

## Design note.

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Project: MMU MTC Building

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## External plant noise commissioning.

Acoustic commissioning measurements were undertaken at the MMU MTC Building on 8 September 2022 to assess noise emissions from new building services plant. Details of the measurements and assessment of noise egress levels to the nearby sensitive premises are provided below.

The commissioning measurements and subsequent assessment demonstrate compliance with the relevant Planning Conditions.

### 1. Criteria.

#### 1.1 Planning conditions.

*Condition 3 is provided below for reference.*

1. *3) 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.*
2. *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.*

#### 1.2 Plant noise limits.

Suitable plant noise limits have been provided previously for the development within report reference 'REP-1012825-AP-20210316-Acoustic planning report-Rev01' dated 19/03/2021. A summary is provided below.

An environmental noise survey has been carried out and a noise egress assessment undertaken in accordance with BS 4142:2014 and Manchester City Council (MCC) requirements. The survey was carried out between 26<sup>th</sup> February and 2<sup>nd</sup> March 2021.

The closest noise-sensitive receptor to the proposed development has been identified as the Vita Living residential premises to the north-east.

The representative background sound levels at the nearby sensitive receptors were 54 dB  $L_{A90,5min}$  during the daytime (07:00 to 23:00 hrs) and 47 dB  $L_{A90,5min}$  during the night-time (23:00 to 07:00 hrs).

Based on MCC criteria, all plant, equipment and machinery associated with the development shall be controlled to ensure that the overall sound pressure levels at 1 m from the façade of the nearest noise sensitive premises (Vita Living) do not exceed 49 dB  $L_{Aeq,T}$  during the daytime (07:00 to 23:00 hrs) and 42 dB  $L_{Aeq,T}$  during the night-time (23:00 to 07:00 hrs). If the plant contains any tonal characteristics a further correction will be required.

The criteria are summarised below on this basis.

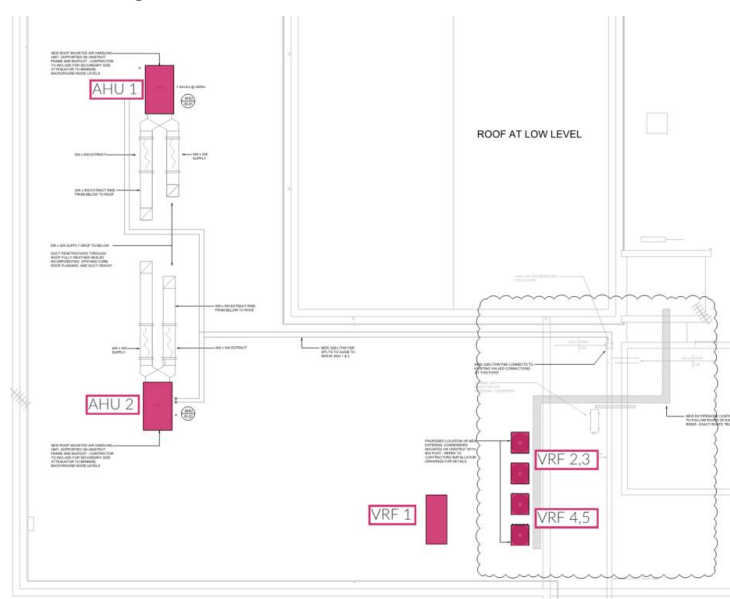
**Table 1: Plant noise emissions limits, from REP-1012825-AP-20210316-Acoustic planning report-Rev01.**

| Period                 | Plant noise limit at 1 m from the façade of the closest noise-sensitive receptor, dB $L_{Aeq,T}$ |
|------------------------|--------------------------------------------------------------------------------------------------|
| Daytime (0700-2300)    | 49                                                                                               |
| Night-time (2300-0700) | 42                                                                                               |

## 2. Proposed external equipment.

The newly installed plant includes five new VRF units and two air handling units (previously out of use and recommissioned). All plant is installed on the roof of the building.

The VRF units are proposed approximately 75 m from the closest noise-sensitive receptor, and the AHUs are proposed 77 m and 83 m from the closest noise-sensitive receptor. The locations are presented in Figure 1.



**Figure 1: Partial roof plan with installed plant equipment highlighted.**

### 3. Measurement results & assessment.

#### 3.1 Noise measurements summary.

A sample of noise measurements were undertaken in the vicinity of the newly installed plant to establish the level of noise emissions from each unit.

Measurements were carried out while all plant was understood be operating at design duty, along with background measurements with no new plant operating. This allows for the plant noise levels to be corrected for background noise. The background noise level in the vicinity of the plant was driven by road traffic along the nearby Mancunian Way.

Further details of the measurements and equipment used are provided in Appendix A.

A summary of the noise levels measured are provided in Table 2. The measurements are presented as  $L_{90}$  noise levels due to limit the impact of variable road traffic noise on the measurements. This is considered suitable to capture the plant noise contributions as these were a constant noise source.

**Table 2** Noise measurements of plant room emissions

|                                | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | $L_{A90}$ |
|--------------------------------|------|-------|-------|-------|------|------|------|------|-----------|
| <i>AHUs</i>                    |      |       |       |       |      |      |      |      |           |
| AHU 1, 0.5 m from grille       | 65   | 74    | 63    | 63    | 64   | 56   | 46   | 39   | 67        |
| AHU 2, 0.5 m from grille       | 63   | 72    | 61    | 62    | 61   | 55   | 46   | 40   | 65        |
| <i>VRFs</i>                    |      |       |       |       |      |      |      |      |           |
| VRF 1, 1 m from unit           | 67   | 74    | 67    | 64    | 66   | 63   | 54   | 50   | 70        |
| VRF 2 & 3, 1 m from unit       | 66   | 66    | 66    | 64    | 66   | 60   | 51   | 48   | 67        |
| VRF 4 & 5, 1 m from unit       | 67   | 68    | 65    | 66    | 64   | 58   | 50   | 48   | 65        |
| <i>Background noise levels</i> |      |       |       |       |      |      |      |      |           |
| Towards edge of roof           | 64   | 65    | 62    | 63    | 66   | 57   | 45   | 32   | 68        |
| Away from edge of roof         | 63   | 62    | 60    | 59    | 62   | 53   | 42   | 29   | 64        |

#### 3.2 Assessment.

Calculations have been carried out based on the measured noise levels presented above to predict noise emissions to the nearby sensitive premises.

The calculations have been based on continuous operation of the plant items during the day and night periods, although in practice it is expected that noise levels will reduce during the night. Appropriate distance corrections have been taken based on the relative locations of the plant and commissioning measurement position in relation to the nearest residential premises (student accommodation at Circle Square). No screening corrections have been taken as the nearby residential premises overlook the rooftop plant area.

Based on the measured noise levels and distance / screening corrections, the predicted noise levels at the Circle Square student accommodation are set out in Table 3.



Table 3 Calculated noise levels at the nearest residential receptor

|                   | Calculated plant noise levels at nearest dwellings |       |       |       |      |      |      |      |                  |
|-------------------|----------------------------------------------------|-------|-------|-------|------|------|------|------|------------------|
|                   | 63Hz                                               | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | L <sub>Aeq</sub> |
| AHUs              | 18                                                 | 32    | 17    | 20    | 16   | 11   | 4    | -1   | 22               |
| VRFs              | 33                                                 | 41    | 35    | 33    | 33   | 30   | 22   | 19   | 37               |
| Total noise level | 33                                                 | 42    | 35    | 33    | 33   | 30   | 22   | 19   | 37               |

The calculated noise levels are compliant with the criteria set out in Section 1.

## Appendix A - Measurement & equipment details.

### Measurements.

Attended noise measurements were carried out in the vicinity of the new plant on 3 August 2021.

Measurements were conducted over 3x 30 second periods per measurement with a RION NL-52 sound level meter (SLM). The SLM was mounted approximately 1.2 m above ground level. The microphone of the SLM was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted.

### Equipment details.

Table B1 summarises the details of the equipment used during the environmental noise survey. All equipment used was within dates of calibration and calibration certificates are available on request.

**Table B1 Equipment used during environmental noise survey**

| Item              | Description                                                                                              | Serial Number                          | Calibration Date |
|-------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------|------------------|
| Sound Level Meter | Rion Logging Sound Level Meter type NL-52<br>Rion Microphone type UC-59<br>Rion Pre-Amplifier type NH-25 | s/n 00297868<br>s/n 14887<br>s/n 88079 | 07/04/2021       |