

Rooftop Plant Acoustic information

Noma Manchester



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P1	18/11/2022	Issued for comment	Andy Mills
P2	14/12/2022	Comments incorporated	Andy Mills

Approvals

This document requires the following approvals. Signed approval forms are filed in the Management section of the project files.

Name	Signature	Title	Date of Issue	Version
Michael Thomas	<i>M Thomas</i>	Project Manager	18/11/2022	P1
Sam Butterworth	<i>S Butterworth</i>	Snr Project Engineer	14/12/2022	P1

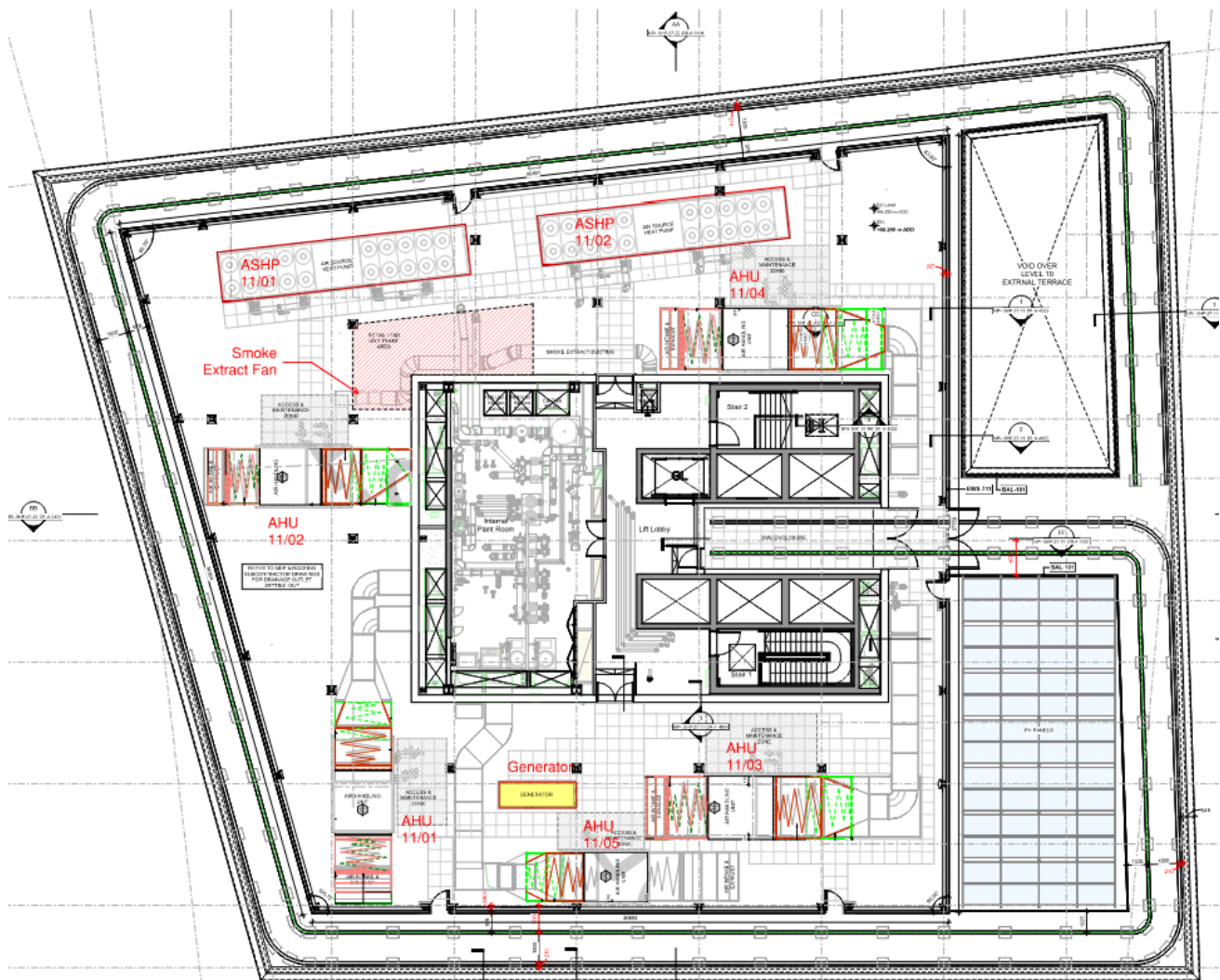
MEP Access and Maintenance Strategy

The scope of work is to install all major plant on the roof. The MEP plant comprises of:

- 5no. Air Handling Unit (AHU)
- 2no. ASHP's
- 1no. Generators
- 1no. Smoke Ventilation Fan

With exception to the ASHP's and essential services standby generator all plant, equipment, located within the external roof plant enclosure will be mounted on a proprietary 'Big Foot' plant support system.

Figure 1 – Rooftop Plant Layout



Air Handling Units – Sound Spectrum

AHU-11-01

FREQUENCY (Hz)	63	125	250	500	1K	2K	4K	8K
SUPPLY FAN DB INLET	70	84	77	74	71	68	65	64
SUPPLY FAN DB OUTLET	75	88	79	81	79	75	72	67
EXTRACT FAN DB INLET	69	79	75	73	69	65	63	62
EXTRACT FAN DB OUTLET	73	85	77	79	77	72	69	64

Breakout Noise

Ahu 11-01 47 DBA @ 5 Meters

AHU-11-02

FREQUENCY (Hz)	63	125	250	500	1K	2K	4K	8K
SUPPLY FAN DB INLET	69	83	77	74	71	67	65	64
SUPPLY FAN DB OUTLET	74	88	78	81	79	74	71	66
EXTRACT FAN DB INLET	71	78	74	72	68	65	63	61
EXTRACT FAN DB OUTLET	74	83	77	79	76	72	68	63

Breakout Noise

Ahu 11-02 46 DBA @ 5 Meters

AHU-11-03

FREQUENCY (Hz)	63	125	250	500	1K	2K	4K	8K
SUPPLY FAN DB INLET	77	82	78	75	73	70	67	68
SUPPLY FAN DB OUTLET	80	87	82	84	81	78	75	71
EXTRACT FAN DB INLET	80	81	78	75	72	69	66	67
EXTRACT FAN DB OUTLET	82	86	82	83	80	76	73	70

Breakout Noise

Ahu 11-03 49 DBA @ 5 Meters

AHU-11-04

FREQUENCY (Hz)	63	125	250	500	1K	2K	4K	8K
SUPPLY FAN DB INLET	76	82	78	75	73	70	67	68
SUPPLY FAN DB OUTLET	79	87	82	83	81	78	75	71
EXTRACT FAN DB INLET	79	81	78	75	72	68	66	67
EXTRACT FAN DB OUTLET	81	87	81	83	80	76	72	70

Breakout Noise

Ahu 11-04 49 DBA @ 5 Meters

AHU-11-05

FREQUENCY (Hz)	63	125	250	500	1K	2K	4K	8K
SUPPLY FAN DB INLET	71	87	77	74	71	67	66	64
SUPPLY FAN DB OUTLET	75	90	80	81	79	74	71	66
EXTRACT FAN DB INLET	70	80	74	72	69	65	63	61
EXTRACT FAN DB OUTLET	74	85	77	79	76	72	68	63

Breakout Noise

Ahu 11-05 48 DBA @ 5 Meters

AHU Attenuation

Refer to attenuator tech sub for conformation of the attenuator selection has been sized to achieve 50dB @ 5m from louvre in line with the acoustic report.

Smoke extract Fan – Sound Spectrum

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	94	94	97	97	96	94	91	85	103	80
Outlet*	94	94	97	97	96	94	91	85	103	80
Breakout*	86	78	77	77	76	73	76	66	88	61
Silencer B1D*	-3	-5	-10	-17	-13	-11	-10	-8	-	-

* Lw dB re 10^{-12} W

** dBA re 2×10^{-5} Pa

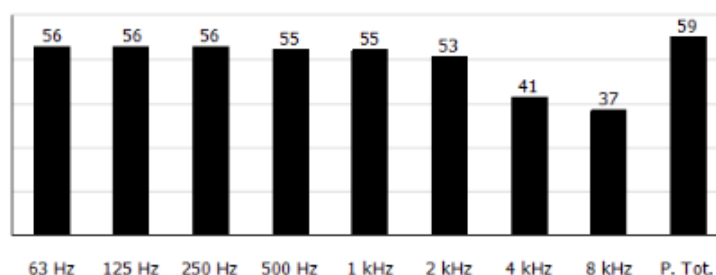
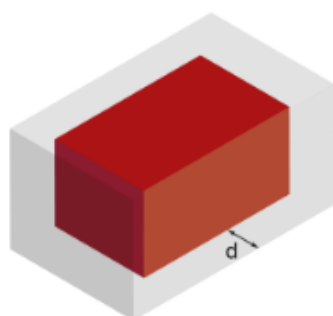
Sound data at requested duty.

During test mode, we will programme the fans to run in a much lower speed than in fire mode to reduce the noise so the data shown above is only for fire mode.

During fire mode, the fans are designed to run at the duty required to clear smoke from the building and we would therefore seek relaxation of the planning consent on the basis that this is a life safety system, and that clearance of smoke should take priority over the noise.

Air Source Heat Pump – Sound Spectrum

SOUND DATA COLD									
Frequencies	Hz	63	125	250	500	1000	2000	4000	8000
Sound power (spectrum)	dB	89	89	89	88	88	86	74	70
Total sound power level in cooling	dB(A)	92							
Sound pressure level (spectrum)	dB	56	56	56	55	55	53	41	37
Total sound Pressure	dB(A)	59							



SOUND DATA OUTDOOR HOT		
Total sound power level in heating	dB(A)	92
Note		
Distance	m	10
Note	Average sound pressure level at 10 m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level. Sound power on the basis of measurements taken in compliance with ISO 9614.	

Generator – Sound Spectrum

Dimensions DW soundproofed version

M139-DW

Length (mm) * Width (mm) * Height (mm)	3590 * 1200 * 2072
Dry weight (kg)	3045
Tank capacity (L)	868
Acoustic pressure level @1m in dB(A) 50Hz (75% PRP)	81
Sound power level guaranteed (Lwa) 50Hz (75% PRP)	97
Acoustic pressure level @7m in dB(A) 50Hz (75% PRP)	71



The sound data of the generator is suitable for hours of 9:00 – 17:00, we will therefore ensure all testing of the generator is written into the O&M's to be within this timeframe.

In the event of an emergency, we would seek relaxation of the planning conditions on the basis that this is a life safety piece of equipment that has been designed to support all life safety systems in the building for up to 12 hours.