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WOOLWORTHS MOOREBANK NATIONAL DISTRIBUTION CENTRE, MOOREBANK

Acoustic Certification of Condition B138 of SSD 7709

22 September 2021

Fabcot Pty Limited C/- Tactical Group

TL265-09F02 Acoustic Certification of Condition B138 for MoNDC Warehouse (r3)

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1 Introduction

Renzo Tonin & Associates was engaged to provide acoustic certification for the Woolworths Moorebank National Distribution Centre (MoNDC) Warehouse in Moorebank.

This certification is to address the acoustic requirements of Consent Condition B138 of State Significant Development (SSD) 7709 prior to construction of the MoNDC at the Moorebank Intermodal Terminal.

The assessment of the mechanical plant and other noisy equipment take into account the predicted contribution noise levels presented in the Noise & Vibration Impact Assessment (NVIA) report for the SSDA [ref: TL265-01F04 DA Acoustic Assessment Construction and Operation (r10)] to ensure the cumulative noise levels at the nearest identified most potentially affected residential receiver locations do not exceed the overall operational noise limits as set out in the Modification Application (MOD).

APPENDIX A contains a glossary of acoustic terms used in this report.

2 Acoustic conditions

Consent Condition B138 is as follows:

Mechanical Plant and Other Noisy Equipment Monitoring

B138. Prior to construction of the freight terminal, freight village and each warehouse, the Applicant must submit to the Secretary a Noise Assessment for Mechanical Plant and other noisy equipment to demonstrate that plant and equipment has been selected to meet the overall noise limits specified in **Table 4**.

The referenced Table 4 was updated on 24 December 2020 and set out in SSD 7709 MOD 1 as follows:

Table 4: Operational Noise Limits dB(A)

Location (residential receivers)	Day $L_{Aeq,\ 15\ minute}$	Evening $L_{Aeq,\ 15\ minute}$	Night $L_{Aeq,\ 15\ minute}$	Night $L_{A1,\ 1\ minute}$
Casula	~~39 dB~~ **46 dB**	~~35 dB~~ **44 dB**	~~35 dB~~ **39 dB**	52 dB
Glenfield	~~35 dB~~ **49 dB**	~~35 dB~~ **46 dB**	~~35 dB~~ **42 dB**	52 dB
Wattle Grove	~~36 dB~~ **44 dB**	~~35 dB~~ **42 dB**	~~35 dB~~ **42 dB**	52 dB
Wattle Grove North	**41 dB**	**41 dB**	**41 dB**	**52 dB**

3 Referenced documents

The following documentation is referenced for this report:

- Architectural drawings prepared by BELL Architecture [ref: MoNDC-Architectural-Drawings]
- Fire Pump House architectural drawings prepared by BELL Architecture [ref: BAS190087 JN-WD-A-F-2200 C1 FIRE TANK AND PUMP HOUSE-FLOOR PLAN,RCP, ROOF PLAN and BAS190087 JN-WD-A-F-3100 C1 FIRE TANK AND PUMP HOUSE-ELEVATIONS, SECTIONS AND LOUVRE ELEVATION]
- Fire services drawings prepared by LCI Consultants (Australia) [ref: MoNDC-Elec Fire-Drawings]
- Mechanical services drawings prepared by Paramount Airconditioning (Aust) [ref: MoNDC-Mechanical-Drawings]
- Mechanical specification prepared by Paramount Airconditioning (Aust) [ref: Mechanical Specification MoNDC]
- AHU Technical Submission prepared by Paramount Airconditioning (Aust) [ref: 9713-TS_003-AHU's_Rev A_210713]
- Schedule of Fans prepared by Fantech for Rapley Consulting Engineers [ref: V0621-400 R 5 Tech Data_Summary Only]
- Vertiv | Liebert LVC | Technical Manual [ref: Vertiv LVC170 Acoustic Data] for CU-CRAC-EC.1, CU-CRAC-EC.2 and CU-CRAC-EC.3
- Mechanical services acoustic markups prepared by Paramount Airconditioning (Aust) [ref: 9713_RCC-MoNDC-Mech Acoustic Markups_210813] including condenser specification
- Additional fan specification provided by Paramount Airconditioning (Aust) on 25 August 2021
- Generator drawings and specification prepared by Class Power Systems (CPS) and provided by Modcol [ref: 210731-01 rev A Concept, 210731-02 rev A Concept and CPS Data sheets]
- 3100KVA Generator Units Containerized enclosure type noise level @ 1m (field free) provided by Richard Crookes Constructions on 12 August 2021
- Fire pump specification provided by Select Fire Systems [ref: Noise Rating Powermaxx V.1 DP6930T-DP61150Ti]
- Letter from Paramount Airconditioning (Aust) Pty Ltd. To Richard Crookes Constructions Pty Ltd RE: Noise & Vibration Impact Assessment [ref: 9713 MoNDC Acoustic 210915] dated 15 September 2021

4 Design review

The established cumulative noise criteria for all noise sources from the Moorebank Intermodal Terminal are set out in Table 4 *Operational Noise Limits dB(A)* in SSD 7709 MOD 1.

So as not to contribute to the existing predicted $L_{Aeq,\ 15min}$ operational noise levels (Table 5.8 of the NVIA), the noise emission from mechanical plant and other noisy equipment has been designed to be significantly below the operational noise limits.

4.1 Mechanical plant and other noisy equipment

To satisfy the requirements of Condition B138 of the Consent, an acoustic review of the proposed items of plant and equipment was conducted. The various items of plant equipment to be associated with MoNDC are presented in Table 1 below.

Table 1: Plant and equipment sound level data

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
Exhaust Fans				
EF-C.1	Access WC 0.1.12 CAR PARK (Level 1)	Fantech RIL-150SW (Lo speed)	39 @ 3m (Inlet)	60
EF-DA.1	Ceiling space of Male Toilets DRIVER'S AMENITIES	Fantech AP0404AP5/24	50 @ 3m (Inlet)	71
EF-ES.1	Roof of UPS Room ENERGY COMPLEX	Fantech MV204E	38 @ 3m (Inlet)	58
EF-G.1	Roof (Grids WR-WS & W2-W3)	Fantech AP2008FA12/24	83 @ 3m (Inlet)	104
Alt EF-G.1	Roof (Grids WR-WS & W2-W3)	Fantech AP1808FA12/35	77 @ 3m (Inlet)	98
EF-G.2	Maintenance (Exhausting on roof Grids WM-WN & W9)	Fantech VM-315L	55 @ 3m (Inlet)	76
EF-G.3	Roof (Grids WB-WC & W4-W7)	Fantech RVLE0804CA6/30	68 @ 3m (Inlet)	89
EF-G.3 @ 75% fan speed[2]	Roof (Grids WB-WC & W4-W7)	Fantech RVLE0804CA6/30	62 @ 3m (Inlet)	83
Alt EF-G.3	Roof (Grids WB-WC & W4-W7)	Fantech RVE0804CA6/27	69 @ 3m (Inlet)	90
EF-G.4	Driver Amenities (North-eastern corner of WAREHOUSE)	Fantech TD-1300/250 (Hi speed)	58 @ 3m (Inlet)	79
Alt EF-G.4	Driver Amenities (North-eastern corner of WAREHOUSE)	Fantech VM-315L	55 @ 3m (Inlet)	76

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
EF-G.5	Roof (Grids WJ-WK & W10-W11)	Fantech RIL-200SW (Lo speed)	44 @ 3m (Inlet)	64
EF-G.6	Roof (Grids WJ-WK & W10-W11)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.7	Roof (Grids WC-WD & W11-W12)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.8	Roof (Grids WC-WD & W12-W13)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.9	Roof (Grids WD-WE & W14-W15)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.10	Roof (Grids WD-WE & W15-W16)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.11	Roof (Grids WD-WE & W16-W17)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.12	Roof (Grids WD-WE & W17-W18)	Fantech GUD506V	50 @ 3m (Inlet) 54 @ 3m (Outlet)	71 75
EF-G.13 (Paramount Air) - exhausting into WAREHOUSE (no external component)	Comms Room 2 - SGS Room	Fantech CPEEC31DD	42 @ 3m (Inlet)	63
EF-GH.1	Acc. WC GATE HOUSE	Fantech RIL-150SW (Hi speed)	43 @ 3m (Inlet)	64
EF-1.1	Locker Room	Fantech AP0564AP5/25	63 @ 3m (Inlet)	83
EF-1.2 REDUCED NOISE LEVELS	Roof (Grids WC-WD & W2-W3)	TBA[3]	58 @ 3m (Inlet) 62 @ 3m (Outlet)	78 82
EF-1.3	Roof (Grids WC-WD & W2-W3)	Fantech CE252V	56 @ 3m (Inlet)	76
EF-1.4	Roof (Grids WC-WD & W2-W3)	Fantech CD354V	52 @ 3m (Inlet)	73
EF-1.5	L1 Compressor Room (Grids WD-WE & W11-W12)	Fantech AP0502JP3/22	66 @ 3m (Inlet)	87
EF-1.6	L1 Compressor Room (Grids WD-WE & W11-W12)	Fantech AP0502JP3/22	66 @ 3m (Inlet)	87

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
EF-1.7	Roof (Grids WC-WD & W2-W3)	Fantech RVLE0714AP5/23	64 @ 3m (Inlet)	84
EF-1.8	Roof (Grids WJ-WK & W10-W11)	Fantech CE454V	57 @ 3m (Inlet)	77
SEF-1	Roof (Grids WR-WS & W5-W6)	Fantech SS1408CA6/27	67 @ 3m (Inlet) 68 @ 3m (Outlet)	88 88
SEF-2	Roof	Fantech SS1408CA6/27	67 @ 3m (Inlet) 68 @ 3m (Outlet)	88 88
SEF-3	Roof (Grids WG-WH & W5-W6)	Fantech SS1408CA6/27	67 @ 3m (Inlet) 68 @ 3m (Outlet)	88 88
SEF-4	Roof (Grids WG-WH & W9-W10)	Fantech SS1408CA6/27	67 @ 3m (Inlet) 68 @ 3m (Outlet)	88 88
SEF-5	Roof (Grids WG-WH & W13-W14)	Fantech SS1408CA6/27	67 @ 3m (Inlet) 68 @ 3m (Outlet)	88 88
SEF-6	Roof (Grids WM-WN & W11-W12)	Fantech SS1406CA6/22	75 @ 3m (Inlet)	96
SEF-7	Roof (Grids WR-WS & W11-W12)	Fantech SS1406CA6/22	75 @ 3m (Inlet)	96
SEF-8	Roof (Grids WR-WS & W15-W16)	Fantech SS1406CA6/22	75 @ 3m (Inlet)	96
SEF-9	Roof (Grids WM-WN & W15-W16)	Fantech SS1406CA6/22	75 @ 3m (Inlet)	96
Supply Fans				
SF-C.1	Roof of Entrance & Lift Lobby 0.1.06 CAR PARK (Level 1)	Fantech TD-500/150ECO	46 @ 3m	67
SF-C.2	Roof of Pedestrian Airbridge 0.1.09 CAR PARK (Level 1)	Fantech TD-500/150ECO[3]	46 @ 3m	67
SF-ES.1	Main switch room ENERGY COMPLEX	Fantech AP0312AP5/10	61 @ 3m	81
SF-ES.2/3	TF Room	Fantech AP0714AP10/27	69 @ 3m	89
SF-G.1 REDUCED NOISE LEVELS	Roof (Grids WS-WT & W1-W2)	TBA[3]	81 @ 3m	102
SF-G.2	Grd / L2	Fantech AP0804CA12/22	70 @ 3m	90
SF-G.3	First Aid, Drivers Amen.	Fantech RIL-150SW (Hi speed)	43 @ 3m	64

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
Alt SF-G.3	First Aid, Drivers Amen.	Fantech TD-500/150ECO	45 @ 3m	66
SF-G.5	Goods IN Load Dock	Fantech AP0714AA5/20	63 @ 3m	83
SF-1.1	Data Room 2	Fantech TD-500/150ECO	46 @ 3m	67
SF-2.1	Grd / L2 (Grids WJ-WK & W10-W11)	Fantech AP0804CA12/22	70 @ 3m	90
PAC Units				
PU-1.1	Roof (Grids WC-WD & W3-W5)	Temperzone OPA 855	63 @ 3m	79
PU-1.2	Roof (Grids WC-WD & W3-W5)	Temperzone OPA 705	63 @ 3m	79
PU-1.3	Roof (Grids WC-WD & W3-W5)	Temperzone OPA 550	65 @ 3m	81
PU-1.4	Roof (Grids WJ-WK & W2-W3)	Temperzone OPA 960	63 @ 3m	79
PU-1.5	Roof (Grids WD-WE & W12-W13)	Temperzone OPA 705	63 @ 3m	79
PU-1.6	Roof (Grids WK-WL & W2-W3)	Temperzone OPA 960	63 @ 3m	79
PU-2.1	Roof (Grids WJ-WK & W2-W3)	Temperzone OPA 855	63 @ 3m	79
PU-2.2	Roof (Grids WD-WE & W12-W13)	Temperzone OPA 960	63 @ 3m	79
PU-2.3	Roof (Grids WD-WE & W13-W14)	Temperzone OPA 960	63 @ 3m	79
PU-2.4	Roof (Grids WJ-WK & W2-W3)	Temperzone OPA 465	68 @ 3m	84
AC Unit Condensers				
CU-CAN.1	Roof (Grids WC-WD & W3-W5)	Mitsubishi PUHY-P400YNW	65.0 @ 1m (Standard - cooling) 52.5 @ 1m (Low noise mode - cooling)	82.5 70.0
CU-CAN.2	Roof (Grids WC-WD & W3-W5)	Mitsubishi PUHY-P500YNW	63.5 @ 1m (Standard - cooling) 53.5 @ 1m (Low noise mode - cooling)	82.0 72.0

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
CU-CP.1	North-western corner CAR PARK (Level 1)	Mitsubishi PUHY-P450YNW	65.5 @ 1m (Standard - cooling) 53.5 @ 1m (Low noise mode - cooling)	83.5 71.5
CU-CP.2	South of Interview Room 0.1.11 CAR PARK (Level 1	Mitsubishi PUZ-ZM71VHA	47 @ 1m (Cooling) 51 @ 1m (Heating)	67 70
CU-CP.3	South of Interview Room 0.1.11 CAR PARK (Level 1	Mitsubishi SUZ-M50VAD	52 @ 1m (High Fan Speed Cooling) 52 @ 1m (High Fan Speed Heating)	70 73
CU-CP.4	South of Comms 0.1.08 CAR PARK (Level 1)	Mitsubishi MUZ-AP25VG MUZ-AP25VGD	46 @ 1m (Cooling) 49 @ 1m (Heating)	59
CU-CP.5	North-western corner CAR PARK (Level 1)	Mitsubishi PUHY-P200YNW	58.0 @ 1m (Standard - cooling) 44.0 @ 1m (Low noise mode - cooling)	75.0 61.0
CU-DA.1	North facade of DRIVER'S AMENITIES	Mitsubishi PUZ-RP200YKA	58 @ 1m (Cooling) 59 @ 1m (Heating)	76
CU-G.1/ CU-RK-1	Driver s Amenities ceiling	Mitsubishi SUZ-M50VAD	52 @ 1m (High Fan Speed Cooling) 52 @ 1m (High Fan Speed Heating)	70 73
CU-G.5/ CU-MHS-1	MHE Maint. Office (Grids WP & W1	Mitsubishi SUZ-M60VAD	55 @ 1m (High Fan Speed Cooling) 55 @ 1m (High Fan Speed Heating)	71 72
CU-GH.1	East of GATE HOUSE	Mitsubishi SUZ-M50VAD	52 @ 1m (High Fan Speed Cooling) 52 @ 1m (High Fan Speed Heating)	70 73
CU-MHS-1	AHU-10 Platform	Mitsubishi SUZ-M50VAD	52 @ 1m (High Fan Speed Cooling) 52 @ 1m (High Fan Speed Heating)	70 73
CU-NA-1	North-western corner CAR PARK (Level 1)	Mitsubishi PUHY-P350YNW	62.0 @ 1m (Standard - cooling) 49.0 @ 1m (Low noise mode - cooling)	80.5 67.5

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
CU-OP-1	Roof (Grids WD-WE & W13-W14)	Mitsubishi MUZ-AP60VG MUZ-AP60VGD	56 @ 1m (Cooling) 57 @ 1m (Heating)	69
CU-OP-2	Roof (Grids WD-WE & W13-W14)	Mitsubishi MUZ-AP60VG MUZ-AP60VGD	56 @ 1m (Cooling) 57 @ 1m (Heating)	69
CU-OP-3	Roof (Grids WJ-WK & W10-W11)	Mitsubishi PUHY-P300YNW	61.0 @ 1m (Standard - cooling) 47.0 @ 1m (Low noise mode - cooling)	80.0 66.0
CU-OP-4	North-western corner CAR PARK (Level 1)	Mitsubishi PUHY-P200YNW	58.0 @ 1m (Standard - cooling) 44.0 @ 1m (Low noise mode - cooling)	75.0 61.0
CU-OP-5	Roof (Grids WJ-WK & W10-W11)	Mitsubishi MUZ-AP25VG MUZ-AP25VGD	46 @ 1m (Cooling) 49 @ 1m (Heating)	59
CU-TO-1	Transport Office Plant Platform	Mitsubishi PURY-P250YNW	60.5 @ 1m (Standard - cooling) 45.0 @ 1m (Low noise mode - cooling)	78.5 63.0
CU-TO-2	Transport Office Plant Platform	Mitsubishi PURY-P450YNW	65.5 @ 1m (Standard - cooling) 53.0 @ 1m (Low noise mode - cooling)	83.0 70.5
CRAC Unit Condensers				
CU-CRAC-G.1	AHU-10 Platform	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m^3	82[3,4]
CU-CRAC-G.2	AHU-10 Platform	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m^3	82[3,4]
CU-CRAC-1.1	Roof (Grids WC-WD & W3-W5)	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m^3	82[3,4]
CU-CRAC-1.2	Roof (Grids WC-WD & W3-W5)	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m^3	82[3,4]
CU-CRAC-EC.1	Generators ENERGY CENTRE	Vertiv LVC170SE4	≤ 68 @ 1m^3	86[3,4]
CU-CRAC-EC.2	Generators ENERGY CENTRE	Vertiv LVC170SE4	≤ 68 @ 1m^3	86[3,4]
CU-CRAC-EC.3	Generators ENERGY CENTRE	Vertiv LVC170SE4	≤ 68 @ 1m^3	86[3,4]

Item	Location	Brand & model no.	Sound pressure level, dB(A)[1]	Calculated / reported sound power level, dB(A)[1]
CU-CRAC-TO-1	Transport Office Plant Platform	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m[3]	82[3,4]
CU-CRAC-TO-2	Transport Office Plant Platform	Vertiv/Emerson (Liebert.PEX Condenser) LSF52	≤ 66 @ 1m[3]	82[3,4]
Air Handling Units				
AHU-1	Roof (Grids WS-WT & W5-W6)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-2	Roof (Grids WO-WP & W5-W6)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-3	Roof (Grids WK-WL & W5-W6)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-4	Roof (Grids WF-WG & W5-W6)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-5	Roof (Grids WG-WH & W10-W11)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-6	Roof (Grids WG-WH & W15-W16)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-7	Roof (Grids WM-WN & W12-W13)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-8	Roof (Grids WR-WS & W12-W13)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
AHU-11	Roof (Grids WJ-WK & W2-W3)	TBA[3]	75 @ 1.5m (Inlet) 77 @ 1.5m (Discharge)	90 (Inlet) 92 (Discharge)
ERV				
ERV	Roof (Grids WJ-WK & W10-W11)	XEM 800C1	-	75
Fire Pumps				
Fire Pumps	PUMP HOUSE	Power Industries Australia POWERMaXX	109.6 @ 1m[3] 99.9 @ 7m[3]	129[4,5] (based on 99.9 @ 7m)
Generators				
Gen-sets	Generators ENERGY CENTRE	Containerized enclosure type	75 @ 1m[3] (field free)	94[4,5]

Attenuators				**Sound Insertion Loss**
ATT-EF-G.1 (discharge side to atmosphere)	Roof (Grids WR-WS & W2-W3)	Fantech NTA25G-270-220	-	36 (Insertion loss)

ATT-SF-G.1 (intake side from atmosphere)	Roof (Grids WS-WT & W1-W2)	Fantech NTA25G-270-220	-	36 (Insertion loss)
SIL-AHU-1 to 8, and 11 (discharge side into the Warehouse)	Roof	Fantech RT15AQS-140-70	-	17 (Insertion loss)

Notes:
1. Noise data obtained or calculated from manufacturers' brochure or technical data sheet.
2. Fan speed @ 75% is assumed to emit lower noise level (to be confirmed by manufacturer/supplier).
3. Exact fan model to be confirmed during Approved For Construction (AFC) Stage.
4. No spectral data is available.
5. No detail is available and therefore, the sound power level has been estimated.

Plant and equipment not listed above has not been assessed.

Contractor or supplier is to use the sound power level data and the associated frequency spectrum for equipment selection.

The following discusses the basis of specific operating assumptions:

- Weatherproof Louvres (WPL) will open in fire mode following the make-up air path, but also as a relief air path when the Evaporator AHUs are running (ie. open during normal operation)
- Smoke Exhaust Fans (SEF) only operate during fire mode (ie. during emergency situation)
- Stair Pressurisation Fans (SF), eg. SF-G.2 and SF-2.1, only operate during fire mode (ie. during emergency situation)
- Fire Pumps (FP) only operate during fire mode (ie. during emergency situation)
- Generators (Gen-set) only run in a power outage, which is an operational emergency, not a life safety emergency situation. These could run for as long as they need to until power is restored. In a major outage this could be days, although highly unlikely given the information provided on reliability and redundancy of the electrical network supplying the project. Outages are generally rare and short and it is understood that there have been no unplanned outages on the estate in the past 2 years; only outages to do cutovers and bringing online new equipment.
- Equipment to be running during fire/emergency mode is tested annually and this will be done during the daytime period only.

4.2 Acoustic treatments

The following acoustic treatment is for external noise emissions only (internal noise level assessment is not required for the purpose of the acoustic certification with regard to Consent Condition B138) and to be incorporated/documented into the mechanical services drawings as appropriate:

Table 2: Plant & Equipment Mitigation Measures

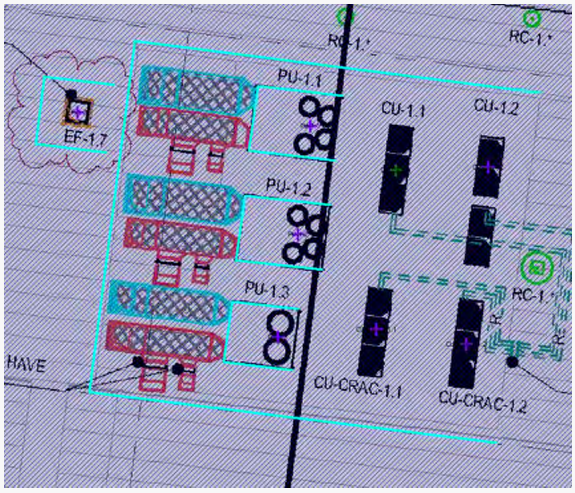
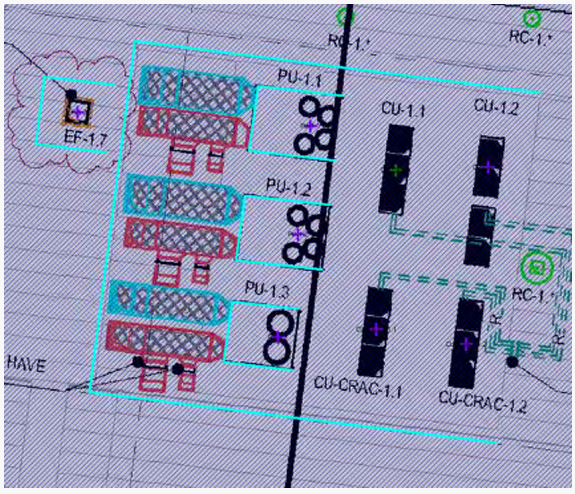
Item	Acoustic treatment	Comment
Exhaust Fans		
EF-C.1	No acoustic treatment required	-
EF-DA.1	No acoustic treatment required	-

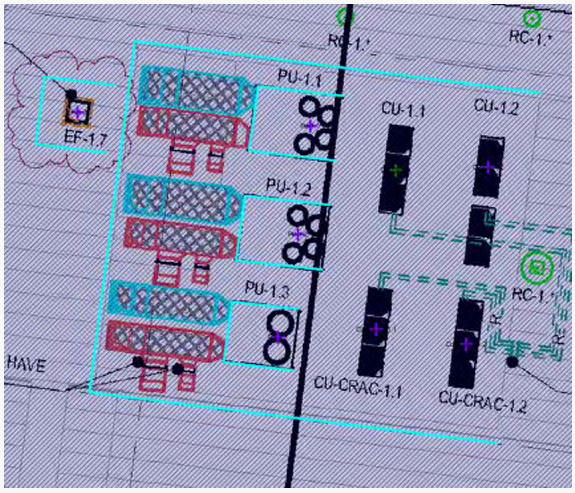
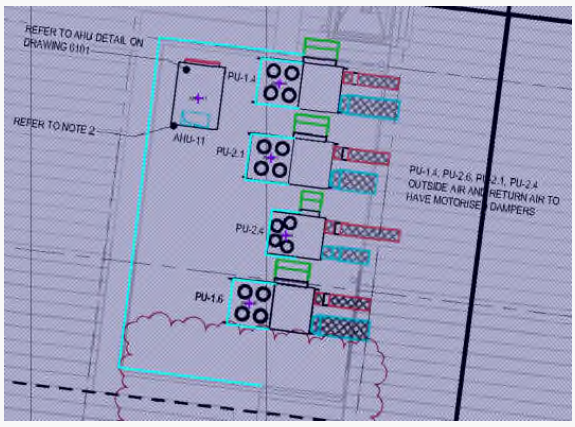
Item	Acoustic treatment	Comment
EF-ES.1	No acoustic treatment required	-
EF-G.1	Select an in-line exhaust fan that has an overall noise level 5dB lower than Alt EF-G.1 (Fantech AP1808FA12/35). Completely clad the fan and seal the fan casing using one sheet of 6mm thick fibrous cement (FC) with 50mm Bradford Martini Prime 50 sandwiched in between the FC and the item. Use metal angles at all corners sealed closed. No gaps are permitted in the cladding treatment. Treatment shall extend 1m either side of the fan casing. Install an acoustic attenuator with equivalent acoustic performance as ATT-EF-G.1 on the discharge side of the fan. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (west and south) of the EF-G.1 Roof Platform. The discharge is ideally directed towards the east. The screen height is to extend at least 1m above the top of the tallest part of the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-G.2	Internally line discharge ductwork with 50mm thick acoustic insulation for a minimum length of 1m from the fan.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-G.3	Select EF-G.3 (Fantech RVLE0804CA6/30) not the alternative (Fantech RVE0804CA6/27). This unit will need to be set to run at 75% capacity during the night-time period. If this is not possible, then the overall noise level will need to be reduced by 6dB. Install a noise screen on three sides (north, west and south) of the unit. The screen height is to extend at least 1m above the top of the tallest part of the unit. ALTERNATIVELY, select an in-line exhaust fan to be installed under the roof line with acoustically lined ductwork on the discharge side of the fan (length of acoustic treatment will depend on the sound power level of the reselected fan).	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-G.4	Select Alt EF-G.4 (Fantech VM-315L) not EF-G.4 (Fantech TD-1300/250 (Hi speed)). No acoustic treatment required	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

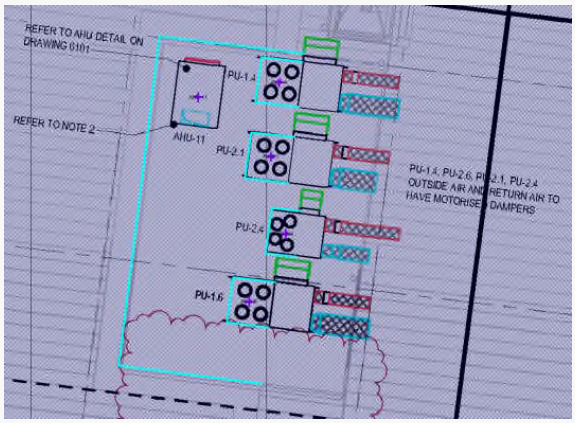
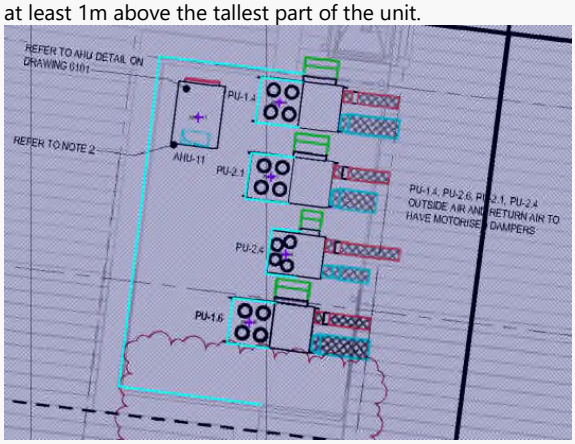
Item	Acoustic treatment	Comment
EF-G.5	No acoustic treatment required	-
EF-G.6	No acoustic treatment required	-
EF-G.7	No acoustic treatment required	-
EF-G.8	No acoustic treatment required	-
EF-G.9	No acoustic treatment required	-
EF-G.10	No acoustic treatment required	-
EF-G.11	No acoustic treatment required	-
EF-G.12	No acoustic treatment required	-
EF-G.13	The fan is exhausting into the WAREHOUSE, ie. no external component. No acoustic treatment required.	-
EF-GH.1	No acoustic treatment required	-
EF-1.1	Internally line discharge ductwork with 50mm thick acoustic insulation for a minimum length of 1m from the fan.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-1.2 REDUCED NOISE LEVELS	Select an in-line exhaust fan that has an overall noise level 10dB lower than EF1.2 REDUCED NOISE LEVELS. Install a noise screen on three sides (north, west and south) of the unit. The screen height is to extend at least 1m above the top of the tallest part of the unit. ALTERNATIVELY, select an in-line exhaust fan to be installed under the roof line with acoustically lined ductwork (Mylar or Melinex facing over acoustic insulation) on the discharge side of the fan (length of acoustic treatment will depend on the sound power level of the reselected fan).	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-1.3	Install a noise screen on three sides (north, west and south) of the unit. The screen height is to extend at least 1m above the top of the tallest part of the unit. ALTERNATIVELY, select an in-line exhaust fan to be installed under the roof line with acoustically lined ductwork on the discharge side of the fan (length of acoustic treatment will depend on the sound power level of the reselected fan).	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

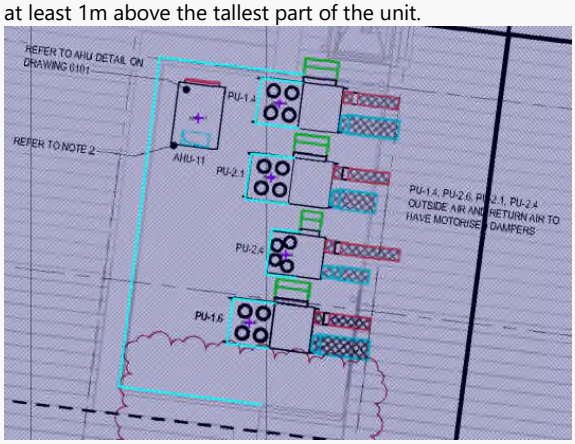
Item	Acoustic treatment	Comment
EF-1.4	Install a noise screen on three sides (north, west and south) of the unit. The screen height is to extend at least 1m above the top of the tallest part of the unit. ALTERNATIVELY, select an in-line exhaust fan to be installed under the roof line with acoustically lined ductwork on the discharge side of the fan (length of acoustic treatment will depend on the sound power level of the reselected fan).	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-1.5	Internally line discharge ductwork with 50mm thick acoustic insulation for a minimum length of 2m from the fan.	Acoustic treatment as shown on Drawing No. JN-WD-M-A-2112 Revision C3
EF-1.6	Internally line discharge ductwork with 50mm thick acoustic insulation for a minimum length of 2m from the fan.	Acoustic treatment as shown on Drawing No. JN-WD-M-A-2112 Revision C3
EF-1.7	Select an in-line exhaust fan that has an overall noise level 5dB lower than EF-1.7 (Fantech RVLE0714AP5/23). Install a noise screen on three sides (north, west and south) of the unit. The screen height is to extend at least 1m above the top of the tallest part of the unit. ALTERNATIVELY, select an in-line exhaust fan to be installed under the roof line with acoustically lined ductwork on the discharge side of the fan (length of acoustic treatment will depend on the sound power level of the reselected fan).	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
EF-1.8	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-9 Roof Platform (encapsulating AHU-9, CU-OP-3, CU-OP-.4, CU-OP-5, EF-G.5 and EF-1.8). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
SEF-1	No acoustic treatment required	Fire mode only
SEF-2	No acoustic treatment required	Fire mode only
SEF-3	No acoustic treatment required	Fire mode only
SEF-4	No acoustic treatment required	Fire mode only
SEF-5	No acoustic treatment required	Fire mode only
SEF-6	No acoustic treatment required	Fire mode only
SEF-7	No acoustic treatment required	Fire mode only

Item	Acoustic treatment	Comment
SEF-8	No acoustic treatment required	Fire mode only
SEF-9	No acoustic treatment required	Fire mode only
Supply Fans		
SF-C.1	No acoustic treatment required	-
SF-C.2	No acoustic treatment required	-
SF-ES.1	Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 2m from the fan	Acoustic treatment as shown on Drawing No. JN-WD-M-E-2100 Revision C3
SF-ES.2/ES.3	Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 2m from the fan	Acoustic treatment as shown on Drawing No. JN-WD-M-E-2100 Revision C3
SF-G.1	Select an in-line supply fan that has an overall noise level 10dB lower than SF-G.1 REDUCED NOISE LEVELS (the current fan selection has high low frequency noise levels). Completely clad the fan and seal the fan casing using one sheet of 6mm thick fibrous cement (FC) with 50mm Bradford Martini Prime 50 sandwiched in between the FC and the item. Use metal angles at all corners and seal closed. No gaps are permitted in the cladding treatment. Treatment shall extend 1m either side of the fan casing. Install an acoustic attenuator with equivalent acoustic performance as ATT-SF-G.1 on the intake side of the fan. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the SF-G.1 Roof Platform. The intake is best directed towards the east. The noise screen height is to extend at least 1m above the top of the tallest part of the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
SF-G.2	No acoustic treatment required	Fire mode only
SF-G.3	Select SF-G.3 (RIL-150SW (Hi speed)) not the alternative (TD-500/150ECO). No acoustic treatment required.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
SF-G.5	Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 2m from the fan.	Acoustic treatment as shown on Drawing No. JN-WD-M-A-2101 Revision C2
SF-1.1	No acoustic treatment required	-
SF-2.1	No acoustic treatment required	Fire mode only

Item	Acoustic treatment	Comment
PAC Units		
PU-1.1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
PU-1.2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to be at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
PU-1.3	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
PU-1.4	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-11 Roof Platform (encapsulating AHU-11, PU-1.4, PU-1.6, PU-2.1 and PU-2.4). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
PU-1.5	No acoustic treatment required	-

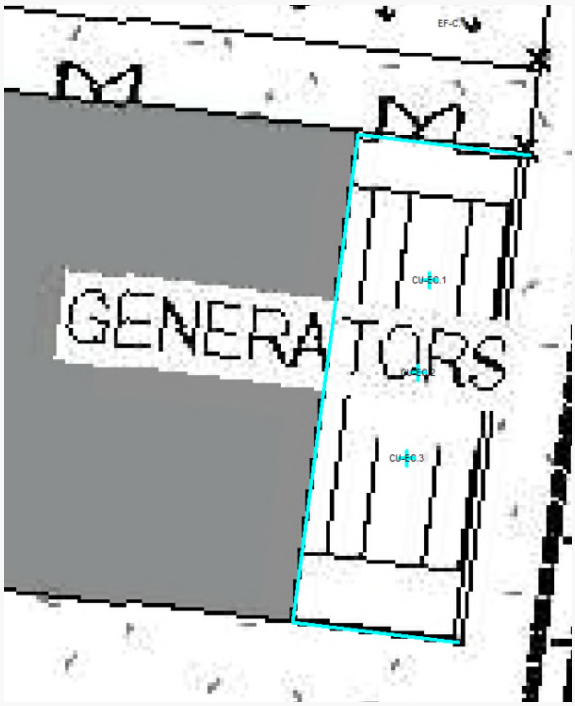
Item	Acoustic treatment	Comment
PU-1.6	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-11 Roof Platform (encapsulating AHU-11, PU-1.4, PU-1.6, PU-2.1 and PU-2.4). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
PU-2.1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-11 Roof Platform (encapsulating AHU-11, PU-1.4, PU-1.6, PU-2.1 and PU-2.4). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
PU-2.2	No acoustic treatment required	-
PU-2.3	No acoustic treatment required	-

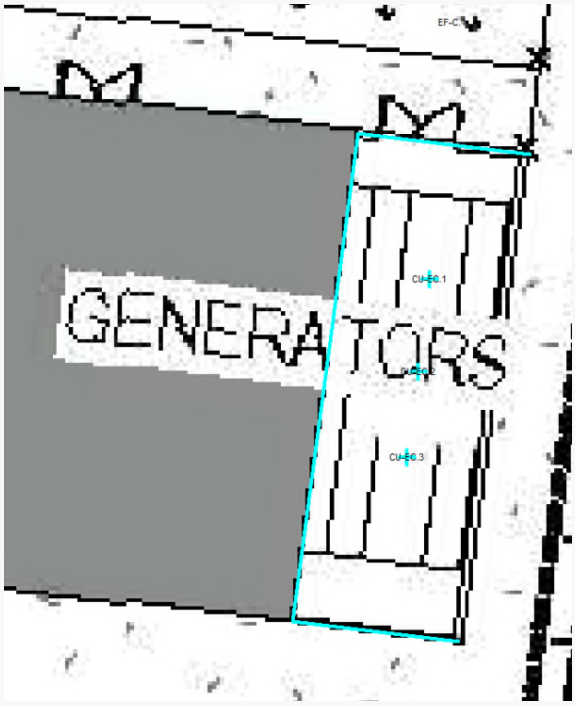
Item	Acoustic treatment	Comment
PU-2.4	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-11 Roof Platform (encapsulating AHU-11, PU-1.4, PU-1.6, PU-2.1 and PU-2.4). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on top of the unit on three sides (north, west and south). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AC Unit Condensers		
CU-CAN-1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, this unit will need to be set to run in low noise mode during the night-time period. If this is not possible, then additional acoustic treatment will be required.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CAN-2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, this unit will need to be set to run in low noise mode during the night-time period. If this is not possible, then additional acoustic treatment will be required.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

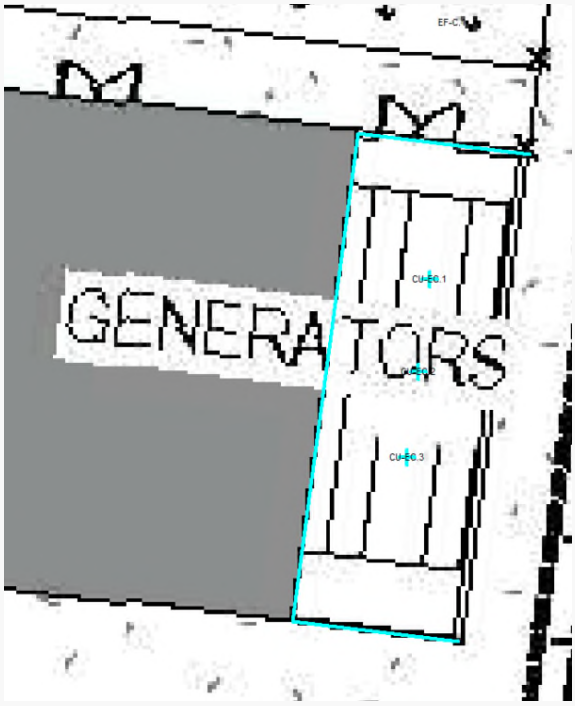
Item	Acoustic treatment	Comment
CU-CP-1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the north-western corner of the Level 1 car park (encapsulating CU-CP-1 and CU-CP-5). The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CP-2	No acoustic treatment required	-
CU-CP-3	No acoustic treatment required	-
CU-CP-4	No acoustic treatment required	-
CU-CP-5	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the north-western corner of the Level 1 car park (encapsulating CU-CP-1 and CU-CP-5). The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-DA-1	No acoustic treatment required	-
CU-G.1/CU-RK-1	No acoustic treatment required	-
CU-G.5/CU-MHS-1	No acoustic treatment required	-
CU-GH-1	No acoustic treatment required	-
CU-MHS-1	No acoustic treatment required	-
CU-NA-1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the Transport Office Roof Platform (encapsulating CU-CRAC-TO-1, CU-CRAC-TO-2, CU-NA-1, CU-TO-1 and CU-TO-2). The eastern side can be open to allow for ventilation. The noise screen is to be at least 1.5m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-OP-1	No acoustic treatment required	-
CU-OP-2	No acoustic treatment required	-

Item	Acoustic treatment	Comment
CU-OP-3	Install a noise absorption wall equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-9 Roof Platform (encapsulating AHU-9, CU-OP-3, CU-OP-.4, CU-OP-5, EF-G.5 and EF-1.8). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. In addition, this unit will need to be set to run in low noise mode during the night-time period. If this is not possible, then additional acoustic treatment will be required.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-OP-4	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-9 Roof Platform (encapsulating AHU-9, CU-OP-3, CU-OP-.4, CU-OP-5, EF-G.5 and EF-1.8). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-OP-5	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-9 Roof Platform (encapsulating AHU-9, CU-OP-3, CU-OP-.4, CU-OP-5, EF-G.5 and EF-1.8). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-TO-1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the Transport Office Roof Platform (encapsulating CU-CRAC-TO-1, CU-CRAC-TO-2, CU-NA-1, CU-TO-1 and CU-TO-2). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1.5m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
CU-TO-2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the Transport Office Roof Platform (encapsulating CU-CRAC-TO-1, CU-CRAC-TO-2, CU-NA-1, CU-TO-1 and CU-TO-2). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1.5m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CRAC Unit Condensers		
CU-CRAC-G.1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-10 Roof Platform (encapsulating AHU-10, CU-CRAC-G.1 and CU-CRAC-G.2). The noise screen height is to extend at least 1m above the tallest unit on the platform. If ventilation is required, acoustic louvres with equivalent acoustic performance as IAC Acoustics Slimshield Acoustic Louvres SL-150 will need to be incorporated onto the noise wall.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CRAC-G.2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-10 Roof Platform (encapsulating AHU-10, CU-CRAC-G.1 and CU-CRAC-G.2). The noise screen height is to extend at least 1m above the tallest unit on the platform. If ventilation is required, acoustic louvres with equivalent acoustic performance as IAC Acoustics Slimshield Acoustic Louvres SL-150 will need to be incorporated onto the noise wall.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CRAC-1.1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
CU-CRAC-1.2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the North-western Roof Platform (encapsulating CU-CAN-1, CU-CAN-2, CU-CRAC-1.1, CU-CRAC-1.2, PU-1.1, PU-1.2 and PU-1.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CRAC-EC.1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) separating it off the Generators (encapsulating CU-CRAC-EC.1, CU-CRAC-EC.2 and CU-CRAC-EC.3). The eastern side can be open to allow for ventilation. The noise screen height is to be at least 1m above the tallest unit on the platform. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
CU-CRAC-EC.2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) separating it off the Generators (encapsulating CU-CRAC-EC.1, CU-CRAC-EC.2 and CU-CRAC-EC.3). The eastern side can be open to allow for ventilation. The noise screen height is to be at least 1m above the tallest unit on the platform. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
CU-CRAC-EC.3	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) separating it off the Generators (encapsulating CU-CRAC-EC.1, CU-CRAC-EC.2 and CU-CRAC-EC.3). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. 	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CRAC-TO-1	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the Transport Office Roof Platform (encapsulating CU-CRAC-TO-1, CU-CRAC-TO-2, CU-NA-1, CU-TO-1 and CU-TO-2). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1.5m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
CU-CRAC-TO-2	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on two sides (north and west) of the Transport Office Roof Platform (encapsulating CU-CRAC-TO-1, CU-CRAC-TO-2, CU-NA-1, CU-TO-1 and CU-TO-2). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1.5m above the tallest unit on the platform.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
Air Handling Units		
AHU-1	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-1 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-2	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-2 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-3	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-3 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-4	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-4 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
AHU-5	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-5 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-6	Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-6 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-7	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-7 Roof Platform. The eastern side can be open to allow for ventilation. The wall is to be at least 432mm above the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
AHU-8	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-8 Roof Platform. The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 432mm above the tallest part of the unit. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]

Item	Acoustic treatment	Comment
AHU-11	Divert ductwork so that the fresh air intake is towards the south. Install a noise absorption screen equivalent to ModularWalls AcoustiSorb75 on three sides (north, west and south) of the AHU-11 Roof Platform (encapsulating AHU-11, PU-1.4, PU-1.6, PU-2.1 and PU-2.4). The eastern side can be open to allow for ventilation. The noise screen height is to extend at least 1m above the tallest unit on the platform. Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 4m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
ERV		
ERV	Internally line intake ductwork with 50mm thick acoustic insulation for a minimum length of 1m from the unit.	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
Fire Pumps		
Fire Pumps	Fire mode only. Technically, there is no acoustic treatment required; however, it is highly recommended that with regard to the Pump House, the constructions of the roof, louvre, door and roller door are acoustically treated such as inclusion of fire-rated ceiling, acoustic louvre, acoustic seals around the door perimeter and door bottom, and acoustic shutter such as SHUTTERMAX 100D by MAX Door Solutions. In addition, acoustic treatment such as silencers to the exhaust flues are highly recommended for testing purpose.	-
Generators		
Gen-sets	As the units are containerized enclosure type with special acoustic treatment, no additional acoustic treatment required	-

Item	Acoustic treatment	Comment
Weatherproof Louvres		
WPLs on western facade	Install an acoustic louvre with equivalent acoustic performance as Aambianz AWAZ Series150 Acoustic Louvres	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
WPLs on northern facade	Install an acoustic louvre with equivalent acoustic performance as Aambianz AWAZ Series150 Acoustic Louvres	Paramount Airconditioning will endeavour to implement the recommendations outlined in this report to an equal or similar method of execution within the mechanical design in order to achieve the desired acoustic outcomes as per the letter from Paramount Airconditioning (Aust) to Richard Crookes Construction [ref: 9713 MoNDC Acoustic 210915]
WPLs on eastern facade	No acoustic treatment required	-
WPLs on southern facade	No acoustic treatment required	-

Note: Night-time period is defined as 10:00pm to 7:00am.

Additional to the descriptions of acoustic treatments presented in the table above, the following measures also apply:

- Noise absorption screens recommended in the table above will need to extend down to connect with the roof.
- It is recommended that plant and equipment shall be vibration isolated and balanced in accordance with Australian Standard 2625 '*Rotating and Reciprocating Machinery - Mechanical Vibration*'.

4.3 Noise predictions

Table 3 summarises the results of the noise assessment incorporating the acoustic treatments listed above along with the most stringent noise criteria listed in Table 4 of SSD 7709 MOD 1 for the Casula receivers, being the nearest and potentially worst affected receivers relating to this warehouse operation.

Table 3: Predicted $L_{Aeq,15min}$ operational noise levels, dB(A)

Receiver	Description		Overall, dB(A)
Mitigated design - 8m high noise barriers within the site up to 325m in total length			
R1 - 9 Casula Road, Casula	Predicted noise levels	Operation (night, adverse)[1,2,3]	37
		Plant and equipment	23
		TOTAL	37
	Noise goal	*Night*	*39*
R3a - Glenfield Farm, Casula	Predicted noise levels	Operation (night, adverse)[1,2,3]	29
		Plant and equipment	20
		TOTAL	30
	Noise goal	*Night*	*39*
R4 - 30 Goodenough Street, Glenfield	Predicted noise levels	Operation (night, adverse)[1,2,3]	<20
		Plant and equipment	<20
		TOTAL	<20
	Noise goal	*Night*	*39*

Noise emissions from the proposed plant and equipment with the acoustic treatments implemented are predicted to be significantly below the $L_{Aeq, 15min}$ operational noise levels previously predicted during the modification application (ie. below the established overall site operational noise limits) and therefore, the design of mechanical plant and other noisy equipment is deemed suitable for operation.

Any changes to the proposed plant and equipment and/or acoustic treatments set out in this report should be reviewed by an acoustic consultant.

5 Conclusion

Based on the documentation reviewed and listed in Section 3 and the design review presented in Section 4, Renzo Tonin & Associates certifies that the acoustic requirements of Consent Condition B138 of State Significant Development (SSD) 7709 prior to construction of the MoNDC at the Moorebank Intermodal Terminal, can be satisfactorily met.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain L_{eq} sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Risk assessment

B.1 Risk management

Risk management is an integral part of good management practice. AS/NZS 4360-1999 "Risk Management" has become part of our company's culture and as a consequence it permeates all aspects of the company's work and is actively promoted to our clients.

The risk management process can be applied to any situation where an undesired or unexpected outcome could be significant or where opportunities are identified. Our clients need to know about possible outcomes and the steps that can be taken to control any adverse impact.

There is an opportunity in the design process for the client to actively participate in risk management by providing input into risk reduction strategy. For example, the client may need to know that some aspects of risk reduction could involve passing those risks on to other entities in a better position to treat those risks. Some aspects of risk reduction may involve additional cost or time consequences. On the other hand, there may also be opportunities to avoid or avert risk at no cost to the client by rescheduling processes so that key information becomes available at a critical time.

When the client is properly informed, this supports better decision making by contributing a greater insight into risks and their impacts.

For this project, there are inherent risks in the design process and in the final outcome where the designer is not in control of all processes. Accordingly, the Risk Assessment Table included in the appendices of this report identifies those risks, analyses the consequences, assesses the levels of risk and advises on the action taken or recommended to minimise them.

B	TABLE B1 - RISK ANALYSIS - EXTERNAL MECHANICAL PLANT NOISE					
No	Item of risk	Analyse risk	Level	Treat risk	Risk allowance	
					Recom-mended	Used on this Project
	The design offered in this report assumes a number of factors which are outside the control of the designer. These include the following:	**The client should be aware that the design tolerance chosen may not be adequate and some remedial measures may be required including, for example, modification to the plant, the provision of additional silencing treatment, construction of noise barriers or limitations in the time of use of equipment.**	**MED**	**In order to reduce the risk of noise levels not complying with the design criteria, the following risk-reducing measures have been implemented or are recommended:**		
1.	Estimated variability of noise data due to measurement uncertainties and production quality control	Standards report that there is an uncertainty of 3-4dB(A) in the noise data of mechanical plant.	MED	If the client relies on the noise data as being guaranteed by the supplier, then the appropriate risk allowance is 0dB(A), which has been assumed for this project. The client may instruct Renzo Tonin & Associates to adopt a higher or lower design tolerance.	3-4	0
2.	Engineering design	Modelling and calculating sound levels contain inaccuracies, for example, design assumptions relating to sound propagation on the site (including reflections from nearby buildings and surfaces).	MED	A design tolerance of 3dB(A) is allowed in the final calculated sound level. The client may instruct Renzo Tonin & Associates to adopt a higher or lower design tolerance. Consider relocation of the plant to a location which minimizes the risk.	3	0
3.	Background/ ambient noise levels	Assumptions made in relation to the background/ ambient noise level adopted which cannot practically be determined with absolute certainty from a limited sample only.	MED	Undertake further background/ ambient noise level measurements to confirm the noise goals at receiver locations.	See 'Treat risk'	Nil
4.	Inaudibility of plant noise (where applicable)	There are no standards which define inaudibility.	N/A	Inaudibility is assumed to mean a source level 5dB lower than the background noise level.	See 'Treat risk'	See 'Treat risk'
5.	No. of plant operating contemporaneously	The assumption that only some plant operate presents a risk of under-design. The assumption that all plant operate presents a potential over-design of acoustic treatment.	LOW	Assume all plant operate contemporaneously.	See 'Treat risk'	See 'Treat risk'

B TABLE B1 - RISK ANALYSIS - EXTERNAL MECHANICAL PLANT NOISE

No	Item of risk	Analyse risk	Level	Treat risk	Risk allowance	
					Recom-mended	Used on this Project
6.	Operating mode of plant (capacity)	The assumption that plant operates at reduced capacity presents a risk of under-design. The assumption that plant operates at 100% capacity presents a potential over-design of acoustic treatment.	LOW	Assume plant operates at 100% capacity.	See 'Treat risk'	See 'Treat risk'
7.	Existing equipment	Existing plant and equipment has not been quantified through detailed measurements and assessment.	MED	Measure and assess existing plant and equipment	See 'Treat risk'	-
8.	Site noise tests	Plant installed on site does not operate within the assumed design noise levels.	MED	Commission the consultant to undertake site noise tests during installation works and prior to commissioning of plant to confirm the assumptions described in this table and if necessary, advise on remedial noise control measures. Allow for the time implications, cost and installation of the remedial treatment described above.	See 'Treat risk'	-

EXPLANATION OF TABLE

The designs offered in this report assume a number of factors which are outside the control of Renzo Tonin & Associates.

The client accepts the risks identified in this document and is encouraged to minimize those risks by the methods described above.

The column marked "Level" identifies the level of risk as HIGH, MED, LOW or N/A. Where the risk is HIGH, the client is advised that if the design does not comply with the selected standards then the client may experience significant additional costs and delays in rectification works. Where the risk is MED, the client is advised that if the design does not comply with the selected standards then the client may experience some additional costs and/or delays in the rectification works. Where the risk is LOW, the client is advised that if the design does not comply with the selected standards then the client may experience delays in the rectification works. Where N/A is indicated, this means the item is not applicable to the project.