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## Technical Memorandum

### Plant Noise Impact Assessment, 340 Deansgate, Manchester

## 1 Introduction

- 1.1 Four new ventilation louvres have been installed on the Southern Street elevation of 340 Deansgate in Manchester.
- 1.2 The louvres are located above two first and second floor windows and serve as the atmospheric terminations for two new Mitsubishi Lossnay heat recovery units that have been installed to serve the first and second floor office accommodation.
- 1.3 The units are understood to operate during typical office hours only (ca. 07:00-19:00).
- 1.4 Planning permission for the works was granted subject to conditions. Condition 4 pertains to plant items and states the following:

*"...4)a) Externally mounted ancillary plant, equipment and servicing, including any plant located behind any ventilation panels or louvres 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..."*

- 1.5 As no submission was made in order to discharge Condition 4a prior to installation of the units, this memorandum seeks to provide evidence for the discharge of both 4a and 4b.

## 2 Nearest Noise Sensitive Receptors

- 2.1 The nearest noise sensitive receptors are understood to be the first and second floor windows of the residential premises directly opposite the louvres across Southern Street, at an approximate horizontal distance of 6 metres.
- 2.2 Figure 1 below shows an aerial view of the site and highlights both the location of the louvres and the nearest noise sensitive receptors.



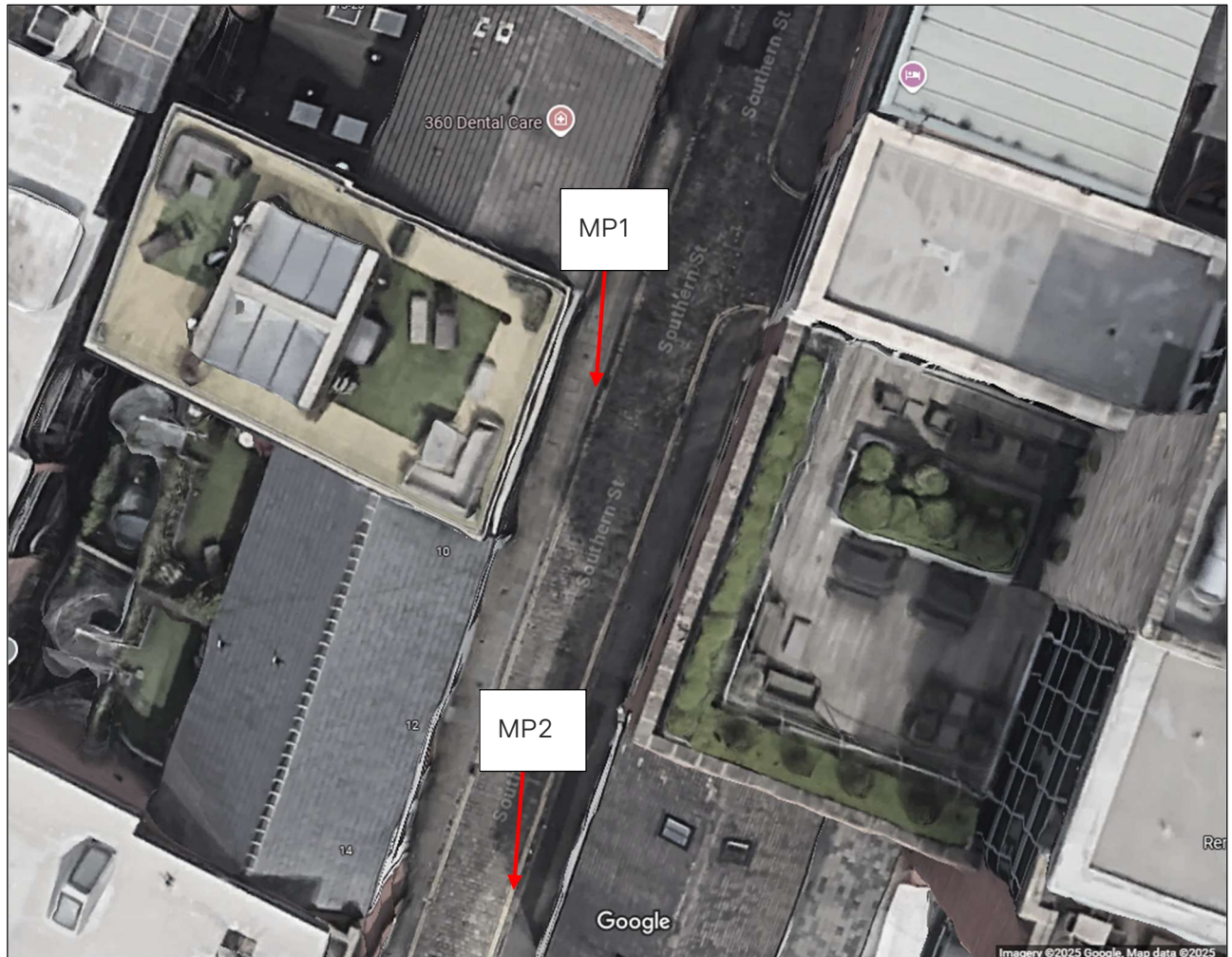
Figure 1: Aerial photograph showing approximate locations of louvres and nearest receptors

## 3 Noise Surveys

- 3.1 Sol Acoustics attended site to undertake noise surveys on Friday 14 February 2025 between approximately 13:50 and 14:50 hours and Wednesday 14 May between approximately 18:30 and 20:00.
- 3.2 The surveys were undertaken at a 2No. measurement positions, as shown in Figure 2, and described in Table 1.

| Measurement Position | Description                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MP1                  | Tripod mounted microphone site in free-field conditions, approximately 1.5m above ground level. Position outside the residential premises directly opposite the louvres.                                |
| MP2                  | Tripod mounted microphone site in free-field conditions, approximately 1.5m above ground level. Proxy position for the residential premises taken approximately 20m to the south along Southern Street. |

**Table 1: Noise monitoring measurement positions summary**



**Figure 2: Aerial photograph showing noise monitoring location**

- 3.3 Measurement position MP1 was a short duration fully attended measurement position intended to measure the noise from the louvres whilst the HRUs were in normal operation, however noise from the louvres was not audible over the ambient noise climate at the site, which, during both surveys, was noted to comprise contribution from road traffic noise and existing building services plant associated with other premises along Southern Street and Barton Street.
- 3.4 During the initial survey in February 2025, due to the presence of significant construction noise along Deansgate it was not possible to select a proxy position to establish a measurement of the existing background sound level in the absence of noise from existing plant associated with other premises. However, during the second survey in May 2025 no nearby construction works were in operation during the survey and as such a proxy position where the influence of the existing plant noise at the site is minimised was identified at MP2.
- 3.5 Type 1 Precision Grade sound measuring instrumentation was exclusively used and microphone windshields were fitted at all times. Full details of all the instrumentation used and corresponding traceable calibration records are retained on file by Sol and is available for inspection if required.
- 3.6 The prevailing weather conditions during the survey were considered suitable for the purposes of environmental noise measurement with no rainfall and low wind speeds.
- 3.7 Table 2 provided a summary of the free-field noise levels measured during the survey:

| Measurement Position | Date/Time               | 340 Deansgate HRUs | dB, $L_{Aeq,15min}$ | dB, $L_{A90,15min}$ |
|----------------------|-------------------------|--------------------|---------------------|---------------------|
| MP1                  | 14 Feb<br>13:52 – 14:07 | Operational        | 62                  | 56                  |
|                      | 14 Feb<br>14:09 – 14:24 | Operational        | 64                  | 57                  |
|                      | 14 Feb<br>14:26 – 14:41 | Operational        | 61                  | 54                  |
|                      | 14 May<br>18:30 – 18:45 | Operational        | 59                  | 54                  |
|                      | 14 May<br>18:45 – 19:00 | Operational        | 59                  | 54                  |
|                      | 14 May<br>19:00 – 19:05 | Non-operational    | 61                  | 54                  |
| MP2                  | 14 May<br>19:07 – 19:22 | Non-operational    | 57                  | 52                  |
|                      | 14 May<br>19:22 – 19:37 | Non-operational    | 58                  | 52                  |
|                      | 14 May<br>19:37 – 19:52 | Non-operational    | 56                  | 51                  |

**Table 2: Summary of measurement results**

- 3.8 Throughout the duration of both surveys, it was observed that noise from the louvres was not audible due to the relatively high ambient noise climate at the site. Furthermore, it is noted that this is to be expected if the units are operating in line with the requirements of Condition 4, as the units should have been designed to achieve a rating level of 5dB lower than the prevailing background noise level at the site, which would therefore mean that the noise contribution when measured at the nearest noise sensitive receptor would not be discernible over the background noise climate.
- 3.9 The inaudibility of noise from the louvres suggests that any noise contribution from the louvres is likely compliant with the requirements of Condition 4, however to validate this observation, Sol have undertaken a retrospective desktop review of the installed heat recovery units in order to calculate the predicted noise level at the nearest noise sensitive receptor and comment with regards to the requirements of Condition 4 and drawing on the representative background noise level established during the survey.

## 4 Plant Noise Emission Limits

- 4.1 On the basis of the results of the noise survey and the requirements of Manchester City Council as set out in Condition 4a, Table 1 below sets out the maximum permissible Rating Level to be achieved at the nearest noise sensitive receptor.

| Location                         | Maximum Permissible Rating Level, dB $L_{A,Tr}$ |
|----------------------------------|-------------------------------------------------|
|                                  | Typical Office Hours<br>(07:00 – 19:00)         |
| Nearest noise sensitive receptor | 46                                              |

**Table 3: Plant Rating Limits**

## 5 Installed Plant Items

5.1 Based on the information provided to Sol Acoustics it is understood that the louvres serve two Mitsubishi Lossnay heat recovery units as set out in Table 4 below.

| Ref  | Manufacturer        | Model         | Duty     | Location     |
|------|---------------------|---------------|----------|--------------|
| 1-03 | Mitsubishi Electric | LGH-80RVX3-E  | S3 (75%) | First Floor  |
| 2-03 | Mitsubishi Electric | LGH-100RVX3-E | S3 (75%) | Second Floor |

**Table 4:** Summary of installed plant items

5.2 The intermediate ductwork between the atmospheric terminals of the installed units and the corresponding façade louvres is set out in the following drawings provided by *axd environmental*:

- ◆ C13283-AXD-XX-01-DR-M-0006 *As Fitted HVAC Layout First Floor*
- ◆ C13283-AXD-XX-02-DR-M-0007 *As Fitted HVAC Layout Second Floor*

5.3 Table 5 below sets out the manufacturers in-duct sound power level data for the fresh air intake and exhaust terminals of the installed units:

| Ref  | Terminal | In-duct Sound Power Level (dB) at Octave Band Centre Frequency (Hz) |     |     |      |      |      |      |
|------|----------|---------------------------------------------------------------------|-----|-----|------|------|------|------|
|      |          | 125                                                                 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| 1-03 | Intake   | 58                                                                  | 52  | 48  | 43   | 39   | 31   | 24   |
|      | Exhaust  | 64                                                                  | 59  | 55  | 52   | 50   | 45   | 36   |
| 2-03 | Intake   | 54                                                                  | 51  | 48  | 43   | 38   | 31   | 25   |
|      | Exhaust  | 61                                                                  | 59  | 57  | 52   | 50   | 45   | 38   |

**Table 5:** In-duct sound power levels of installed plant at operating duty (Speed 3)

## 6 Plant Noise Assessment

### BS 4142 Rating Penalty

6.1 As noise from the units was inaudible when measured at a position representative of the nearest noise sensitive receptor with no acoustic character observed, no BS 4142 rating penalty is deemed necessary.

### Context

6.2 In full accordance with BS 4142 methodology, the context in which the sound occurs must be taken into consideration when demining the magnitude of the noise impact. In this case, the background noise level at site is dominated by transportation noise and other noise sources typical of an urban location. As such, the context of the site is not expected to affect the BS 4142 predicted magnitude of the noise impact generated.

### Summary of Results

Table 6 summarises the results of the plant noise impact assessment at the nearest noise sensitive receptor.

| Description                                        | Sound Level (dB) at Octave Band Centre Frequency (Hz) |     |     |      |      |      |      | dBA       |
|----------------------------------------------------|-------------------------------------------------------|-----|-----|------|------|------|------|-----------|
|                                                    | 125                                                   | 250 | 500 | 1000 | 2000 | 4000 | 8000 |           |
| In-duct SWL<br>1-03 Intake                         | 58                                                    | 52  | 48  | 43   | 39   | 31   | 24   | -         |
| SPL @ 1m from Louvre                               | -                                                     | -   | -   | -    | -    | -    | -    | 45        |
| Distance Loss (6m)                                 | -                                                     | -   | -   | -    | -    | -    | -    | -16       |
| 1-03 Intake<br>Contribution @ 1m<br>from receptor  | -                                                     | -   | -   | -    | -    | -    | -    | 29        |
| In-duct SWL<br>1-03 Exhaust                        | 64                                                    | 59  | 55  | 52   | 50   | 45   | 36   | -         |
| SPL @ 1m from Louvre                               | -                                                     | -   | -   | -    | -    | -    | -    | 54        |
| Distance Loss (6m)                                 | -                                                     | -   | -   | -    | -    | -    | -    | -16       |
| 1-03 Exhaust<br>Contribution @ 1m<br>from receptor | -                                                     | -   | -   | -    | -    | -    | -    | 38        |
| In-duct SWL<br>2-03 Intake                         | 54                                                    | 51  | 48  | 43   | 38   | 31   | 25   | -         |
| SPL @ 1m from Louvre                               | -                                                     | -   | -   | -    | -    | -    | -    | 44        |
| Distance Loss (6m)                                 | -                                                     | -   | -   | -    | -    | -    | -    | -16       |
| 2-03 Intake<br>Contribution @ 1m<br>from receptor  | -                                                     | -   | -   | -    | -    | -    | -    | 28        |
| In-duct SWL<br>2-03 Exhaust                        | 61                                                    | 59  | 57  | 52   | 50   | 45   | 38   | -         |
| SPL @ 1m from Louvre                               | -                                                     | -   | -   | -    | -    | -    | -    | 54        |
| Distance Loss (6m)                                 | -                                                     | -   | -   | -    | -    | -    | -    | -16       |
| 2-03 Exhaust<br>Contribution @ 1m<br>from receptor | -                                                     | -   | -   | -    | -    | -    | -    | 38        |
| Cumulative @ 1m from<br>receptor                   | -                                                     | -   | -   | -    | -    | -    | -    | 41        |
| Rating Level                                       | -                                                     | -   | -   | -    | -    | -    | -    | 41        |
| Maximum Permissible<br>Rating Level                | -                                                     | -   | -   | -    | -    | -    | -    | 46        |
| <b>Exceedance</b>                                  | -                                                     | -   | -   | -    | -    | -    | -    | <b>-5</b> |

**Table 6: Summary of results**

6.3 The results of the assessment set out in Table 6 show a predicted rating level 5dB below the maximum permissible rating level that has been set based on the measured background noise level at the site and the requirements of Manchester City Council, when assessed at the nearest noise sensitive receptor, and are therefore considered to validate the observations made during the noise survey, and in turn should be sufficient evidence to allow for the discharge of Condition 4.

Yours sincerely

For and on behalf of Sol Acoustics Limited

A handwritten signature in dark ink, appearing to read 'Joe Sinker', with a long horizontal flourish extending to the right.

Joe Sinker

Executive Consultant

## APPENDIX A

### Glossary of Acoustic Terms

| Term                              | Abbreviation            | Description                                                                                                                                                                                                                                              |
|-----------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Decibel                           | dB                      | A scale for comparing the ratios of two quantities, including sound pressure and sound power.                                                                                                                                                            |
| A-weighting                       | dB(A)                   | The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.                                                                                                  |
| Sound Pressure Level              | $L_{pA}$                | A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to $2 \times 10^{-5}$ Pascals.                                                                                                                         |
| Equivalent Continuous Sound Level | $L_{Aeq,T}$             | The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.                                                               |
| Statistical Sound Levels          | $L_{A10}$ and $L_{A90}$ | The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.                                                                                                                                           |
| Background Sound Level            | $L_{A90,T}$             | The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.                                                                                                          |
| Maximum Sound Level               | $L_{Amax}$              | The maximum sound or noise level determined with instrumentation set to either a fast time weighting, $L_{AFmax}$ , or a slow time weighting, $L_{ASmax}$ , as occurring during the time period being sampled.                                           |
| Sound Power Level                 | $L_{WA}$                | A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to $1 \times 10^{-12}$ W.                                                                            |
| Broadband                         |                         | Sound sampled over a wide range of frequencies.                                                                                                                                                                                                          |
| Narrow band                       |                         | Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment. |
| Ambient Sound                     | $L_{eq,T}$              | Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.                                                                                                                         |
| Specific Sound Level              | $L_{eq,T}$              | The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, $T_r$                                                                                                      |
| Rating Level                      | $L_{Ar,T_r}$            | The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).                                                                                                                     |
| Residual Noise                    | $L_{Aeq,T}$             | The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.                                                                   |
| Sound Reduction Index             | <i>SRI</i>              | The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.                                                                         |
| Weighted Sound Reduction Index    | $R_w$                   | The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.                                                                                                                                                          |
| Dynamic Insertion Loss            | <i>DIL</i>              | Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).                                                                                                                      |
| Free Field                        |                         | Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.                                                 |