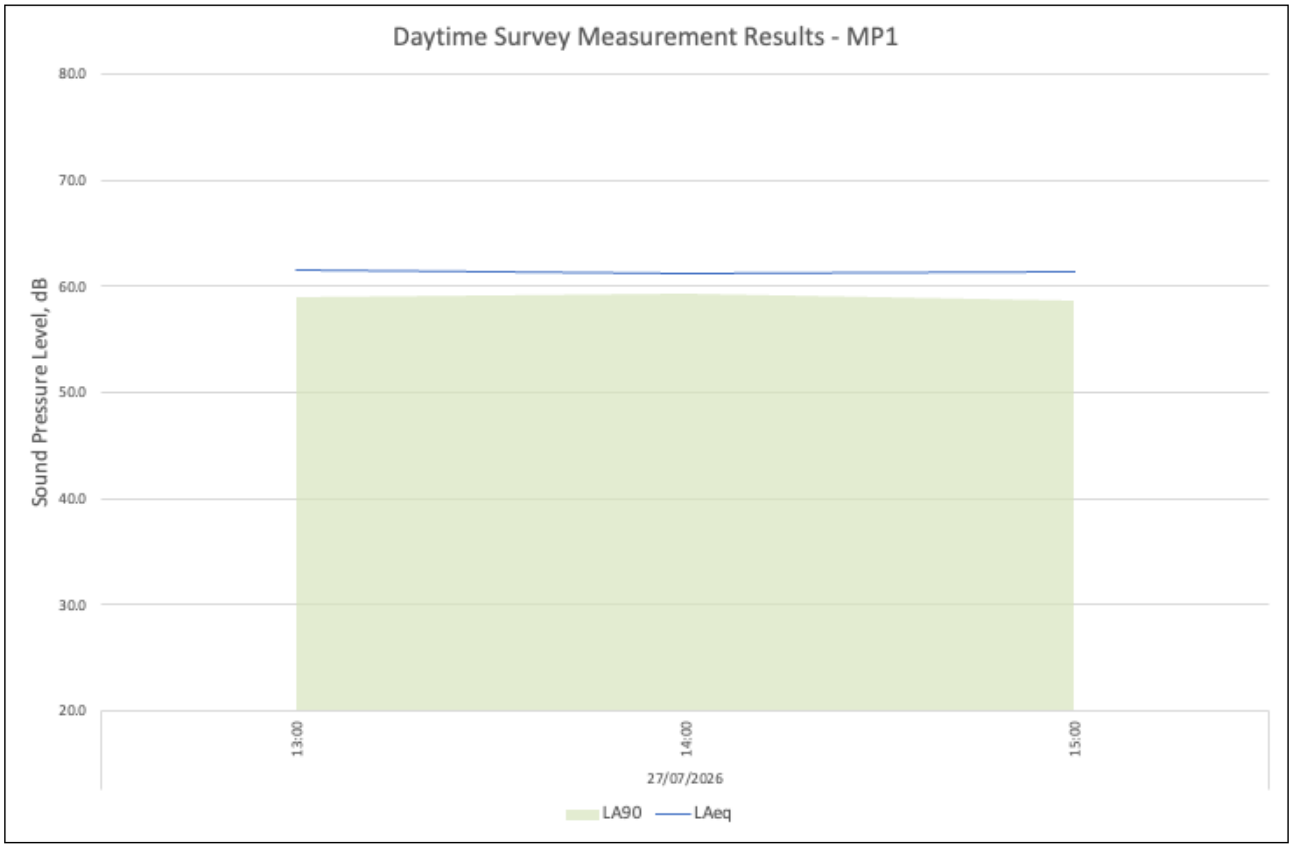


Figure 4.3: Nighttime Survey Measurement Results - MP1

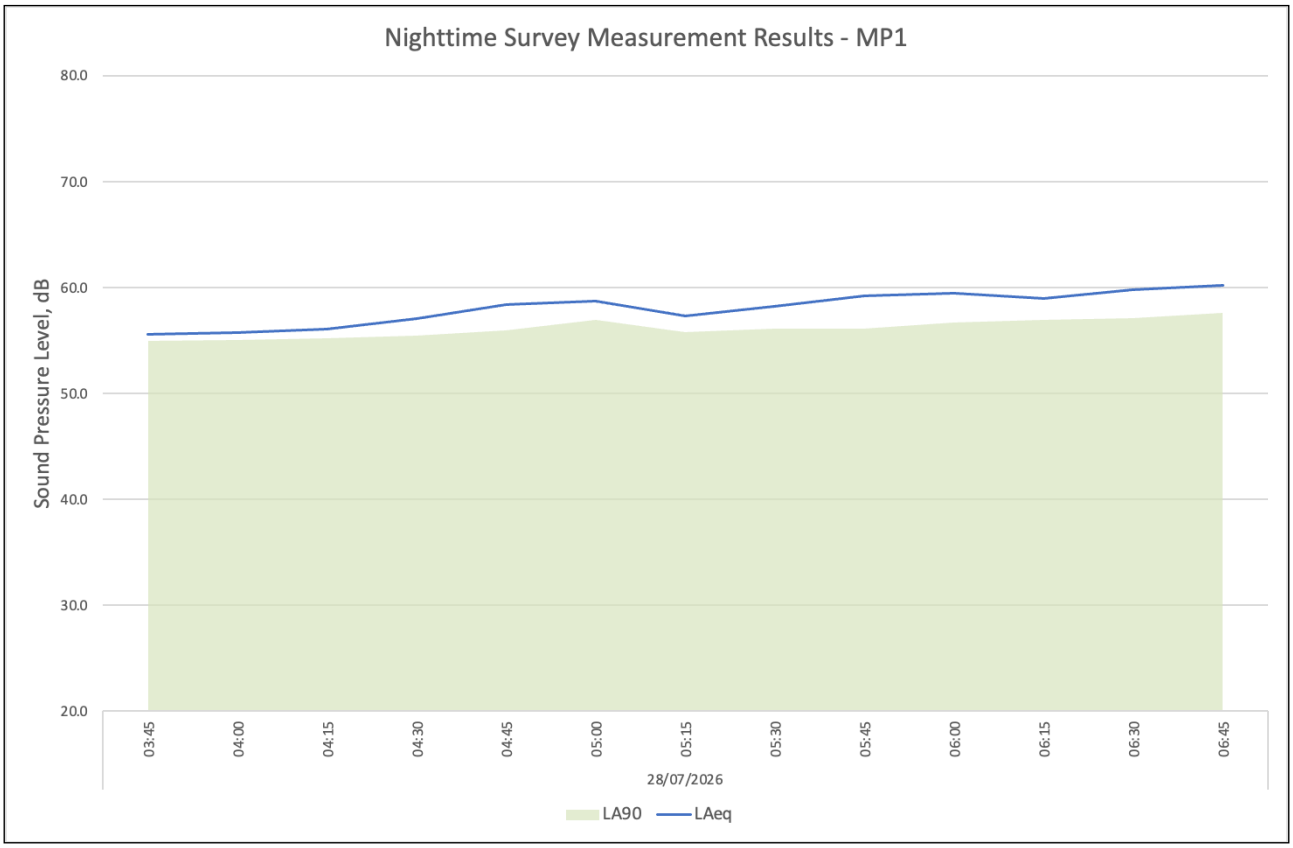


Table 4.1 also summarises the measured data taken at position MP1.

Table 4.1: Measured Data Summary - MP1

Position	Date	Period	Measurement Period	Octave Band Centre Frequency Hz / dB					Measured Broadband (dBA)	Typical L90 (dBA)
				125	250	500	1000	2000		
MP1	27/07/26	Daytime	$L_{Aeq,3hr}$	64.3	59.2	58.8	57.4	52.7	61.4	59.0
	28/07/26	Nighttime	$L_{Aeq,3.hr}$	61.4	55.1	53.9	55.4	49.7	58.3	55.0

Based on a subsequent review of the measured daytime and nighttime background sound levels, Table 4.2 below identifies the typical background sound levels at positions representative of the nearest noise sensitive receptors.

Table 4.2: Typical Background Sound Levels (Daytime/Nighttime Periods)

Location	Measured Sound Pressure Levels, dB	
	Daytime (07:00 - 23:00)	Nighttime (23:00 - 07:00)
	Typical Measured $L_{A90, 1hr}$	Typical Measured $L_{A90\ 15min}$
MP1	59	55

An assessment of predicted noise impact on the nearby residential receptors is presented is Sections 5.0 and 6.0 below.

5.0 CADNAA SOUND PROPAGATION MODELLING

To predict sound levels from the proposed plant installation to the surrounding environment and to the nearest noise sensitive receptors, the latest version of CadnaA 3D sound propagation modelling software has been used, which implements the calculation procedure specified within ISO9613-2.

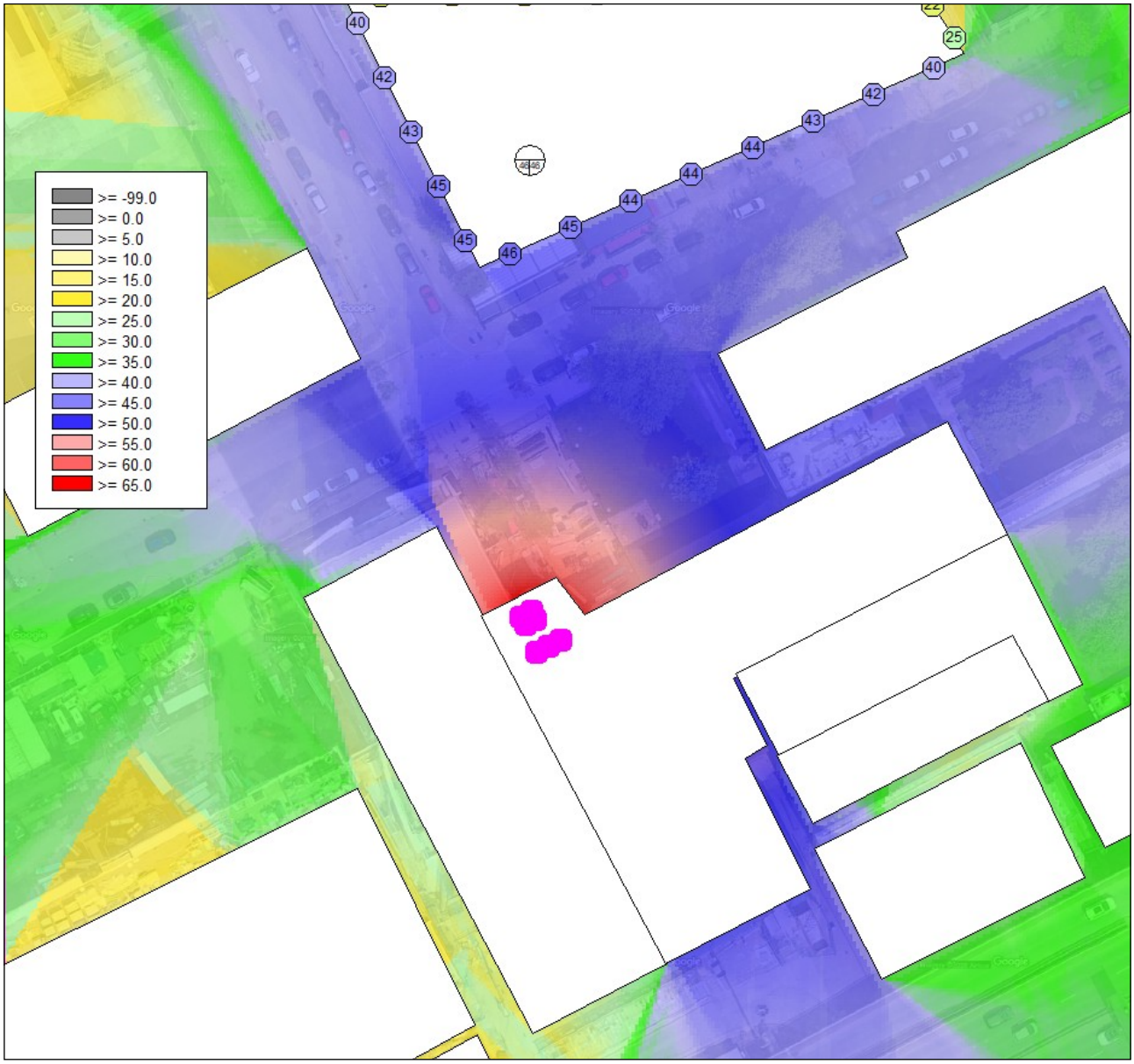
The model has been generated using the sound source data presented in Section 2.0. The modelling of the surrounding environment was undertaken by modelling the existing buildings and the surroundings using Google Earth imagery, site inspection notes and digital terrain mapping data from DEFRA.

Noise propagation is predicted from the proposed location of the plant installation with ground set to 100% reflective and 4 orders of reflection set within the model. Noise impact is predicted to all facades of the nearby noise sensitive uses with the highest predicted facade level used for the purpose of the assessment.

The result of the sound propagation modelling is presented below. Figure 5.1 below shows the prediction grid at plant installation level and the highest predicted facade levels for the nearest noise sensitive dwellings.

The predicted level represents the Specific Sound Level in terms of BS4142:2014+A1:2019. An assessment in accordance with BS4142 is presented in Section 6.0 below.

Figure 5.1: Predicted Specific Sound Level (dBA)



It can be be seen in Figure 5.1 that the highest predicted specific sound level due to the proposed roof mounted plant is 46dBA. This represents a typical BS4142 daytime 1 hour period or 15 minute nighttime period as plant is expected to operate continuously.

6.0 BS4142 PLANT NOISE IMPACT ASSESSMENT

To undertake a noise impact assessment from the proposed development in accordance with BS4142:2014+A1:2019, measured data at the proposed development site has been used to determine the existing background sound level. The manufacturer supplied sound level data as discussed in Section 2.0 above has been used within the CadnaA sound propagation model to predict the impact of the Specific Sound Level to the nearest NSPs including the attenuation provided by distance and other obstacles. Tables 6.1 - 6.2 below present the BS4142 assessments for the nearest/most affected noise sensitive premises during the relevant time periods. The Rating Level in each case has been rated against the typical measured $L_{A90,15min}$ background sound level as discussed in Section 4.0 above. It can be seen from the assessment in accordance with the guidance in BS4142:2014+A1:2019 that impact is not expected to be significant from typical plant operation in the context of the existing environment and no additional mitigation is proposed.

Table 6.1: BS4142 Assessment Table - NSP Typical Daytime Period

	Period (07:00 - 23:00)	Commentary
Ambient Sound Level	N/A	Prediction method to be used.
Residual Sound Level	N/A	
Specific Sound Level (predicted)	46 dBA	Typical predicted facade level.
Corrections	+4 Tonality	No corrections for on-time as operational duty periods cannot be assumed. Plant is assumed to operate continually for a worst case assessment. +4 dB character correction has also been applied, as the AHU's tonal characteristic at 125 Hz may be perceptible.
Rating Level dB	50 dBA	
Typical Existing Background $L_{A90,t}$	59 dBA	Based on measured data position MP1.
Difference	-9 dBA	
Conclusion	Low impact	

Table 6.2: BS4142 Assessment Table - NSP Typical Nighttime Period

	Period (23:00 - 07:00)	Commentary
Ambient Sound Level	N/A	Prediction method to be used.
Residual Sound Level	N/A	
Specific Sound Level (predicted)	46 dBA	Typical predicted facade level.
Corrections	+4 Tonality	No corrections for on-time as operational duty periods cannot be assumed. Plant is assumed to operate continually for a worst case assessment. +4 dB character correction has also been applied, as the AHU's tonal characteristic at 125 Hz may be just perceptible.
Rating Level dB	50 dBA	
Typical Existing Background $L_{A90,t}$	55 dBA	Based on measured data position MP1.
Difference	-5 dBA	
Conclusion	Low impact	

7.0 CONCLUSIONS

An assessment of expected impact due to commercial sound generated by the proposed air handling unit has been undertaken to the nearest noise sensitive properties in line with the guidance in BS4142:2014+A1:2019. Impact is expected to be low and no additional mitigation is proposed.

APPENDIX A:
NOISE MEASUREMENT DETAILS

Location

Chester Street, Manchester

Survey Dates

27th & 28th July 2026 — Background Sound Survey

Weather during the survey was suitable for measurement of sound with no periods of rain and wind speeds below 5ms^{-1}

Survey Conducted By

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Red Acoustics Limited

Full Members of the Association of Noise Consultants

Accredited Test Organisation Number 180

Instrumentation

Table A1: List of Instrumentation Used

Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
Sound Level Meter	XL2	Nti Audio	A2A-16928-E0	08 December 2025	UK-25-168
Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	32273	29 October 2024	49118

Methodology

Before and after the measurements the sound level meter was check calibrated to an accuracy of ±0.3dB using the sound calibrator.