



Loreto College

ASHP Plant Noise Verification Survey

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24093-R01-JT
Client: Loreto College
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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
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1 INTRODUCTION

- 1.1 dBx Acoustics has been appointed by Loreto College to carry out a verification noise survey and noise impact assessment of the ASHP plant installed at Loreto Sixth Form College, Chichester Rd South, Manchester M15 5PB.
- 1.2 Planning Condition 4b requires that prior to operation of the scheme, a verification report shall be provided to confirm that the noise criteria presented within dBx Acoustics' report reference *23050-R01-SW* dated 11th May 2023 are met.
- 1.3 A glossary of acoustic terminology has been supplied in Appendix A in order to assist the reader.

2 BASIS OF ASSESSMENT

Manchester City Council (MCC)

- 2.1 The noise impact assessment within this report is intended to satisfy Part b of Condition 4 of planning permission reference 137770/FO/2023.
- 2.2 'Condition 4' of the planning permission states:
- 4) a. 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. Prior to commencement of the use hereby approved the 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. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.*
- b. Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.*
- Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to Policy DM 1 of the Manchester Core Strategy and DC26 of the Extant Unitary Development Plan.*
- 2.3 The approved acoustic report referenced in this condition is dBx Acoustics' report reference 23050-R01-SW dated 11th May 2023.
- 2.4 The building services noise emission limits set within the report when assessed at the NSRs in accordance with BS4142:2014 are 45dBL_{Ar,Tr} during the daytime (07:00h-23:00h) and 37dBL_{Ar,Tr} at night (23:00h-07:00h).

3 SITE DESCRIPTION

- 3.1 Five Strebel S-ASX-VP90R air source heat pumps (ASHP) have been installed within the area marked 'ASHP Location' on Figure 1, below.

Figure 1: Proposed ASHP Location



Nearest Noise Sensitive Receptors

- 3.2 The nearest noise sensitive receptors (NSRs) are residential houses on Drayton Street approximately 80m to the west of the plant, as indicated on Figure 1 above.

4 VERIFICATION NOISE SURVEY

Methodology

- 4.1 A noise survey was carried out at the site on Monday 28th October 2024, to measure noise from the ASHP units in operation.
- 4.2 At the time of testing, all units were set to operate simultaneously to represent a worst-case for potential noise impact.
- 4.3 Measurements were taken at close to the plant with the plant both running and switched off.

Weather Conditions

- 4.4 Weather conditions during the measurement periods were generally cloudy and dry. Wind speeds were within suitable parameters for the measurement of environmental noise (i.e., generally under 5 ms⁻¹). The microphone was protected with a windshield for the duration of the survey.

Equipment

- 4.5 The equipment used in the survey is detailed in Table 1, below;

Table 1: Equipment Used in the Survey

Equipment	Manufacturer & Part No	Serial Number
Sound Level Meter	NOR 140	1403443
Microphone	NOR 1225	18437
Calibrator	B&K 4231	1821323

- 4.6 The sound level meter was calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, except for the calibrator, which had been calibrated not more than one year prior to the survey.

Measured Data

- 4.7 A summary of the measurements at 1m from the ASHP compound is shown in Table 2, below;

Table 2: Measurement Results Summary

Plant On or Off	Start Date and Time (hh:mm)	Duration (hh:mm)	Ambient Noise Level (dBL _{Aeq,T})	Background Noise Level (dBL _{A90,T})
ON	28/10/2024 12:41	05:00	66	65
OFF	28/10/2024 13:08	05:00	48	44

- 4.8 Due to the forced running of the plant which allowed full operation for only 15 minutes, it was not possible to undertake extended measurements at the NSRs. The surveyor attended this location and noted that plant noise was subjectively inaudible.

5 ASSESSMENT

Manchester City Council Requirements

- 5.1 Planning condition 4b detailed within planning application 137770/FO/2023 requires that external plant items should be designed to a rating noise level of no higher than 5dB below existing background noise levels.
- 5.2 The measured background sound level during the typical daytime period and night-time period, as measured in May 2023 and used in the submitted planning noise impact assessment, was 50dB_{LA90,1hr} and 42dB_{LA90,15mins}, respectively.
- 5.3 Therefore, based on the above background levels and requirements from MCC, the cumulative plant noise levels should not exceed 45dB_{LA,r,Tr} during the daytime period and 37dB_{LA,r,Tr} the night-time period.

Calculations

- 5.4 The measured sound pressure level at 1m from the units in operation can be distance corrected to derive the specific sound level at the NSR on Drayton Street as shown in Table 3, below.

Table 3: Predicted Noise Levels at NSR

Plant	Unit SPL at 1m (dB _{LAeq,T})	Approximate Distance to NSRs (m)	Distance Attenuation (dB)	Specific Noise Level at NSRs (dB _{LA,r,Tr})
ASHPs	66	80	38	28

- 5.5 On this basis, a BS4142 assessment for the plant as installed is presented in Table 4, below.

Table 4 : BS4142 Assessment- NSR -Drayton Street

Item	Calculation	Relevant Clause	Comments
Measured background sound level - daytime	50dBL _{A90, 1hr}	8.3	The typical background sound level measured during the daytime period.
Measured background sound level – night-time	42dBL _{A90, 15min}	8.3	The typical background sound level measured during the night-time period.
Specific sound level	28dBL _{Aeq, 1hr}	7.3.3	A prediction made using the methodology outlined above, includes all sources, screening and distance corrections.
Assessment made during the daytime and night-time periods so reference period is 1 hour and 15 minutes respectively		7.2	-
Acoustic Feature Correction	+3dB	9.2	Intermittent operation
Rating Level	31dBL _{Ar, Tr}	9.2	The predicted Rating Level during the daytime and night-time period.
Excess of Rating Level over background sound level - daytime	-19dB	11	-
Excess of Rating Level over background sound level -night-time	-11dB	11	-
Assessment indicates low likelihood of adverse impact		11	Predicted Rating Level does not exceed the measured typical background level. This is an indication of the development having a low impact.
Uncertainty of the assessment	Minor	10	Background sound level based on repeatable measurements. The predicted Rating Level is based on established prediction methodologies.

- 5.6 It is be seen from Table 4 that the rating level of the installed plant is at least 5dB lower than the existing background noise level measured during the daytime and the night-time respectively, and is therefore compliant with the requirements of MCC. On this basis, Planning Condition 4b can be discharged.

6 CONCLUSION

- 6.1 dBx Acoustics has been appointed by Loreto College to carry out a verification noise survey for ASHP plant installed externally to Loreto Sixth Form College, Chichester Rd South, Manchester M15 5PB.
- 6.2 A verification noise survey of the installed plant units was undertaken on Monday 28th of October 2024.
- 6.3 The measured data confirms that the requirements of Manchester City Council as set in Planning Condition 4b of application reference 137770/FO/2023 are achieved by the installation.
- 6.4 This condition can therefore be discharged.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.

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