Hann Tucker Associates
Consultants in Acoustics Noise & Vibration
Duke House 1-2 Duke Street Woking Surrey GU21 5BA
(t) +44 (0) 1483 770595
(e) enquiries@hanntucker.co.uk
(w) hanntucker.co.uk

PROJECT TECHNICAL MEMORANDUM

JOB TITLE	:	Lomax + Ducie Street
REF	:	HT: 29666/PTM3
DATE	:	12 August 2024
FROM	:	Will Robertson
ISSUED TO	:	Zerum

RE: LOMAX + DUCIE STREET, MANCHESTER PLANNING CONDITION 11

The Lomax and Ducie Street development has been granted planning permission subject to a number of conditions. Condition 11 relates to noise from fixed building services plant and this Technical Memorandum sets out the desktop study regarding the noise egress from the proposed plant.

1.0 Condition 11

Planning Condition 11 is as follows:

> *"Prior to occupation of the development a scheme for the acoustic insulation of any plant or externally mounted ancillary equipment to ensure that it achieves a background noise level of 5dB below the existing background (La90) in each octave band at the nearest noise sensitive location 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 equipment. The approved scheme shall be implemented prior to occupancy and shall remain operational thereafter.*
>
> *Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy."*

2.0 Project Acoustic Criteria

2.1 External Plant Noise Emissions

Based on the findings of the environmental noise survey previously undertaken by Hann Tucker, it proposed that building services plant achieve the following plant noise emission limits for the development.

Period	BS 4142 Plant Noise Rating Limit, $L_{Ar,Tr}$ dB
Daytime (07:00-23:00)	46 dB(A)
Night-time (23:00-07:00)	41 dB(A)

These limits should be achieved with plant operating cumulatively at 1m from noise sensitive windows. These limits are to be achieved cumulatively by landlord and tenant plant.

3.0 Noise Sensitive Receptors

Externally, the worst affected noise sensitive receptor to the plant is the hotel “The Northern Quarters Serviced Apartments Manchester” situated approximately 7 metres away from the northern façade of the development. The following plan highlights the location of the noise sensitive receptor.



Figure 1. Site Plan of Nearby Sensitive Receptors (Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024)

4.0 Summary of Building Services Proposals

The following assessment will be split up into an assessment of the separate plant items and concludes with an assessment of cumulative plant noise assessment.

The internal plant that is housed within plant rooms has not been included in the assessments as the attenuation provided by doors and walls, and that they are low noise items of plant, is expected sufficiently control any noise to the criteria at the nearby noise sensitive receptors. For the avoidance of doubt, however, internal items of plant that are ducted to atmosphere have been assessed herein within this Report.

The plant item categories are as follows:

- **Internally Mounted Plant (Ducted to Atmosphere)**
  - Heat Recovery Units (HRU) with in-duct attenuators
  - In-line duct fans
  - MEV Unit
- **Internal Plant (not ducted to atmosphere)**
  - Sprinkler Pumps
  - Deisel Generator (Emergency use only)

4.1 Plant Locations

On the ground floor of the site, the plant room housing the sprinkler plant and the generator room are located to the west of the site. There is a bin store which houses the MEV300 and Slimline 500/150 in-line duct fans to the northeast of the site, as well as a cycle store to the east of the site which houses an SL150 heat recovery unit.

This can be seen in the duct-layout plan below.

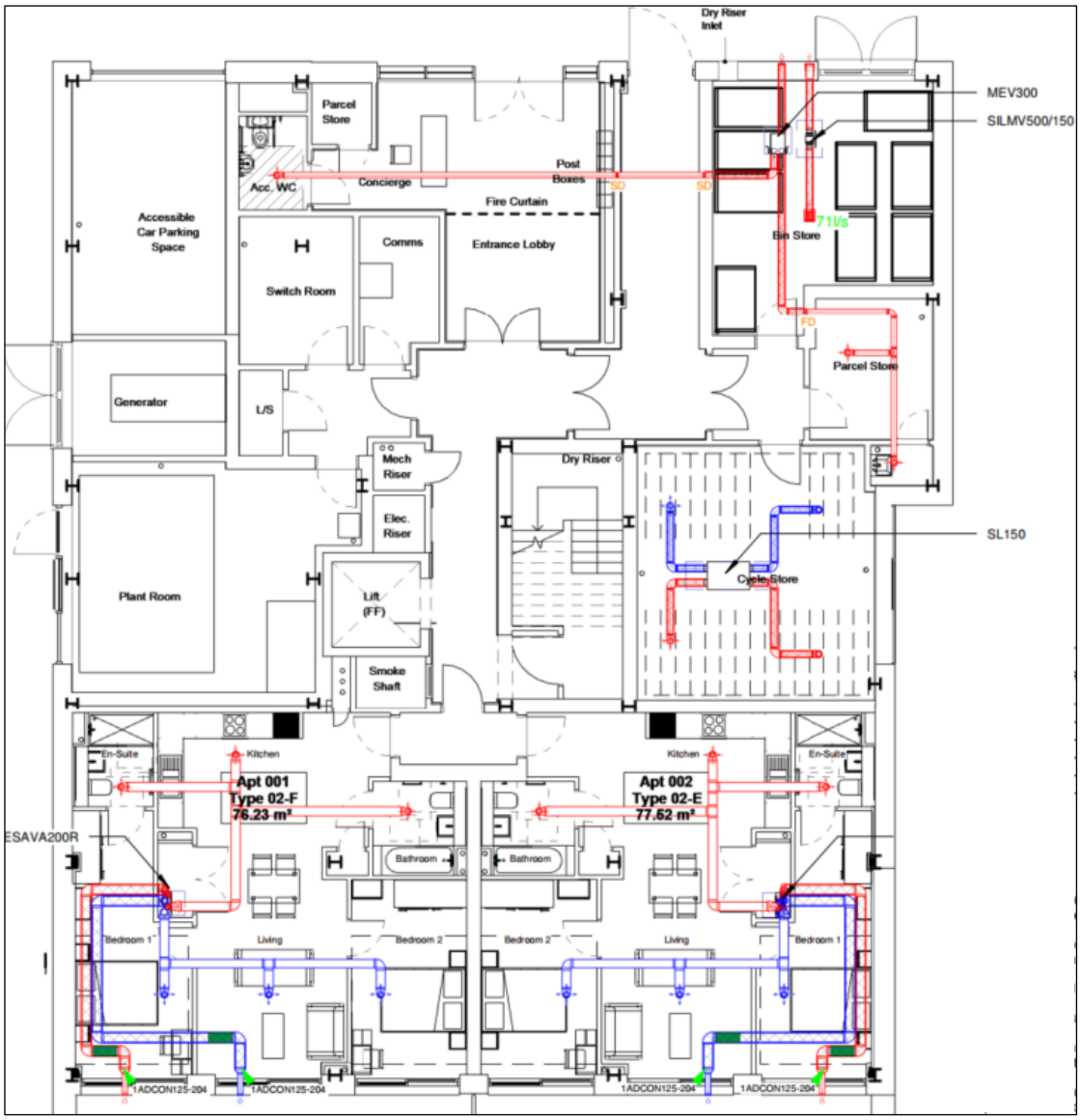


Figure 2. Ventilation plans detailing the location of each of the rooms on the ground floor (c/o Envirovent)

From the ground floor to sixth floor the HRUs in the apartments can be seen in the plan overleaf. For the purpose of our assessment, we have labelled the supply and extract atmospheric grille locations that we reference within this report herein.

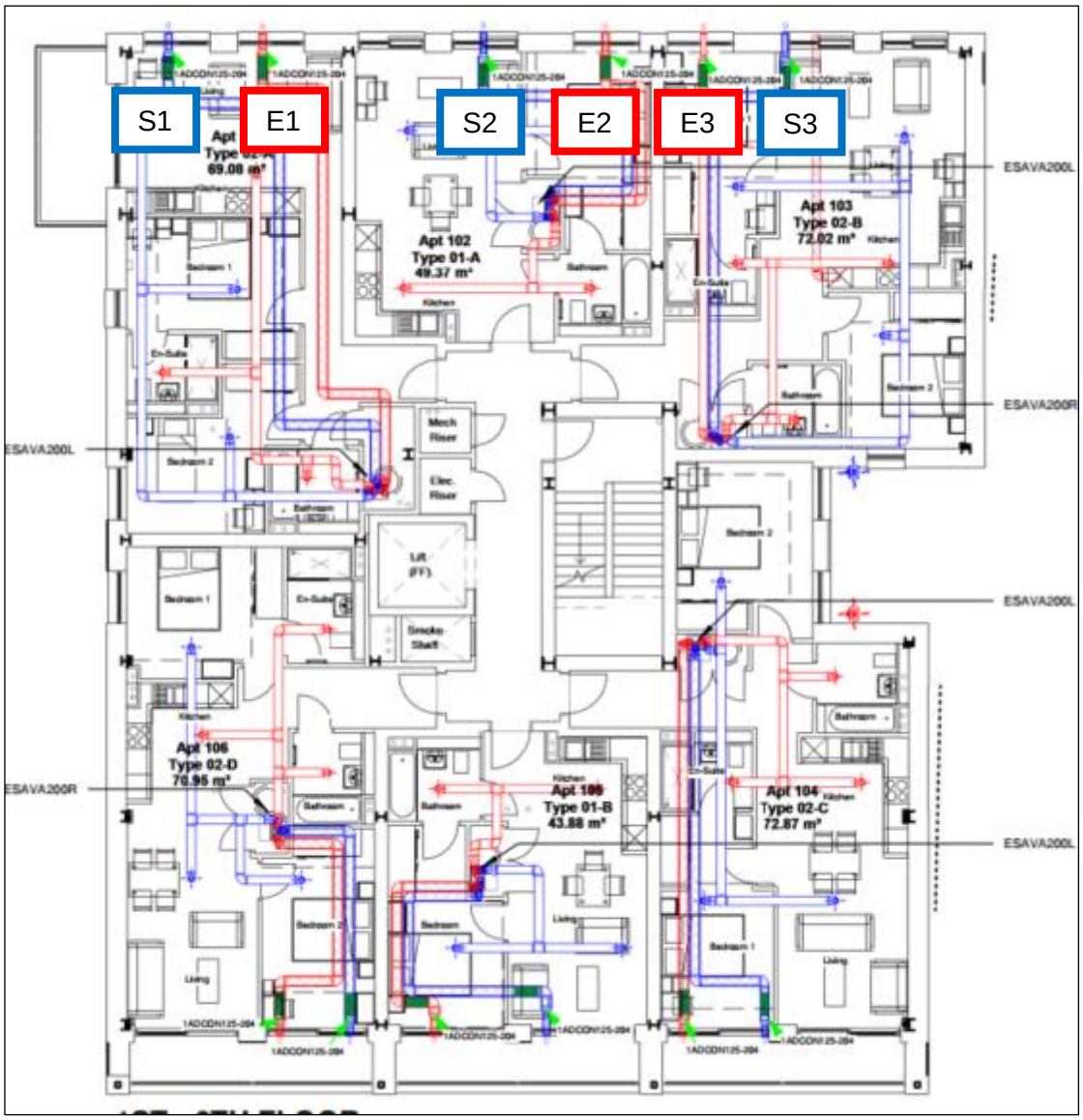


Figure 3. Ventilation plans detailing the location of each of the rooms on floors 1-6 (c/o Envirovent)

5.0 Proposed Plant Noise Data

5.1 Heat Recovery Unit (HRUs)

Based on the ventilation plans (project number ENV-10612, drawing number 2) the fans are to have a boost rate of 30l/s. The EnergiSava200 data sheet shows that a flow rate of 35l/s is expected at a duty of 48%. As such the data for these fans running at a 48% duty has been used in the following assessment and considered robust as in reality these levels may be lower due to the lower flow rate.

Plant Item	Mode	Sound Power Level (dB) at Octave Band Centre Frequency (Hz)								dBA*
		63	125	250	500	1k	2k	4k	8k	
EnergiSava 200 at 48% duty	Extract	19	28	42	38	38	37	25	23	45
	Supply	24	36	40	48	51	49	38	26	55
	Breakout	21	34	54	48	45	44	34	25	55

*Measured at a distance of 3m

It is shown on the ventilation plans that in-duct attenuators are to be installed at the grilles of the Energisava200 ducts. The selected attenuator is the Verplas VKC5660, and in reference to the scale on the duct layout drawings the length of the attenuators used in this assessment is 0.5m. The static insertion losses provided by the unit can be seen below.

Attenuator Length (m)	Static Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
0.5	-1	-3	5	6	12	18	12	9

Located within the cycle store area, is the SL150 heat recovery unit. As shown on the duct layout plans, the bike store extract and supply are both to have a boost rate of 12 l/s and a trickle rate of 10 l/s. There is no octave-band sound data for this unit however the broadband sound power levels are presented in the table below.

Ventilation Capacity (m^3/h)		45			75			105		150	
Static Pressure (Pa)		10	50	100	25	50	100	50	100	50	100
SWL (dBA)	Housing Emission	24	33	39	33	35	40	38	41	44	45
	Duct “from dwelling”	27	36	42	34	37	42	40	43	46	47
	Duct “to dwelling”	41	49	58	50	53	57	57	60	62	64

As stated above, the boost mode for this unit is to be set to 12 l/s; this converts to approximately 43 m^3/h. As such, the “worst-case” sound power levels for this unit at 45 m^3/h are used for the assessment.

5.2 In-line duct fans

Within the bin store is the SILMV500/150 in-line duct fan. The table overleaf presents the sound pressure level of the fan at different speeds.

Plant Item	Speed	Sound Pressure Level at 3 metres (dBA)	Airflow (l/s)
SILMV500/150	Low	17	97
	Medium	22	125
	High	27	153

As denoted on the plans presented in Section 4.1, the SILMV500/150 unit is expected to run at a rate of 71 l/s and as such the speed of the fan is considered “low” for the subsequent assessment.

The table below details the sound power level for the “low” fan speed setting at each octave-band.

Plant Item	Type	Sound Power Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
SILMV500/150	Inlet	41	41	48	52	46	43	37	32	52
	Outlet	42	42	52	52	47	38	33	19	52
	Breakout	34	33	37	33	29	26	18	14	35

5.3 Mechanical Extract Ventilation

Also, within the bin store is the MEV300 unit. As it has not been stated at which duty the MEV300 will be operating at, for robustness, it has been assumed that the unit may run at 100% duty during any given period. The octave-band sound power level for both the breakout and extract noise at 100% is presented in the table below.

Plant Item	Type	Sound Power Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
MEV300	Extract	46	41	54	41	37	34	24	21	48
	Breakout	74	63	71	62	57	50	43	32	66

6.0 Plant Noise Assessment

An assessment of the plant items to the nearest noise sensitive receptor has been conducted. The sections below detail the noise impact of the selected plant items on the nearest receptor.

6.1 Heat Recovery Unit Assessment

Assuming the worst-case receptor is the closest hotel room to the north of the site, approximately 3no floors up, the impact of all of the outlets to the north of the site have been assessed.

After the in-duct losses and the losses provided by the 0.5m attenuator have been applied to the HRUs, the following table details the noise level at 1m from each of the outlets:

Assessment of HRU Noise	Outlet Sound Pressure Level at 1 metre (dBA) at each Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Supply 1 (S1)	0	13	11	25	25	15	6	0	**27**
Extract 1 (E1)	0	6	15	16	12	4	0	0	**16**
Supply 2 (S2)	0	15	15	28	27	18	10	0	**29**
Extract 2 (E2)	0	6	15	16	12	4	0	0	**16**
Supply 3 (S3)	0	14	13	27	26	17	9	0	**28**
Extract 3 (E3)	0	7	16	17	13	8	1	1	**18**

The following table presents the predicted distance loss from each level of the site to the nearest integer.

Floor No.	Distance Loss (dB)
1	20
2	18
3	17
4	17
5	18
6	20

After summing each of the grilles on all the floors and applying the distance corrections to each of the grilles, the levels presented in the table below are predicted at the nearest noise sensitive receptor.

Assessment of HRU Noise to third floor room of northern receptor	Outlet Sound Pressure Level at each Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Floor 1	0	0	2	12	11	2	0	0	14
Floor 2	0	1	4	14	13	3	0	0	15
Floor 3	0	2	5	15	14	5	0	0	17
Floor 4	0	2	5	15	14	5	0	0	17
Floor 5	0	1	4	14	13	4	0	0	16
Floor 6	0	0	2	12	11	2	0	0	14
Cumulative Specific Sound Level, dB	**0**	**8**	**12**	**21**	**20**	**11**	**0**	**0**	**-**
Cumulative (A-Weighted) Specific Sound Level, dBA	**0**	**0**	**3**	**18**	**20**	**13**	**0**	**0**	**23**

As such, the impact of all residential HRUs on this elevation on the hotel is **23 dBA**.

6.2 Cycle Store Plant

The externally mounted units associated with the SL150 are located on the lower platform to the east of the site, as seen in Figure 3 in Section 4.1.

Bike Store Ducted Plant	Sound Pressure Level (dBA)
SWL of SL150 at grille (Supply)	58
Distance loss (to 15m)	-29 (Quarter Spherical)
Screening provided by building	-5
Calculated Noise Level at Receptor	**24**
SWL of SL150 at grille (Extract)	42
Distance loss (to 15m)	-29 (Quarter Spherical)
Screening provided by building	-5
Calculated Noise Level at Receptor	**8**
Cumulative Calculated Noise Level at Receptor	**24**

6.3 Bin Store Plant

In the table below, the impact of both the MEV300 and the in-duct fan have been assessed to the nearest noise sensitive receptor to the north of the site. More detailed calculations are available upon request.

	Sound Power Level (dB) at each Octave Band Centre Frequency (Hz)								dBA
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
SPL of MEV300 (at 1 metre from grille)	38	33	45	32	28	25	16	12	38
Distance Correction (to 6m)	-16	-16	-16	-16	-16	-16	-16	-16	-16
Noise level at receptor	**22**	**17**	**29**	**16**	**12**	**9**	**0**	**0**	**22**
SPL of SILMV500/150 (at 1 metre from grille)	34	34	43	44	39	29	25	11	44
Distance Correction (to 6m)	-16	-16	-16	-16	-16	-16	-16	-16	-16
Calculated Noise Level at Receptor	**18**	**18**	**27**	**28**	**23**	**13**	**9**	**0**	**28**
Cumulative Calculated Noise Level at Receptor	**23**	**21**	**31**	**28**	**23**	**14**	**9**	**0**	**29**

6.4 Cumulative Plant Impact

The table below presents the expected worst-case cumulative level of all plant items on the nearest noise sensitive receptor.

All Plant Items	Sound Power Level (dB) at each Octave Band Centre Frequency (Hz)								dBA
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
HRUs (Apartments)	0	8	12	21	20	11	0	0	**23**
HRU (Bike Store)	-	-	-	-	-	-	-	-	**24**
MEV300	22	17	29	16	12	9	0	0	**22**
SILMV500/150	18	18	27	28	23	13	9	0	**28**
Cumulative Calculated Noise Level at Receptor	**23**	**21**	**31**	**29**	**25**	**16**	**9**	**0**	**31**

Based on the above assessment, it is expected that the cumulative noise from all plant items, at the worst affected noise sensitive receptors, should be 10 dB under the night-time criterion and 16 dB under the daytime criterion.

Based on the above, it is considered that the Condition 11(a) requirements have been met, and the condition can be discharged.

Yours sincerely

Will Robertson
for HANN TUCKER ASSOCIATES