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# MEMO P23-075-M02v1

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| **Project** | Loreto College, Manchester - New Classroom Block |
| **Date** | 14 April 2025 |
| **To** | Sam Oldfield – Caddick Construction |
| **From** | David Thurstan BSc MIOA – Principal Consultant |
| **Subject** | **Planning Condition 11 – Fixed Plant Noise Verification Assessment** |

This memo sets out the findings of a validation/verification assessment of noise from external equipment associated with the new classroom block at Loreto College, Manchester.

Planning permission for the classroom block has the following condition relating to the assessment and control of externally mounted fixed plant noise:

*"11 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."*

This assessment forms part of an application to discharge part b of the condition.

The items of rooftop equipment considered during this site visit were:

- 12 no Air Source Heat Pump (ASHP) units;
- 3 no overdoor heat pump units;
- 2 no. VRF condenser units;
- Computer service room condenser unit;
- Heat recovery system.

The roof top equipment operates on an on-demand basis, with some units providing cooling (i.e to computer server room) and other units providing heating (such as the ASHP units, the heat recovery system etc). Therefore, the demand changes throughout the day and depending upon ambient temperature. As such, it is unlikely that all units will operate simultaneously. The majority of units will operate during college hours only, but one or two ASHPs could operate overnight during colder months.

On this basis, the assessment (which assumes simultaneous of all equipment) is a robust worst-case. It is noted that it would be very difficult or infeasible to demonstrate compliance with the requirements of the planning condition by measurements at the nearest dwellings. As such, we have carried out measurements close up the equipment and extrapolated the measured source noise levels to the nearest dwellings.

## Adopted Noise Limits

The typical background noise levels were determined from the results of a 24-hour noise survey as detailed in Hepworth Acoustics Report P23-075-R01v2.

The representative background noise values were 45 dB $L_{A90,T}$ for the evening period and 40 dB $L_{A90,T}$ for the night-time value was period. Therefore, based on requirements of the condition the adopted noise limits are 40 dB $L_{Aeq,T}$ for the daytime and 35 dB $L_{Aeq,T}$ at night outside the nearest dwellings. The nearest dwellings are considered to be apartments at 1 Alexandra Road diagonally opposite the site at the junction of Alexandra Road and Moss Lane West, approximately 35-40 metres from the rooftop plant.

## Measurement of Equipment Noise Emission Levels

The noise measurements were undertaken during a site visit in the evening on Wednesday 9 April 2025. The purpose of the visit was to carry out noise measurements to establish the noise emissions from the various items of plant/equipment.

The noise measurements were carried out using a B&K 2250 ‘Class 1’ sound analyser (s/n: 3011706). Calibration checks were carried out both before and after the measurement periods with no variance in levels observed. The noise measurements were taken in ‘free-field’ conditions and at a microphone height of approximately 1.4 metres above the roof.

The majority of the equipment operates at a low, steady noise level, although the VRF units while still steady in nature are the dominant noise source on the roof top when they operate. Therefore the noise measurements were taken as multiple short-term periods in terms of $L_{eq,T}$ at 3 metres from the VRF units, which also included all the other equipment operating. Further measurements were undertaken at 1 metre from ASHP units. The results are presented in Table 1 below:

**Table 1: Measured noise emission levels from equipment, standardised to a distance of 3m (dB)**

| Description | Noise Level |
|---|---|
| 2 no. VRF condensers (including all other equipment) | 61 |
| 1 no. Air Source Heat Pump | 58 |

## Resulting Noise Levels at Nearby Dwellings

The measured source noise levels have been calculated to the nearest apartments at 1 Alexandra Road (i.e. top floor) for each assessment period. For the daytime period the noise level measured 3 metres from the VRF units, which also included all the other equipment operating, has been used. At night it is assumed that two

ASHPs will operate. The attenuation of sound over distance for each item of equipment has been calculated. Furthermore, considering the position of the equipment on the roof in relation to the building parapet and the relative height of the top floor apartment diagonally opposite, a 10 dB correction for screening has been applied for the ASHPs which are fully screened by the parapet and a 5 dB reduction has been applied for the VRF units (which are taller). The equipment is steady in nature with no tonality or impulsivity associated with its operation and therefore no acoustic feature correction has been applied. The representative background noise levels and adopted noise limits for each period are also shown.

**Table 2: Assessment of rooftop fixed plant noise at nearest dwellings (dB)**

| Description | Daytime | Night-time |
|---|---|---|
| Calculated Specific Sound Level outside Dwelling | 33 | 17 |
| Acoustic feature correction | 0 | 0 |
| Rating Level of Sound at Dwelling | 33 | 17 |
| Adopted Noise Limit | 40 | 35 |
| Difference | -7 | -18 |

The results in Table 2 show that the combined rating noise levels at the nearest dwellings are well below the adopted noise limits during the daytime and night-time periods.

## Conclusion

Therefore, the proposed equipment will not result in any unacceptable impact on the planning permission without any specific additional noise mitigation measures.