

MMU Science & Engineering

Noise Impact Verification Report – Condition 19

Bowmer + Kirkland Ltd.

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1.0

Introduction

1.0 Introduction

Cundall has been commissioned to carry out acoustic pre-completion verification measurements of items of external plant at the newly constructed Manchester Metropolitan University Science & Engineering Building.

The purpose of this document is to document the measured noise levels on site and assess noise rating levels at the nearest noise sensitive receptor with BS 4142 methodology to determine compliance with Planning Condition 19 attached to the proposed planning decision notice for the development (Ref: 125799/FO/2019).

This assessment has been prepared by Cundall who are Members of the Association of Noise Consultants (ANC).

The report authors, checkers and verifiers are Associate/Corporate Members of the Institute of Acoustics (AMIOA/MIOA) and have over three years' relevant experience within the last five years.

1.1 Test equipment used

Table 1-111 summarises the equipment used in testing:

Item of equipment	Serial number	Calibration certificate	Date of last calibration	Next calibration due
NTi Audio sound level meter Type XL2	A2A-16315-E0	06292/2	07/07/2023	06/07/2025
NTi Audio pre-amplifier Type MA220	8550			
NTi Audio microphone Type MC230A	A17555			

Table 1-111: List of equipment used

2.0

Compliance criteria

2.0 Compliance Criteria

2.1 Local Authority noise policy guidance – planning condition 19

Manchester City Council have issued a decision notice in relation to the proposed development (Ref: 125799/FO/2019). Planning Condition 19 attached to this decision relates to noise from items of plant associated with the development and states the following;

“19) a) Any externally mounted ancillary equipment, plant 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:

Prior to the first occupation of the development a scheme 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 site.

b) Notwithstanding condition 2 and the above part a, prior to first occupation of the development a verification report will be required, to be submitted to and approved in writing by the City Council as local planning authority, to validate that the work undertaken confirms to the above noise criteria. The report shall give the results of post-completion testing to confirm that the proposed noise limits are being achieved once the equipment and any mitigation measures have been installed. Any instances of non-conformity with the above criteria shall be detailed along with any measures required to ensure compliance.

The approved report and any necessary mitigation measures shall be implemented, and retained thereafter, in full in accordance with the approved details before the first occupation of the development.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the City of Manchester Core Strategy and saved Unitary Development Plan Policy DC26.”

2.2 BS 4142

‘BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound’ (BS 4142) provides methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant / vehicles associated with industrial / commercial premises (e.g. fork-lift trucks).

Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific.

As a guideline, BS 4142 states that:

- *A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context*
- *A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context*
- *The lower the rating level relative to the background level, the less likely it is that the specific sound will have an adverse impact*
- *Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context*

BS 4142:2014 also outlines ratings penalties for sound based on a subjective assessment of its characteristics:

“

3.0

Site Context

3.0 Site Context

The site is bounded by Chester Street to the north, the A57 to the south, and Cambridge Street to the west. The nearest and worst-case affected noise sensitive receptor is Manchester Student Village (MSV) located approximately 46 metres from the edge of the site rooftop.

An aerial photograph indicating the new plant location (red) and nearest noise sensitive receptor (green) is presented in Figure 3-11 below:

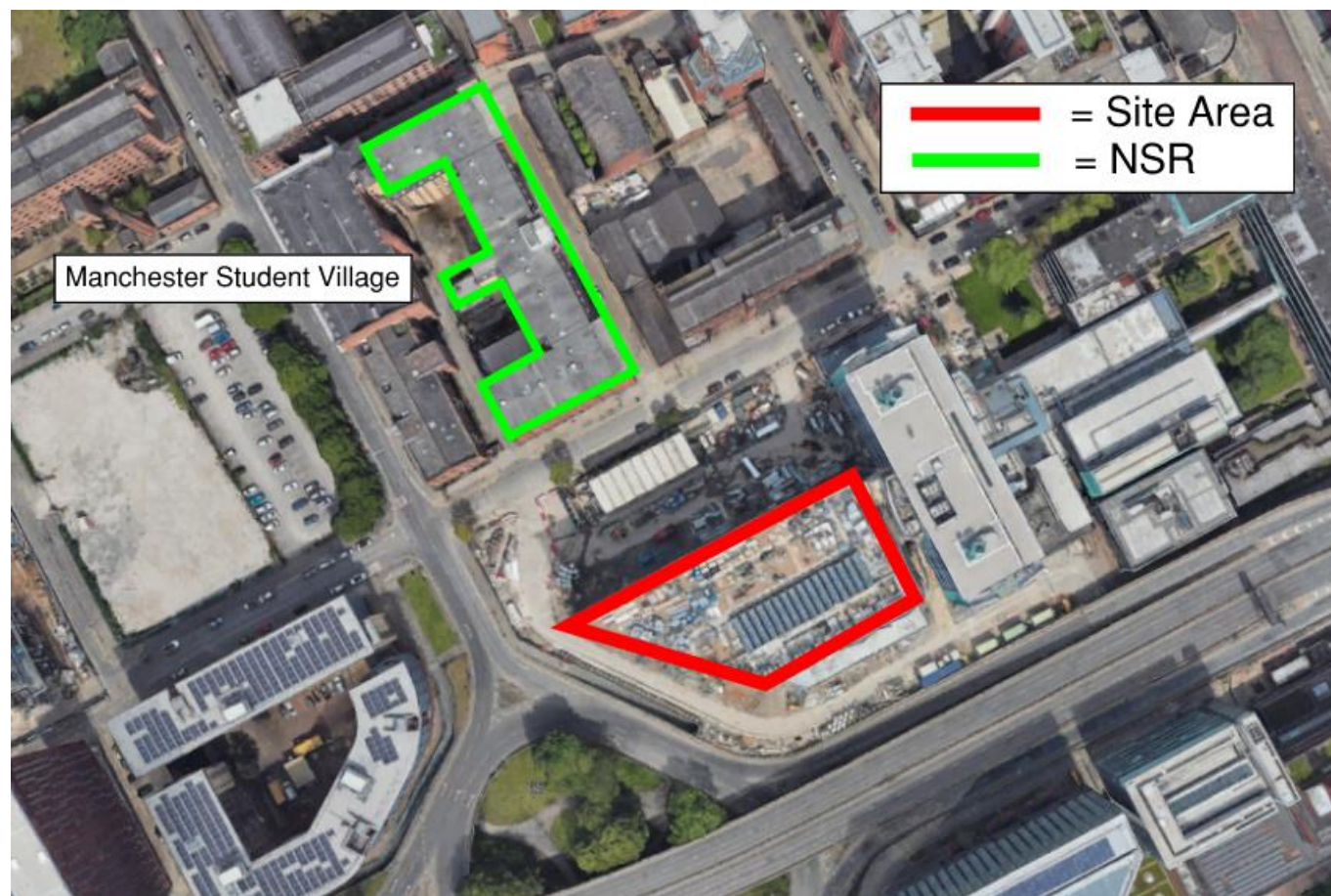


Figure 3-11: Site and NSR location

4.0

Compliance measurements

4.0 Compliance measurements

4.1 Methodology

In order to assess the rooftop plant noise levels affecting nearest noise sensitive receptors, attended daytime measurements have been undertaken on the 9 April 2024.

The approximate measurement locations in external rooftop plant areas is shown in Figure 4-11 below.



Figure 4-11: Noise measurement position

Noise measurements were made using an NTi XL2 (serial number A2A-16315-E0) precision sound level meter, generally in accordance with BS 7445:2003. The meter was field-calibrated before and after with no significant drift witnessed. Laboratory calibration certificates for all equipment are available upon request.

Monitoring equipment was set up by competently trained Cundall staff and all measurement have been reported for free-field conditions.

It was confirmed by site operatives that all external noise generating plant was fully balanced and operating at design duty levels at the time of the measurements.

4.2 Results summary

A summary of source level measurements of external noise generating plant at one metre from the primary rooftop noise sources are detailed within Table 4-111: Plant source level measurements at 1 metre

Table 4-1: Plant source level measurements at 1 metre

overleaf.

All values have been rounded to the nearest integer value (as fractions of a decibel are imperceptible) and are given in dBA.

Measurement	L _{Aeq,T}	L _{AFmax}	L _{AFmin}	L _{A10}	L _{A90}
MP0	56	59	54	57	55
MP1	79	81	78	79	78
MP2	63	64	61	64	62
MP3	64	66	62	64	63
MP4	65	69	63	67	64
MP5	66	69	63	68	65
MP6	62	63	61	62	61
MP7	61	62	60	62	61
Summary	70	81	54	71	70

Table 4-111: Plant source level measurements at 1 metre

5.0

Plant Noise Emission Limits

5.0 Plant Noise Emission Limits

The existing representative background sound levels and subsequent plant noise rating limits for this assessment have been taken from the BDP Environment Noise Assessment Report (Ref: 1338B-BDP-XX-XX-RP-U-000001 Rev B December 2019) submitted in support of the planning application.

Based on survey data of the existing background sound climate, Table 4 of the BDP report provides suitable plant noise rating limits based on achieving a rating level of 5 dB below representative background levels, which aligns with the requirements of Planning Condition 19.

These resultant limits to achieve compliance with the requirements of Condition 19 are reproduced below in Table 5-111: Noise limits at noise sensitive receptors

Table 5-1: Noise limits at noise sensitive receptors:

Nearest or most exposed noise sensitive receptor (NSR) location	External noise limits at the NSR façade (dB L _{Af,Tr})*	
	Daytime (07:00 – 19:00)	Evening/Night-time** (19:00 – 07:00)
Chester Street (Representative of Manchester Student Village)	52 dB L _{Af,Tr}	44 dB L _{Af,Tr}
* External noise limits at the NSR façade location for plant items associated with the Project (dB L_{Af,Tr}). Limits set to 5 dB below the representative background sound level. ** Evening / Night-time external noise limits have been determined from sample background noise levels measured between 23:00 – 07:00 hrs.		

Table 5-111: Noise limits at noise sensitive receptors

The above limiting levels apply to the cumulative level of impact from all items of new building services plant when operating at their design duty.

6.0

Plant Noise Impact Assessment

6.0 Plant Noise Impact Assessment

6.1 Plant installations

The following items of plant have been installed at the proposed development. The plant selections are detailed as follows:

Item	Number of Items
Condenser - Mitsubishi PUZ-ZM100VKA2	17
Condenser - Mitsubishi PUZ-ZM250YKA2	1
Condenser - Mitsubishi PUHY-P300YNW-A1	1
Chiller - Carrier 30RBP450R	2
Smoke Extract	2
Kitchen Extract	1
AHU	1

Table 6-111: Plant Selection

6.2 Noise Impact Assessment

To meet the requirements of Condition 19, sound levels attributable to external services plant associated with the proposed development should be designed to 5 dB below the existing background level, when measured at 1m from the nearest existing noise-sensitive receptor, in accordance on the methodology set out in BS 4142. The applicable limits are reproduced in Table 5-111Table 5-1.

6.2.1 Assessment of noise levels at NSR

Using the source level measurements of external plant as presented in Table 4-111, the specific sound level at the nearest noise-sensitive receptor has been calculated allowing for standard distance attention reductions.

The cumulative specific level at 1 metre from the NSR façade has then been by assessing the one metre noise level at each individual source and then summing the source results at the NSRs after distance and screening attenuation have been considered. A conservative estimate of 5 dB screening attention has also been applied to consider the height differences in building at that there will be no direct line-of-sight from the external plant to the NSR. In practice, the level of screening afforded by the massing of the building and roof/plant layout will mean that acoustic screening will be significantly higher.

The predicted levels at the Manchester Student Village (MSV) are shown below in Table 6-222 overleaf

Measurement position	Measured $L_{Aeq,T}$	Distance to NSR	Distance attenuation	Additional screening	Resultant noise level
MP0	56	65	-36	-5	15
MP1	79	69	-37	-5	37
MP2	63	67	-36	-5	21
MP3	64	75	-37	-5	21
MP4	65	81	-38	-5	22
MP5	66	75	-38	-5	24
MP6	62	84	-39	-5	18
MP7	61	81	-38	-5	18
Sum (dBA)					38

Table 6-222: Predicted NSR levels at Manchester Student Village

6.2.2 Overall assessment summary

For this assessment the night-time plant noise limit of 44 dB (based on background level of 49 dB) has been accepted as the worst-case noise limit. The BS 4142 assessment using this limit is detailed below in Table 6-333.

	A-weighted sound pressure level (dBA)
Calculated specific noise level	38
BS 4142 Impulsivity Correction	0
BS 4142 Tonality Correction	0
BS 4142 Rating Level at Receiver	38
Condition 19 noise limits (5 dB below representative background sound level)	44
Assessment of BS 4142 Rating Level Relative to Background	-6 dB below Condition 19 night-time noise limit (11 dB below representative background sound level)

Table 6-333: Plant noise rating calculation

It can be seen from the table above that the rating level of items of plant meet criteria set out in the Condition 19.

7.0

Conclusions

7.0 Conclusions

Noise levels of new items of external plant been measured in order to inform this compliance report in relation to the discharging of Planning Condition 19 attached to the proposed development.

Limiting noise levels for external noise impacts at existing nearby noise-sensitive receptors have been provided by BDP in their environmental noise report, in order to minimise the potential for adverse noise effects in line with Local and National Planning Policy.

An assessment of proposed items of noise generating plant has indicated cumulative rating noise levels at the nearest existing receptor to the development site are predicted to be 11 dB below prevailing background levels. This is considered a positive indication that the development's operation will not adversely affect the amenity of nearby residences and that the requirements of Planning Condition 19 have been met.

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