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MAROOCHY PRIVATE HOSPITAL, MAROOCHYDORE

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2021/1251/2

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Queensland Government

Noise Impact Assessment

1 December 2022

Essence Project Management

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The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

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We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

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1 Introduction

Renzo Tonin & Associates was engaged to prepare a noise impact assessment for the proposed Maroochy Private Hospital to be located on Lots J1 and J2 at Mundoo Boulevarde, Maroochydore.

The assessment authority is Economic Development Queensland (EDQ).

This report has been prepared for the Development Application (DA) stage of the project and provides preliminary comments for the following acoustic issues:

- Noise intrusion from external sources (local mechanical plant and traffic noise);
- Noise emissions from steady state noise sources (mechanical plant), and;
- Noise emissions from non-steady state noise sources (truck deliveries and carpark activities).

Specialised acoustic advice and associated reports will be prepared as the design progresses through the various design stages.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Proposed Development

The Maroochy Private Hospital; is located within the Principal Centre (CBD) Zone within Precinct 3 of the Maroochydore Priority Development Area (PDA). The intended mixed-use development is approximately 11,836m^2 and includes the following:

- Office tenancies;
- Medical tenancies;
- Private Hospital;
- Coffee Shop;
- Restaurant; and
- 284 carparking spaces.

Table 1 presents a list of floor levels and proposed occupancy.

Table 1: Floor Level and Occupancy

Floor Level	Proposed Occupancy
Ground	Coffee Shop (G.01), Pathology (G.03), 4 x Tenancy (G.02, G.04, G.05 & G.06), Restaurant (G.07), Substation, Loading Dock, Amenities, Fire Pump room, Waste room, Parking for Ambulance (1 bay)
Level 1	Carpark (58 bays), Plantroom, Amenities
Level 2	Carpark (75 bays)
Level 3	Carpark (75 bays)
Level 4	Carpark (75 bays)
Level 5	Clinical Trials (4.02), USC Education & Research (4.03), Cadaver Lab (4.04), Amenities
Level 6	Health Care Consulting (5.01), Health Care Consulting (5.02), Health Care Consulting (5.03), Health Care Consulting (5.04), Health Care Consulting (5.05), Health Care Consulting (5.06), Amenities
Level 7	Health Care Consulting (6.01), Health Care Consulting (6.02), Health Care Consulting (6.03), Health Care Consulting (6.04), Health Care Consulting (6.05), Health Care Consulting (6.06), Health Care Consulting (6.07), Amenities
Level 8	Hospital (7.01)
Level 9	Hospital (8.01)
Level 10	Open plant, enclosed plantroom, Indoor Lounge, Plantroom, Outdoor Terrace, Amenities, Kitchen

The local authority is Sunshine Coast Council (SCC). The real property description is Lots J1 and J2.

The site is bounded by Mundoo Boulevard, South Sea Islander Way, Market Lane and Future Way.

Refer to Figures 1, 2 and 3 for site location details.

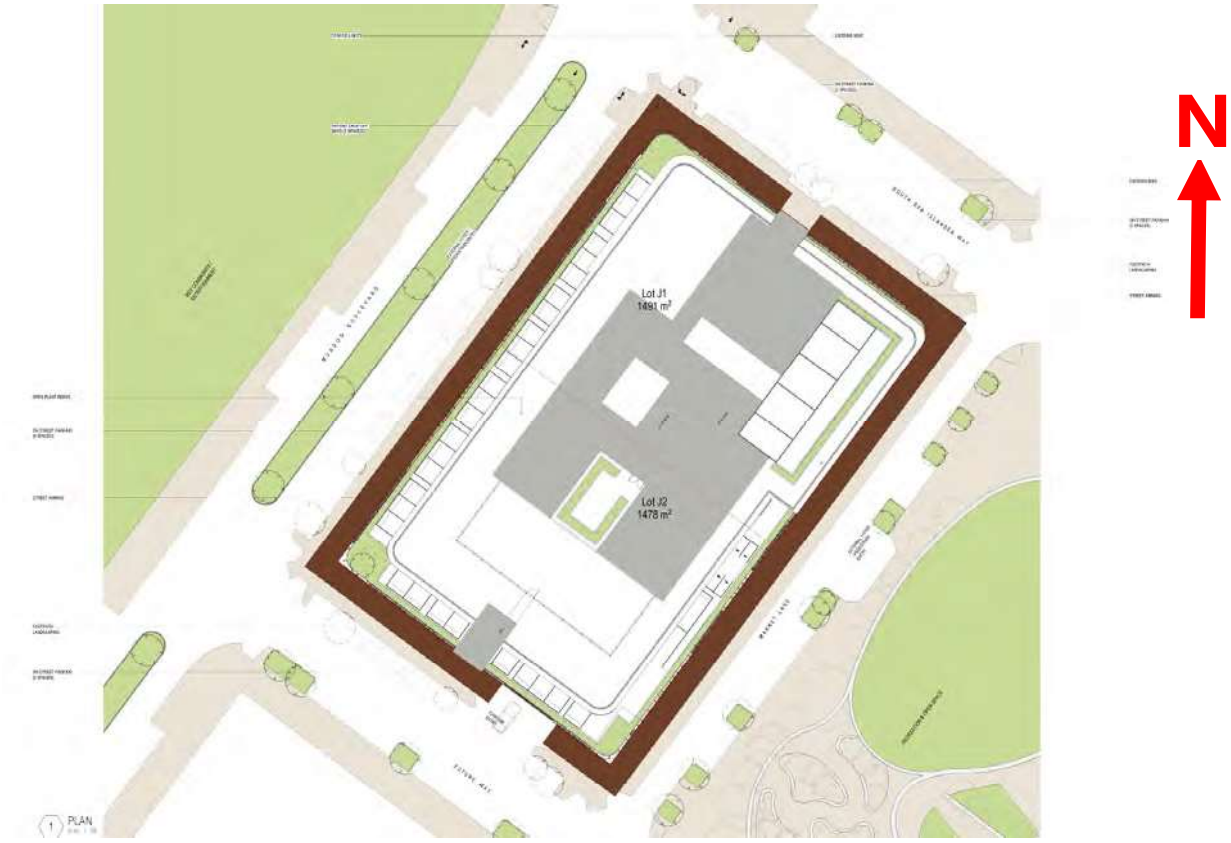

Figure 1: Site Location, Mundoo Boulevard

Figure 2: Site Location, Mundoo Boulevard

Figure 3 presents a zoning layout.

Figure 3: Zoning Layout - Principal Centre (CBD) Zone)

3 Noise Issues

A review of the proposed development and surrounding area identified the following noise issues that require consideration:

- Noise intrusion from external sources (local mechanical plant and traffic noise);
- Noise emissions from steady state noise sources (mechanical plant), and;
- Noise emissions from non-steady state noise sources (truck deliveries and carpark activities).

Table 2 presents a list of the nearest noise sensitive receivers (NSR's).

Table 2: Nearest noise sensitive receivers (NSR's)

Receiver	Building Type	Address	RP	Distance Separation to NSR (approx.)
NSR1	Residential apartments	Horton Apartments, 1A Mungar Street	0SP171082	90m NW
NSR2	Mixed use	9 Market Lane	130SP305312	35m N
NSR3	Commercial	3 South Sea Islander 5 Fairway Drive	120SP305312 100SP305312	30m NE
NSR4	Commercial	First Avenue 42 First Avenue	71SP308184 74SP308194	100m E
NSR5	Commercial	54 First Avenue	80SP305312	60m SE

Figure 4 shows the site is surrounded by a number of noise sensitive receivers described in Table 2.

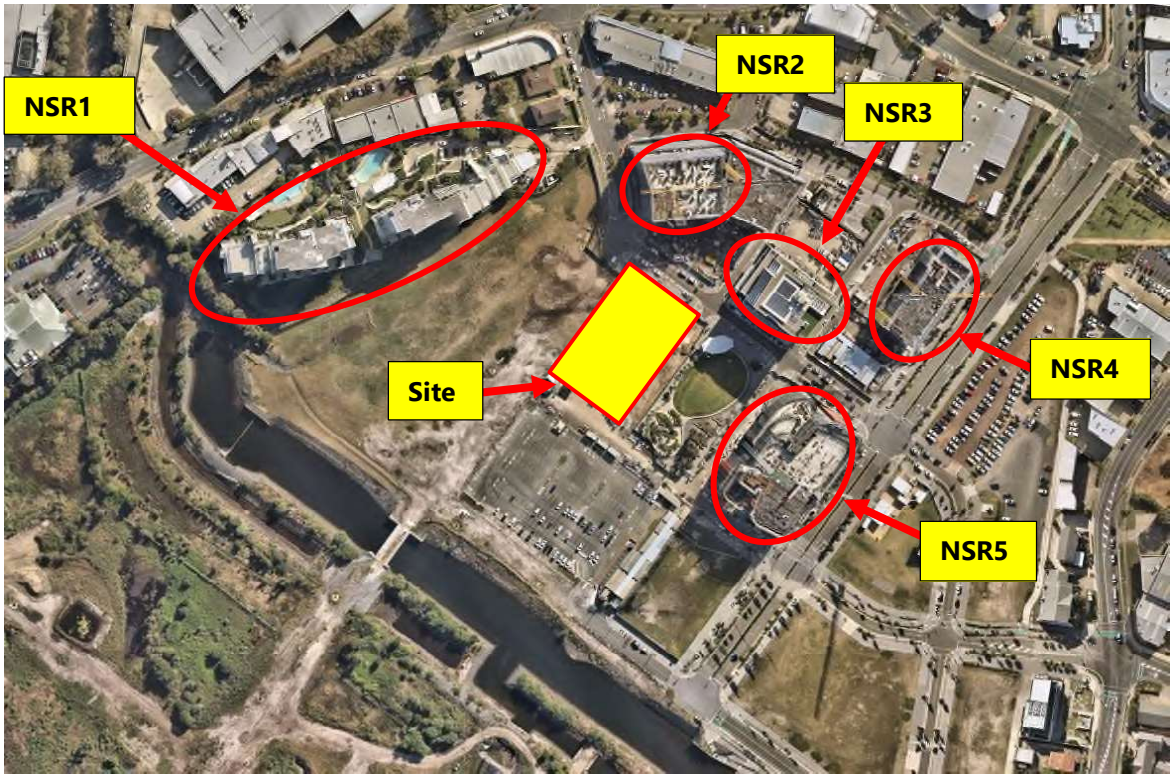

Figure 4: Nearest Noise Sensitive Receivers (NSR's)

4 Noise Criteria

Applicable noise emission limits are determined from local government and state government policies and Acts.

4.1 Sunshine Coast Council (SCC) Planning Scheme 2014

The development is located within the Sunshine Coast Council (SCC) local government area.

Schedule 6 Planning scheme policies in the Sunshine Coast Planning Scheme 2014 states the following:

SC6.15.4 Advice for preventing or minimising nuisance emissions and imissions associated with noise and/or vibration

The following is advice for achieving Performance Outcomes PO1 and PO2 of Table 9.4.3.3.1 (Performance outcomes and acceptable outcomes for assessable development) of the Nuisance code where there is potential for noise and/or vibration emissions or imissions to cause environmental harm or nuisance at a sensitive land use:-

(a) compliance with Performance Outcomes PO1 and PO2 of Table 9.4.3.3.1 (Performance outcomes and acceptable outcomes for assessable development) of the Nuisance code may be demonstrated in part or aided by the submission of a noise impact assessment report prepared by a competent person, which properly addresses, describes or includes the following:-

> *(i) a location plan identifying the subject site and sensitive land uses or the nearest potentially sensitive land uses to the subject site and any significant features such as topographic variation, barriers and intervening buildings;*
>
> *(ii) the results of measurements of background LA90 noise levels using an appropriate methodology at a location representative of the nearest potentially affected sensitive land uses to the subject site in the absence of noise emissions from the subject site, with:-*
>
> > *(A) the background noise levels to include time periods that are most likely to be sensitive from a noise perspective (generally at night); and*
> >
> > *(B) the background noise monitoring to be completed for a sufficient period of time to establish 'the average minimum background noise levels' for the locality;*
>
> *(iii) comparison of the background noise level with predicted source noise levels using an appropriately recognised methodology and criteria, from the proposed activity at the nearest potentially affected sensitive land uses to determine compliance with criteria as defined in Schedule 1 of the Environmental Protection (Noise) Policy 2008; and*
>
> *(iv) specification of appropriate control and mitigation measures as necessary;*

.....

(c) where a sensitive land use is proposed in a locality with existing noise sources, Council may also require submission of a noise impact assessment report prepared by a competent person that includes the following:-

(i) a location plan identifying the subject site, any existing or future potential noise sources in the locality that could potentially affect sensitive land uses on the subject site and any significant features such as topographic variation, barriers and intervening buildings;

(ii) the results of measurements of LA10, LAeq and background LA90 noise levels at the subject site, with:-

(A) the noise measurements to include time periods that are most likely to be affected by noise from existing sources and also include measurement of background in the absence of noise from local emission sources; and

(B) the noise monitoring to be completed for a sufficient period of time to establish typical and worst case pre-existing noise levels for the subject site;

(iii) an assessment of the measured and predicted noise levels using an appropriately recognised methodology and criteria. From the assessment, the determination of compliance with the criteria as defined in Schedule 1 of the Environmental Protection (Noise) Policy 2008; and

(iv) specification of appropriate control measures if necessary.

Section 9.4.3.3 *Performance outcomes and acceptable outcomes* in the Sunshine Coast Planning Scheme 2014 states the following

Table 9.4.3.3.1 Performance outcomes and acceptable outcomes for assessable development

Performance Outcomes		***Acceptable Outcomes***	
Acoustic Amenity and Noise[13]			
P01	*Development, other than development involving live entertainment or amplified music in a designated special entertainment precinct or as part of a temporary event, is located, designed, constructed and operated to ensure that noise emissions do not unreasonably impact on surrounding sensitive land uses having regard to the location and* *Note—this performance outcome applies even if noise emissions are generated by sensitive land uses, from sources such as communal areas, service areas, plant and equipment (e.g. air conditioning units) and the like.*	*A01.1*	*Development, other than development in a designated special entertainment precinct, involving live entertainment or amplified music is designed and constructed to achieve an amplified music noise level external to existing or approved affected residences of:-* *(a) LA10 not greater than 5dB(A) above the background noise levels LA90 from 6am to 10pm; and* *(b) LOCT10 not greater than 8dB above the octave band background noise levels LOCT90 from 10pm to 6am.* *Note: Acceptable outcome AO1 is provided as a guide only. A higher or lower noise level may be appropriate depending on the location, setting and context of the proposed development.*

Performance Outcomes		*Acceptable Outcomes*	
Acoustic Amenity and Noise[13]			
		A01.2	*For development not involving live entertainment or amplified music, no acceptable outcome provided.*
P02	*Development that is a sensitive land use, other than development in the residential activity group located in a designated special entertainment precinct and associated primary or secondary buffer area or a prescribed mixed use area, is located, designed, constructed and operated to achieve a satisfactory level of acoustic amenity where there is potential for noise emissions generated from surrounding development, including potential future development anticipated by the zone or precinct, to adversely affect the sensitive land use.* *Editor's note—this performance outcome relates to a 'reverse amenity' situation where a proposed sensitive land use may be adversely impacted by noise emissions from surrounding development. In such cases, it is contingent upon the proposed sensitive land use to implement measures to ensure a satisfactory level of acoustic amenity is provided to prospective occupants and users of the development.*	*A02*	*The sensitive land use is not established in an area that will be adversely impacted by noise generated by existing land uses, activities and possible future development in the area.* *OR* *Where located in an area where adverse noise impacts are likely, the sensitive land use mitigates all potential impacts through site layout, design, construction, and operation.*

[13] Note—Council will take the order of occupancy of new and existing noise sources into consideration in implementing Performance Outcome PO1 of this code. The intent of this performance outcome is not to require existing lawful uses to control noise emissions in response to encroachment by new noise sensitive development.

4.2 Department of Environment and Science – Environmental Protection (Noise) Policy 2019

Schedule 1 of the EPP (Noise) 2019 presents outdoor and indoor acoustical quality objectives during the day, evening and night-time periods. These objectives apply to all forms of noise experienced by a receptor.

The acoustical quality objectives for dwellings are reproduced in Table 3 below. The objectives are presented in terms of the adjusted L_{Aeq}, L_{A10} and L_{A01} noise levels measured over a 1-hour time period.

Table 3: EPP (Noise) acoustic quality objectives

Sensitive Receptor	Time of Day	Acoustic Quality Objectives (dBA)		
		$L_{Aeq,\ adj,\ 1hr}$	$L_{A10,\ adj,\ 1hr}$	$L_{A01,\ adj,\ 1hr}$
Residence (for outdoors)	Daytime and Evening	50	55	65
Residence (for indoors)	Daytime and Evening	35	40	45
	Night-time	30	35	40
Commercial and retail activity (for indoors)	Business hours	45	-	-

4.3 Environmental Protection Act 1994

The object of this Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

The Act describes a number of offences relating to noise emission, including building work, regulated devices (e.g. power tools, pumps, air-conditioning equipment, refrigeration equipment, etc.).

4.3.1 Section 440U: Air-conditioning equipment

(1) This section applies to premises at or for which there is air conditioning equipment.

(2) An occupier of the premises must not use, or permit the use of, the equipment on any day—

(a) before 7a.m, if it makes a noise of more than 3dB(A) above the background level; or

(b) from 7a.m. to 10p.m, if it makes a noise of more than 5dB(A) above the background level; or

(c) after 10p.m, if it makes a noise of more than 3dB(A) above the background level.

4.3.2 Section 440V: Refrigeration equipment

(1) This section applies to a person who is - .

a) An occupier of premises at or for which there is plant or equipment for refrigeration (refrigeration equipment);

Or

b) An owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway.

(2) The person must not use, or permit the use of, the refrigeration equipment on any day -

(a) before 7a.m, if it makes a noise of more than 3dB(A) above the background level; or

(b) from 7a.m. to 10p.m, if it makes a noise of more than 5dB(A) above the background level; or

(c) after 10p.m, if it makes a noise of more than 3dB(A) above the background level.

In the case of **continuous noise**, the following criteria are generally applied:

- Between 7am and 10pm: $L_{A\ max\ adj,\ T}$[1] $\leq$ $L_{A\ bg,\ T}$[2] + 5dBA.

---

[1] $L_{A\ max\ adj,\ T}$ refers to the average maximum noise emission level measured at the noise-sensitive premises and adjusted upwards if required, to account for annoying characteristics such as impulsiveness or tonality. Typically, adjustments of 2dBA or 5dBA apply.

[2] $L_{A\ bg,\ T}$ refers to the background noise level, usually measured as the L_{A90} statistical noise level in the absence of the intrusive noise.

- Between 10pm and 7am: $L_{A\ max\ adj,\ T} \leq L_{A\ bg,\ T}$ + 3dBA.

4.4 Australian Standard AS/NZS 2107

Internal noise limits for mechanical noise have been specified based upon the levels presented in Australian Standard Australian Standard AS/NZS2107-2016 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors.

Table 4 below presents typical design sound levels for various spaces within the health buildings.

Table 4: Design Sound Levels from AS/NZS 2107:2016

Occupancy	Design Sound Level (Leq,t) Range dBA	Design Reverberation Time (T) Range, s
Educational Buildings		
Laboratories – Teaching	35 to 45	0.5 to 0.8
Laboratories – Working	40 to 50	0.5 to 0.8
Professional and administrative offices	35 to 40	0.6 to 0.8
Office Buildings		
Cafeterias	45 to 50	< 1.0
Corridor and lobbies	45 to 50	< 1.0
Executive office	35 to 40	0.4 to 0.6
General office areas	40 to 45	0.4 to 0.6
Meeting room (small)	40 to 45	< 0.6
Open plan office	40 to 45	0.4 (see Note 1)
Public spaces	40 to 50	0.5 to 1.0
Quiet rooms	40 to 45	< 0.6
Reception areas	40 to 45	0.6 to 0.8
Rest rooms and break-out spaces	40 to 45	0.4 to 0.6
Toilets	40 to 55	-
Undercover carparks	< 65	-
Municipal buildings		
Restaurants and cafeterias - Cafeterias	40 to 50	See Note 1
Restaurants and cafeterias – food courts	45 to 55	See Note 1
Restaurants and cafeterias – coffee shops	40 to 50	See Note 1
Restaurants and cafeterias - restaurants	40 to 50	See Note 1
Health Buildings		
Corridors & lobby spaces	< 50	See Note 1
Consulting rooms	40 to 45	0.4 to 0.6
Kitchens, sterilizing & service areas	< 55	< 0.8 (see Note 8)
Laboratories	40 to 50	0.4 to 0.7
MTI/CT Scan/X-Ray areas/Ultrasound	45 to 50	See Note 1

Occupancy	Design Sound Level (Leq,t) Range dBA	Design Reverberation Time (T) Range, s
Nurses' stations	40 to 45	0.4 to 0.7
Office areas	35 to 45	0.4 to 0.7
Operating theatres	40 to 50	See Notes 1, 8
Patient lounge	40 to 45	0.4 to 0.6
Post-Op, Pre-Op, recovery rooms	40 to 45	0.4 to 0.6 (see Note 8)
Pharmacies	45 to 50	0.4 to 0.6
Staff rooms	40 to 50	0.4 to 0.6
Sterilizing areas in operating theatres	40 to 45	< 0.9 (see Note 8)
Surgeries/treatment/procedure rooms	40 to 45	0.4 to 0.7
Utilities Rooms	50 to 60	-
Ward Bedrooms – Single Bed	35 to 40	0.4 to 0.7
Ward Bedrooms – Multiple Beds	35 to 40	0.4 to 0.7 (see Note 8)
Waiting rooms, reception areas	40 to 50	< 0.7

Note 1 – Reverberation time should be minimized for noise control.

Note 8 – Health requirements for hygiene and infection control may preclude achieving these recommended reverberation times.

5 Noise Measurements

5.1 Ambient Noise Levels

Noise measurement of existing ambient noise levels was conducted over a continuous 8-day period commencing on Friday 25th June 2021. The measurements were conducted using an unattended logger located on the vacant site.

Figure 5 shows the noise monitoring location marked as Location L1.

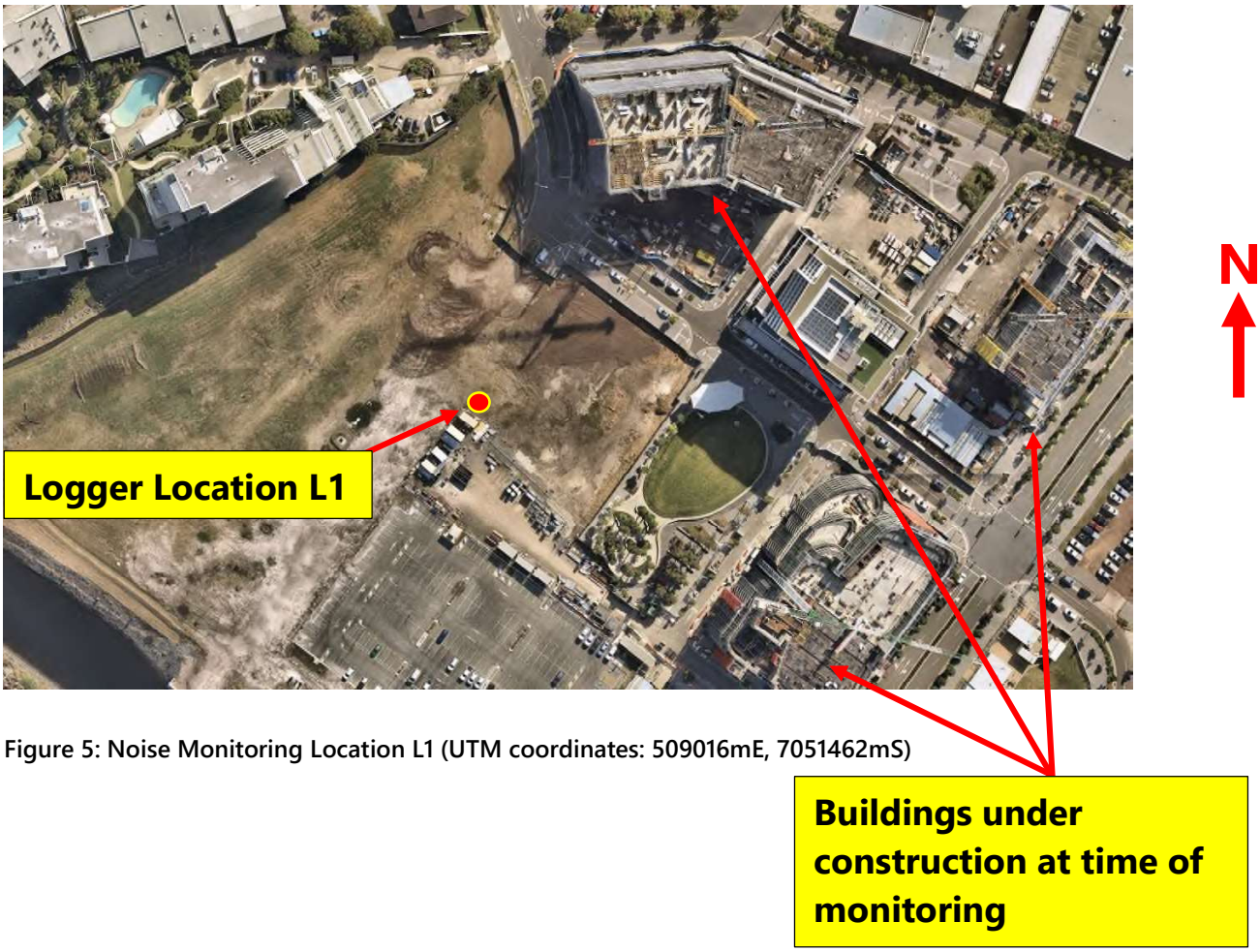

Figure 5: Noise Monitoring Location L1 (UTM coordinates: 509016mE, 7051462mS)

The test instrumentation consisted of:

- *Portable Noise Logger*: RTA07, NTi-XL2 (S/N: A2A-2422-D0, FW4.60);
- *Acoustical Calibrator*: Larson Davis/ NTi CAL200 (S/N 15600).

The results of the ambient noise logging are presented graphically in Appendix C of this report and summarized in Table 5.

The average ambient results include values for the L_{A01}[3], L_{A10}[4], L_{Aeq}[5] and L_{Amax}[6] for each of the day, evening and night periods. For the L_{Amax}, L_{A01} and L_{A10} parameters, arithmetic averaging has been used. For L_{Aeq}, logarithmic averaging has been used. For L_{A90}[7] the result has been calculated as the Rating Background Level (RBL) of the dataset in accordance with accepted practice.

Table 5: Existing ambient noise levels

Time of Day	Average Noise Levels (dBA)				
	L_{A01}	L_{A10}	L_{A90} (RBL)	L_{Aeq}	L_{Amax}
Day (7am-6pm)	64	59	51	59	74
Evening (6pm-10pm)	55	51	45	52	63
Night (10pm-7am)	52	48	39	51	62

From observations made during separate site visits, the noise levels at the logger location were primarily influenced by local construction activities during daytime (refer to Figure 5 for construction locations) and local traffic noise during other periods. Weather conditions were fine during the noise logging sessions.

The measurement procedures used, and the results reported in this document were conducted in accordance with Renzo Tonin and Associates' Quality Assurance System, Australian Standard AS1055-2018 "Acoustics - Description and Measurement of Environmental Noise" and the DES's Noise Control Manual (March 2020).

5.2 Noise Emission Limits for Residential Receptors

A comparison of the noise requirements discussed in Sections 4.1, 4.2 and 4.3 suggests the most stringent noise limits occur during the night time period of 10pm to 7am. That is if noise emissions from the Private Hospital comply during the quieter night time period, noise emissions are expected to comply during other periods including daytime (7am to 6pm) and evening periods (6pm to 10pm).

For broadband steady state noises produced by mechanical plant, the most stringent noise limit is considered background level plus 3dBA or 5dBA depending on the time period.

The following noise limit is assumed at the nearest noise sensitive residential receivers (NSR1 and NSR2) for compliance purposes:

$L_{eq, adj,T}$ = L_{90} (RBL from Table 5) + 5 = 51 + 5 = 56dBA daytime periods (7am to 6pm)

$L_{eq, adj,T}$ = L_{90} (RBL from Table 5) + 5 = 45 + 5 = 50dBA evening periods (6pm to 10pm)

$L_{eq, adj,T}$ = L_{90} (RBL from Table 5) + 3 = 39 + 3 = 42dBA night time periods (10pm to 7am)

[3] L_{A01} is the A-weighted sound pressure level exceeded for 1% of the time.
[4] L_{A10} is the A-weighted sound pressure level exceeded for 10% of the time.
[5] L_{Aeq} is the equivalent or energy-averaged A-weighted sound pressure level.
[6] L_{Amax} is the average of the maximum A-weighted sound pressure levels occurring within the consecutive 15 minute samples.
[7] L_{A90} is the A-weighted sound pressure level exceeded for 90% of the time.

5.3 Noise Emission Limits for Commercial & Retail Receptors

Table 3 in Section 4.2 of this report discusses an acoustic quality objective of 45dBA Leq, adj, 1 hour for commercial and retails spaces. The objective applies for indoors during business hours.

For commercial receivers the equivalent external or outdoor noise level is [45 + 20 =] 65dBA Leq, adj, 1 hour based on a minimum noise reduction of 20dBA across the glazing system.

For commercial receivers, an external noise limit of 65dBA Leq, adj, 1 hour during business hours is considered reasonable. This noise limit is a component noise level.

For retail receivers typically located at street level, Table 5 shows existing ambient noise levels during daytime periods were determined to be around 59dBA Leq (measured externally) and well above the 45dBA Leq acoustic quality objective (indoors).

For retail receivers, an external noise limit of 59dBA Leq, adj, 1 hour during business hours is considered reasonable. This noise limit is a component noise level.

6 Noise Intrusion from External Sources

Table 3 in Section 4.4 of this report provides recommended internal noise levels for steady state noises (internal air conditioning) and quasi steady state noises (external mechanical plant and local traffic noises).

The lower range of recommended internal noise levels is typically around 35dBA to 40dBA L_{eq}.

Based on our site observations and noise logging results, external noise levels around 60dBA L_{eq} may be expected around the building façade.

Based on our analysis of the site ambient environment, local future development and experience from similar projects, we recommend all façade glazing assembly should have a minimum acoustic rating of Rw35 or higher. A performance rating of Rw 35 may be achieved using heavier laminated glass such as 10.38mm glass or 6.5mm VLam Hush glass in an appropriate aluminium framing system.

We suggested discussing the acoustic requirements of glazing assemblies (rated to Rw 35) with reputable suppliers such as G James Glass, AWS, Bradnams and Capral.

The glazing assembly includes the glass and aluminium framing system. The client would be advised not to commence detailing or otherwise commit to glazing assemblies which have not been tested in an approved laboratory or for which an opinion only is available. Testing of glazing assemblies is a component of the quality control of the design process and should be viewed as a priority.

7 Noise Emissions

The following noise emissions have been identified as potentially impacting the nearest noise sensitive receivers:

- Noise emissions from steady state noise sources (mechanical plant), and;
- Noise emissions from non-steady state noise sources (truck deliveries and carpark activities).

7.1 Steady State Sources

Noise emissions from mechanical services plant located in plantrooms on Ground Level, Level 01 and Level 10 must be controlled to acceptable levels.

The following figures show locations of the plantrooms.

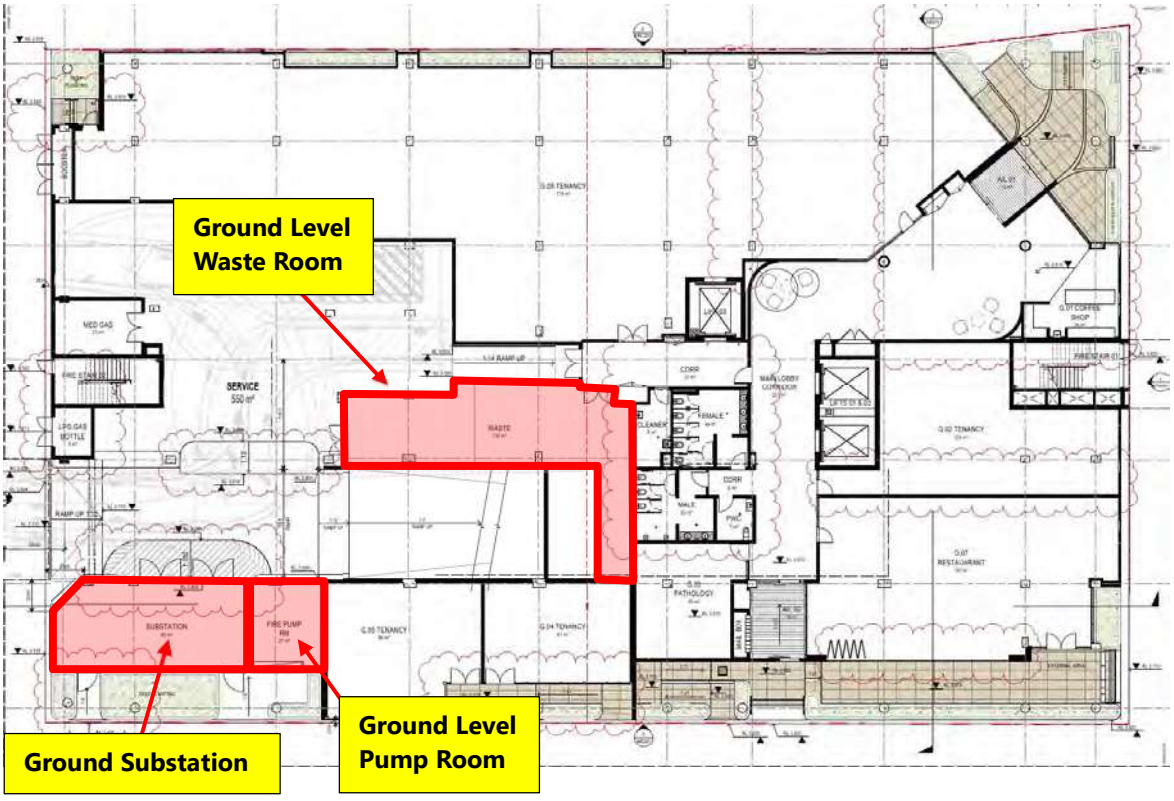

Figure 6: Ground Level Plantrooms

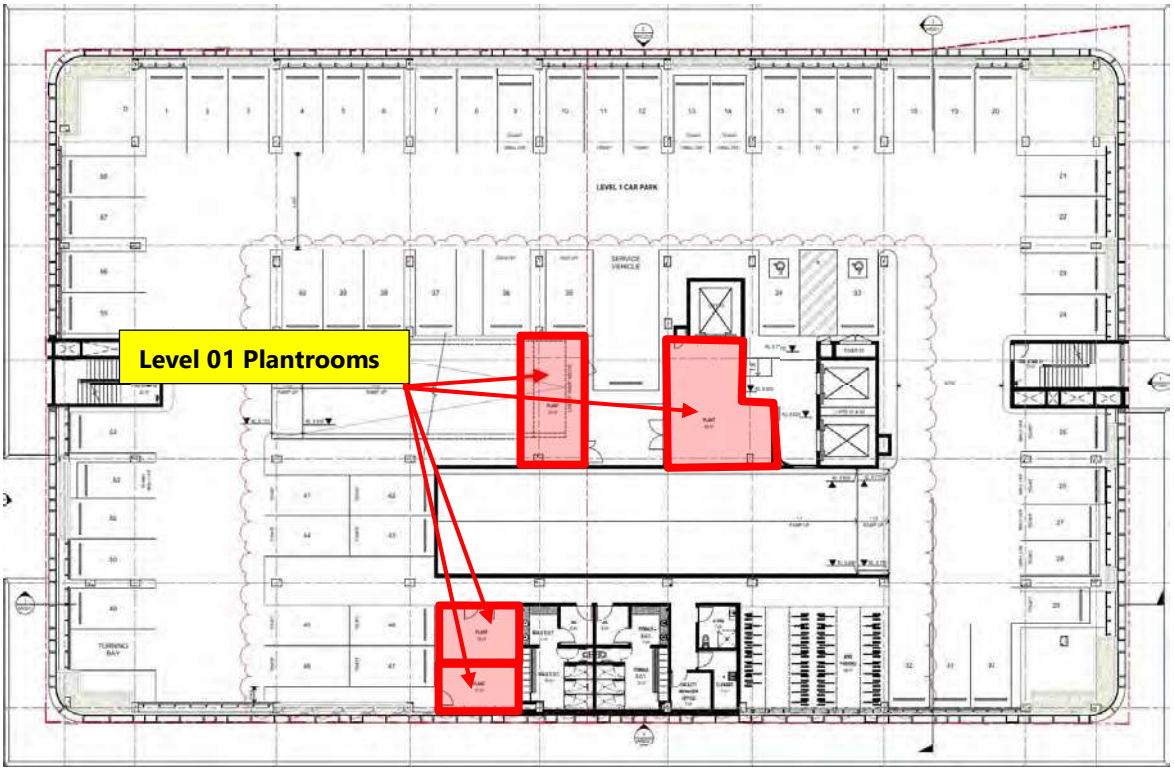

Figure 7: Level 01 Plantroom

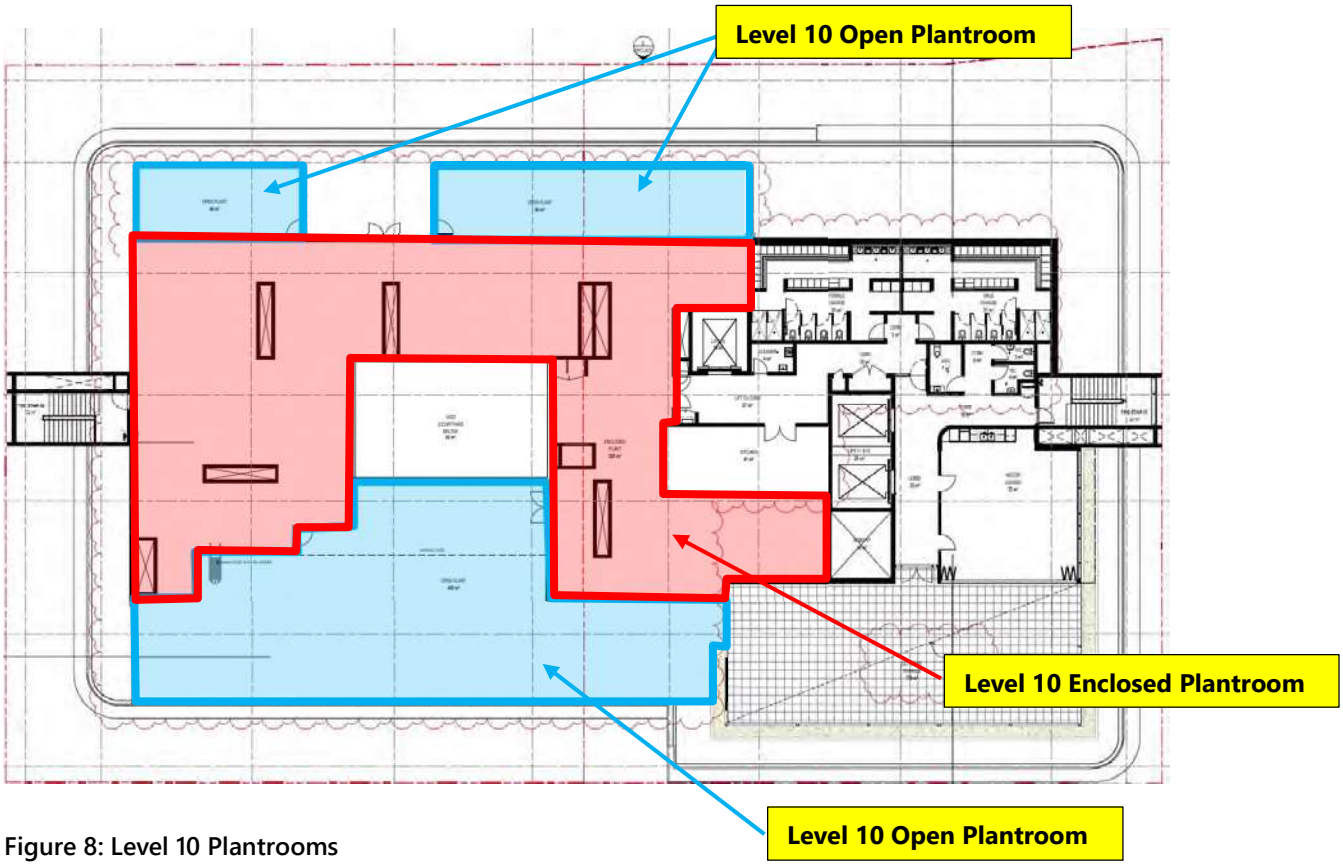

Figure 8: Level 10 Plantrooms

A detailed assessment of the noise impact from mechanical plant will be undertaken later, when detailed plant layout and noise data is available.

The detailed assessment will include noise emissions from the Ground Level Substation, Automated Waste Collection System (AWCS), Fire Pump Room and plantrooms located on Levels 01 and 10.

Standard noise control treatment in the form of acoustic silencers, internal duct insulation, air plenums and acoustic louvres may be required to minimise noise emissions to the atmosphere.

7.2 Non-Steady State Sources

Non steady state noise sources including truck deliveries and carpark activities. The following figures shows of locations of the loading dock and carparking spaces.

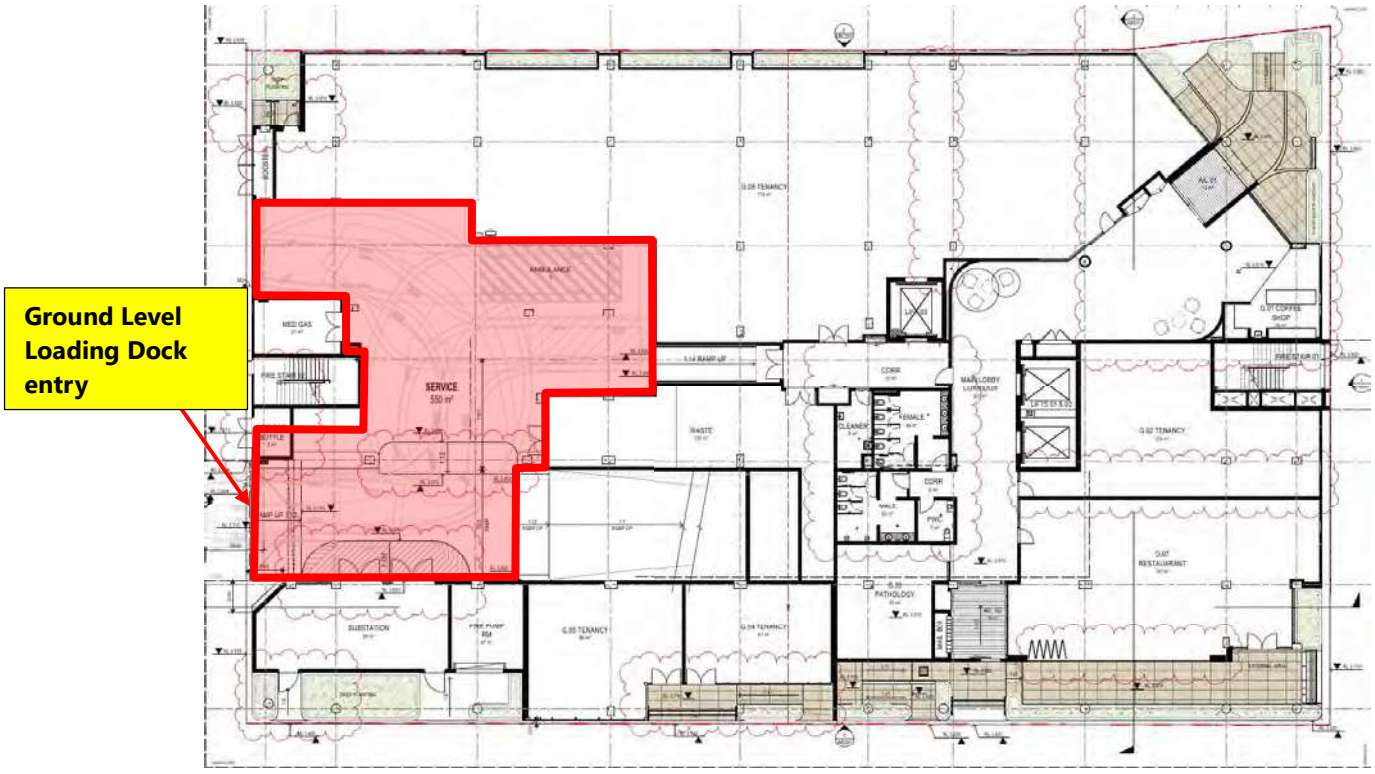

Figure 9: Ground Level Loading Dock

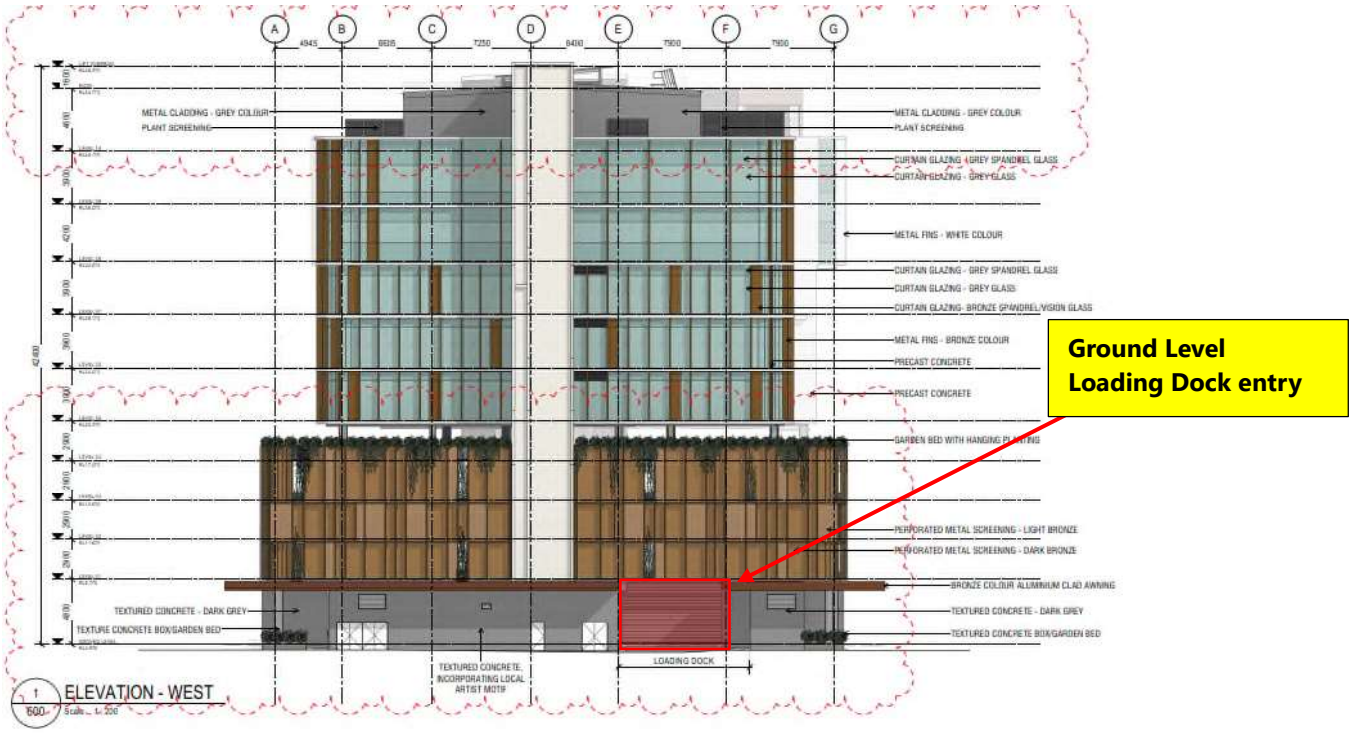

Figure 10: Ground Level Loading Dock entry

Figure 11: Level 01 Carparking (58 bays)

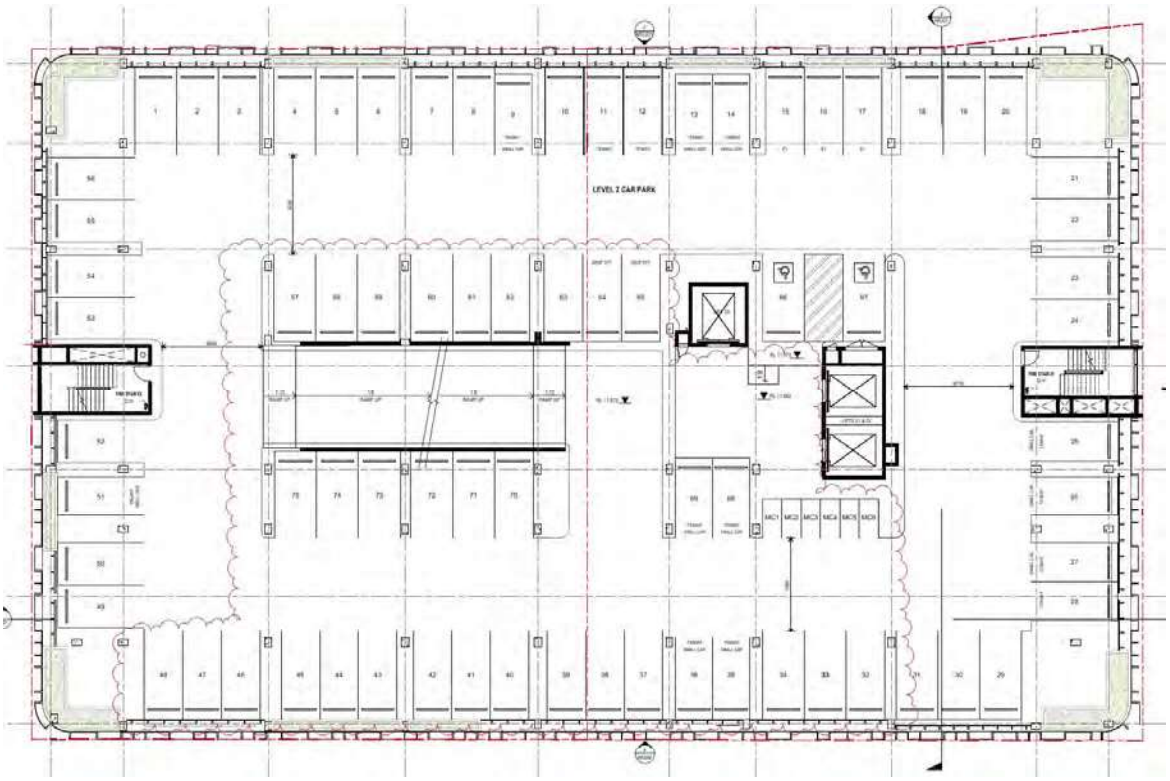

Figure 12: Level 02 Carparking (75 bays)

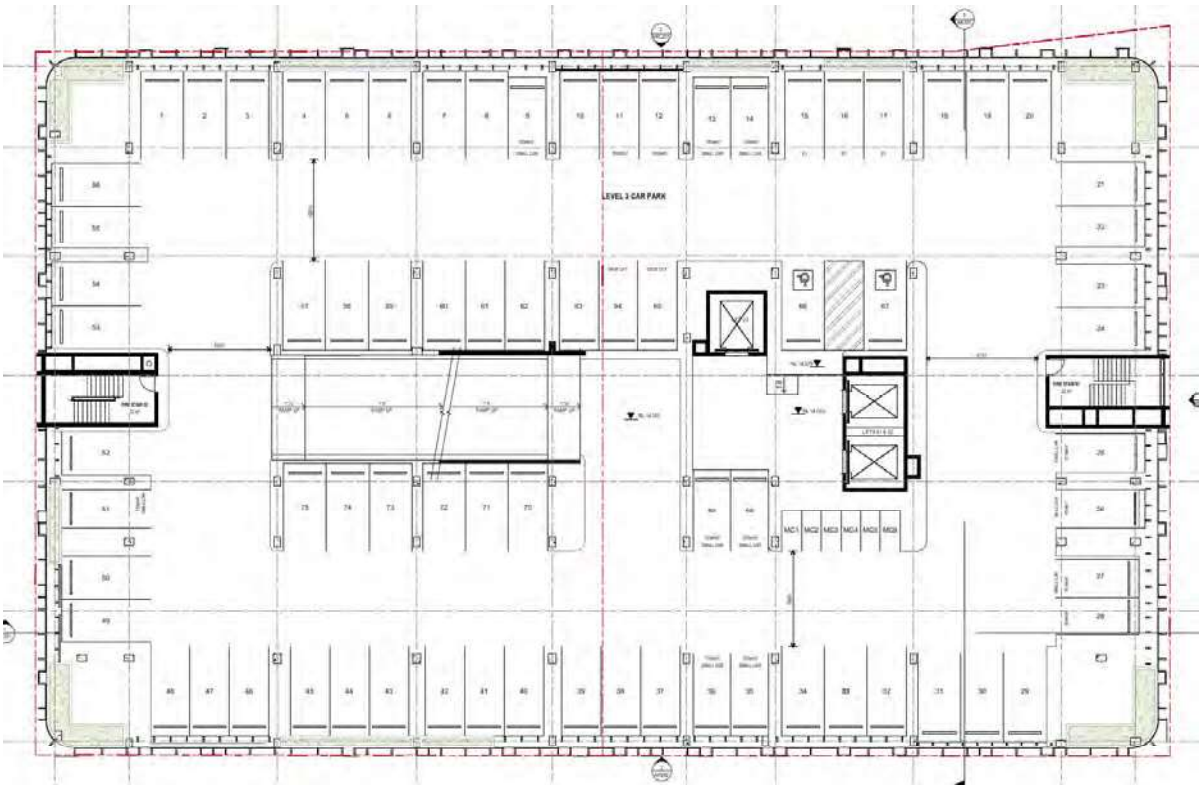

Figure 13: Level 03 Carparking (75 bays)

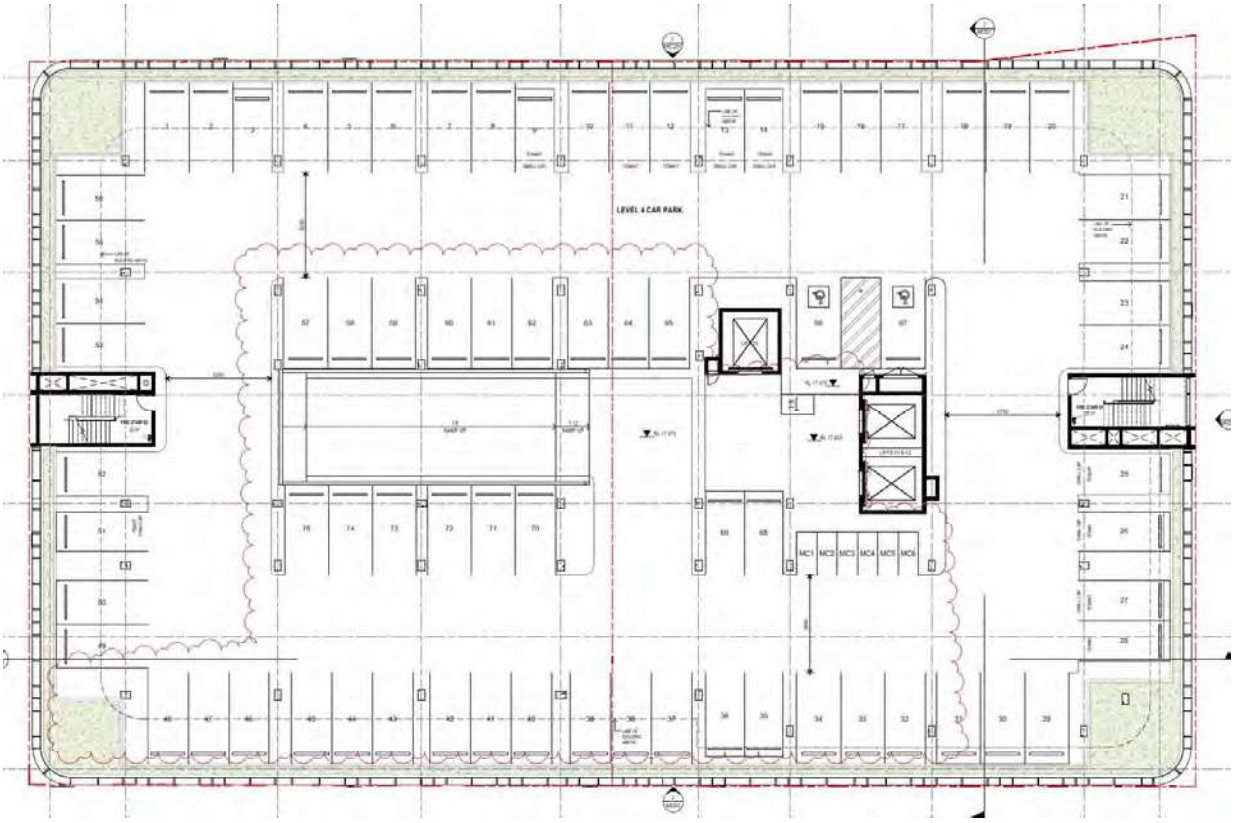

Figure 14: Level 04 Carparking (75 bays)

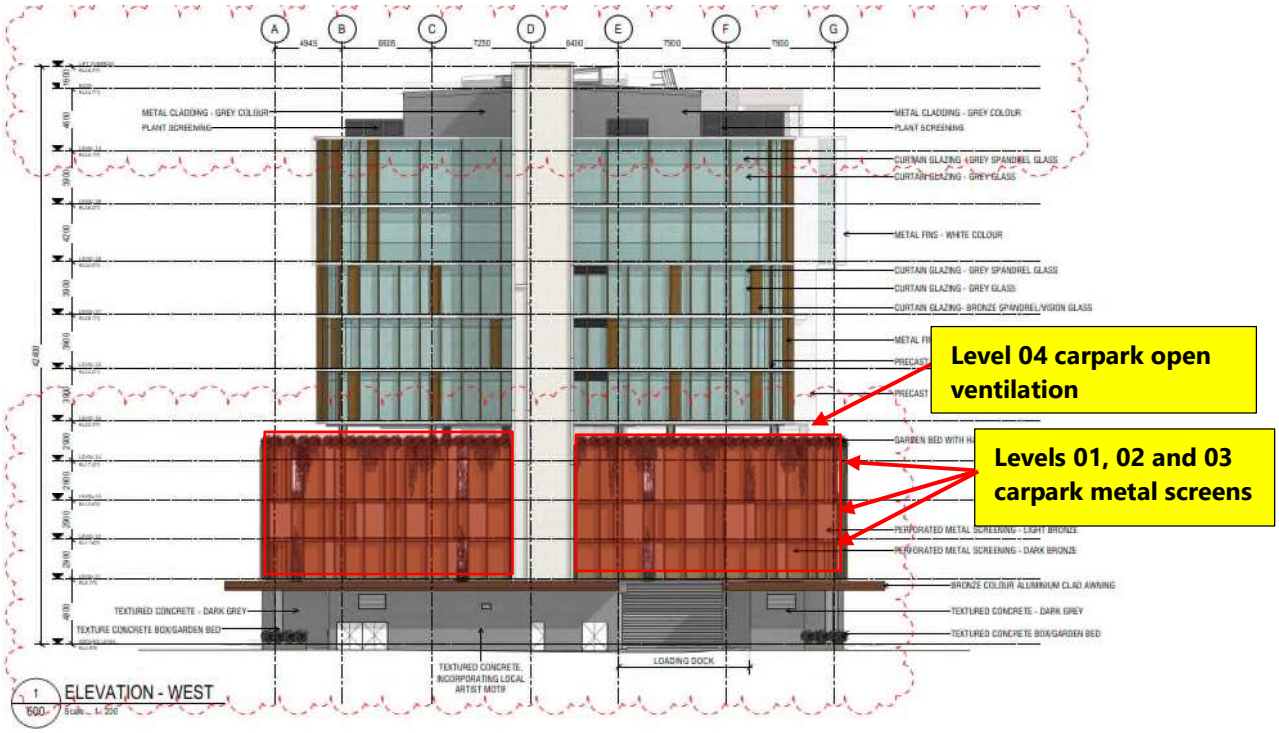

Figure 15: carpark ventilation via metal screens

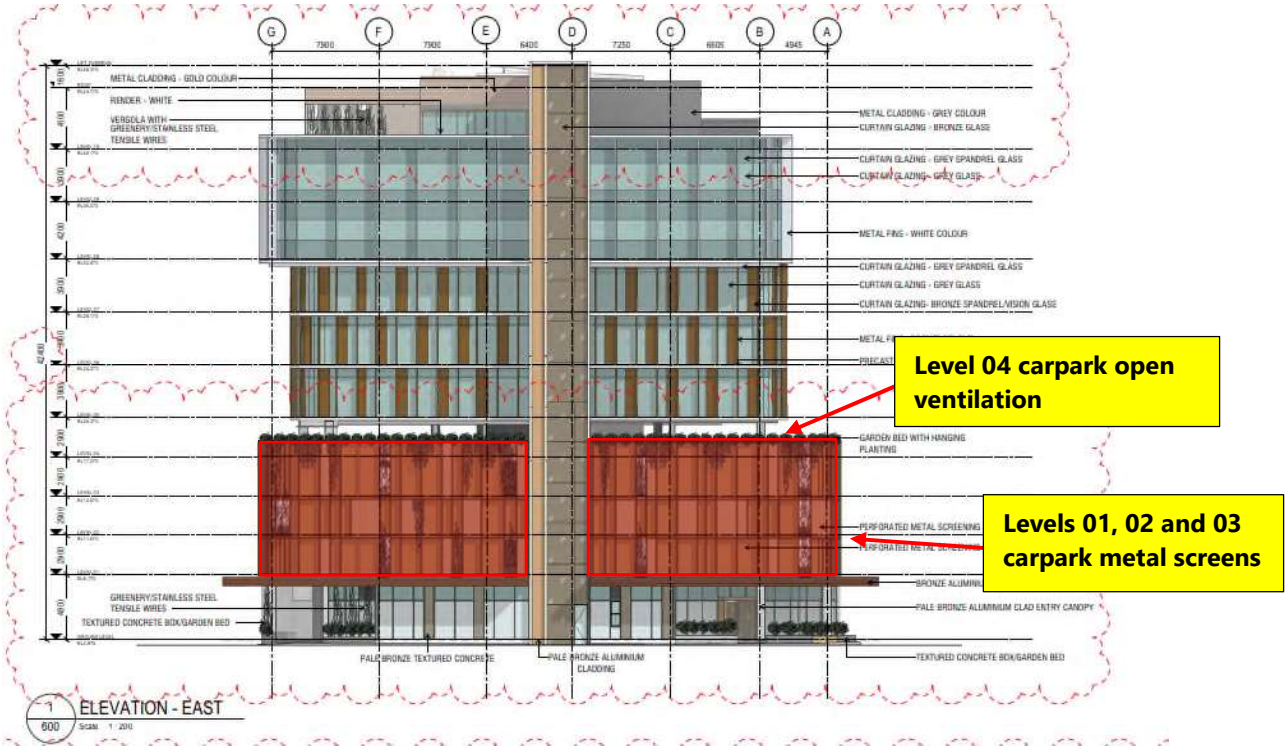

Figure 16: carpark ventilation via metal screens and openings

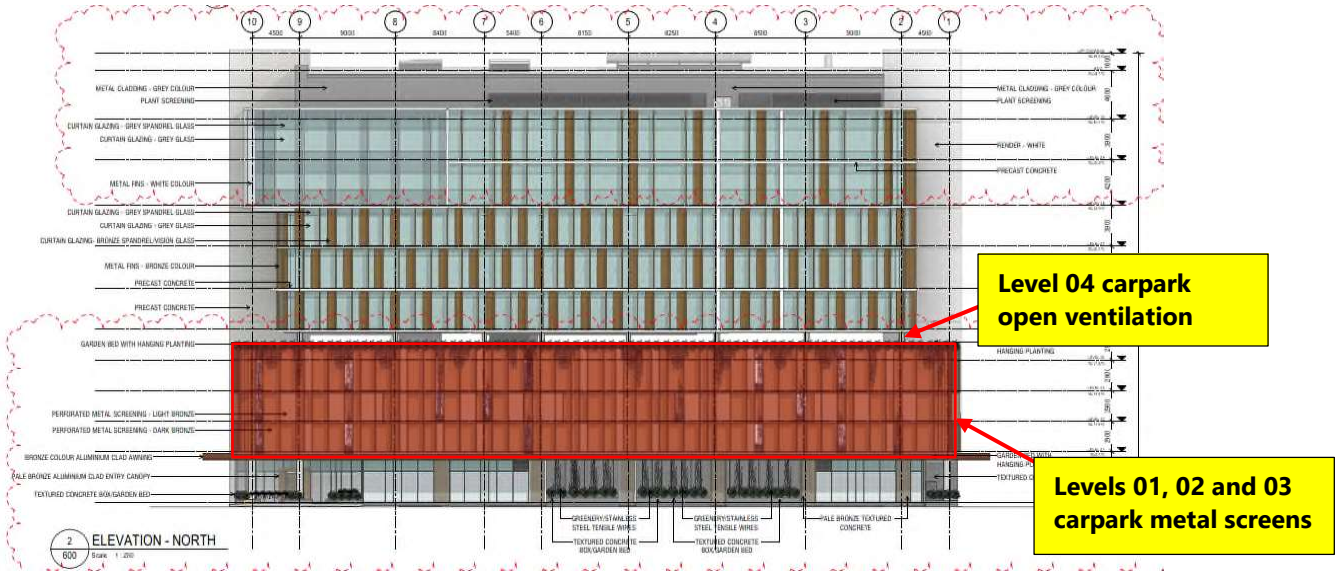

Figure 17: carpark ventilation via metal screens and openings

Figure 18: carpark ventilation via metal screens and openings

7.3 Noise Model

Predictions of noise emissions to the nearest noise sensitive receivers have been predicted using the CadnaA[8] computer programme (Version 2021 MR) and compared against the criteria presented in Section 4.

The noise prediction models take account of:

- Location of noise sources and receiver locations;
- Height of sources and receivers;
- Separation distances between sources and receivers;
- Shielding from building structures;
- Attenuation from intervening structures.

7.4 Loading Dock

Noise generated by the proposed loading dock has been assessed using the noise sources shown in Table 6 below.

[8] CadnaA is a noise modeling program used for the calculation, presentation, assessment and prediction of environmental noise.

Table 6: Source noise levels for loading dock and truck activities (Sound Power Levels, Lw), dBA

Noise Source	Noise Descriptor	Overall dB(A)	Octave Band Centre Frequency - Hz (dB)							
			63	125	250	500	1k	2k	4k	8k
Truck – small rigid accelerating and moving (5km/h – L_W per metre)	$L_{eq,15min}$	64	71	62	63	60	59	58	52	46
Truck – HRV moving constant speed (10km/h – L_W per metre)	L_{eq}	92	103	92	88	91	87	83	79	-

Notes: Source - Renzo Tonin past project files and database

Table 7 presents predicted noise levels from loading dock activities at the nearest noise sensitive receivers surrounding the site.

Table 7: Predicted Noise Levels from Loading Dock Activities, dBA

Noise Sensitive Receiver	Occupancy	Loading Dock Noise
		$L_{eq,\ adj,\ 15\ minutes}$
NSR1	Residential apartments	13
NSR2	Mixed use	0
NSR3	Commercial	0
NSR4	Commercial	0
NSR5	Commercial	18

Table 7 shows noise levels based on one vehicle accessing and departing the loading dock based over 15 minutes complies with the residential noise criteria for day (56dBA L_{eq}), evening (50dBA L_{eq}) and night time (42dBA L_{eq}) periods.

Table 7 also shows noise levels comply with the commercial and retail noise criteria discussed in Section 5.2 of this report.

7.5 Carpark Noise

Noise generated by car park activities includes vehicle doors closing, vehicle engines starting, vehicles accelerating and vehicles moving.

The sound power levels generated by carpark activities on site are presented in the following table.

Table 8: Carpark activity sound power levels

Activity	Metric	Sound Power Level, dB(A) re. 1pW
Vehicle moving (10km/h)	Passby Lweq	79
Door Slam	SEL	86
Engine Start	SEL	92

The general residential noise criteria was determined as:

Day (7am to 6pm) 56dB(A) $L_{eq,\ adj,\ T}$

Evening (6pm to 10pm) 50dB(A) $L_{eq, adj, T}$

Night (10pm to 7am) 42dB(A) $L_{eq, adj, T}$

Where "T" is either a relevant representative 15 minutes or if the duration of the noise occurs for less than 15 minutes the duration of the noise source.

These levels are considered component noise levels.

The worst-case scenario for car park activities is during peak hours where up to 212 vehicles may use the car park, as described in Table 9.

Table 9: Peak Hourly Vehicle Movements within Carpark

Period	Peak Hourly Vehicle Movements within Car Park
AM Peak	284 cars
PM Peak	284 cars

For assessment purposes we assume a maximum of [212 / 4 =] 53 vehicle movements over any 15 minutes within the carpark during the AM or PM peak hour period.

Table 10 presents predicted carpark noise levels at the nearest noise sensitive receivers surrounding the site.

Table 10: Predicted Noise Levels from Carpark Activities

Noise Sensitive Receiver	Occupancy	Predicted Carpark Noise dBA Leq, adj, 15 minutes	Complies with noise criteria?
NSR1	Residential apartments	34	Yes
NSR2	Mixed use	42	Yes
NSR3	Commercial	45	Yes
NSR4	Commercial	23	Yes
NSR5	Commercial	36	Yes

Table 10 shows carpark noise emissions are predicted to comply at the nearest noise sensitive receivers based on a daytime peak period of up to 53 vehicle movements (15 minutes).

Carpark noise emissions are expected to be minimal during evening and night time periods with fewer cars entering the carpark levels.

Table 10 also shows noise levels comply with the commercial and retail noise criteria discussed in Section 5.2 of this report.

7.6 Mechanical Plant Noise Emissions

Table 11 presents predicted mechanical plant noise levels at the nearest noise sensitive receivers surrounding the site. Appendix D of this report presents mechanical plant information and noise data provided by Multitech Solutions.

Table 11: Predicted Noise Levels from mechanical plant

Noise Sensitive Receiver	Occupancy	Predicted Plant Noise dBA Leq, adj, 15 minutes	Complies with noise criteria?
NSR1	Residential apartments	37	Yes
NSR2	Mixed use	42	Yes
NSR3	Commercial	55	Yes
NSR4	Commercial	51	Yes
NSR5	Commercial	57	Yes

Table 10 shows mechanical plant noise emissions to comply at the nearest noise sensitive residential and commercial receivers.

Excessive noise from chiller operations may be experienced within the Outdoor Lounge area located on Level 10 rooftop. A 3m high noise barrier is recommended next to the rooftop chiller in order to reduce chiller noise impacting the amenity within the Outdoor Lounge area. The noise barrier should have a minimum superficial mass density of 12.5kg/m^2.

Figure 19 shows a recommended noise barrier location next to the Level 10 rooftop chiller.

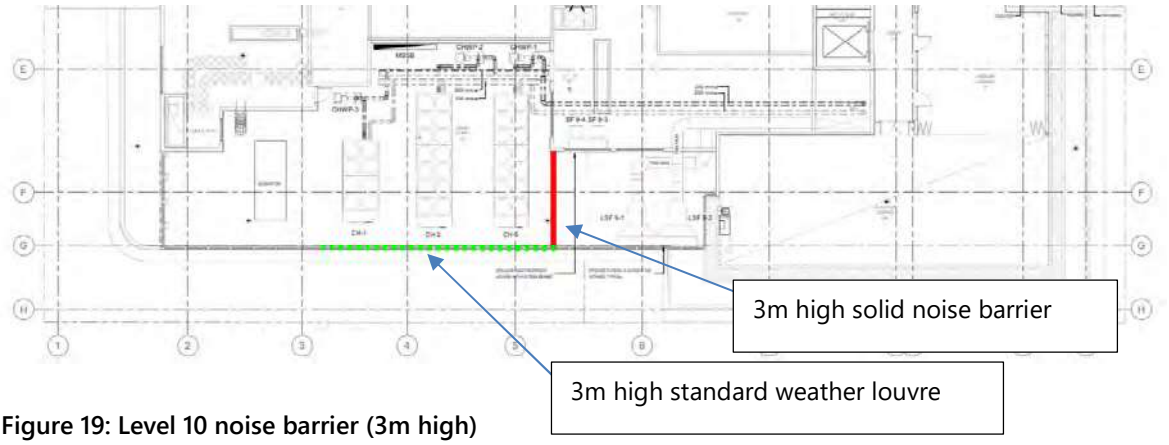

Figure 19: Level 10 noise barrier (3m high)

Figure 19 also shows a 3m high standard weather louvre located next to the three chillers facing South-West towards Market Lane.

7.7 Emergency Generator

An emergency power generator will be provided as part of the project. The emergency generator would likely be tested up to once per month, during the daytime weekday period. Typical testing would normally occur over short durations.

The generator would likely operate infrequently and would not form part of normal operations. In order to minimise the potential noise impacts on nearby sensitive receivers, installation of the emergency generator is proposed for the rooftop within acoustically rated enclosures. The generator should include residential grade exhaust flue silencers to minimise noise impacts to the nearest receivers during testing and maintenance procedures.

Noise emissions from the emergency generator should not substantially increase ambient noise levels at the nearest residential receivers. In this instance we recommend an increase of background noise levels by no more than 10dB due to the infrequent use of the emergency generator.

$L_{eq,\ adj,T}$ = L_{90} (RBL from Table 5) + 10 = 51 + 10 = 61dBA daytime periods (7am to 6pm)

$L_{eq,\ adj,T}$ = L_{90} (RBL from Table 5) + 10 = 45 + 10 = 55dBA evening periods (6pm to 10pm)

$L_{eq,\ adj,T}$ = L_{90} (RBL from Table 5) + 10 = 39 + 10 = 49dBA night time periods (10pm to 7am)

Table 12 presents predicted generator noise levels at the nearest noise sensitive receivers surrounding the site.

Table 12: Predicted Noise Levels from emergency generator

Noise Sensitive Receiver	Occupancy	Predicted Plant Noise dBA Leq, adj, 15 minutes	Complies with noise criteria (D/E/N = 61/55/49)?
NSR1	Residential apartments	37	Yes
NSR2	Mixed use	41	Yes
NSR3	Commercial	55	Yes
NSR4	Commercial	50	Yes
NSR5	Commercial	58	Yes

Table 10 shows mechanical plant noise emissions to comply at the nearest noise sensitive receivers based on noise data provided by Multitech Solutions. Refer to Appendix D for packaged generator information.

8 Internal noise from mechanical plant

The mechanical services for the building will be designed to ensure that the limits previously presented in Table 4 in Section 4.4 of this report are achieved. These limits will be co-ordinated with Mechanical Engineer's design.

The design and installation of the mechanical plant will need to ensure that noise breakout and duct-borne noise from each plantroom will not cause a problem. Isolation of the mechanical plant to prevent vibrations from entering the building structure will also need to be addressed.

Acoustic lagging, cladding and bulkheads may be required to minimise case radiated breakout noise.

Vibration transfer and structure borne noise may occur if not treated adequately.

To minimise the potential transmission of vibration to the building fabric by the following

- Balancing – All rotating equipment such as fans, pumps, centrifugal compressors etc. complete with pulleys, couplings, belts etc. should be statically and dynamically balanced.
- Mountings – Equipment should be mounted on rigid bases supported by vibration isolators.
- Inertia Blocks – Inertia blocks should be provided for equipment where limiting the amplitude of vibration is required.
- All fans should be isolated from duct work with flexible connections.

9 Conclusion

Renzo Tonin & Associates was engaged to prepare a noise impact assessment for the proposed Maroochy Private Hospital to be located on Lots J1 and J2 at Mundoo Boulevarde, Maroochydore.

The following acoustic issues have been assessed in this report:

- Noise intrusion from external sources (local mechanical plant and traffic noise);
- Noise emissions from steady state noise sources (mechanical plant), and;
- Noise emissions from non-steady state noise sources (truck deliveries and carpark movements).

Noise Intrusion

External noise levels around 60dBA L_{eq} may be expected around the building façade.

We recommend all façade glazing assembly should have a minimum acoustic rating of Rw35 or higher. A performance rating of Rw 35 may be achieved using heavier laminated glass such as 10.38mm glass or 6.5mm VLam Hush glass in an appropriate aluminium framing system.

Noise Emissions from Steady State Sources

Noise emission limits from future mechanical plant have been derived in Sections 5.2 and 5.3. Noise emissions have been predicted to comply at the nearest noise sensitive receivers. A 3m high noise barrier is recommended on Level 10, next to the chiller in order to reduce chiller noise impact on the Level 10 Outdoor Lounge area.

Noise Emissions from Non - Steady State Sources

Noise emissions from the loading dock area on Ground Level were predicted to comply with noise limits at the nearest residential, commercial and retail receivers. No additional noise control treatment is required.

Noise emissions from use of the carpark areas located on Levels 1, 2 and 3 were predicted to comply with noise limits at the nearest residential, commercial and retail receivers. No additional noise control treatment is required.

For assessment purposes we assume a conservative maximum of 53 vehicle movements over any 15 minutes within the carpark during the AM or PM peak hour period.

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 L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:

threshold of hearing	0 dB	The faintest sound we can hear
	10 dB	Human breathing
almost silent	20 dB	
	30 dB	Quiet bedroom or in a quiet national park location
generally quiet	40 dB	Library
	50 dB	Typical office space or ambience in the city at night
moderately loud	60 dB	CBD mall at lunch time
	70 dB	The sound of a car passing on the street
loud	80 dB	Loud music played at home
	90 dB	The sound of a truck passing on the street
very loud	100 dB	Indoor rock band concert
	110 dB	Operating a chainsaw or jackhammer
extremely loud	120 dB	Jet plane take-off at 100m away
threshold of pain	130 dB	
	140 dB	Military jet take-off at 25m away

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 L90 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 Leq 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 Architectural Drawings

Maroochy Private Hospital

MUNDOO BOULEVARD, MAROOCHYDORE, QLD

Development Summary

RPD:

LOTS J1 & J2

SITE AREA:

2969 m²

LOCAL COUNCIL:

Sunshine Coast Council

ZONING:

Principal Centre (CBD) Zone

GROSS FLOOR AREAS:

SITE AREA (m²)	2969
MAXIMUM DEVELOPMENT (m²): 4:1	11876

Gross floor area (GFA)

The total floor area of all Storeys of a building (measured from the outside of the external walls or the centre of a common wall), other than areas used for the following:

a. building services, plant and equipment
b. access between levels
c. ground floor public lobby
d. a mall
e. the parking, loading and manoeuvring of motor vehicles
f. unenclosed private balconies wheater roofed or not.

SUMMARY

Level	COMMENTS	NLA Areas (m²)
Ground Floor		1352
Level 01		90
Level 02		0
Level 03		0
Level 04		0
Level 05		1986
Level 06		1985
Level 07		1985
Level 08		2112
Level 09		1984
Level 10		342
Sub-Total		**11836**

CAR PARKING TOTALS:

Ground Floor (1 Ambulance)	1
Level 01(42 Standard/ 8 Small Car/ 2 Acc/ 2 Drop-Off/ 3 EV/ 1 Service Vehicle)	58
Level 02(57 Standard/ 11 Small Car/ 2 Acc/ 3 EV)	75
Level 03(57 Standard/ 11 Small Car/ 2 Acc/ 3 EV)	75
Level 04(57 Standard/ 11 Small Car/ 2 Acc/ 3 EV)	75
GRAND TOTAL	**284**

MOTOR BIKE PARKING TOTALS:

Level 01	-
Level 02	6
Level 03	6
Level 04	6
Grand Total	**18**

EOT BIKE PARKING TOTALS:

Level 01	76
Level 02	-
Level 03	-
Level 04	-
Grand Total	**76**

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CLIENT: BARWON INVESTMENT PARTNERS

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: COVERSHEET

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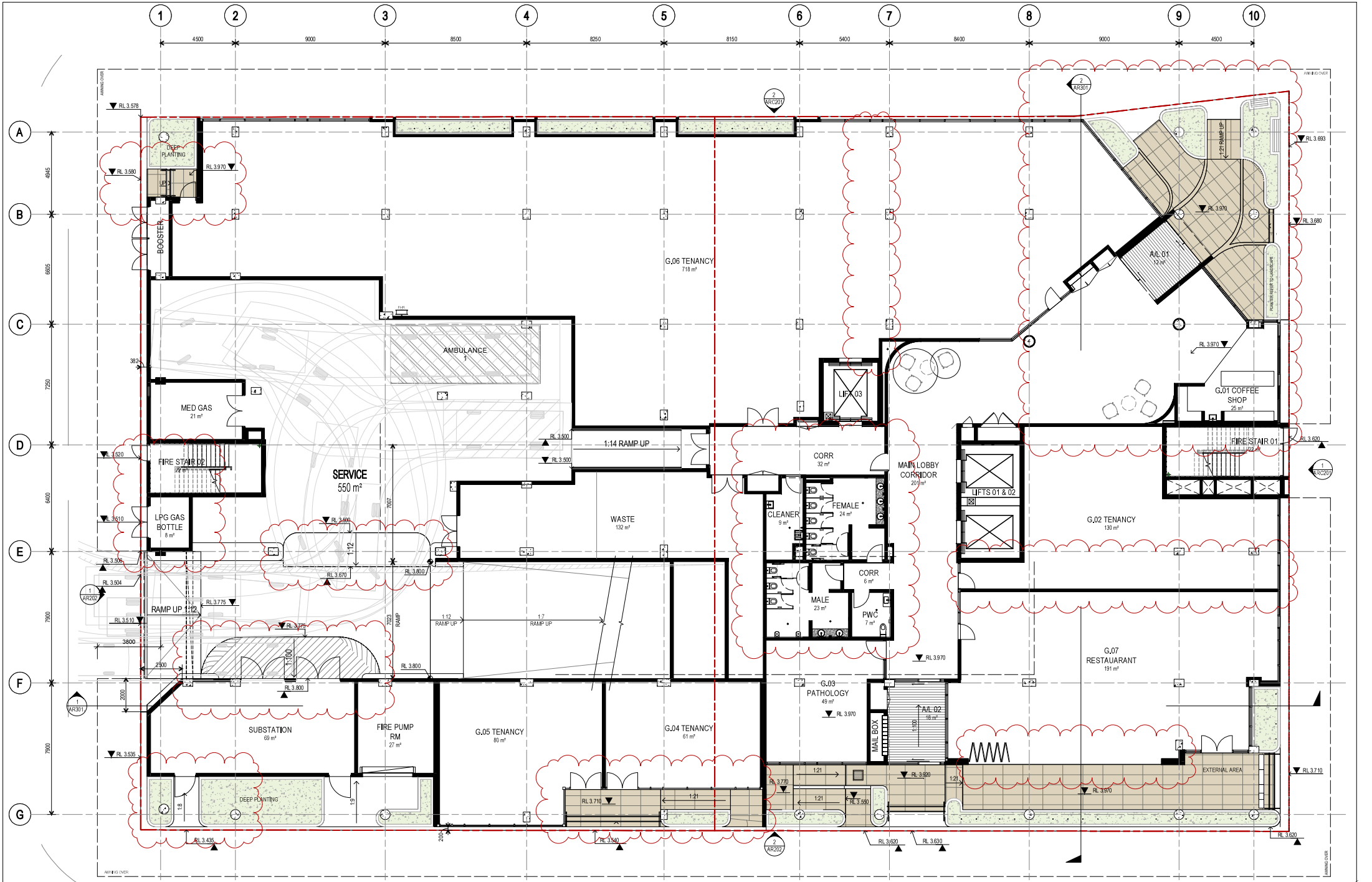

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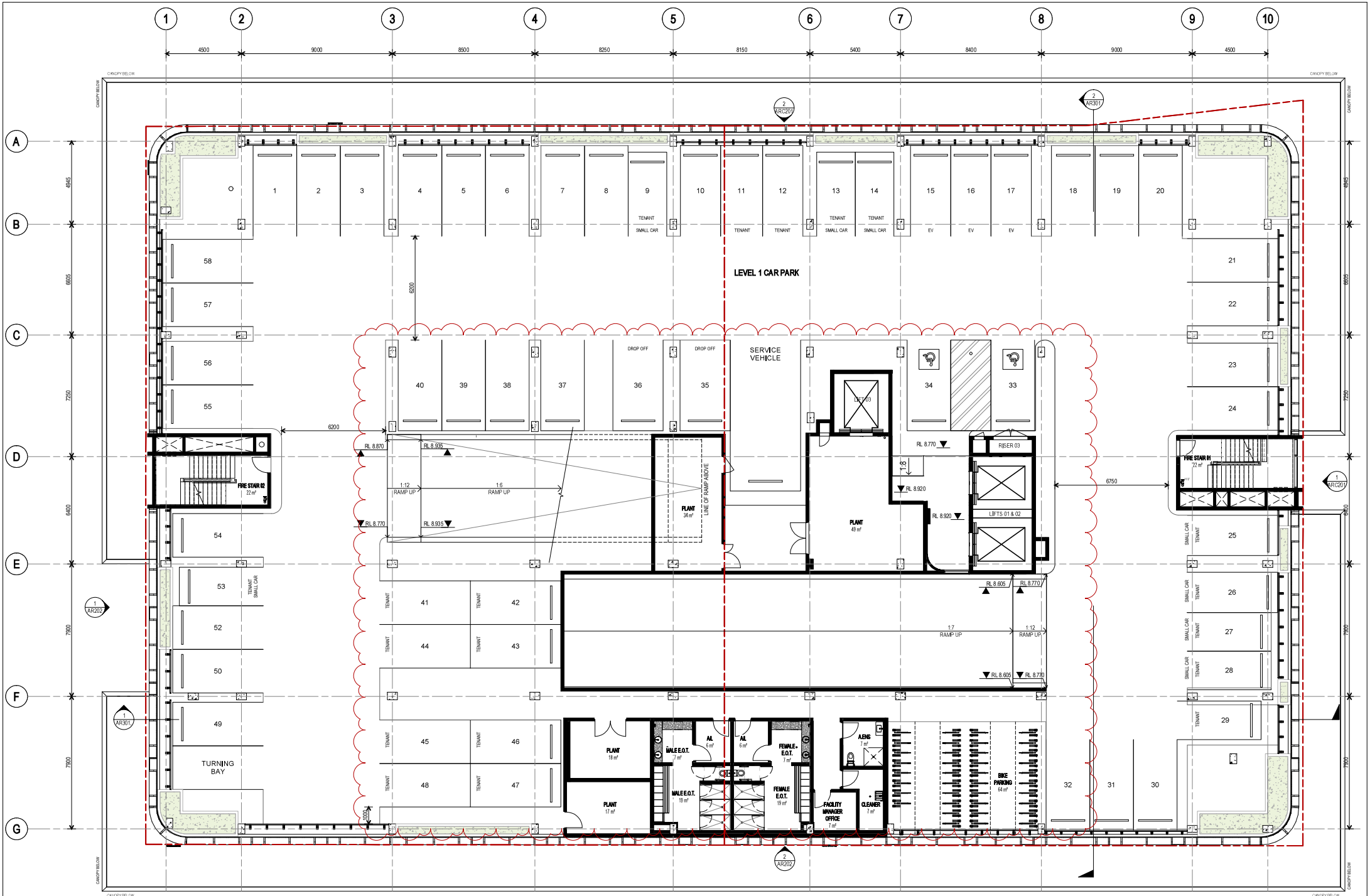

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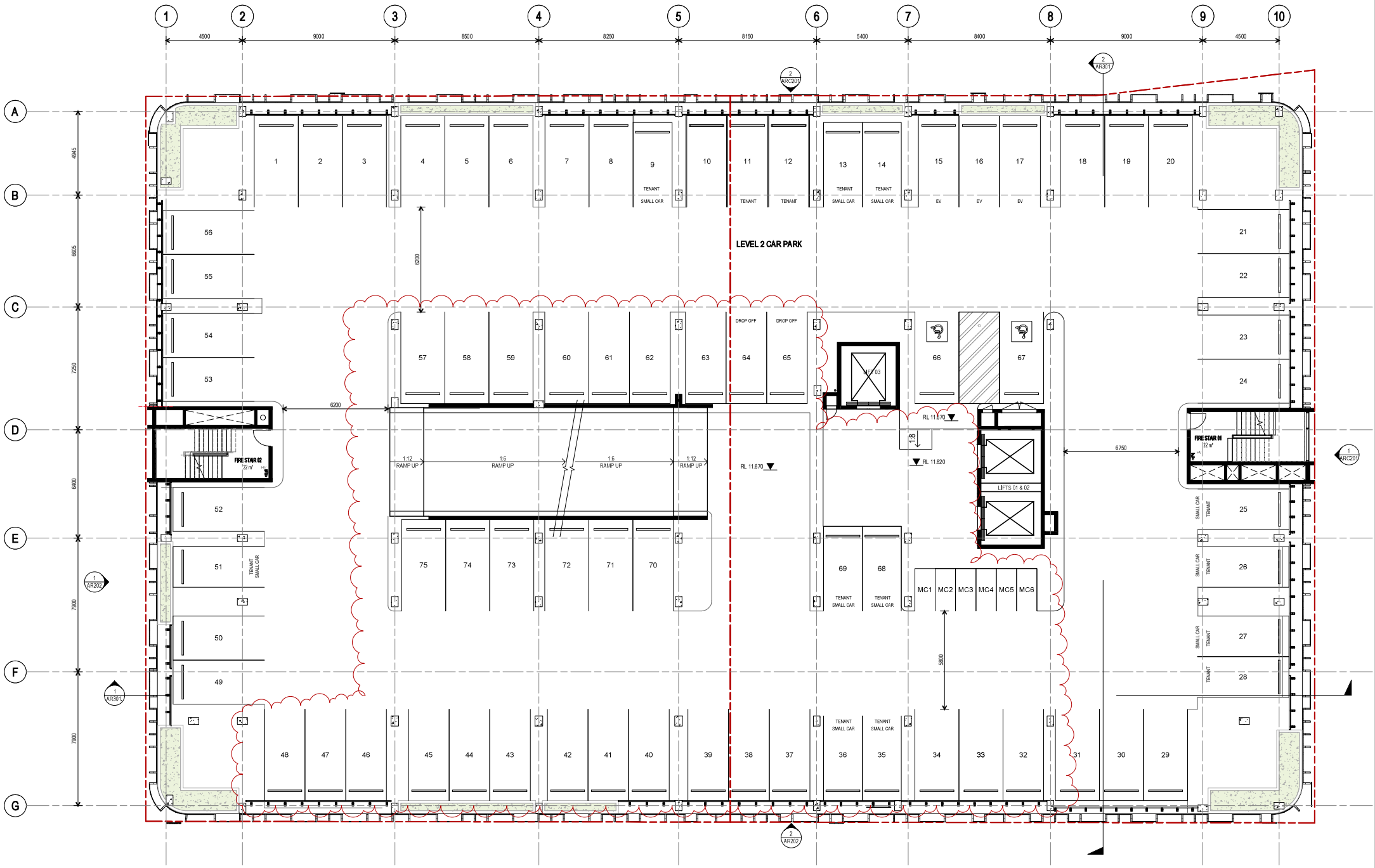

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 02

DRAWN	CHECKED
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ISSUE: 15/08/2022 9:55:13 PM	SCALE @ A1: 1 : 100

PROJECT No	STAGE	DRAWING No	REVISION
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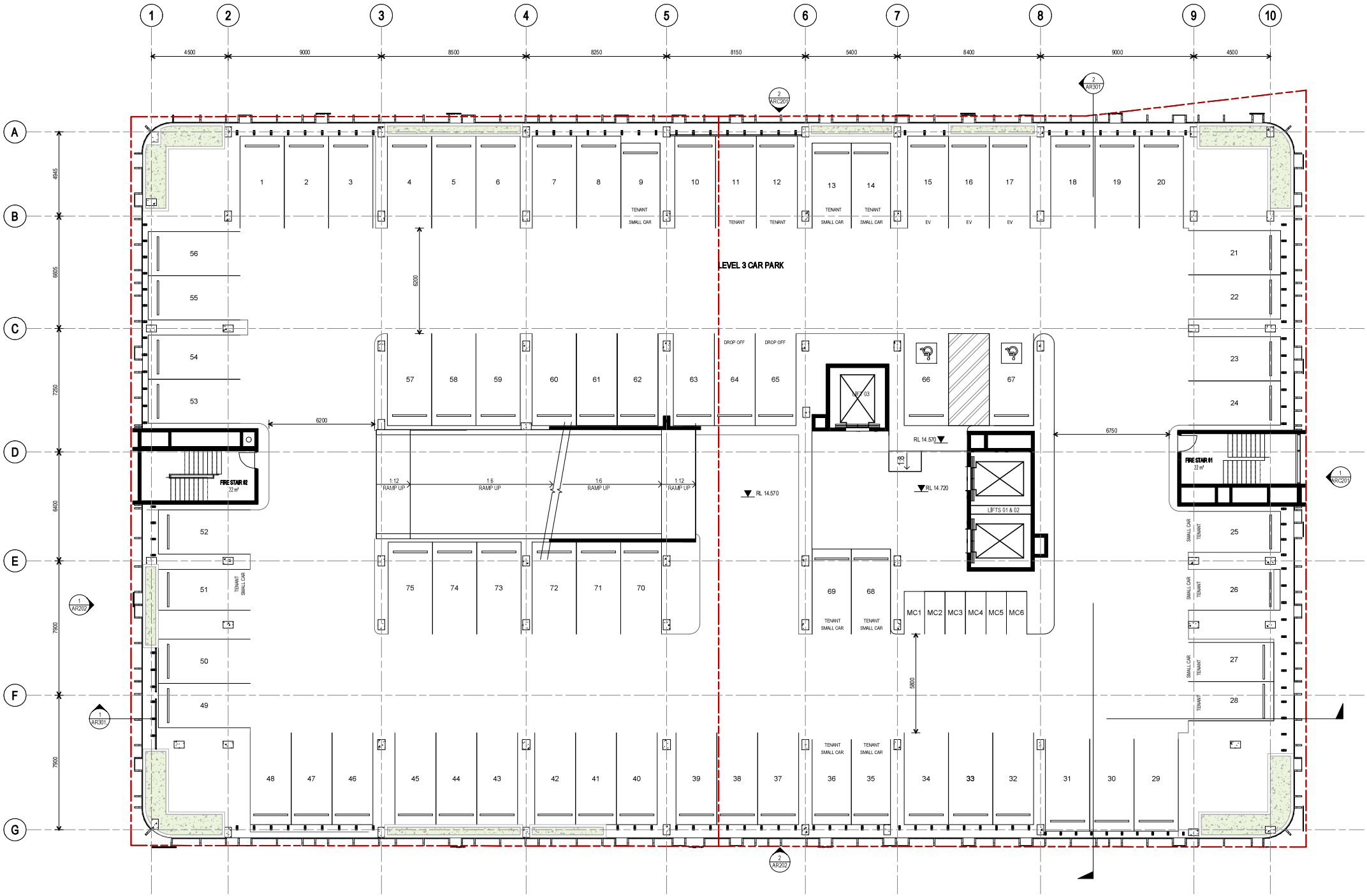

REV	DESCRIPTION	AUTH	CHK	DATE
A	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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CLIENT: BARWON INVESTMENT PARTNERS

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 03

DRAWN	CHECKED
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ISSUE: 15/08/2022 10:19:00 PM	SCALE @ A1: 1 : 100

PROJECT No	STAGE	DRAWING No	REVISION
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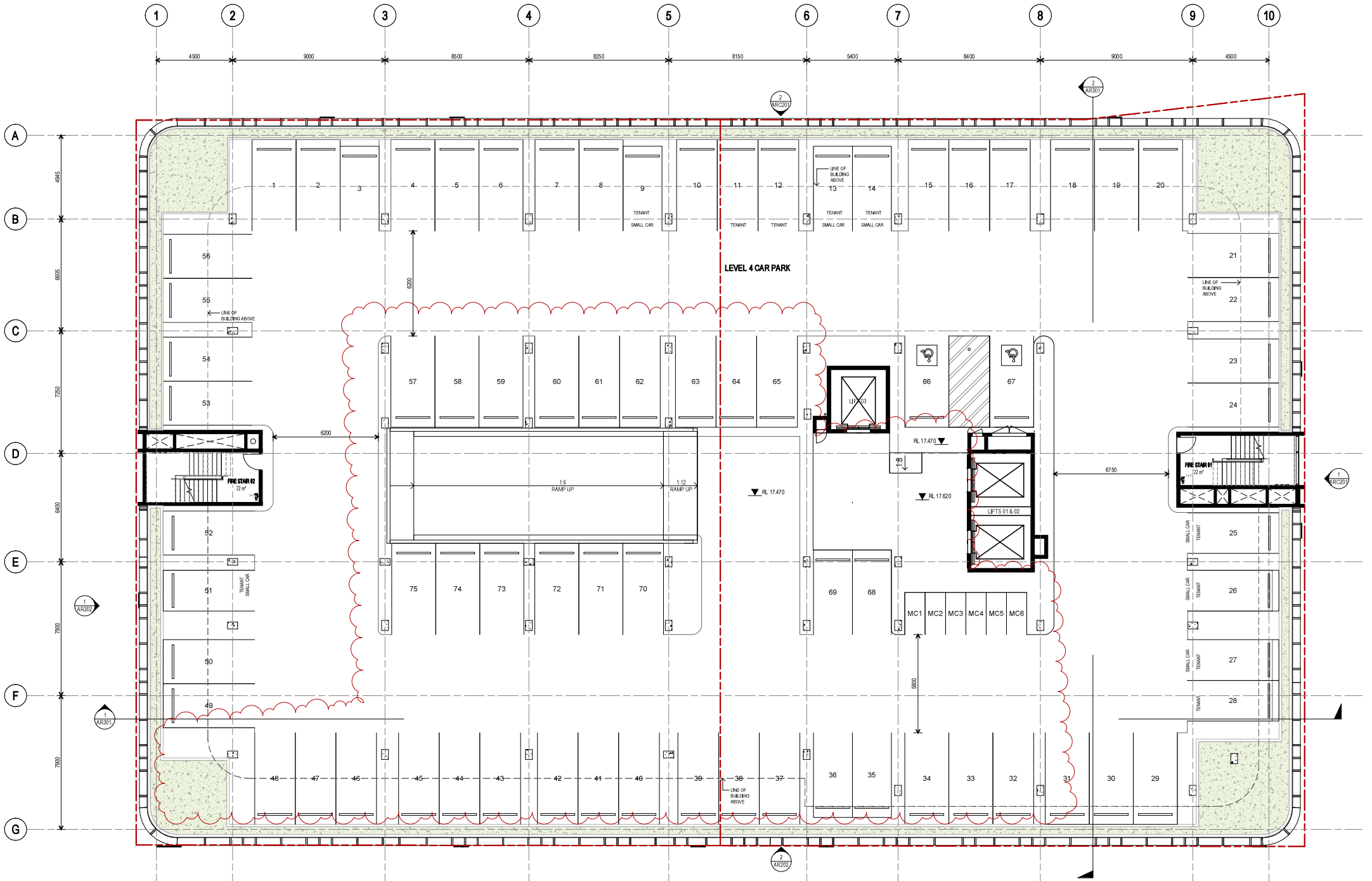

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C	FOR COORDINATION	DSJ	MP	16.09.21
D	SUN CENTRAL SUBMISSION	DH	PB	08.11.21
E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 04

DRAWN	CHECKED
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ISSUE: 15/08/2022 10:20:17 PM	SCALE @ A1: 1 : 100

PROJECT No	STAGE	DRAWING No	REVISION
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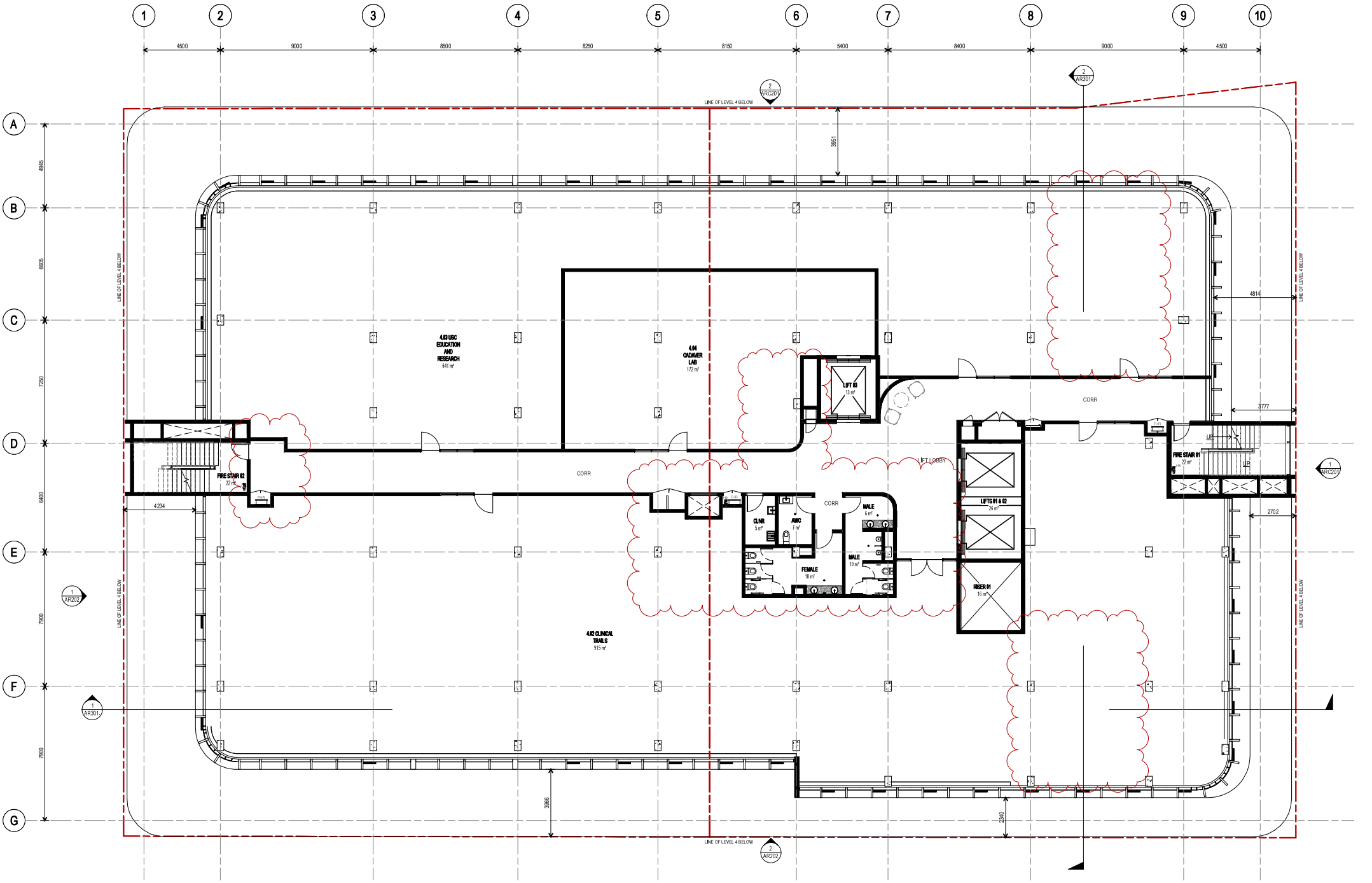

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D	SUN CENTRAL SUBMISSION	DH	PB	08.11.21
E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22
G	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	18.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 05

DRAWN	CHECKED
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PROJECT No	STAGE	DRAWING No	REVISION
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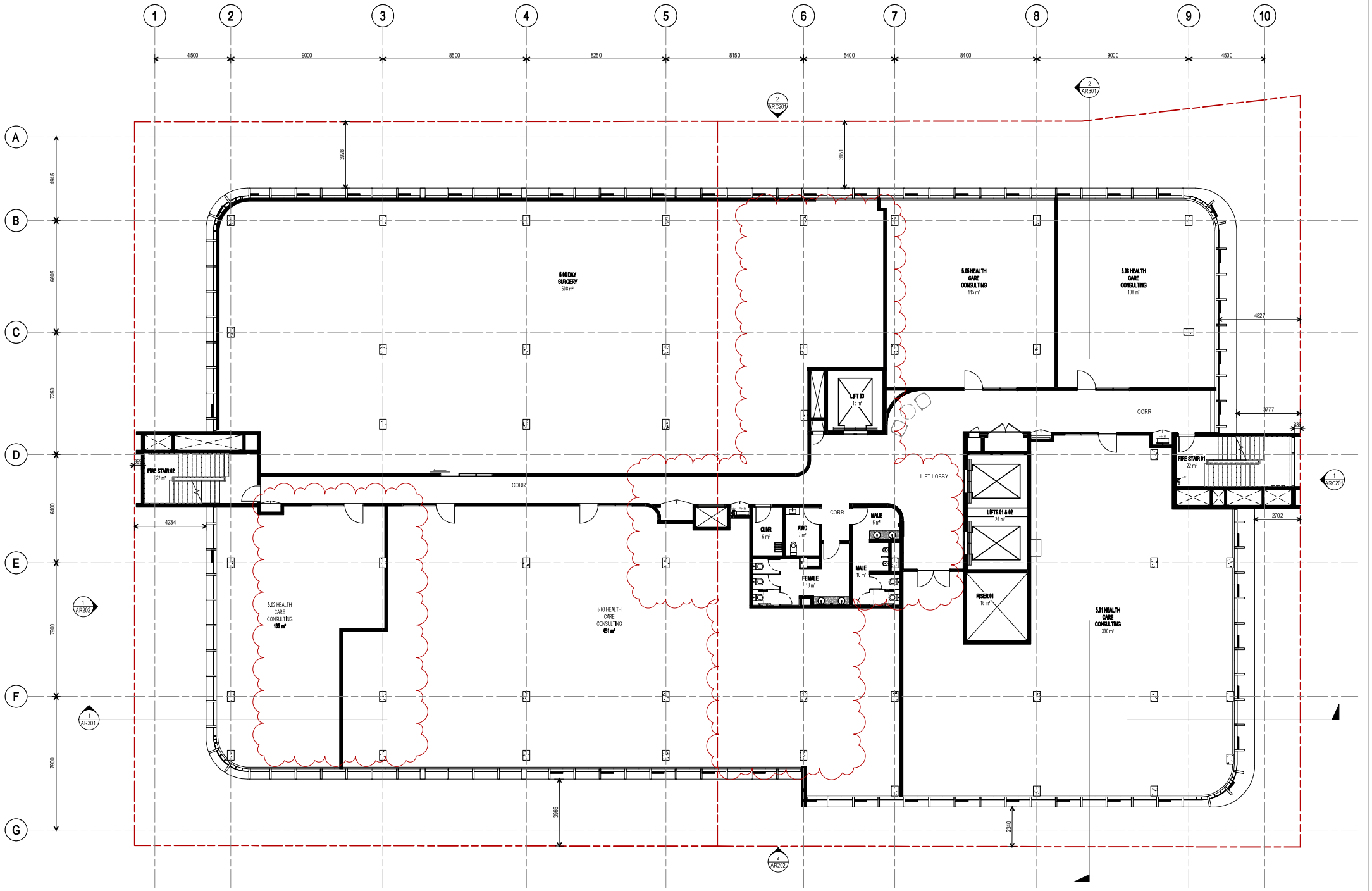

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D	SUN CENTRAL SUBMISSION	DH	PB	08.11.21
E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22
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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 06

DRAWN	PM
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PROJECT No	20673
STAGE	DA
DRAWING No	AR-106
REVISION	G

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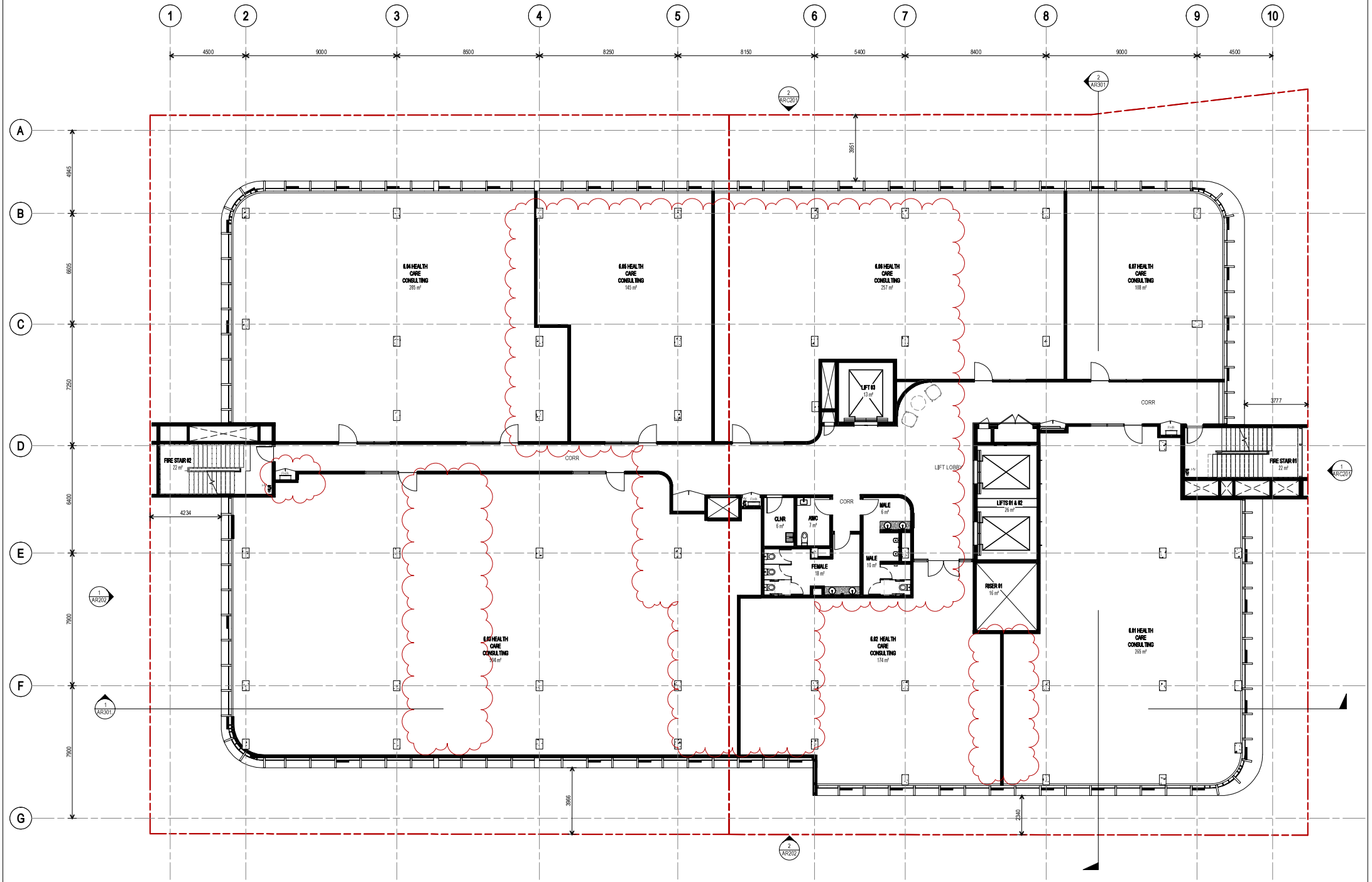

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D	SUN CENTRAL SUBMISSION	DH	PB	08.11.21
E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22
G	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	18.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 07

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PROJECT No	STAGE	DRAWING No	REVISION
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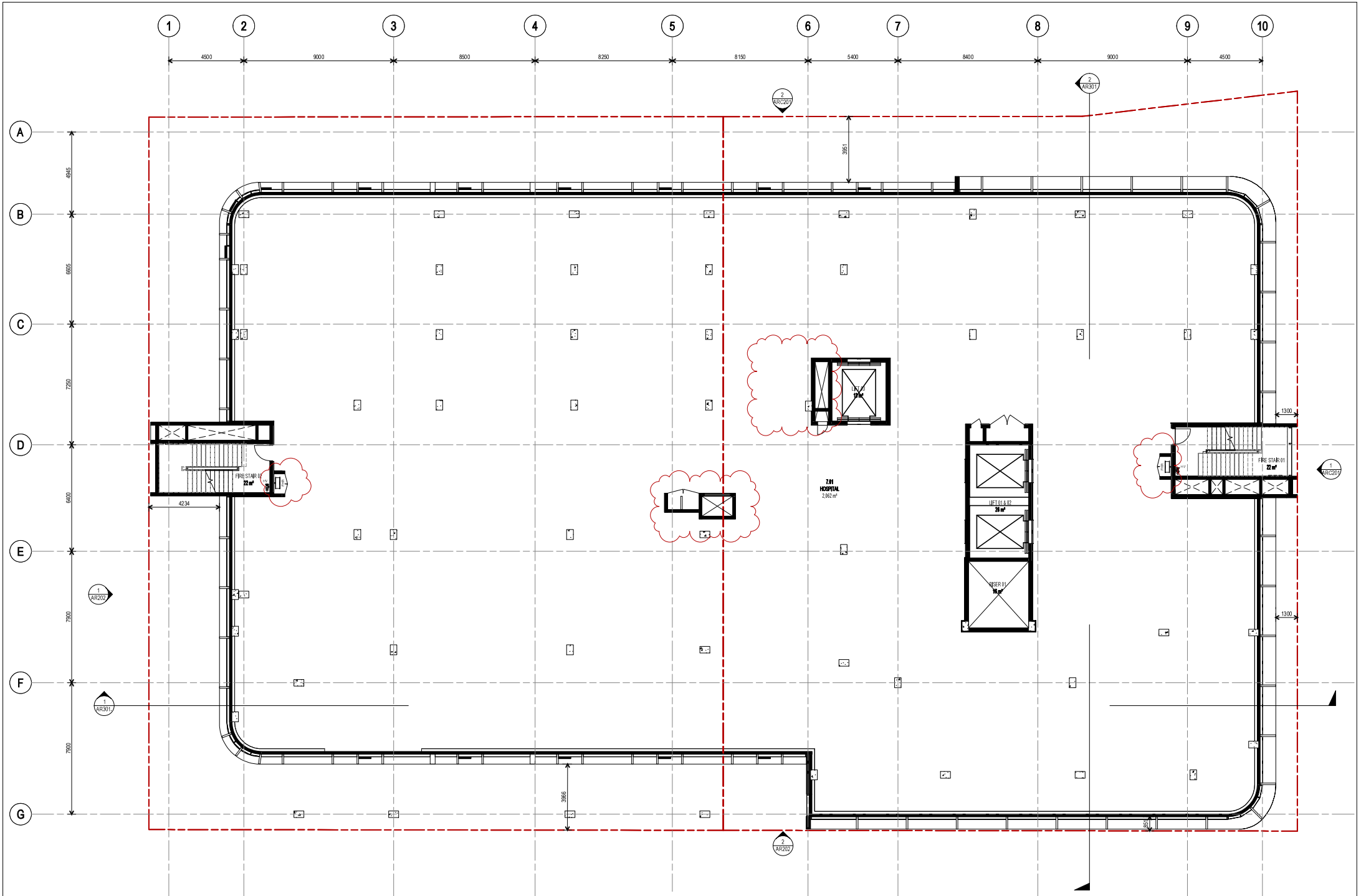

REV	DESCRIPTION	AUTH	CHK	DATE
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D	SUN CENTRAL SUBMISSION	DH	PB	08.11.21
E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 08

DRAWN: PM
ISSUE: 15/08/2022 10:50:35 PM
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PROJECT No: 20673
STAGE: DA
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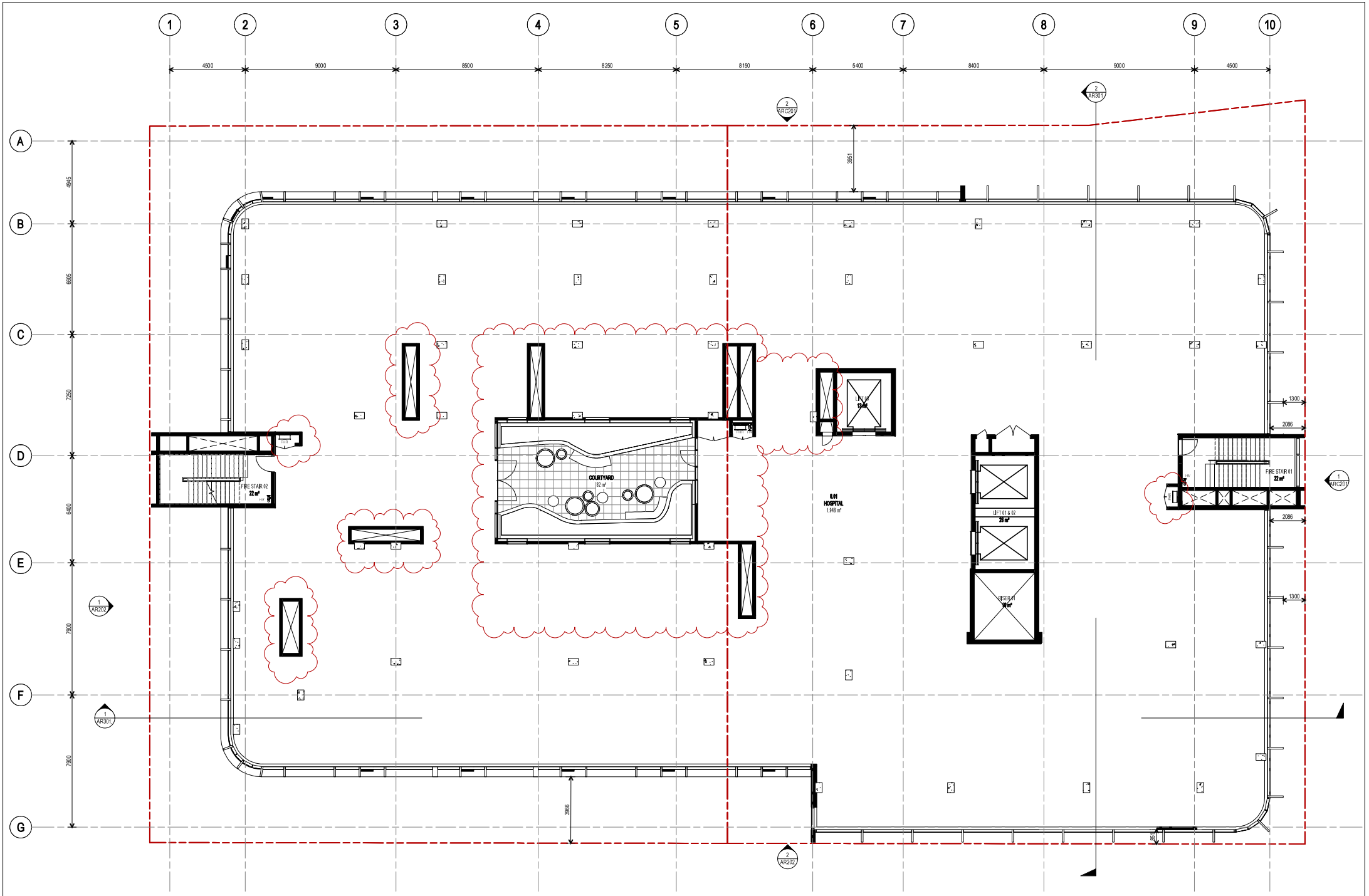

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E	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
F	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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HEALTH ARCHITECTS

PROJECT
MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE
FLOOR PLAN - LEVEL 09

DRAWN
PM

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MS

ISSUE
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PROJECT No	STAGE	DRAWING No	REVISION
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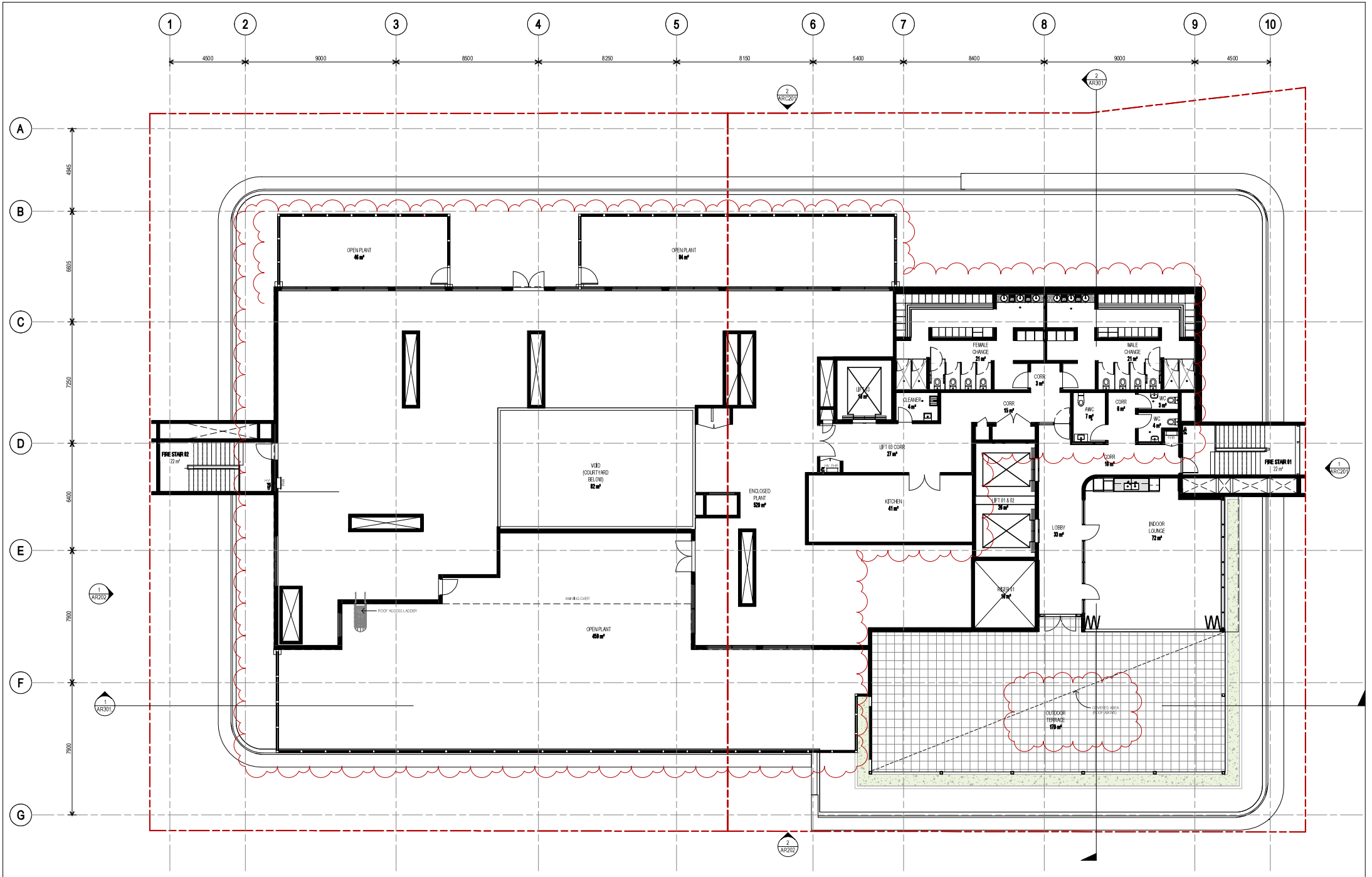

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B	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
C	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: FLOOR PLAN - LEVEL 10

DRAWN	CHECKED
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PROJECT No	STAGE	DRAWING No	REVISION
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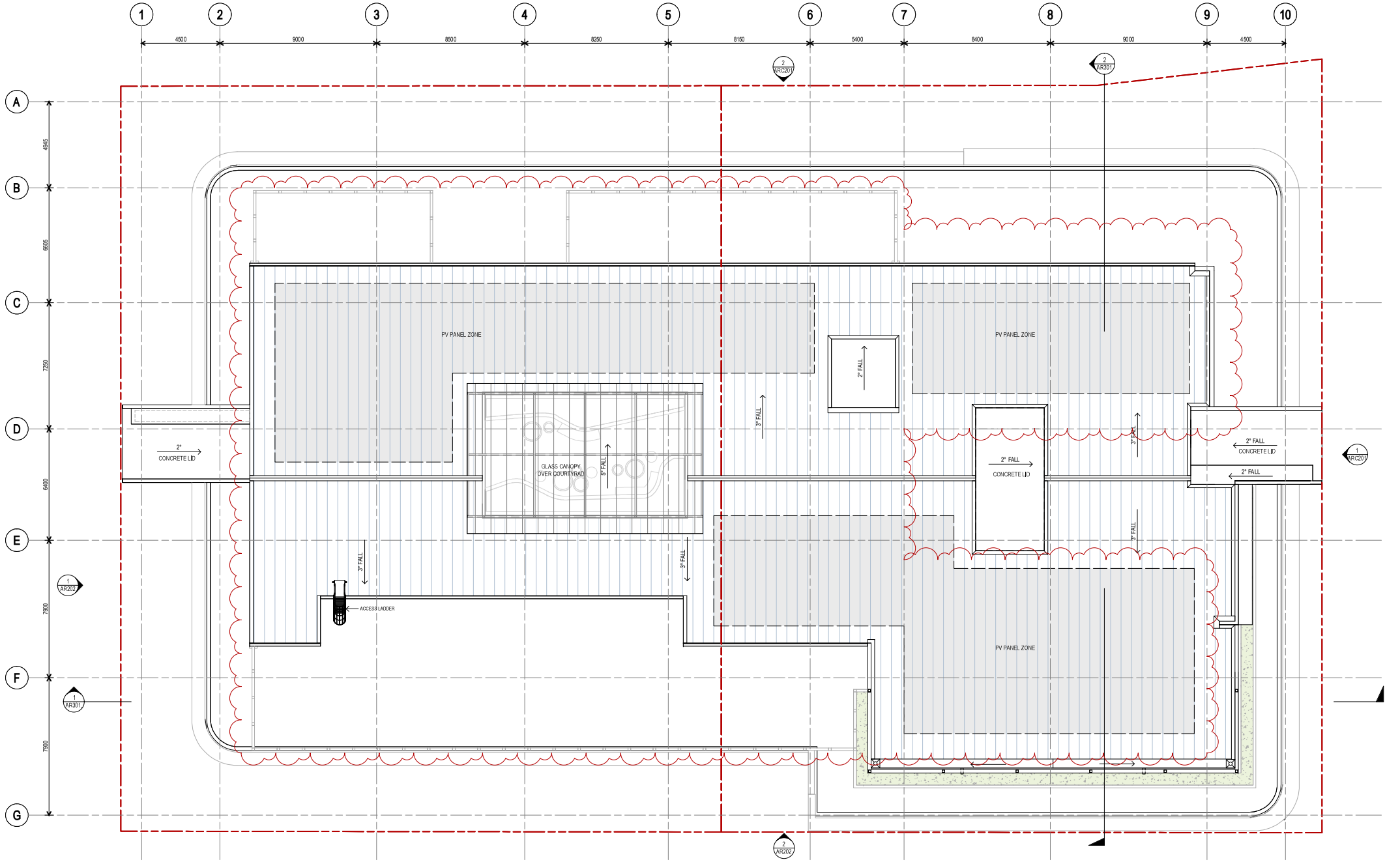

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D	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
E	DEVELOPMENT APPROVAL AMENDMENT	PM	MS	17.08.22

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HSPC HEALTH ARCHITECTS

PROJECT: MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE: ROOF PLAN

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REVISION	E

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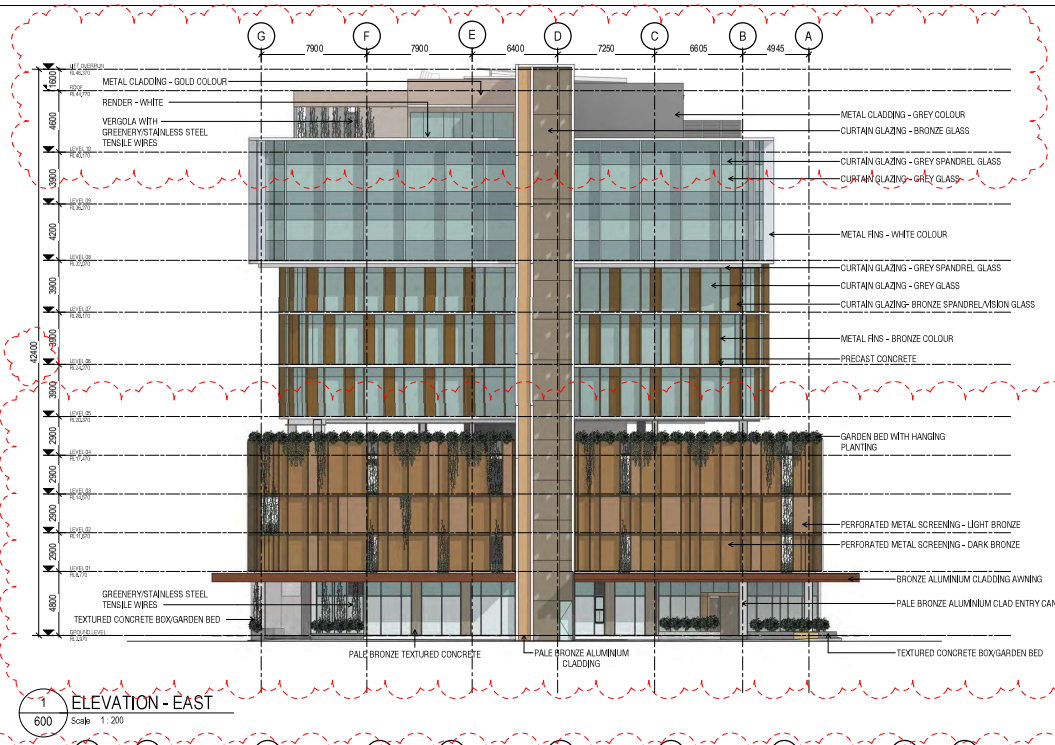

1/600 ELEVATION - EAST
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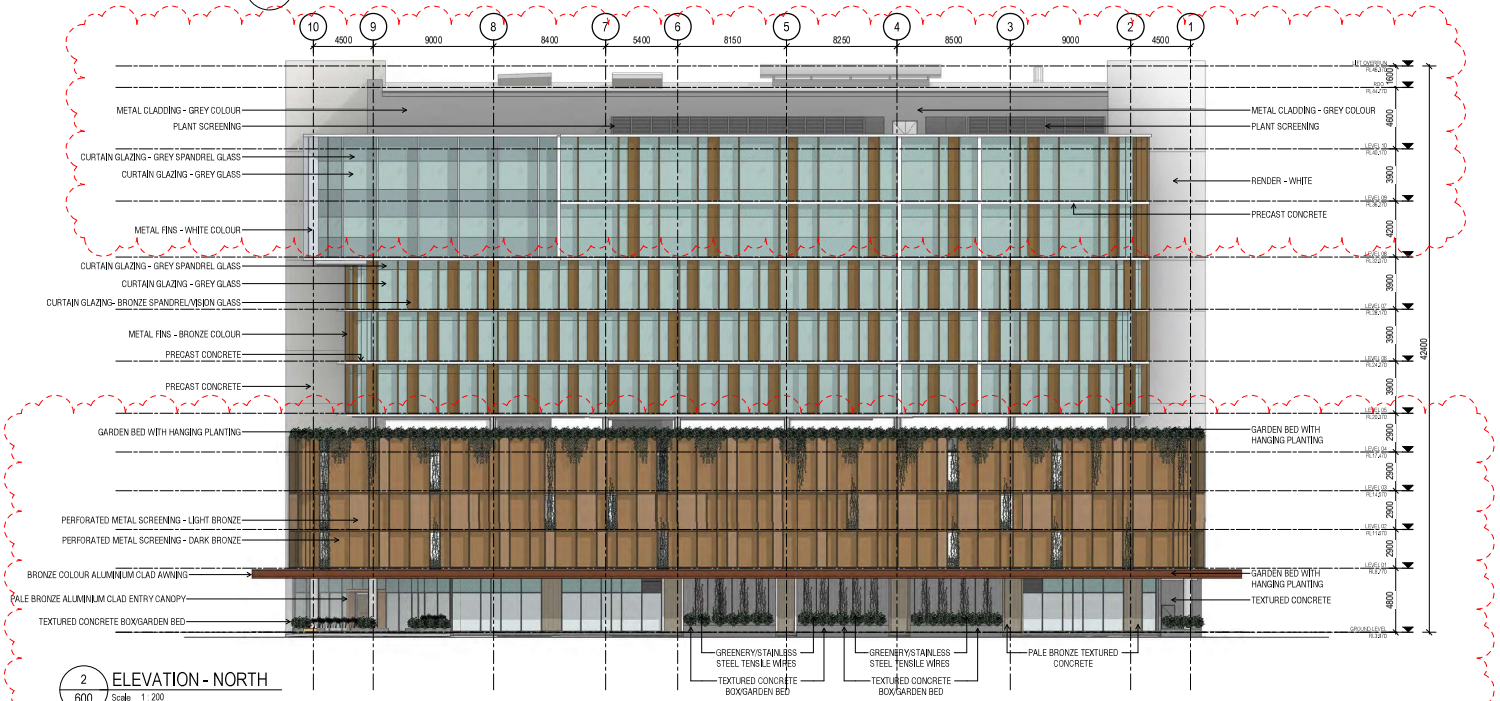

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B	FOR INFORMATION	PM	MS	16.11.21
C	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
D	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	11.08.22

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STATUS
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0m 2 4 6 8 10 @A1

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HSPC HEALTH ARCHITECTS

PROJECT
MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE
PROPOSED ELEVATIONS - SHEET 1

DRAWN	CHECKED
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PROJECT No	STAGE	DRAWING No	REVISION
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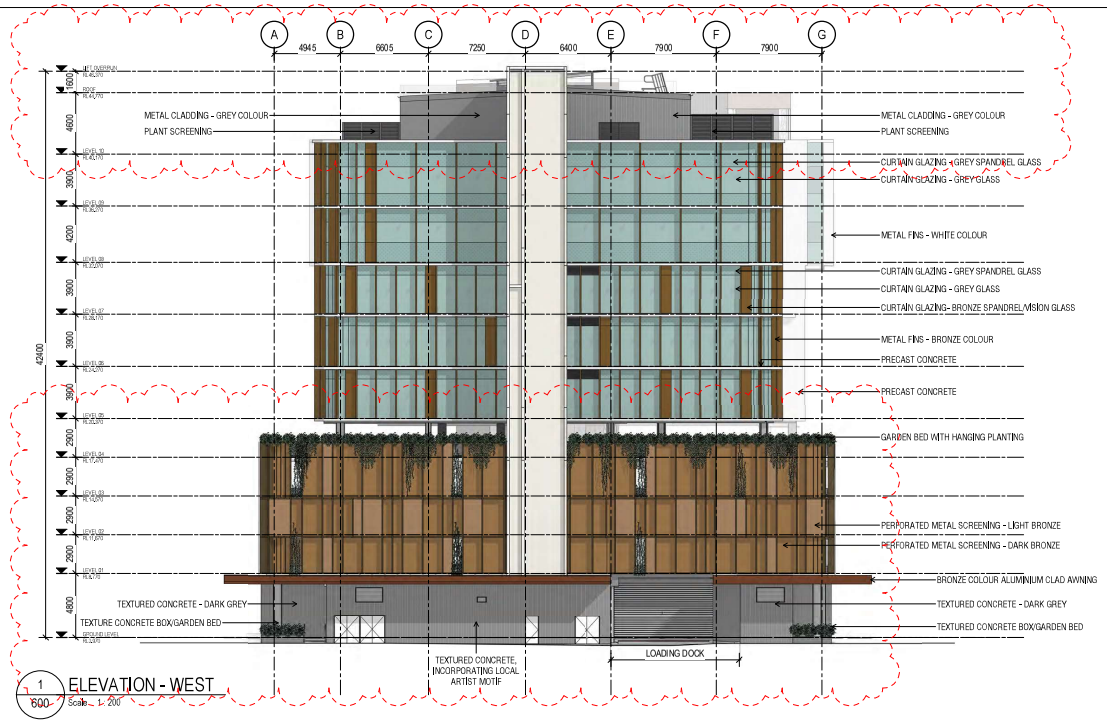

1 600 ELEVATION - WEST
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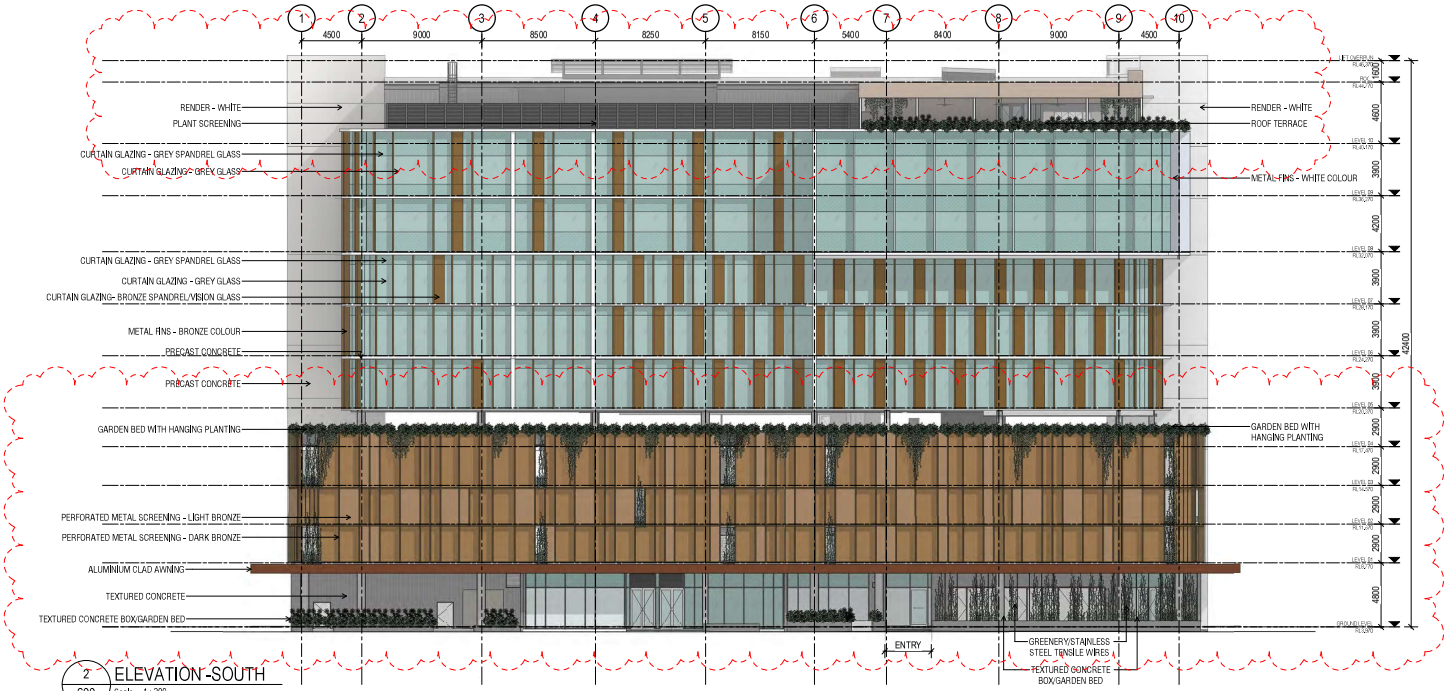

2 600 ELEVATION -SOUTH
Scale 1 : 200

REV	DESCRIPTION	AUTH	CHK	DATE
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B	FOR INFORMATION	PM	MS	16.11.21
C	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
D	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	11.08.22

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STATUS
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HSPC HEALTH ARCHITECTS

PROJECT
MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE
PROPOSED ELEVATIONS - SHEET 2

DRAWN	CHECKED
PM	MS
ISSUE	SCALE @ A1 / SCALE @ A3
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PROJECT No	STAGE	DRAWING No	REVISION
20673	DA	AR-202	D

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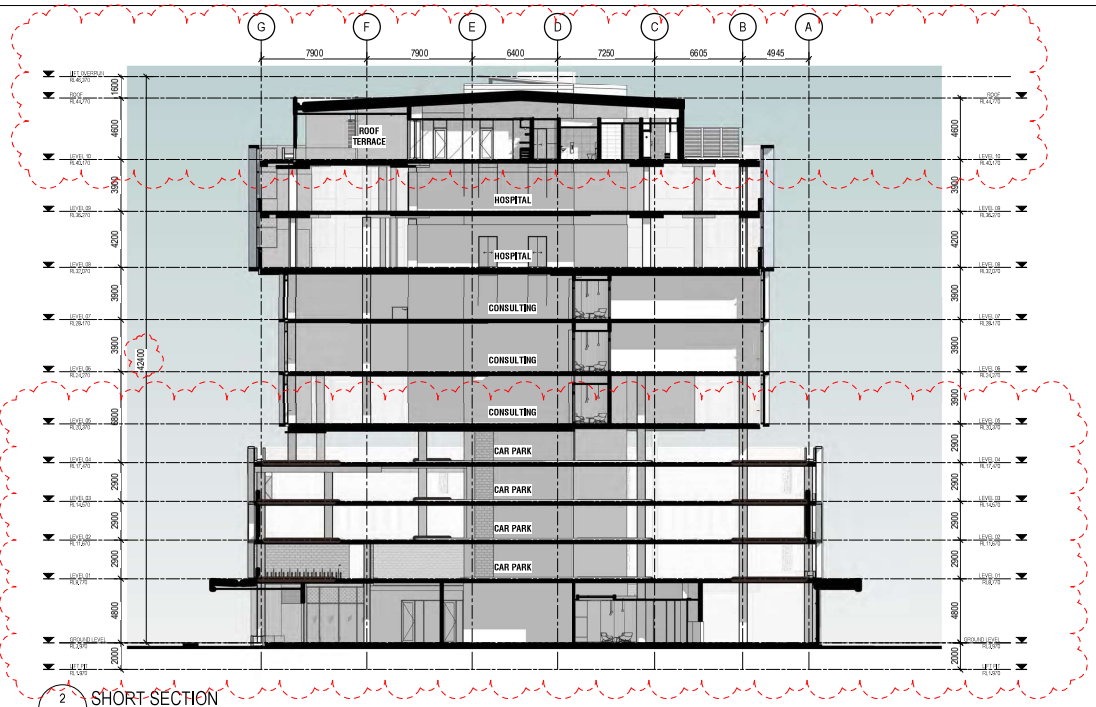

2 / 600 SHORT SECTION
Scale 1 : 200

1 / 600 LONG SECTION
Scale 1 : 200

REV	DESCRIPTION	AUTH	CHK	DATE
A	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
B	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	11.08.22

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STATUS
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0m 4 8 12 16 20 @A3
0m 2 4 6 8 10 @A1

CLIENT
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HSPC HEALTH ARCHITECTS

PROJECT
MAROOCHY PRIVATE HOSPITAL

DRAWING TITLE
PROPOSED SECTIONS - SHEET 1

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PM	MS
ISSUE 16/08/2022 9:58:01 PM	SCALE @ A1 1 : 200 / SCALE @ A3 1 : 400

PROJECT No	STAGE	DRAWING No	REVISION
20673	DA	AR-301	B

16/08/2022 9:58:01 PM

3D VISUALISATION - NORTH/WEST ELEVATION

REV	DESCRIPTION	AUTH	CHK	DATE
A	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
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STATUS
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HSPC
HEALTH ARCHITECTS

PROJECT
MAROOCHY
PRIVATE HOSPITAL

DRAWING TITLE
PROPOSED 3D
VISUALISATIONS - SHEET 1

DRAWN	PM
CHECKED	MS
ISSUE	15/08/2022 11:53:15 PM
SCALE @ A1	
PROJECT No	20673
STAGE	DA
DRAWING No	AR-501
REVISION	B

15/08/2022 11:53:15 PM

3D VISUALISATION - EAST PERSPECTIVE

REV.	DESCRIPTION	AUTH	CHK	DATE
A	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
B	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	11.08.22

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STATUS
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HSPC
HEALTH ARCHITECTS

PROJECT
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DRAWING TITLE
PROPOSED 3D
VISUALISATIONS - SHEET 2

DRAWN	CHECKED
Author	Checker
ISSUE 15/08/2022 11:54:36 PM	SCALE @ A1

PROJECT No	STAGE	DRAWING No	REVISION
20673	DA	AR-502	B

15/08/2022 11:54:36 PM

3D VISUALISATION - NORTH/EAST ELEVATION

REV	DESCRIPTION	AUTH	CHK	DATE
A	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	19.11.21
B	ISSUE FOR DEVELOPMENT APPROVAL	PM	MS	11.08.22

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STATUS
DEVELOPMENT APPROVAL

0m 1 2 3 4 5

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ABN: 65 112 807 931

HSPC
HEALTH ARCHITECTS

PROJECT
MAROOCHY
PRIVATE HOSPITAL

DRAWING TITLE
PROPOSED 3D
VISUALISATIONS - SHEET 5

DRAWN	PM
CHECKED	MS
ISSUE	15/08/2022 11:55:45 PM
SCALE @ A1	
PROJECT No	20673
STAGE	DA
DRAWING No	AR-505
REVISION	B

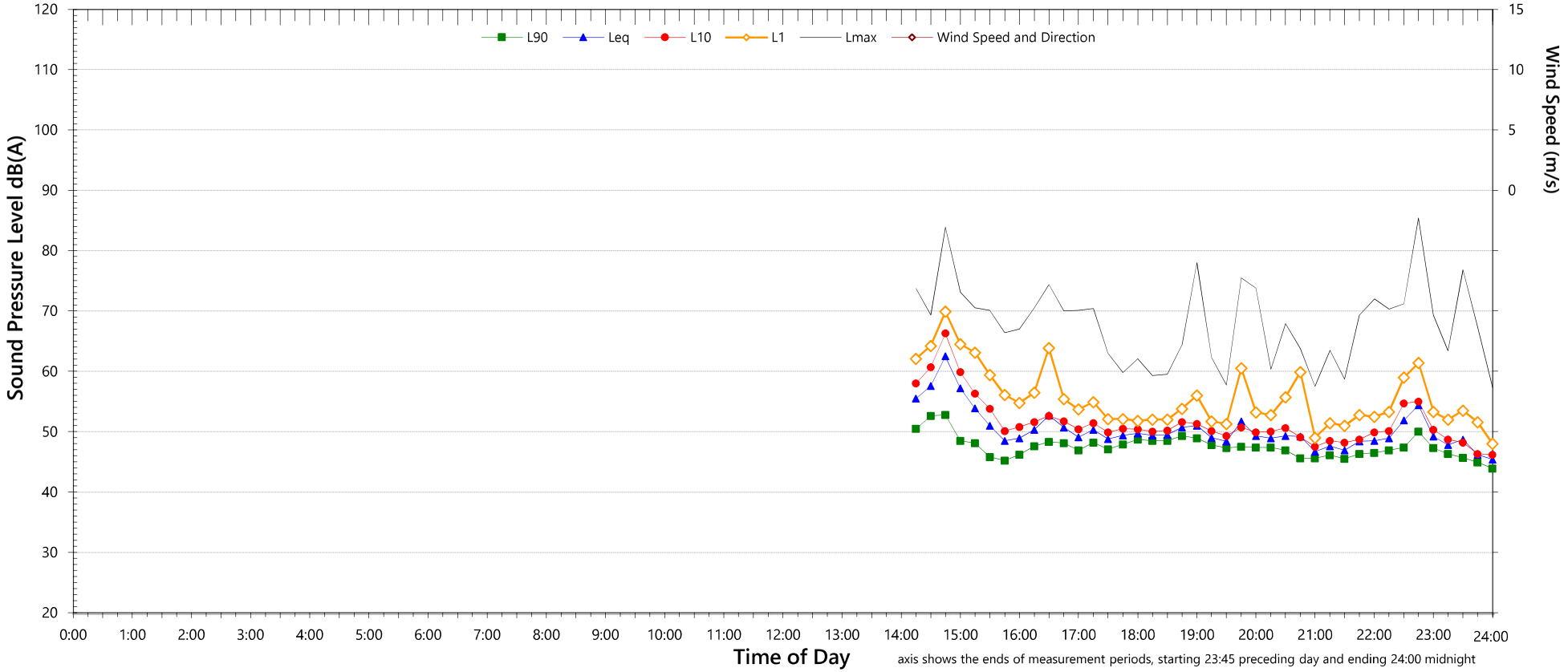
15/08/2022 11:55:45 PM

APPENDIX C Ambient Noise Monitoring Results

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Friday, 25 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	70	65	59
L_1	58	53	48
L_{10}	54	50	45
L_{90}	47	46	37
Leq	55	49	51

Notes:

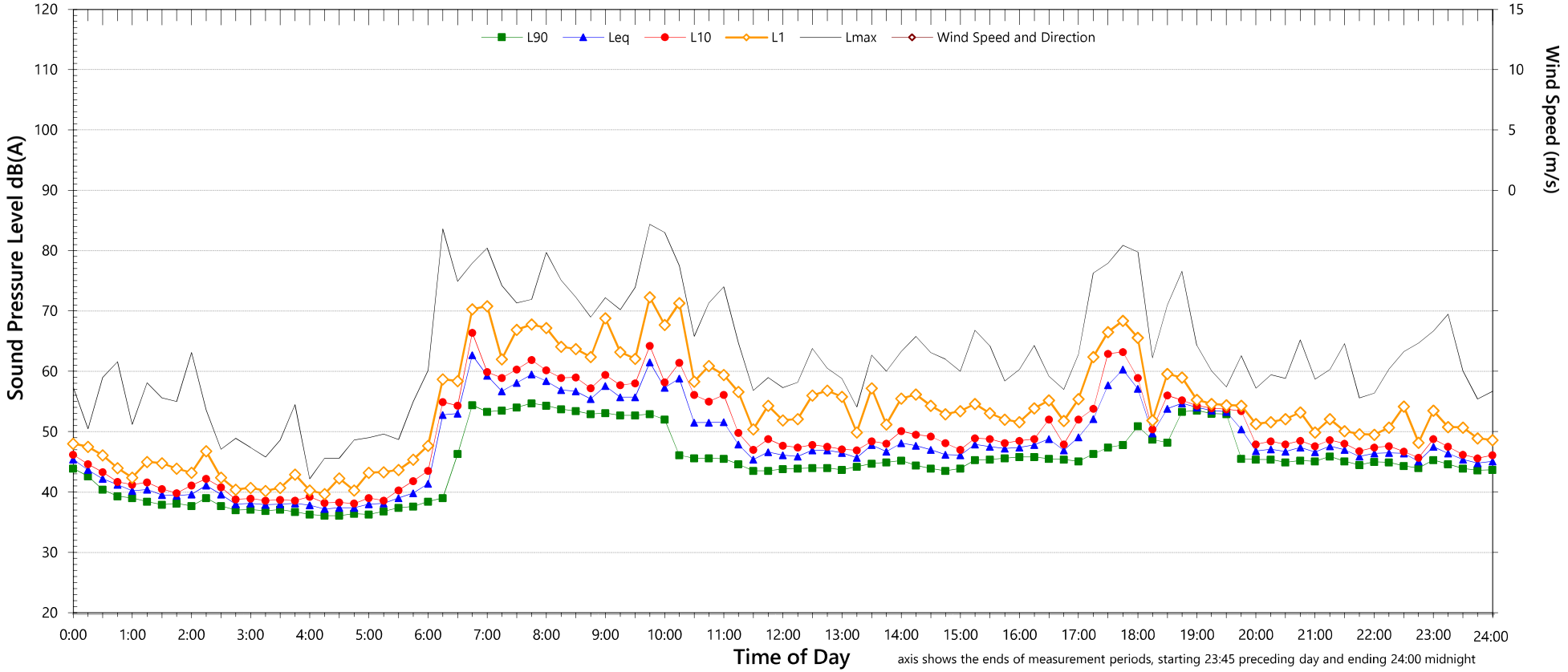
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Saturday, 26 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	67	62	58
L_1	59	53	48
L_{10}	53	51	44
L_{90}	44	45	37
Leq	54	51	43

Notes:

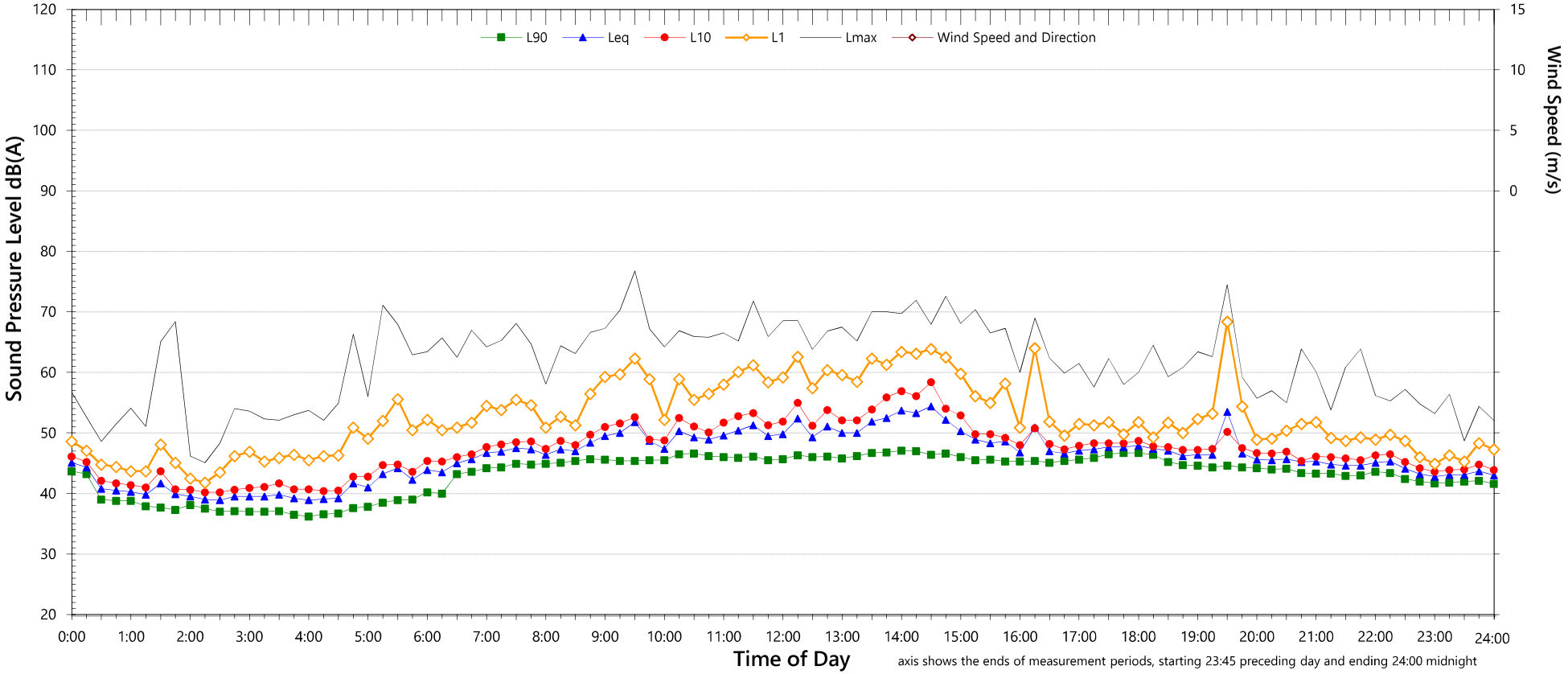
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Sunday, 27 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	66	61	61
L_1	57	52	51
L_{10}	51	47	46
L_{90}	45	43	38
Leq	50	47	52

Notes:

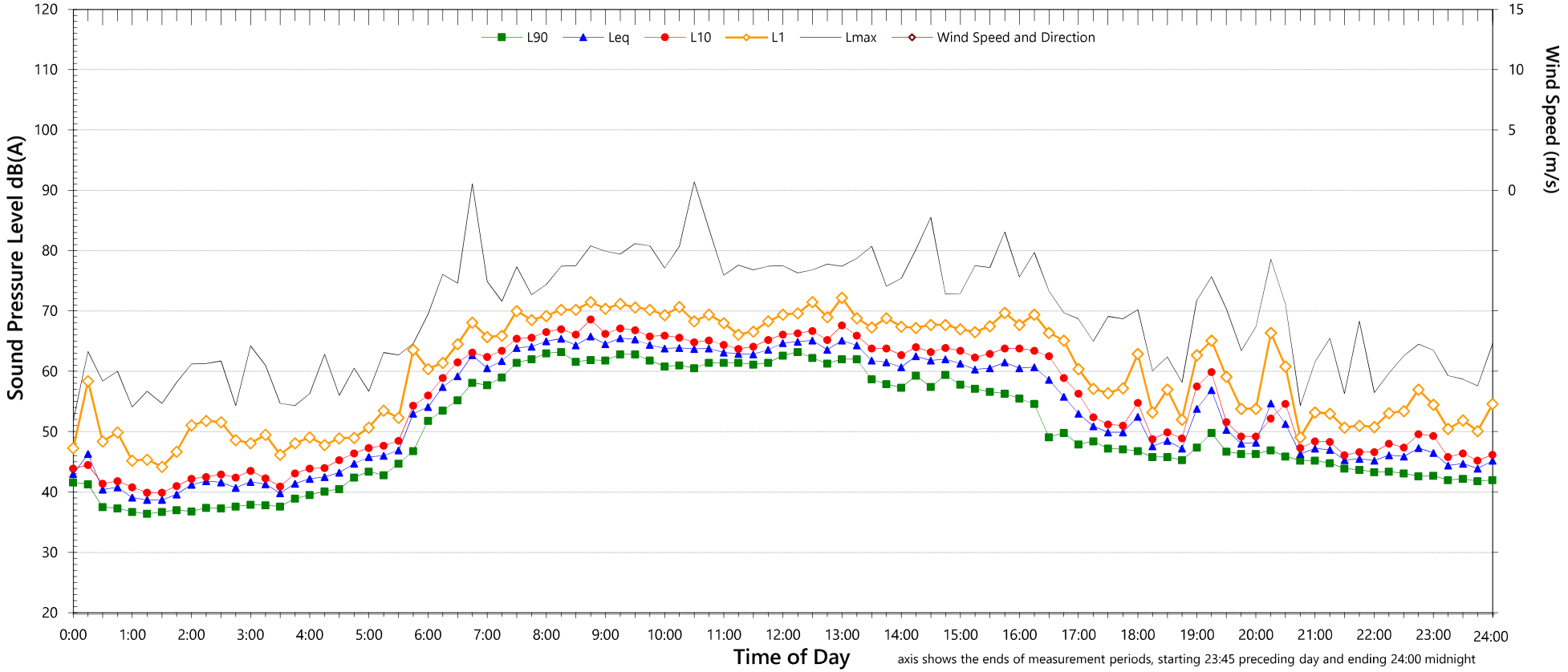
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Monday, 28 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	77	65	63
L_1	68	56	54
L_{10}	63	50	47
L_{90}	55	44	38
Leq	63	51	53

Notes:

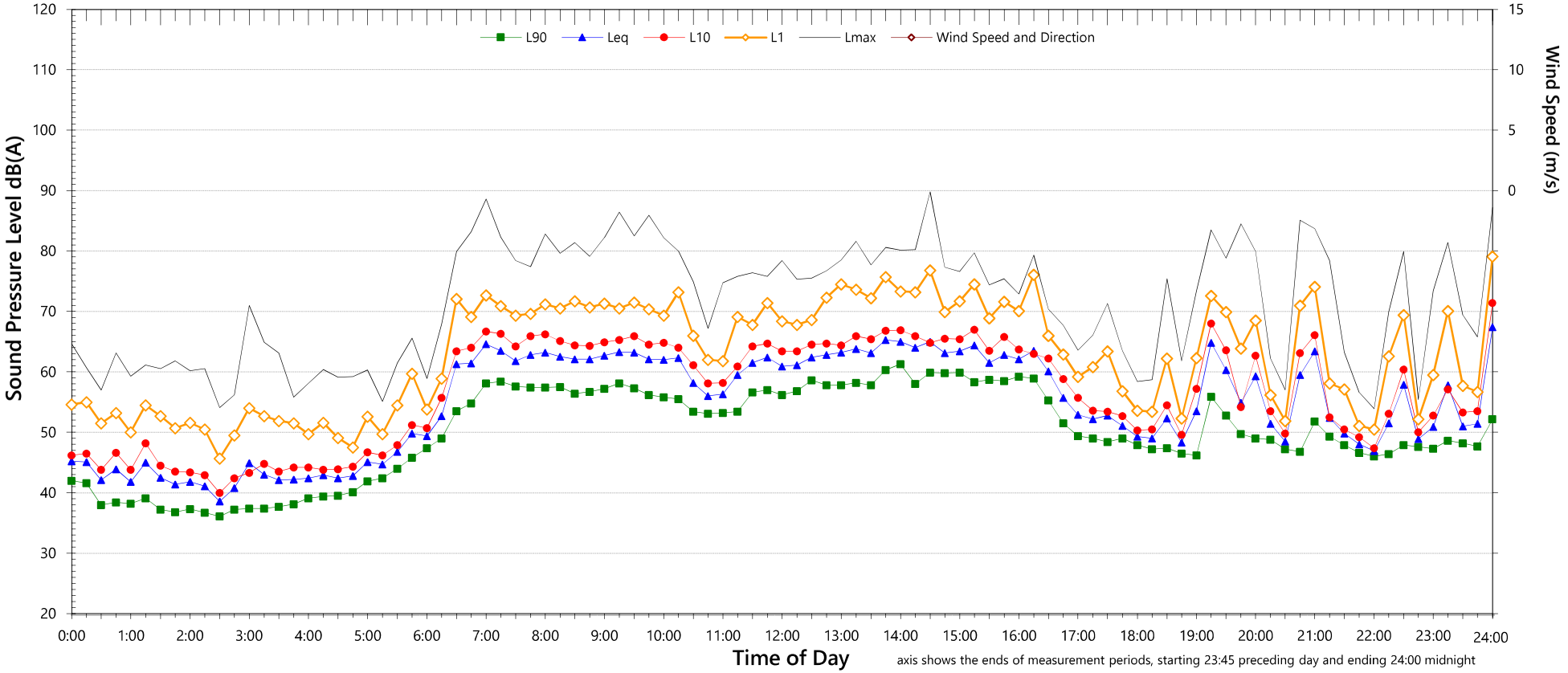
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Tuesday, 29 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	77	71	73
L_1	69	61	63
L_{10}	63	56	57
L_{90}	54	47	46
Leq	62	58	63

Notes:

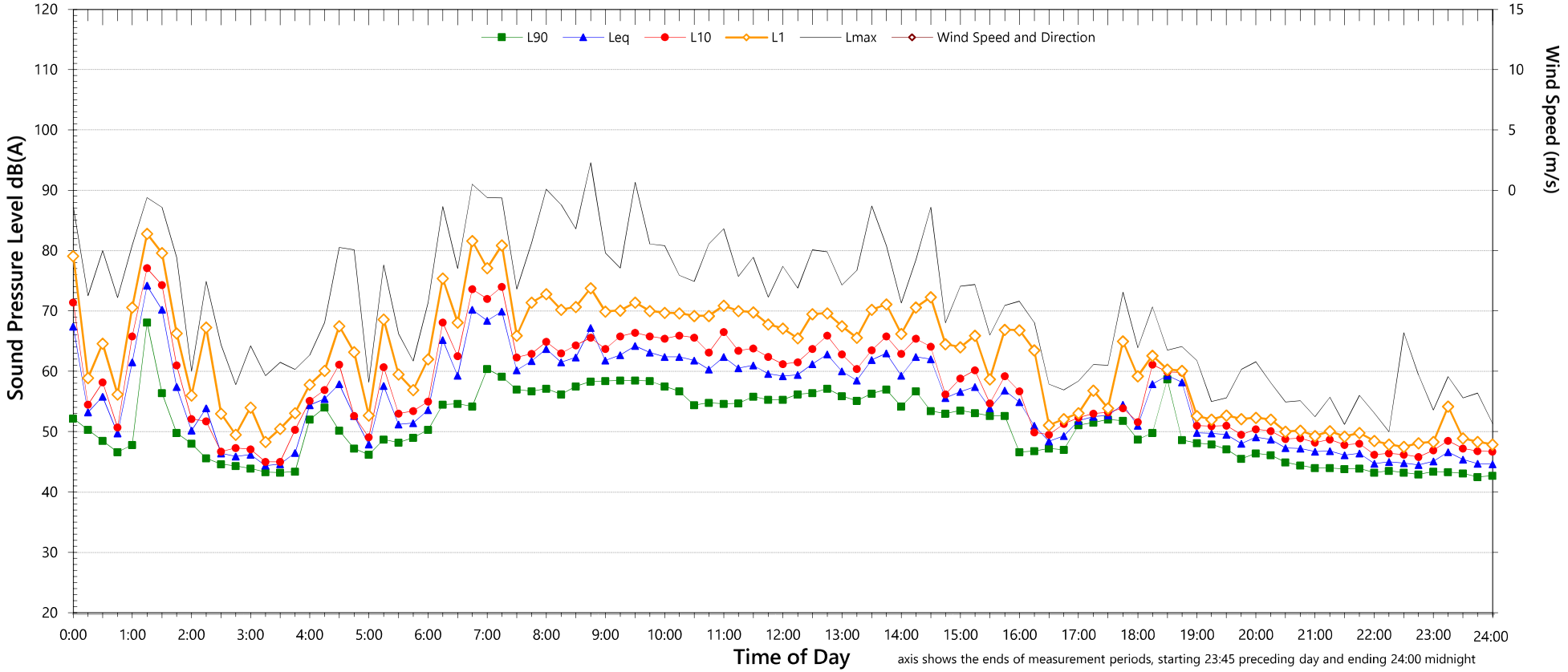
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Wednesday, 30 June 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	76	58	60
L_1	67	53	50
L_{10}	61	51	46
L_{90}	52	44	37
Leq	61	53	51

Notes:

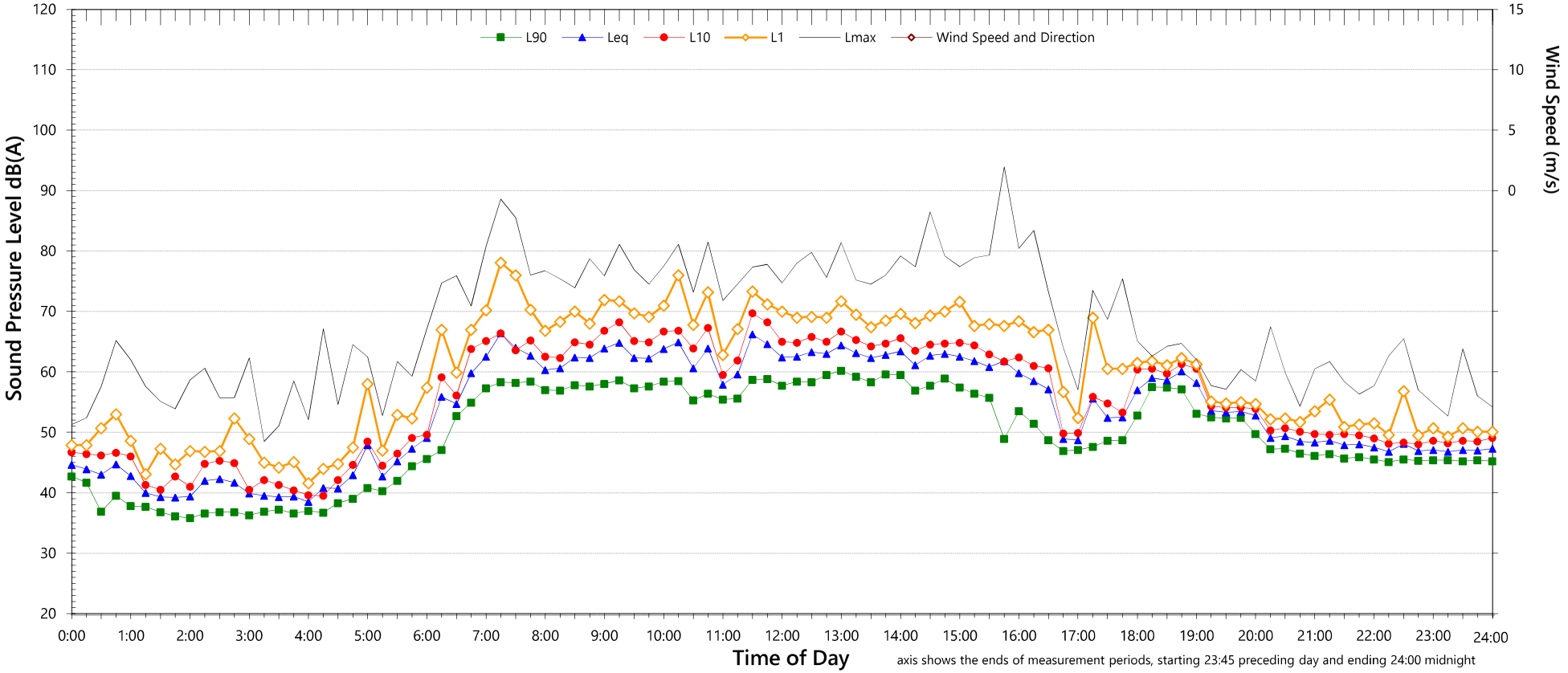
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Thursday, 1 July 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	77	60	59
L_1	68	55	51
L_{10}	63	54	47
L_{90}	53	46	40
Leq	62	55	48

Notes:

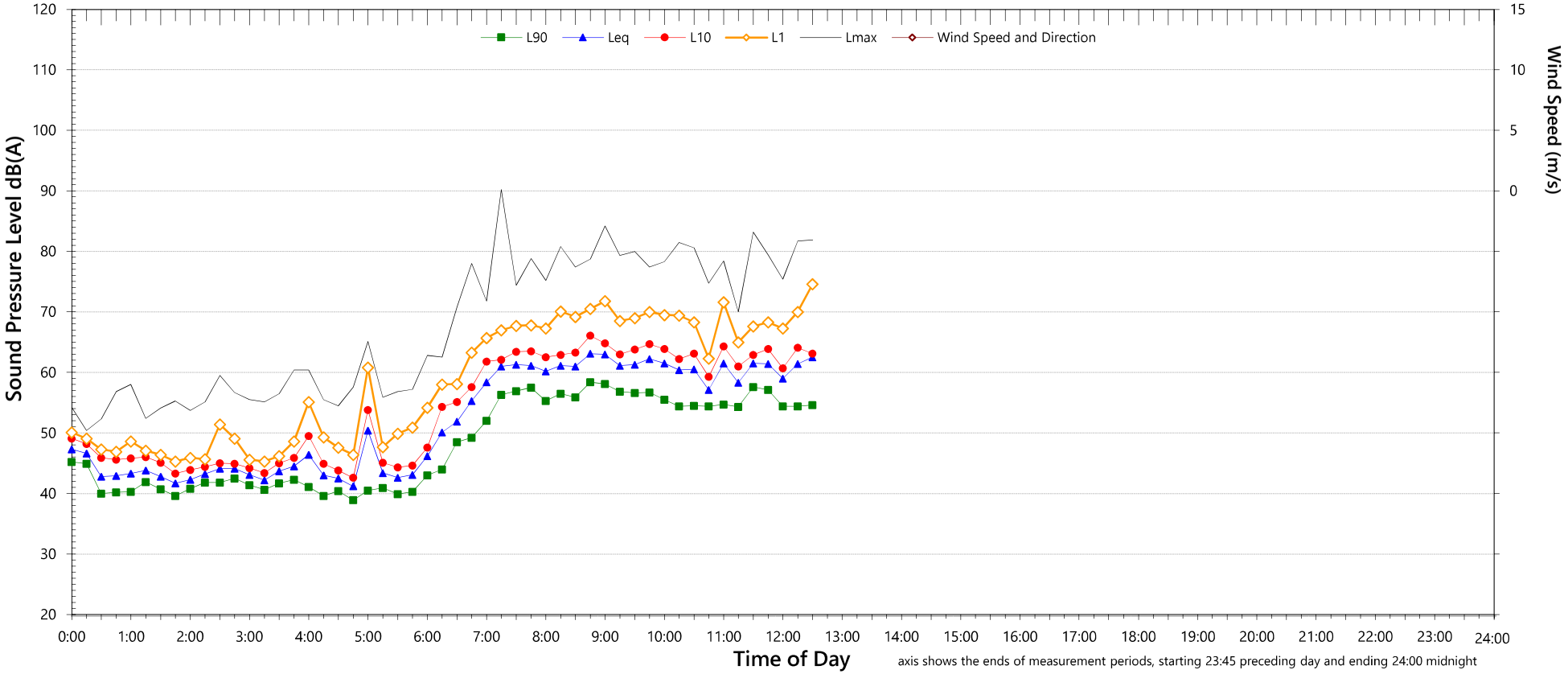
1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

Unattended Noise Monitoring Results

Mundoo Bvd Maroochydore (UTM: 909016mE, 7051462mS)

Friday, 2 July 2021



Representative Noise Levels			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
Lmax	79	-	-
L_1	69	-	-
L_{10}	63	-	-
L_{90}	55	-	-
Leq	61	-	-

Notes:

1. Grey areas indicate periods of time that are either affected by rain,wind or other extraneous factors

2. Graphed & tabulated data measured in free-field

APPENDIX D Mechanical Plant Information

MAROOCHYDORE HEALTH CENTRE

MUNDOO BOULEVARD, MAROOCHYDORE
MECHANICAL SERVICES

MECHANICAL LEGEND

- UNINSULATED DUCTWORK
- 50mm INTERNALLY INSULATED DUCTWORK
- 50mm EXTERNALLY INSULATED DUCTWORK
- 75mm INTERNALLY INSULATED DUCTWORK
- 75mm EXTERNALLY INSULATED DUCTWORK
- DUCT SPIGOT WITH BUTTERFLY DAMPER
- MOTORISED DAMPER
- OPPOSED BLADE DAMPER
- FIRE DAMPER
- DENOTES FLEXIBLE DUCTWORK
- 4 WAY BLOW SUPPLY AIR REGISTER
- 3 WAY BLOW SUPPLY AIR REGISTER
- 2 WAY BLOW SUPPLY AIR REGISTER
- 1 WAY BLOW SUPPLY AIR REGISTER
- RETURN AIR GRILLE
- EXHAUST AIR GRILLE
- UNDERCUT DOOR BY 35mm
- DENOTES GRILLE REFERENCE, REFER TO SCHEDULE THIS DRAWING
  - TOP NUMBER IS REFERENCE Sx - SUPPLY GRILLE AS LISTED IN SCHEDULE; Rx - RETURN GRILLE AS LISTED IN SCHEDULE; Ex - EXHAUST GRILLE AS LISTED IN SCHEDULE; WPx - WEATHERPROOF LOUVRE AS LISTED IN SCHEDULE
  - BOTTOM NUMBER IS AIR QUANTITY IN L/s
- DENOTES DOOR GRILLE REFERENCE, REFER TO SCHEDULE THIS DRAWING
- TUNDISH
- ACCESS PANEL
- TEMPERATURE SENSOR
- CONTROLLER
- RELATIVE HUMIDITY SENSOR
- CHILLED WATER PIPE
- CONDENSATE PIPE
- CONDENSER PIPE
- HOT WATER PIPE
- REFRIGERANT PIPE

DRAWING SCHEDULE

DRG	TITLE	SCALE
M100	COVER SHEET SCHEDULE AND LEGEND	N.T.S.
M200	GROUND AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M210	LEVEL 1 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M220	LEVEL 2 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M230	LEVEL 3 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M240	LEVEL 4 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M250	LEVEL 5 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M260	LEVEL 6 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M270	LEVEL 7 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M280	LEVEL 8 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M290	LEVEL 9 AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M300	ROOF AIR CONDITIONING AND VENTILATION LAYOUT	1:100
M400	CHILLED WATER SCHEMATIC	N.T.S.

No.	DESCRIPTION	DATE
A	TENDER ISSUE	02/06/22
B	REVISED TENDER ISSUE	03/06/22
C	REVISED TENDER ISSUE	10/06/22
D	WIP	-

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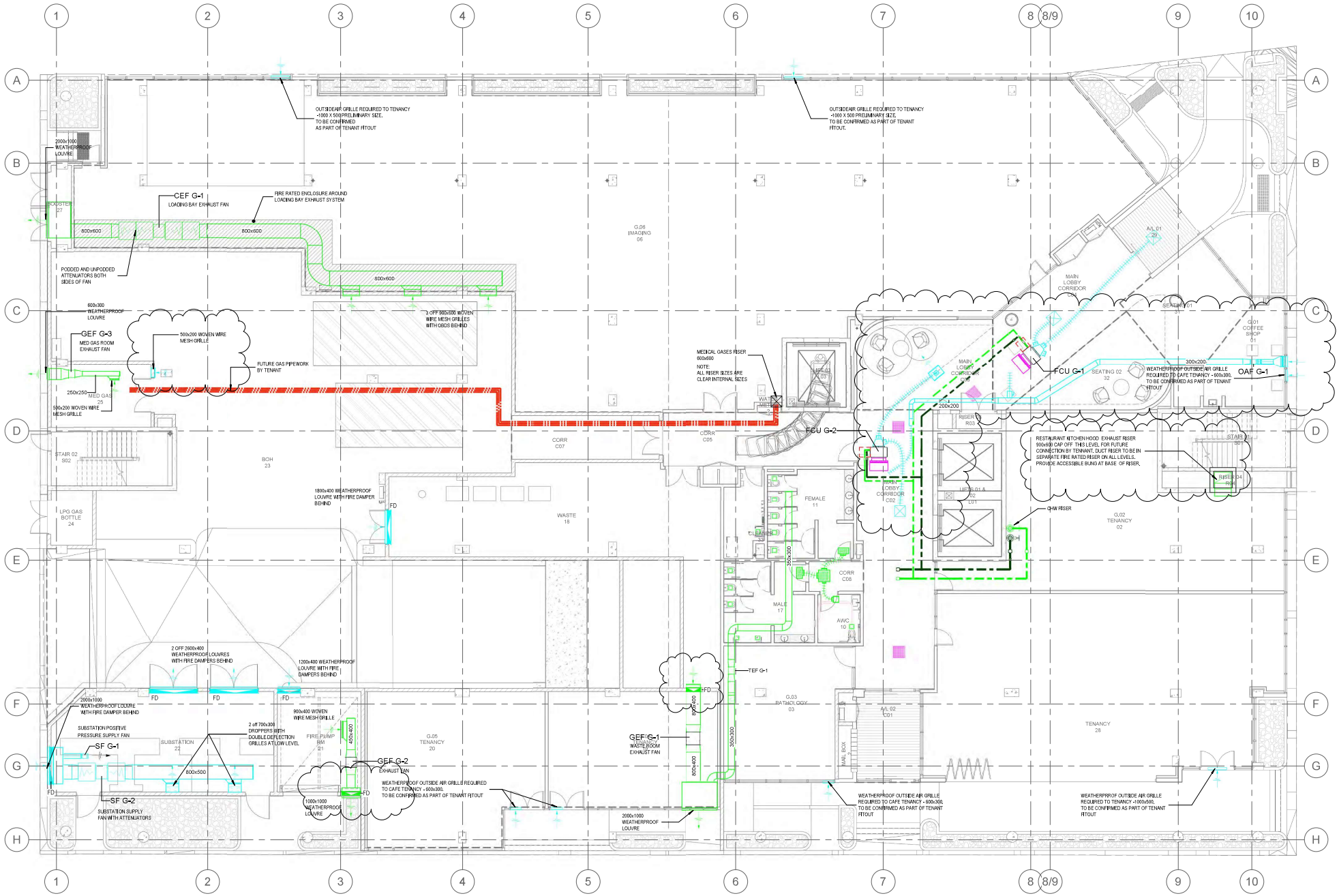
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
COVER SHEET SCHEDULE AND LEGEND

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M100
REVISION: D



No.	DESCRIPTION	DATE
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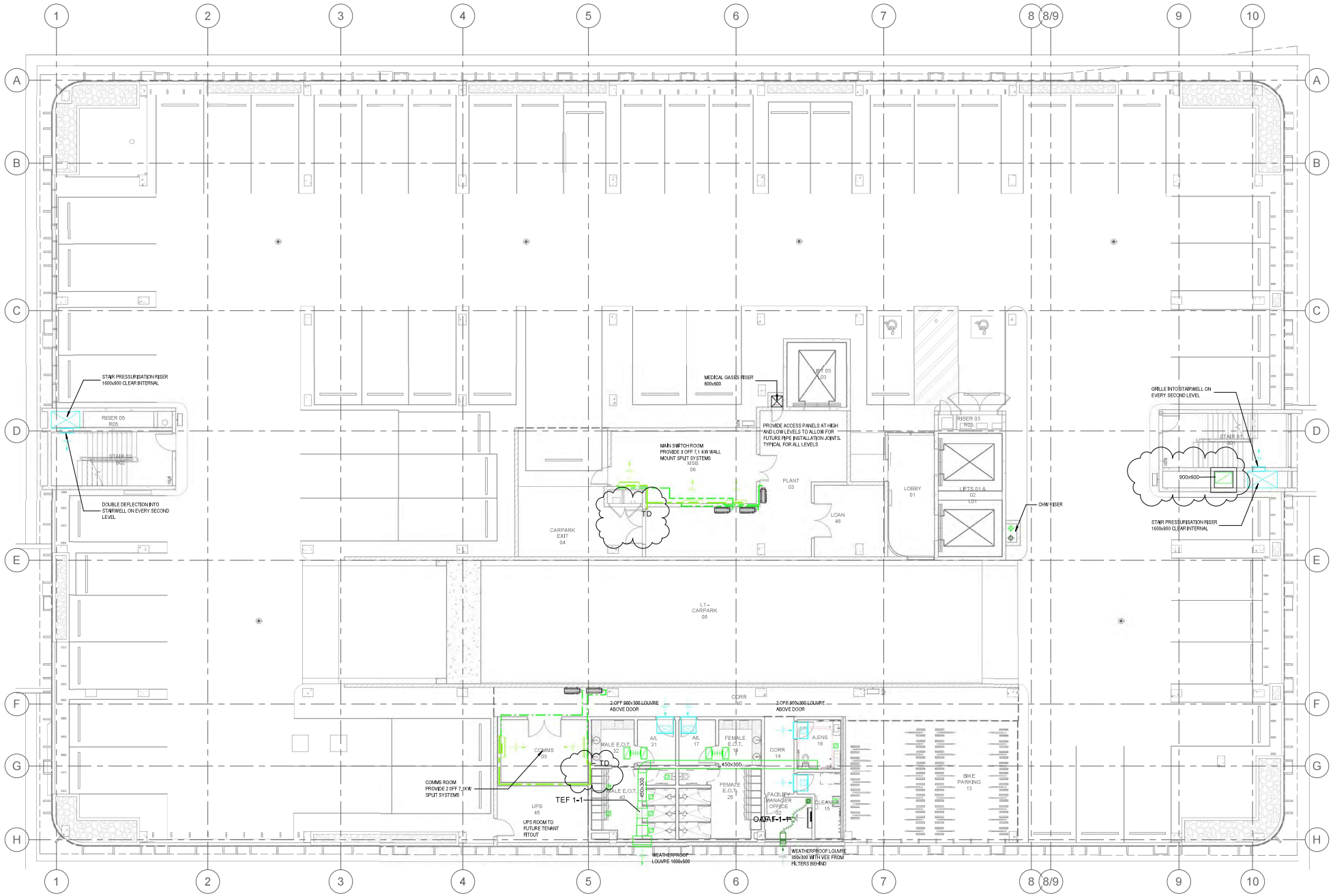
PROJECT: STAGE 2J MAROOCHYDORE HEALTH CENTRE

TITLE: GROUND AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M200
REVISION: D



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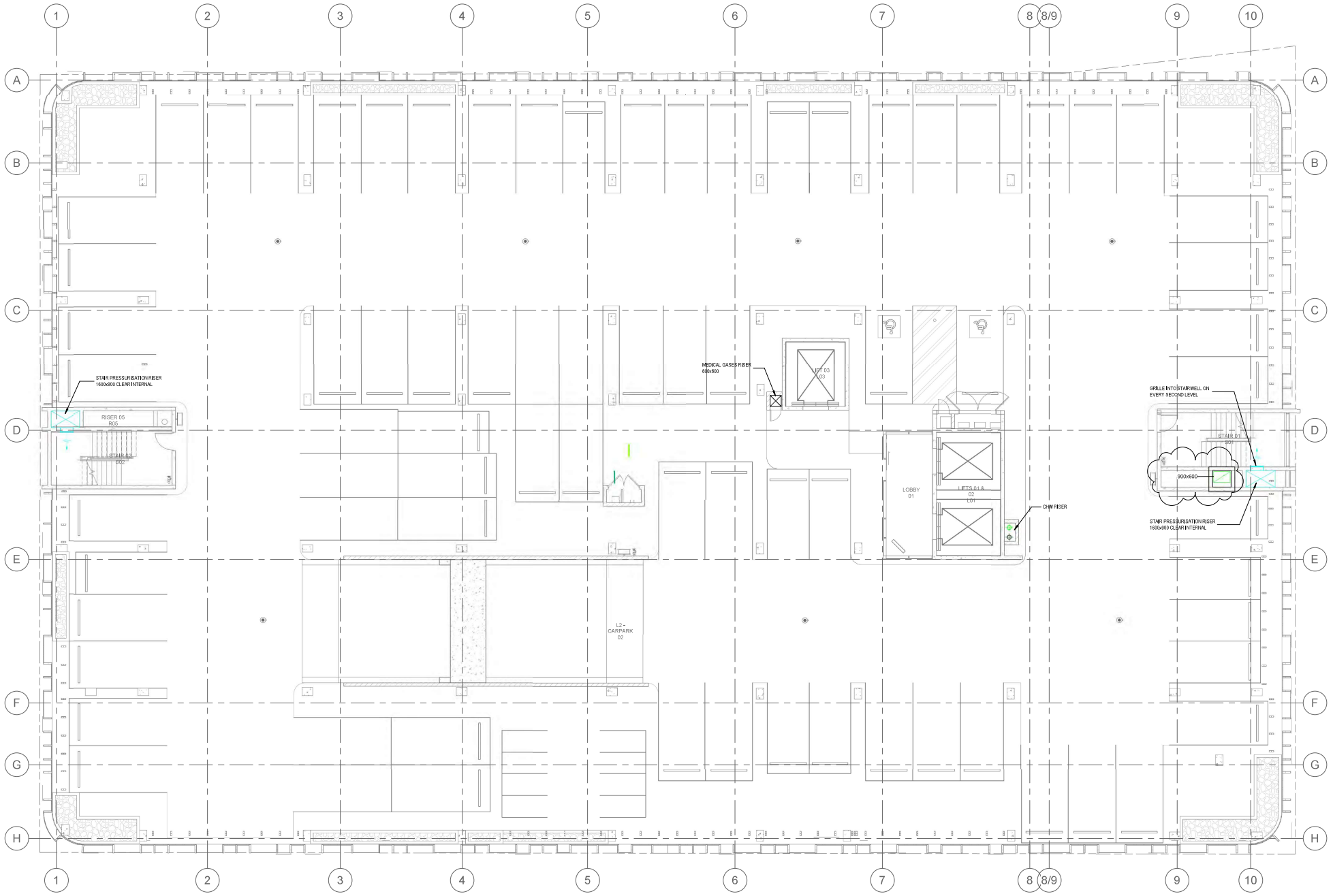
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 1 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M210
REVISION: D



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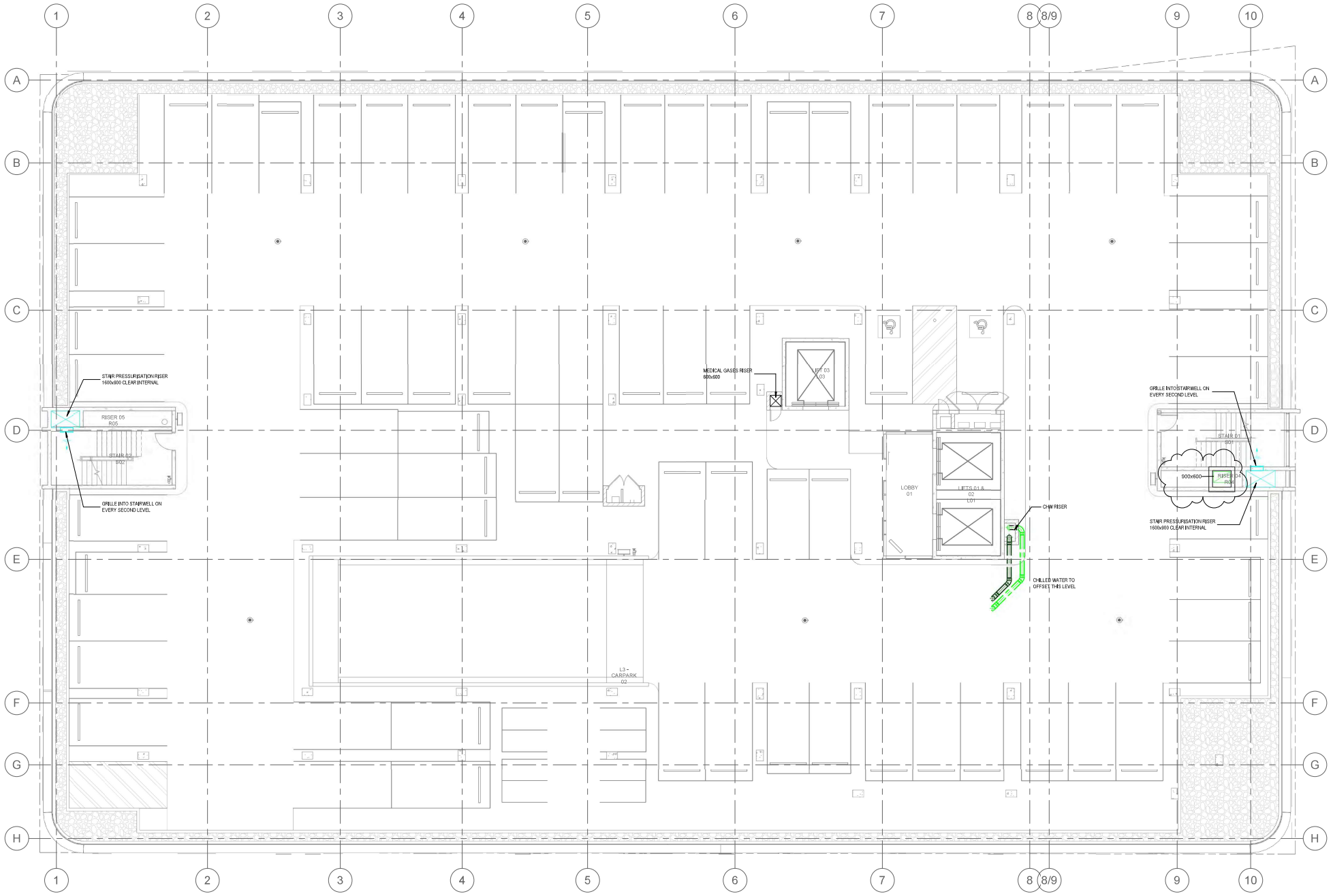
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 2 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M220
REVISION: D



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C	REVISED TENDER ISSUE	10/06/22
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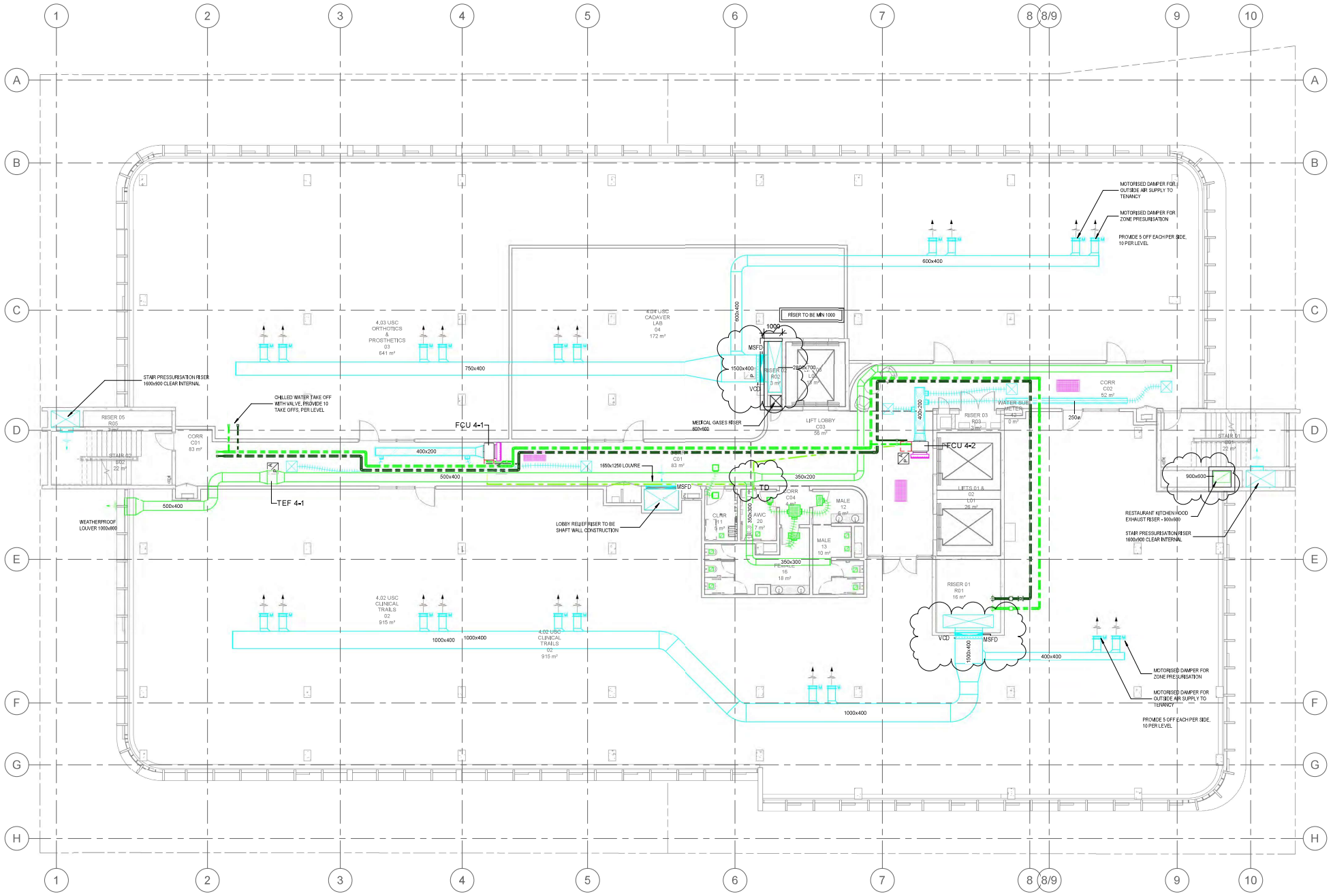
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 3 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M230
REVISION: D



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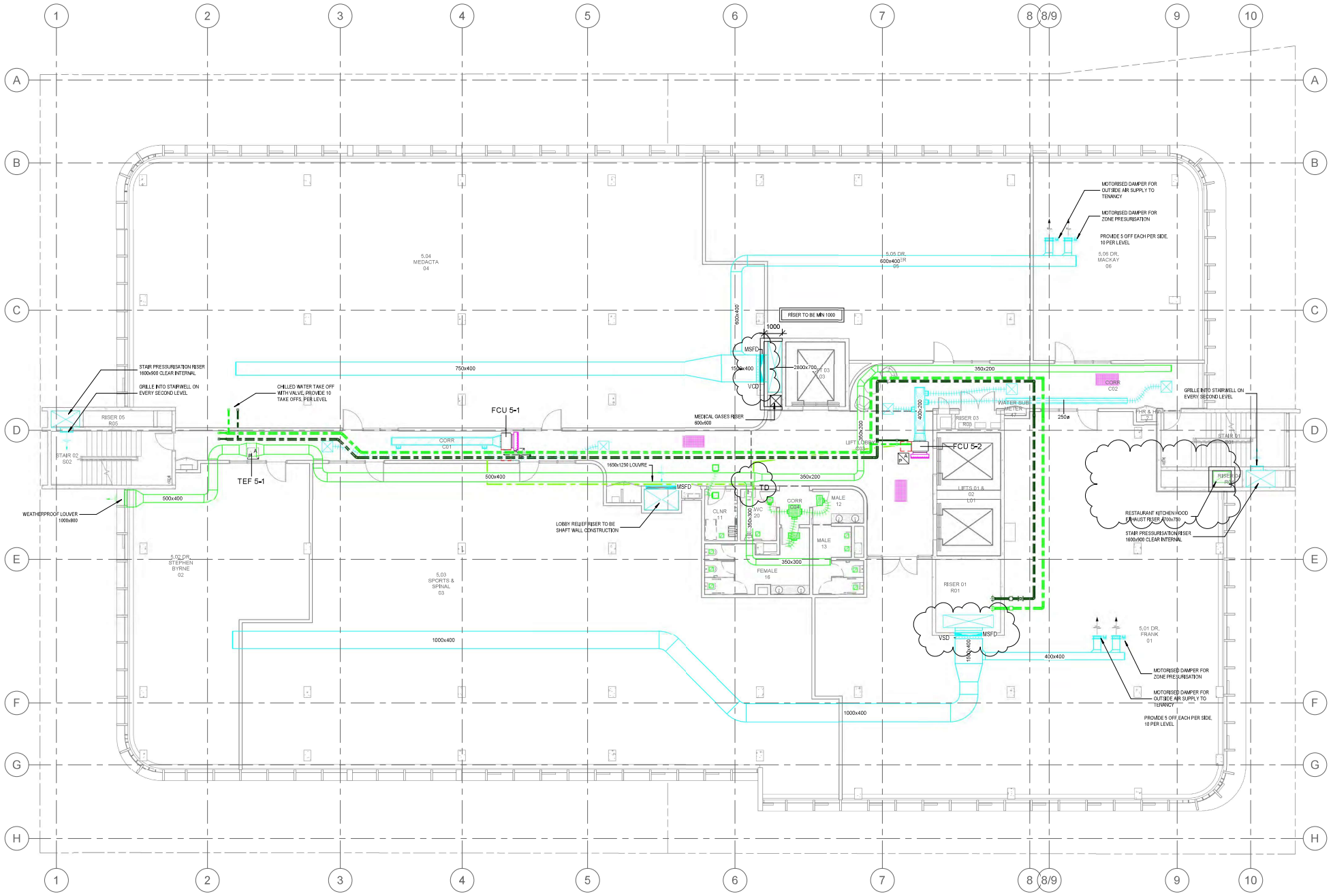
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 4 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M240
REVISION: D



No.	DESCRIPTION	DATE
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B	REVISED TENDER ISSUE	03/06/22
C	REVISED TENDER ISSUE	10/06/22
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4. ALL STEEL ITEMS SHALL BE GALVANISED.
5. ALL DIMENSIONS ARE CLEAR AIRWAY SIZE.

CLIENT:
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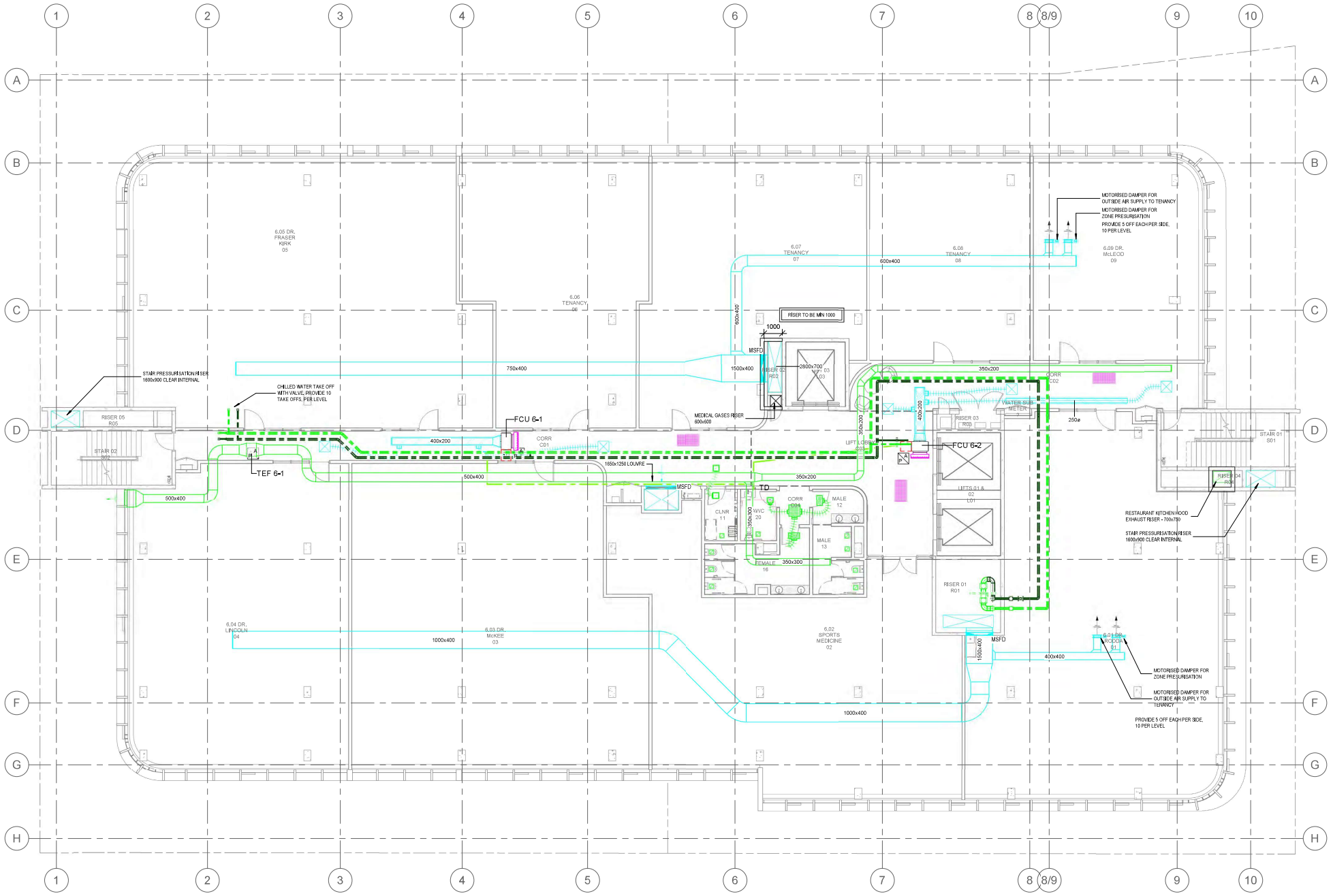
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 5 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M250
REVISION: D



No.	DESCRIPTION	DATE
A	TENDER ISSUE	02/06/22
B	REVISED TENDER ISSUE	03/06/22
C	REVISED TENDER ISSUE	10/06/22
D	WIP	-

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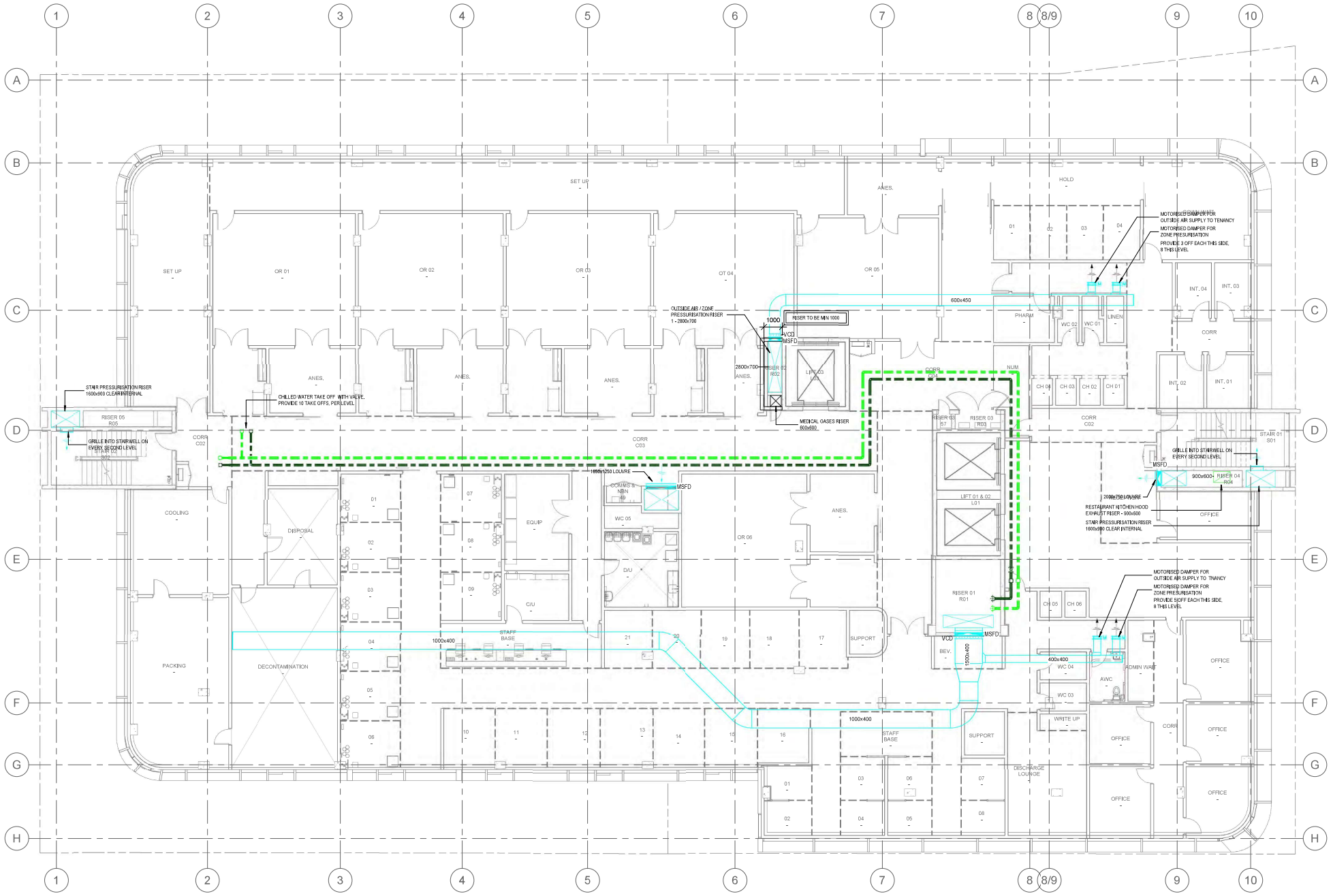
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 6 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M260
REVISION: D



No.	DESCRIPTION	DATE
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C	REVISED TENDER ISSUE	10/06/22
D	WIP	-

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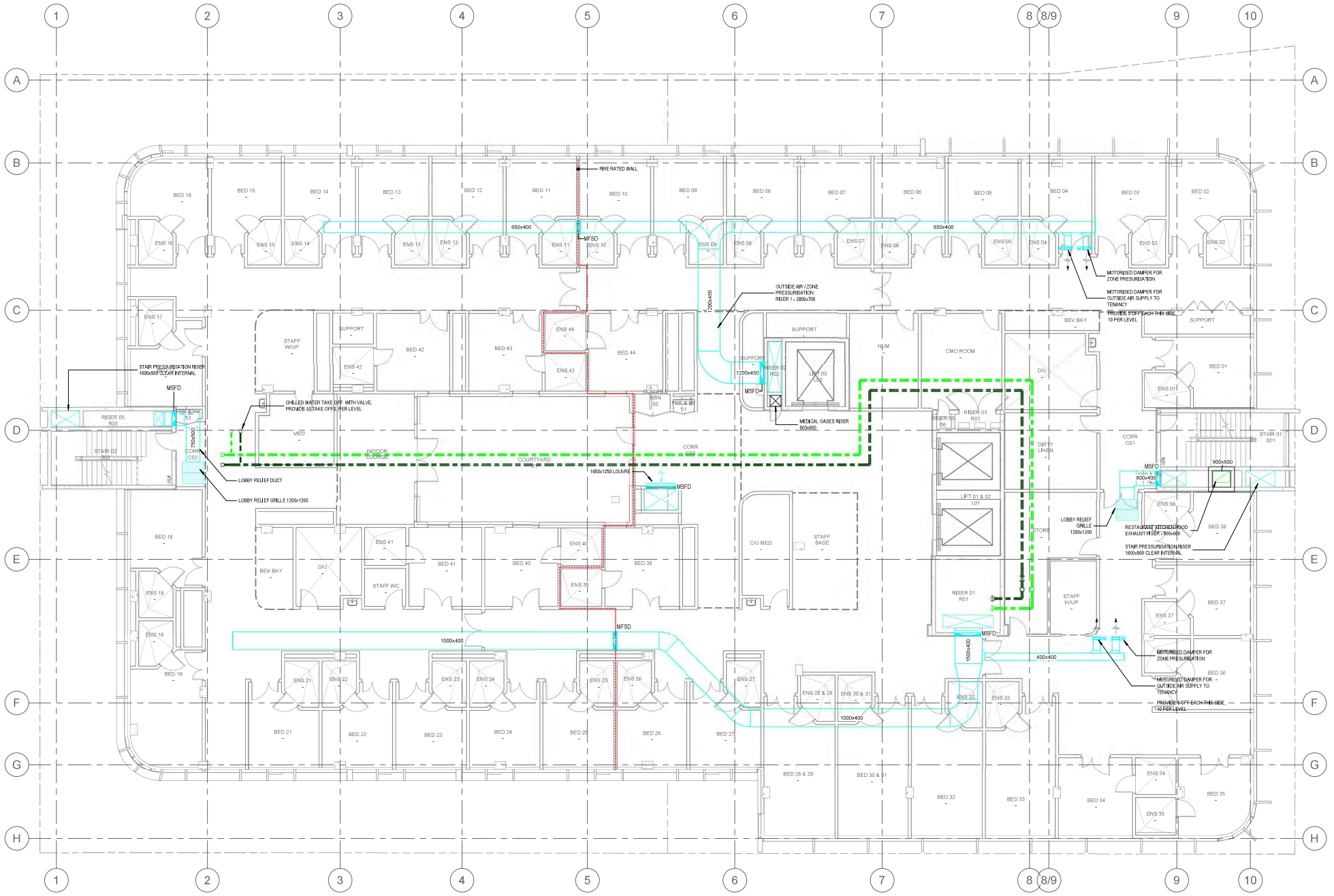
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 7 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M270
REVISION: D



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C	REVISED TENDER ISSUE	10/06/22
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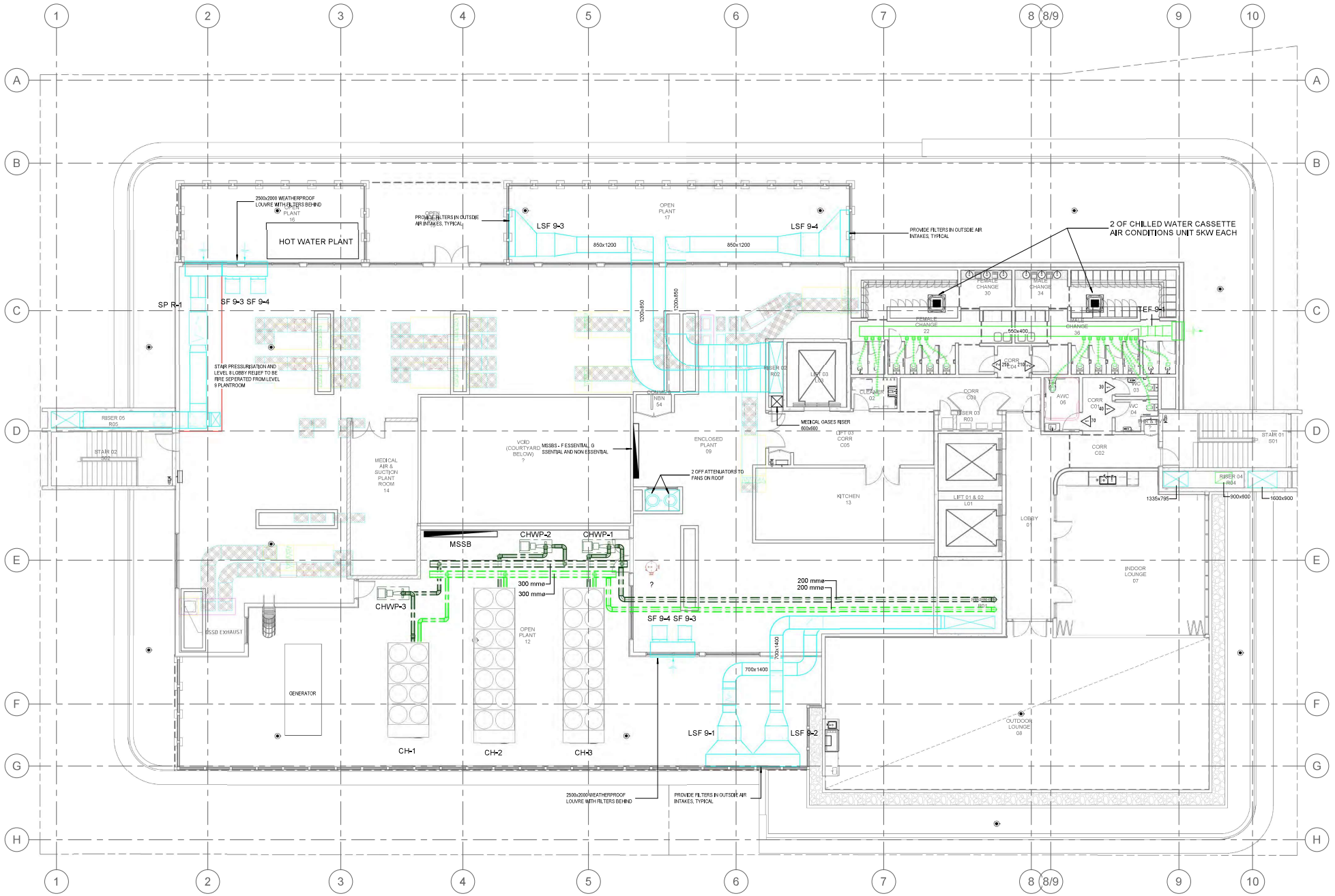
PROJECT:
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 8 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M280
REVISION: D



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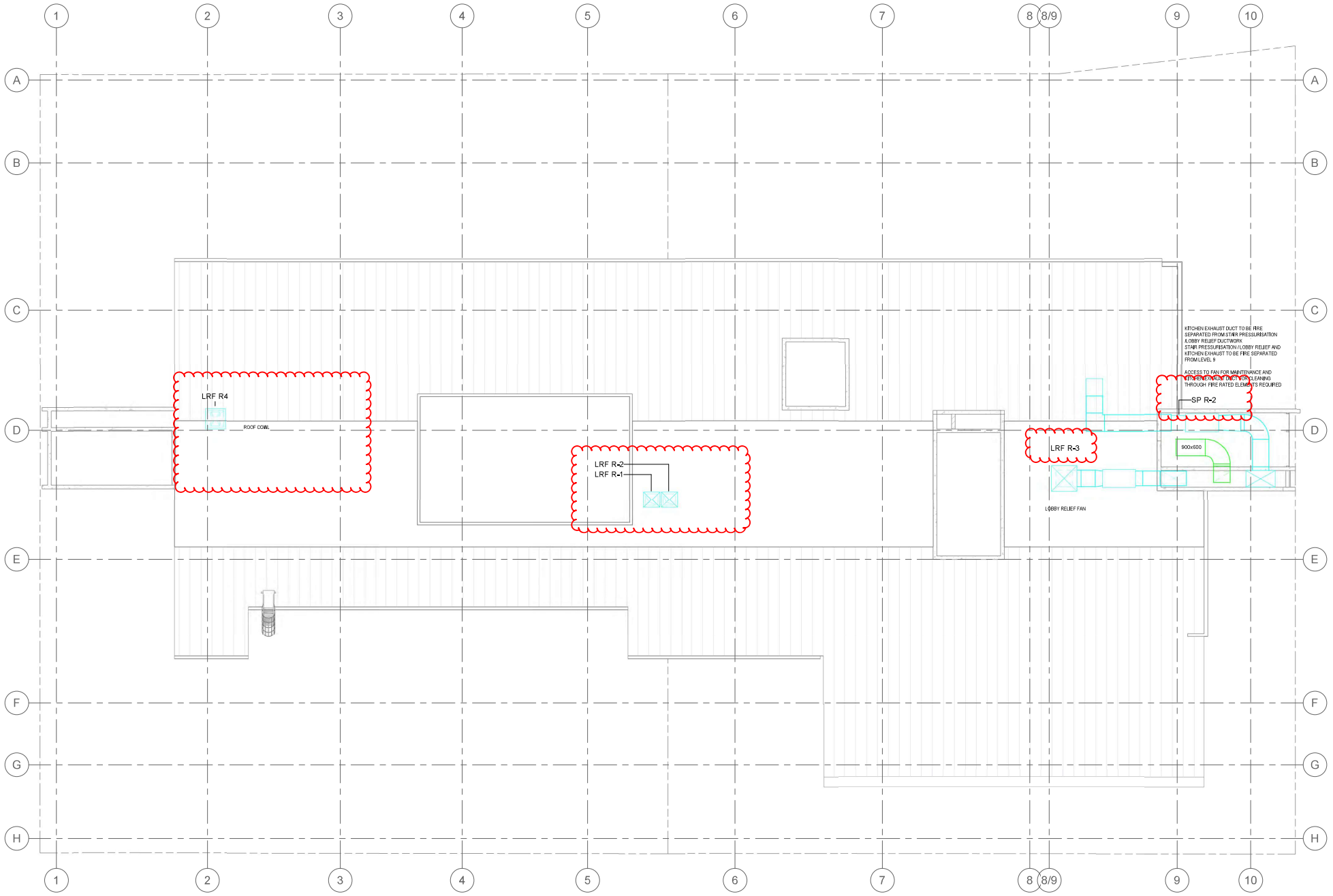
PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
LEVEL 9 AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M290
REVISION: D



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C	REVISED TENDER ISSUE	10/06/22
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PROJECT
STAGE 2J
MAROOCHYDORE
HEALTH CENTRE

TITLE:
ROOF AIR CONDITIONING AND VENTILATION LAYOUT

DATE: JUNE 2022
SCALE: 1 : 100 ORIGINAL SIZE A1
SERVICE: MECHANICAL SERVICES
DRAWING NO.: M300
REVISION: D

Standard Report

Marooch PH - CH-1

Date: 2/1/2022 7:30 AM

Prepared By: Wayne Cormack

30KAV1100A

Air Cooled Screw Chiller with Greenspeed Intelligence

Performance Information

Mode		Cooling
Cooling Capacity	kW	992.3
Efficiency (COPR)	W/W	2.735
Unit Power Input	kW	362.8
IPLV.SI	W/W	5.501
Sound Power Level (LwA)	dBA	101
Sound Pressure Level (LpA)	dBA	79
Minimum Capacity	%	10
Operating Weight	kg	8100
Shipping Weight	kg	8285
Unit Dimensions (LxWxH)	mm	8635x2253x2379
Maximum Pressure Drop	kPa	115
Minimum Pressure Drop	kPa	5.72

Operating Conditions

System element			Evaporator	Condenser
Fluid	Fluid Type		FW	-
	Fluid Concentration	%	-	-
	Fouling Factor	m²·K/kW	0.0180	-
	Leaving Temperature	°C	6.00	-
	Entering Temperature	°C	14.00	-
	Fluid Flow	L/s	29.56	-
	Pressure Drop	kPa	17.9	-
Air	Altitude	m	-	0.000
	Entering Air Temperature	°C	-	39.0
	Minimum Outdoor Air Temperature	°C	-	0.0
	Entering Air Humidity	%	-	50.0
	Total Condenser Fan Air Flow At 15°C	L/s	-	70150

Unit Information

Manufacturing Source		Shanghai, China
Refrigerant		R-134a
Refrigerant Weight (Circuit 1)	kg	125
Refrigerant Weight (Circuit 2)	kg	125
Number Of Passes		2
Number Of Compressors		2
Number Of Fans		14

Electrical Information

Unit Voltage	V-Ph-Hz	400-3-50	
Standby Power	kW	0.1500	
Power Factor		0.92	
		Circuit 1	Circuit 2
Max Unit Current Draw (RLA)	A	682	-
Max Start Up Current (ICF)	A	682	-
Nominal Unit Current Draw (A)	A	535	-

Unit Configuration

Included Options
Opt. 015S Low noise option
Opt. 071 High efficiency
Opt. 093A Compressor discharge valves
Opt. 148C Bacnet Gateway
Opt. 281 Evaporator with aluminium jacket
Opt. 282 EMC class
Opt. 312A Australian Compliance

Documentation

	Technical Drawing
	Revit File

Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.
http://www.ahridirectory.org

Performance Report

Marooch PH - CH-1

Date: 2/1/2022 7:30 AM

Prepared By: Wayne Cormack

30KAV1100A

Air Cooled Screw Chiller with Greenspeed Intelligence

Integrated Part Load Value					
IPLV.SI	W/W	5.501			
Unit Performance					
Percent of Full Load Capacity	%	100.00	75.00	50.00	25.00
Cooling Capacity	kW	1058	793.7	529.1	264.6
Unit Power Input	kW	341.0	188.6	86.91	32.95
Efficiency (COPR)	W/W	3.103	4.210	6.088	8.029
Evaporator Data					
Fluid Entering Temperature	°C	12.00	10.75	9.50	8.25
Fluid Leaving Temperature	°C	7.00	7.00	7.00	7.00
Fluid Flow Rate	L/s	50.44	50.44	50.44	50.44
Fouling Factor	$m^2 \cdot K/kW$	0.0180	0.0180	0.0180	0.0180
Condenser Data					
Entering Air Temperature	°C	35.0	27.0	19.0	13.0

Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.
http://www.ahridirectory.org

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E-mail: info@fantech.com.au

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Technical Data - Fan Model PUD568ER

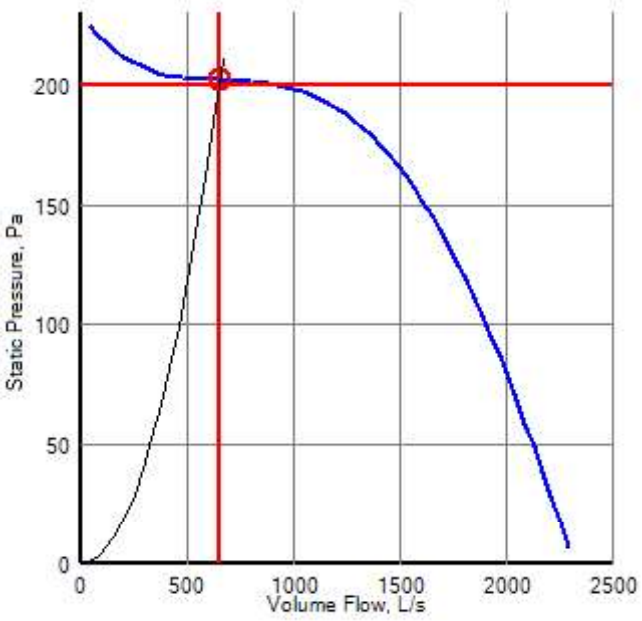
Location: 1 **Designation:** TEF G-1

Performance - Required

Air Flow :	650 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

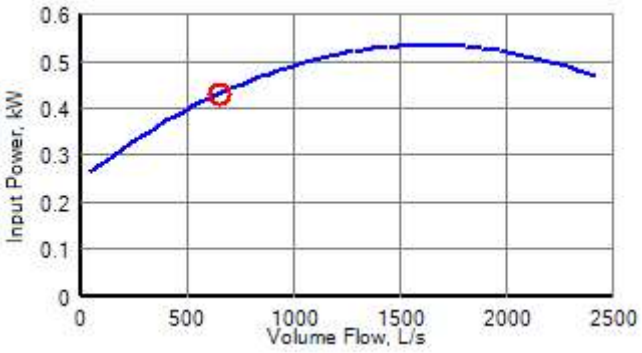
Actual

Air Flow:	653 L/s
Static Pressure:	202 Pa
Total Pressure:	203 Pa



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.43 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	207.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	1.9
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.5
Cost per kWh ($):	0.16		

As part of our continuous improvement processes, Fantech reserves the right to make changes in design or specification to products without notice.

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Technical Data - Fan Model PUDEC63

Location: 2

Designation: CEF G-1

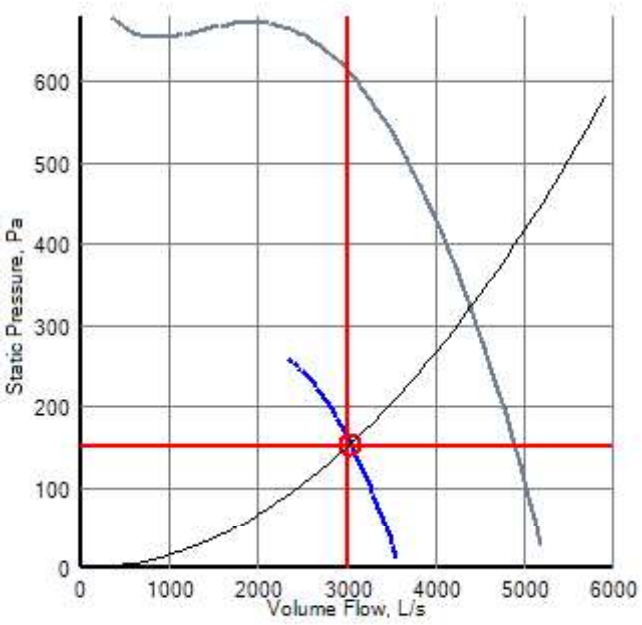
Performance - Required

Air Flow :	3000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

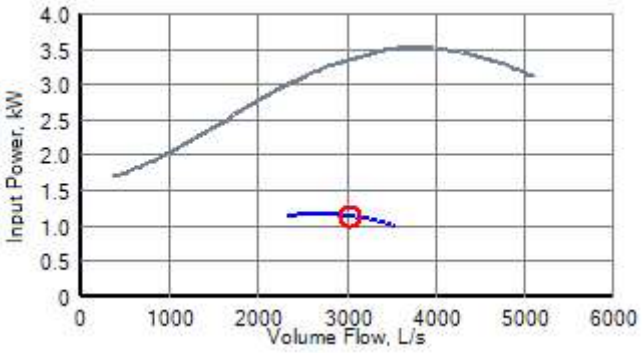
Air Flow:	3042 L/s
Static Pressure:	154 Pa
Total Pressure:	168 Pa

68% Speed, 48% additional capacity available



Fan Data

Catalogue Code:	PUDEC63		
Description:	PowerLine Ultra EC Series		
Diameter:	630 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	891 r/min @50 Hz		
Power, Abs:	-		
Input Power:	1.14 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	68.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	3.50kW
FLC/Start (DOL):	5.60A / 5.60A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	64	72	68	66	65	64	60	56	76	50
Outlet (dB):	67	75	71	73	71	69	65	57	80	55

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	545.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	5.0
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	1.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 3

Designation: GEF G-1

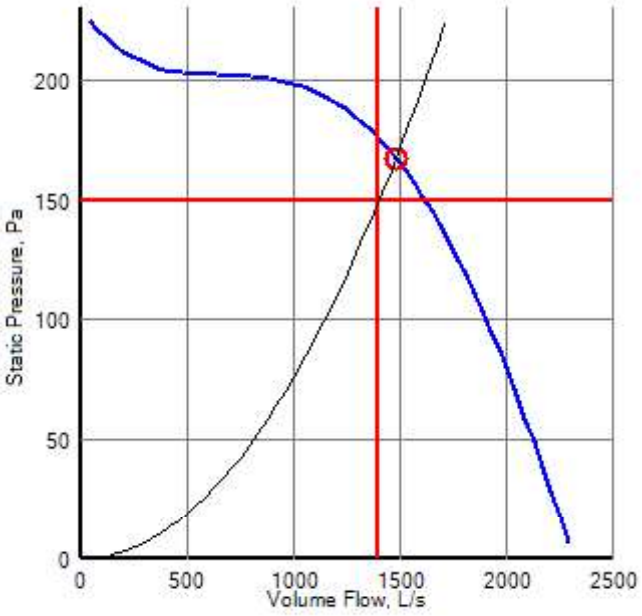
Performance - Required

Air Flow :	1400 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	1480 L/s
Static Pressure:	167 Pa
Total Pressure:	172 Pa

6% additional capacity available

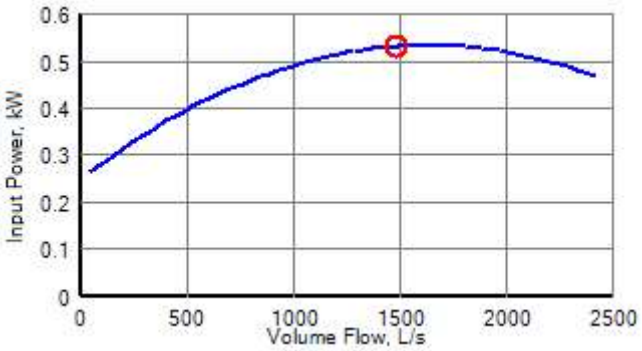


Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.53 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	254.9
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.3
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model FSDEC56

Location: 4 **Designation:** GEF G-2

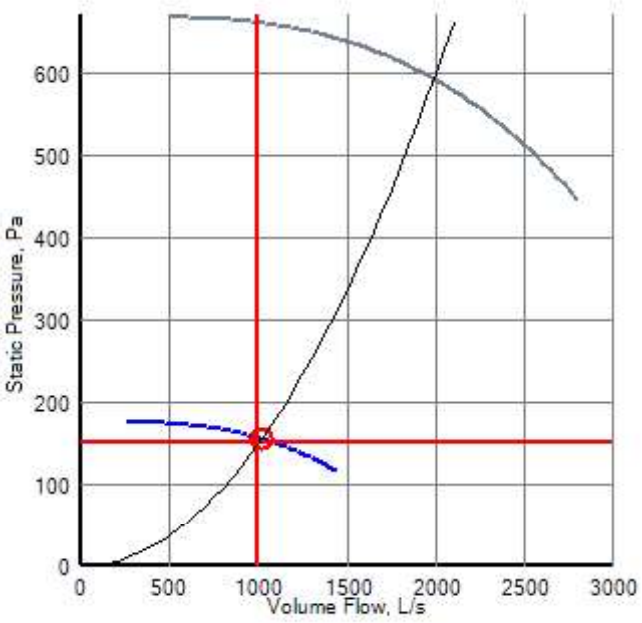
Performance - Required

Air Flow :	1000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

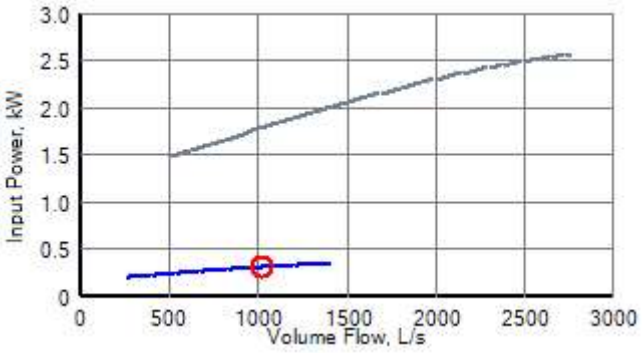
Air Flow:	1020 L/s
Static Pressure:	156 Pa
Total Pressure:	156 Pa

51% Speed, 99% additional capacity available



Fan Data

Catalogue Code:	FSDEC56		
Description:	Filter Supply Inline EC		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	723 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.31 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	-	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	2.60kW
FLC/Start (DOL):	4.20A / 4.20A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	65	68	63	59	57	57	55	50	71	43
Outlet (dB):	68	71	66	66	64	63	61	55	75	49

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	149.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	1.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD356DD

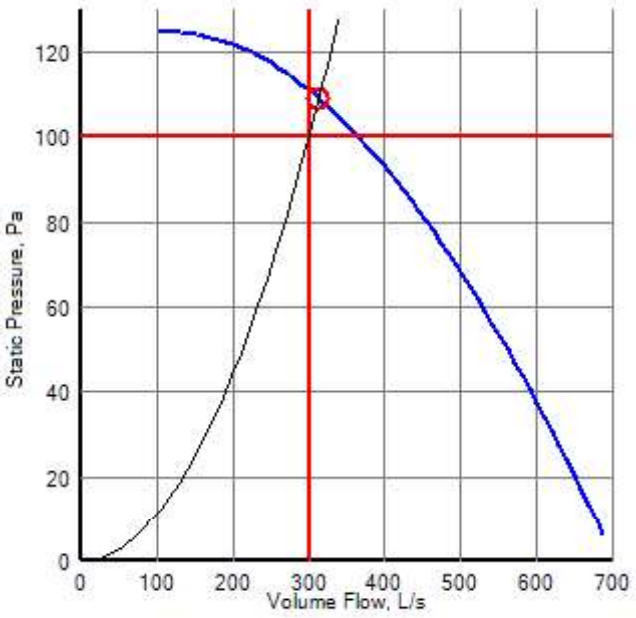
Location: 5 **Designation:** SF G-1

Performance - Required

Air Flow :	300 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	313 L/s
Static Pressure:	109 Pa
Total Pressure:	111 Pa

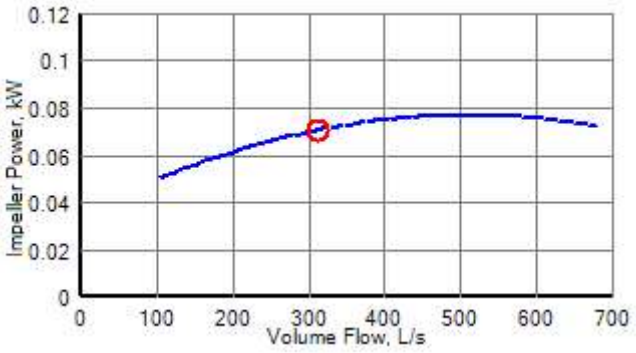


Fan Data

Catalogue Code:	PUD356DD		
Description:	PowerLine Ultra Series		
Diameter:	350 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	880 r/min @50 Hz		
Power, Abs:	0.07 kW		
Input Power:	0.10 kW	Peak:	0.08 kW
Efficiency Total:	48.7%		
Fan Weight:	36.0 kg	Static:	48.1%

Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	D80
Motor Power:	0.37kW
FLC/Start:	1.32A / 6.86A
Motor Speed:	6 pole
Motor Efficiency:	73.2%



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	54	57	50	47	43	45	44	38	60	31
Outlet (dB):	55	56	50	49	51	49	47	41	61	35

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	46.4
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 6 **Designation:** SF G-2

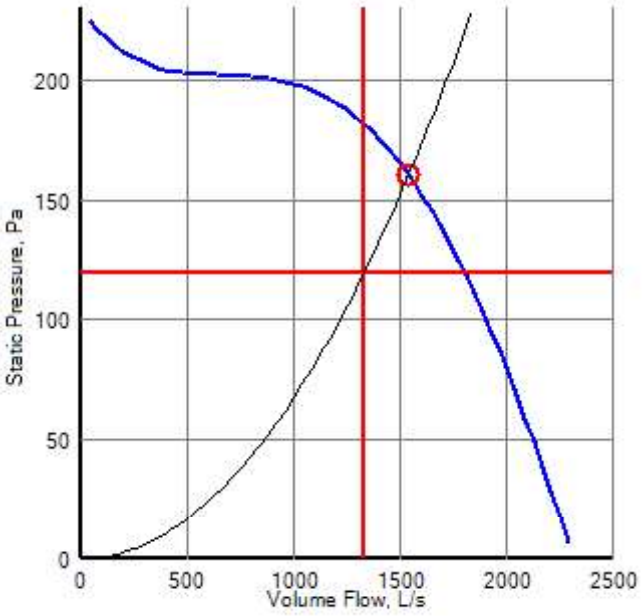
16% additional capacity available

Performance - Required

Air Flow :	1330 L/s
Static Pressure :	120 Pa
Selection Pressure:	120 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

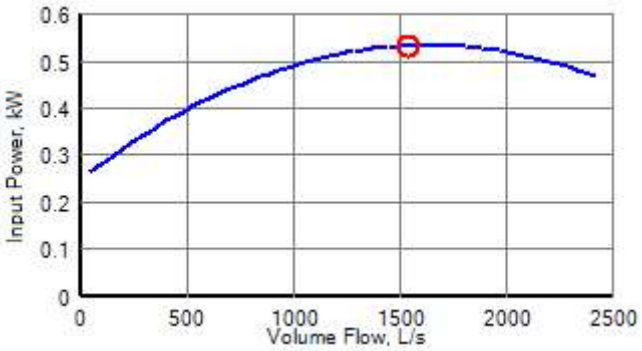
Actual

Air Flow:	1539 L/s
Static Pressure:	161 Pa
Total Pressure:	166 Pa



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.53 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	255.6
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.3
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 7

Designation: TEF 1-1

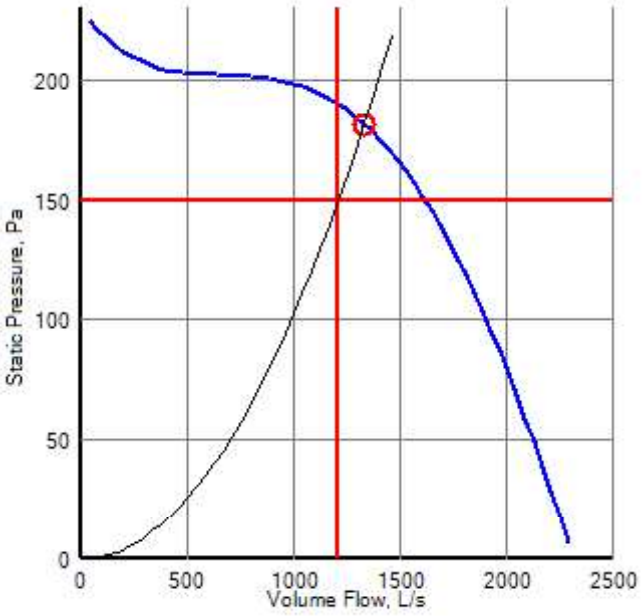
10% additional capacity available

Performance - Required

Air Flow :	1210 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

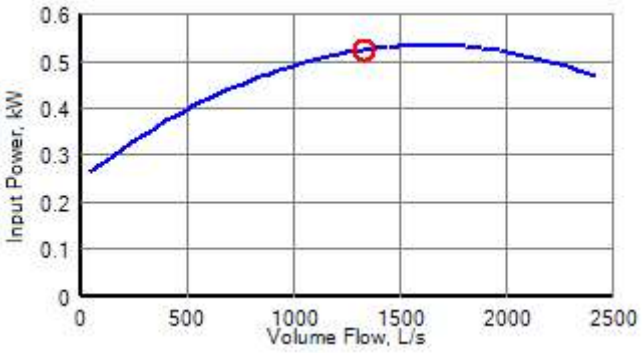
Actual

Air Flow:	1331 L/s
Static Pressure:	182 Pa
Total Pressure:	185 Pa



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.52 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	251.4
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.3
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model FSDEC56

Location: 8

Designation: TEF 4-1

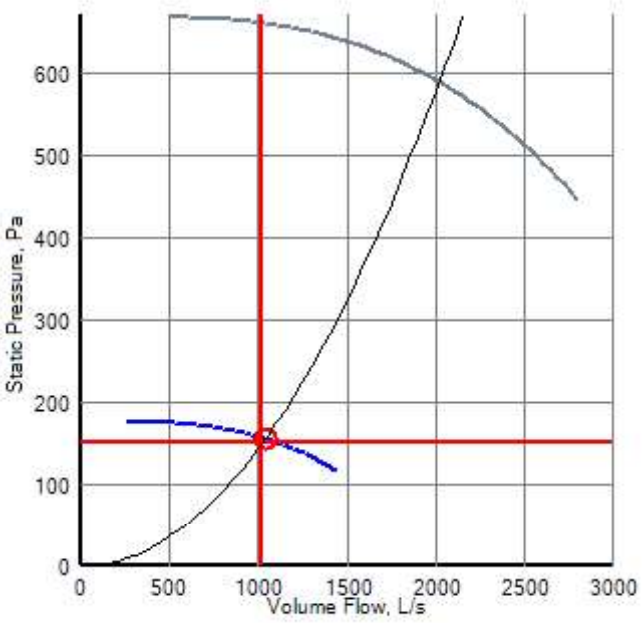
51% Speed, 98% additional capacity available

Performance - Required

Air Flow :	1020 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

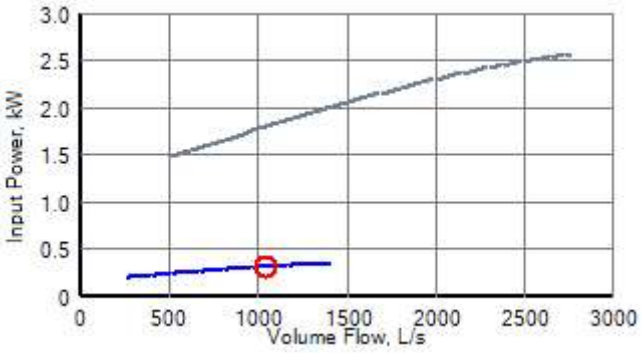
Actual

Air Flow:	1039 L/s
Static Pressure:	156 Pa
Total Pressure:	156 Pa



Fan Data

Catalogue Code:	FSDEC56		
Description:	Filter Supply Inline EC		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	725 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.31 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	-	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	2.60kW
FLC/Start (DOL):	4.20A / 4.20A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	65	68	63	59	57	57	55	50	71	43
Outlet (dB):	68	71	66	66	64	63	61	55	75	49

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	151.1
DaysPerYear:	300	Annual GH Gas (Tonnes):	1.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model FSDEC56

Location: 9

Designation: TEF 5-1

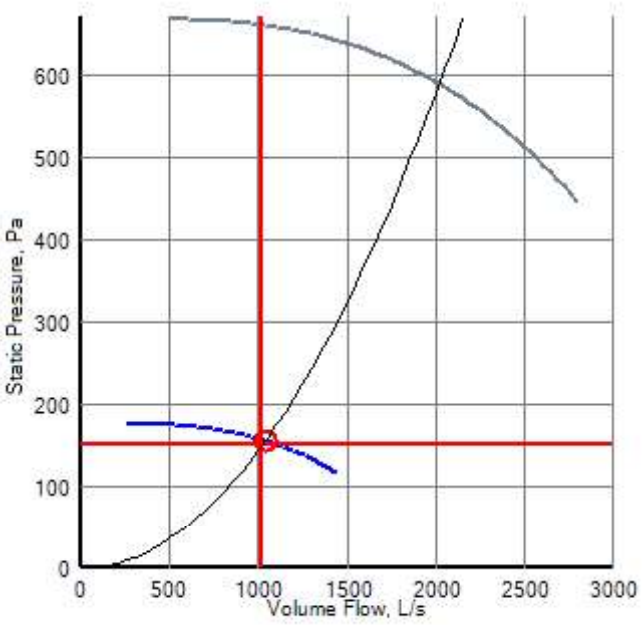
51% Speed, 98% additional capacity available

Performance - Required

Air Flow :	1020 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

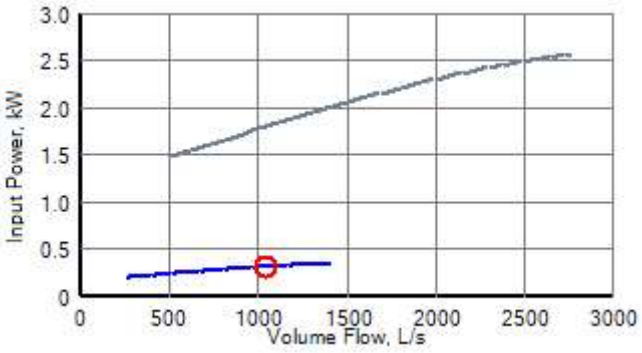
Actual

Air Flow:	1039 L/s
Static Pressure:	156 Pa
Total Pressure:	156 Pa



Fan Data

Catalogue Code:	FSDEC56		
Description:	Filter Supply Inline EC		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	725 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.31 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	-	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	2.60kW
FLC/Start (DOL):	4.20A / 4.20A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	65	68	63	59	57	57	55	50	71	43
Outlet (dB):	68	71	66	66	64	63	61	55	75	49

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	151.1
DaysPerYear:	300	Annual GH Gas (Tonnes):	1.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model FSDEC56

Location: 10

Designation: TEF 6-1

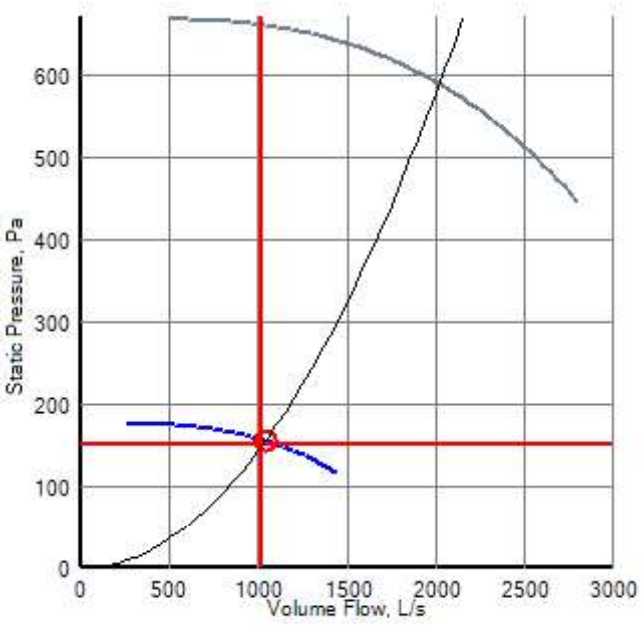
51% Speed, 98% additional capacity available

Performance - Required

Air Flow :	1020 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

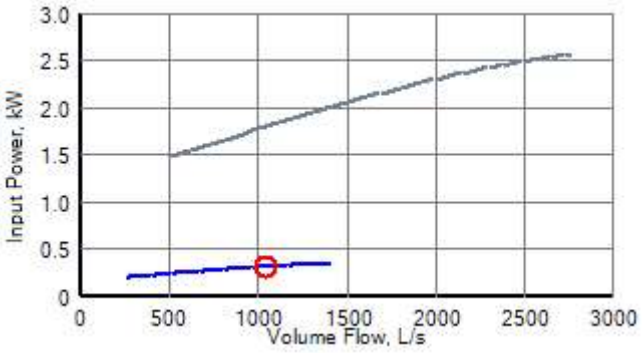
Actual

Air Flow:	1039 L/s
Static Pressure:	156 Pa
Total Pressure:	156 Pa



Fan Data

Catalogue Code:	FSDEC56		
Description:	Filter Supply Inline EC		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	725 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.31 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	-	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	2.60kW
FLC/Start (DOL):	4.20A / 4.20A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	65	68	63	59	57	57	55	50	71	43
Outlet (dB):	68	71	66	66	64	63	61	55	75	49

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	151.1
DaysPerYear:	300	Annual GH Gas (Tonnes):	1.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PCEEC45

Location: 11

Designation: TEF 7-1

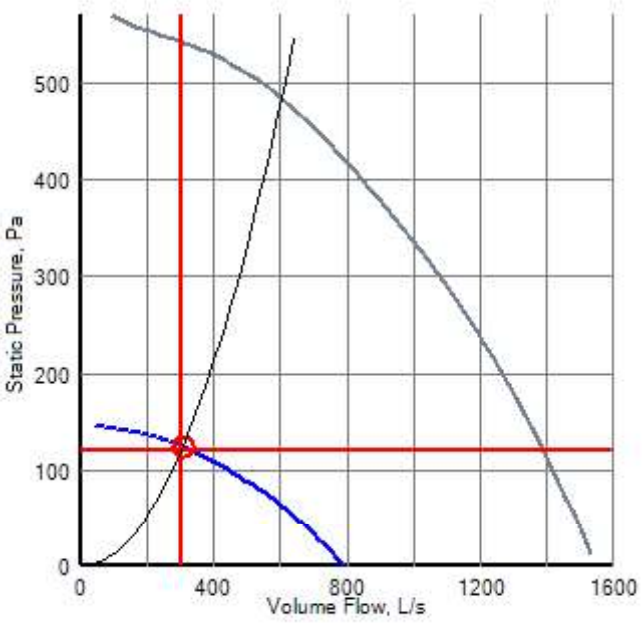
50% Speed, 101% additional capacity available

Performance - Required

Air Flow :	300 L/s
Static Pressure :	120 Pa
Selection Pressure:	120 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

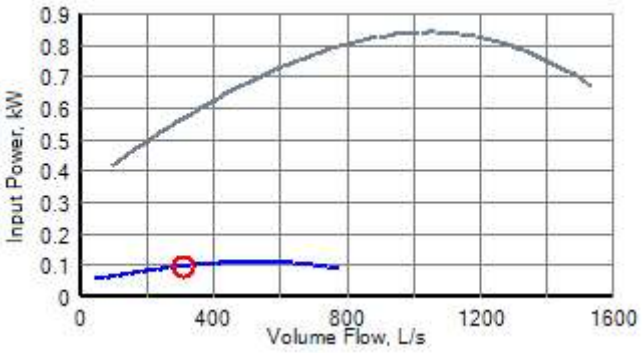
Actual

Air Flow:	306 L/s
Static Pressure:	125 Pa
Total Pressure:	125 Pa



Fan Data

Catalogue Code:	PCEEC45		
Description:	PowerLine EC Series		
Diameter:	450 mm		
Impeller Type:	Centrifugal		
Blade Material:	-		
Speed:	731 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.10 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	50.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.75kW
FLC/Start:	3.90A / -
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	53	58	57	56	53	46	43	39	63	37

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	45.9
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.4
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUDEC63

Location: 12

Designation: TEF 8-1

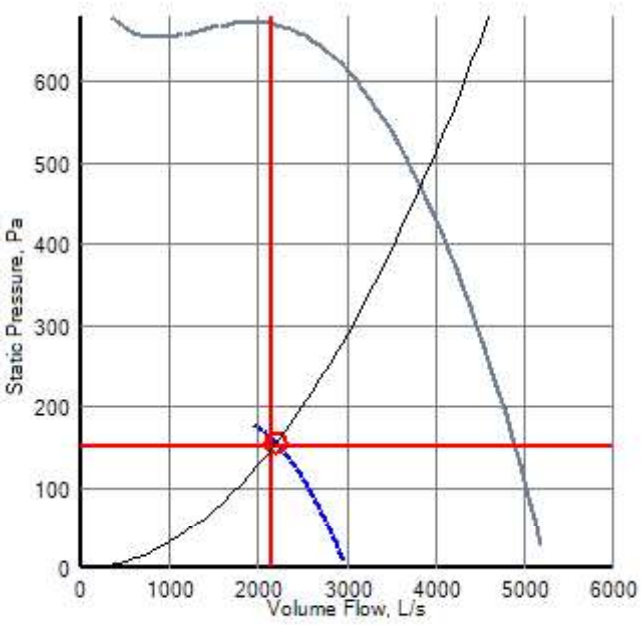
56% Speed, 79% additional capacity available

Performance - Required

Air Flow :	2160 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

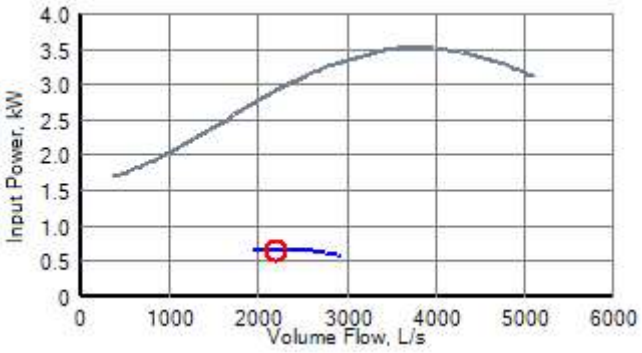
Actual

Air Flow:	2198 L/s
Static Pressure:	155 Pa
Total Pressure:	162 Pa



Fan Data

Catalogue Code:	PUDEC63		
Description:	PowerLine Ultra EC Series		
Diameter:	630 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	740 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.67 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	68.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	3.50kW
FLC/Start (DOL):	5.60A / 5.60A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	60	68	64	62	61	60	56	52	72	46
Outlet (dB):	63	71	67	69	67	65	61	53	76	51

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	319.7
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.9
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.8
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

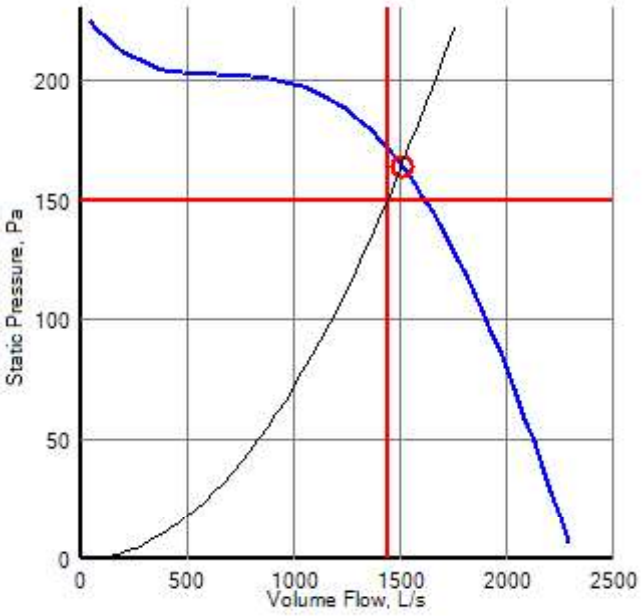
Location: 13 **Designation:** TEF 8-2

Performance - Required

Air Flow :	1440 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	1507 L/s
Static Pressure:	164 Pa
Total Pressure:	169 Pa

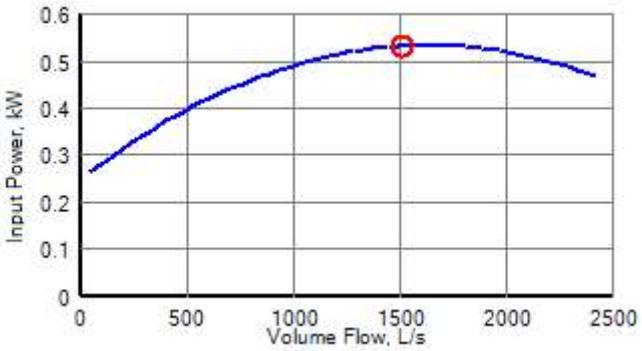


Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.53 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	255.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.3
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUDEC63

Location: 14 **Designation:** TEF 8-3

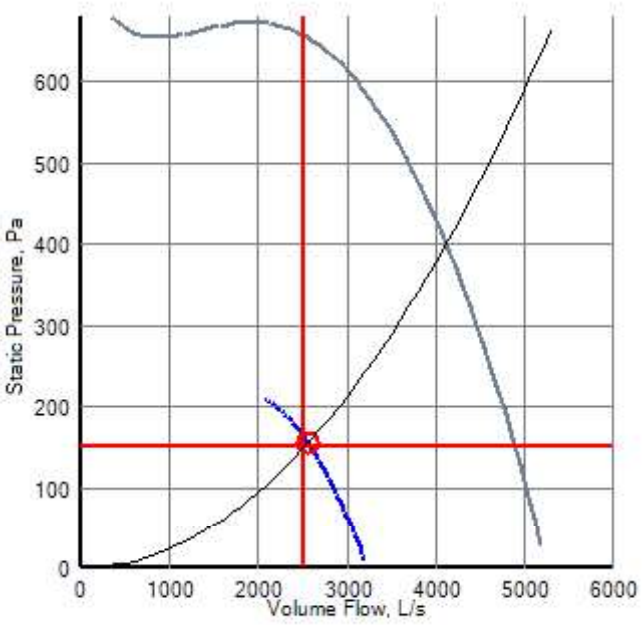
61% Speed, 65% additional capacity available

Performance - Required

Air Flow :	2520 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

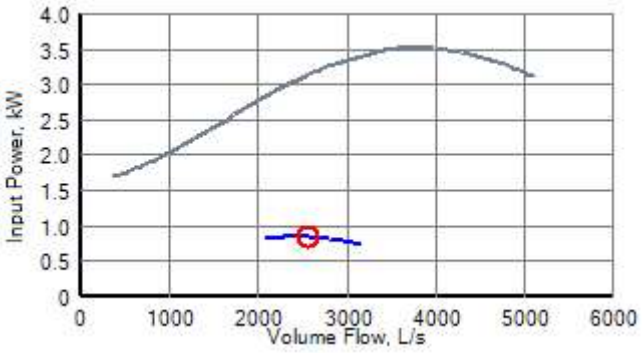
Actual

Air Flow:	2561 L/s
Static Pressure:	155 Pa
Total Pressure:	165 Pa



Fan Data

Catalogue Code:	PUDEC63		
Description:	PowerLine Ultra EC Series		
Diameter:	630 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	800 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.84 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	68.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	150
Motor Power:	3.50kW
FLC/Start (DOL):	5.60A / 5.60A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	62	70	66	64	63	62	58	54	74	48
Outlet (dB):	65	73	69	71	69	67	63	55	78	53

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	402.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	3.7
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	1.0
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

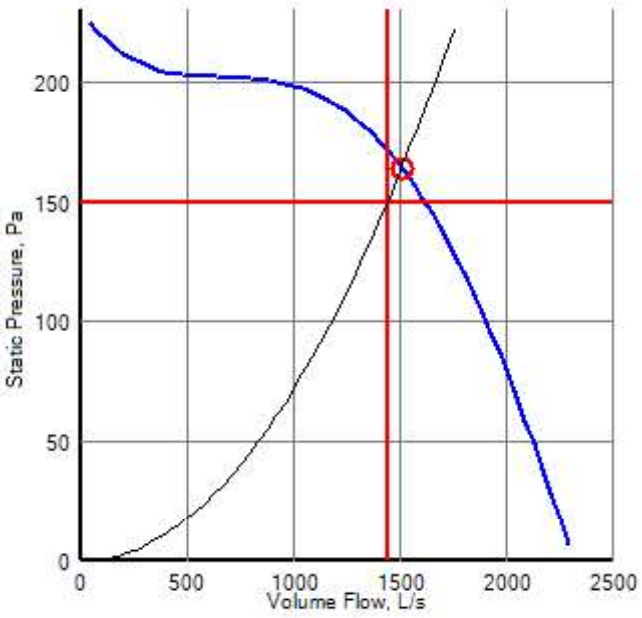
Location: 15 **Designation:** TEF 8-4

Performance - Required

Air Flow :	1440 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	1507 L/s
Static Pressure:	164 Pa
Total Pressure:	169 Pa

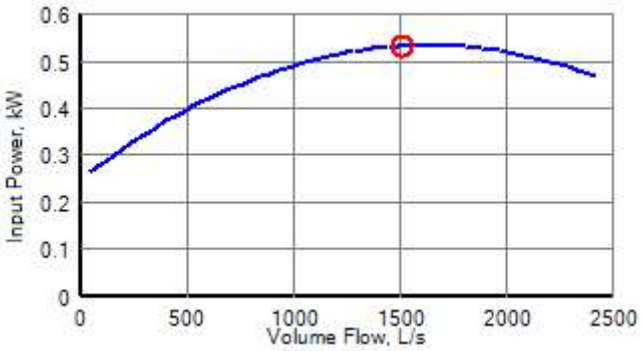


Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.53 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	255.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.3
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model APGV0806CP12/30

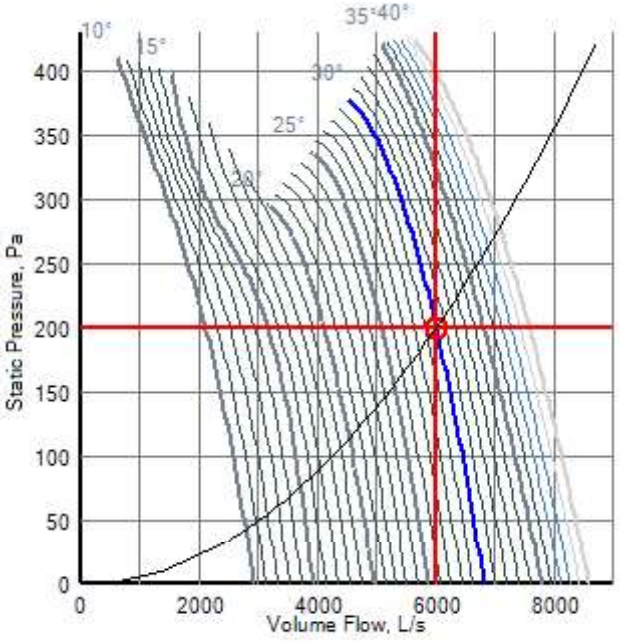
Location: 16 **Designation:** LSF 9-1

Performance - Required

Air Flow :	6000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	6008 L/s
Static Pressure:	201 Pa
Total Pressure:	287 Pa

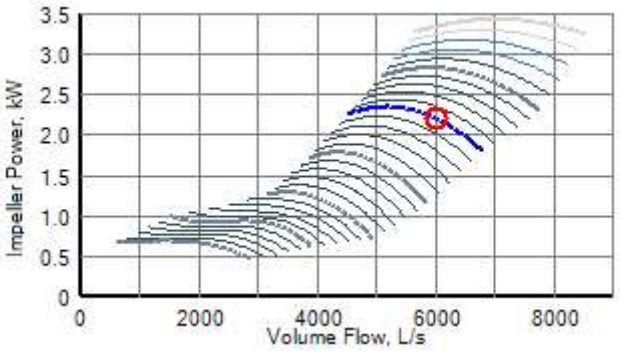


Fan Data

Catalogue Code:	APGV0806CP12/30 (APGV0806CP12B030)		
Description:	BladeVane Adj Pitch Fans		
Diameter:	800 mm	Hub:	350 mm
Impeller Type:	Axial	Pitch:	30°
Blade Material:	GRP	Blades:	12
Speed:	960 r/min @50 Hz		
Power, Abs:	2.21 kW	Form:	A
Input Power:	2.55 kW	Peak:	2.35 kW
Efficiency Total:	78.0%		
Fan Weight:	128.5 kg	Static:	54.6%

Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D132S	
Motor Power:	3.30kW (AOM)	(3.00kW IEC)
FLC/Start:	7.82A (AOM) / 43.37A	(7.11A FL IEC)
Motor Speed:	6 pole	
Motor Efficiency:	86.4%	



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+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	80	83	81	76	74	70	63	89	62
Outlet (dB):	88	84	85	82	78	76	71	67	92	64
Breakout (dB):	86	77	72	65	57	52	42	37	87	48

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	1226.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	11.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	3.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model APGV0806CP12/30

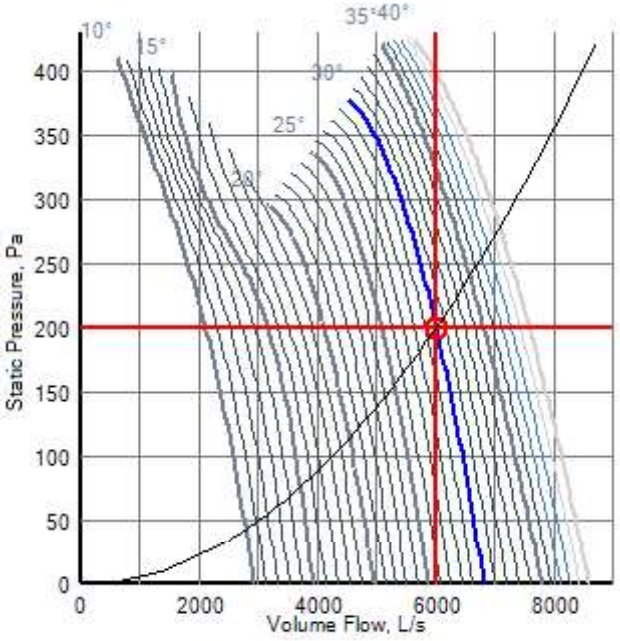
Location: 16 **Designation:** LSF 9-2

Performance - Required

Air Flow :	6000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	6008 L/s
Static Pressure:	201 Pa
Total Pressure:	287 Pa

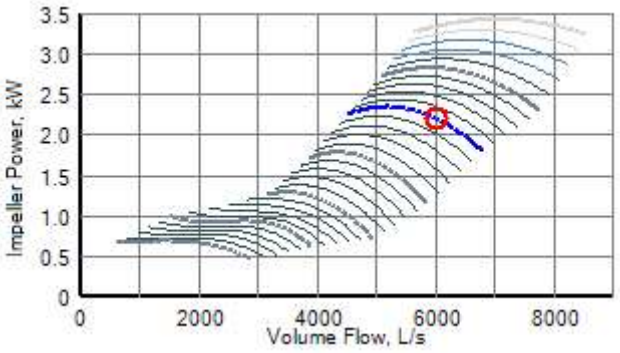


Fan Data

Catalogue Code:	APGV0806CP12/30 (APGV0806CP12B030)		
Description:	BladeVane Adj Pitch Fans		
Diameter:	800 mm	Hub:	350 mm
Impeller Type:	Axial	Pitch:	30°
Blade Material:	GRP	Blades:	12
Speed:	960 r/min @50 Hz		
Power, Abs:	2.21 kW	Form:	A
Input Power:	2.55 kW	Peak:	2.35 kW
Efficiency Total:	78.0%		
Fan Weight:	128.5 kg	Static:	54.6%

Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D132S	
Motor Power:	3.30kW (AOM)	(3.00kW IEC)
FLC/Start:	7.82A (AOM) / 43.37A	(7.11A FL IEC)
Motor Speed:	6 pole	
Motor Efficiency:	86.4%	



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+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	80	83	81	76	74	70	63	89	62
Outlet (dB):	88	84	85	82	78	76	71	67	92	64
Breakout (dB):	86	77	72	65	57	52	42	37	87	48

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	1226.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	11.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	3.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model APGV0806CP12/30

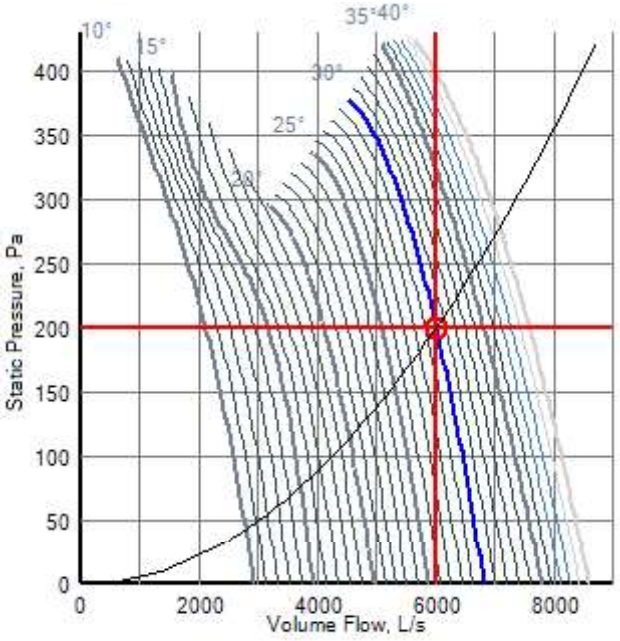
Location: 16 **Designation:** LSF 9-3

Performance - Required

Air Flow :	6000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	6008 L/s
Static Pressure:	201 Pa
Total Pressure:	287 Pa

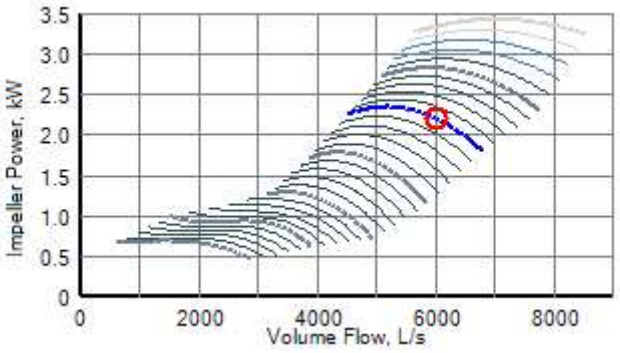


Fan Data

Catalogue Code:	APGV0806CP12/30 (APGV0806CP12B030)		
Description:	BladeVane Adj Pitch Fans		
Diameter:	800 mm	Hub:	350 mm
Impeller Type:	Axial	Pitch:	30°
Blade Material:	GRP	Blades:	12
Speed:	960 r/min @50 Hz		
Power, Abs:	2.21 kW	Form:	A
Input Power:	2.55 kW	Peak:	2.35 kW
Efficiency Total:	78.0%		
Fan Weight:	128.5 kg	Static:	54.6%

Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D132S	
Motor Power:	3.30kW (AOM)	(3.00kW IEC)
FLC/Start:	7.82A (AOM) / 43.37A	(7.11A FL IEC)
Motor Speed:	6 pole	
Motor Efficiency:	86.4%	



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	80	83	81	76	74	70	63	89	62
Outlet (dB):	88	84	85	82	78	76	71	67	92	64
Breakout (dB):	86	77	72	65	57	52	42	37	87	48

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	1226.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	11.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	3.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model APGV0806CP12/30

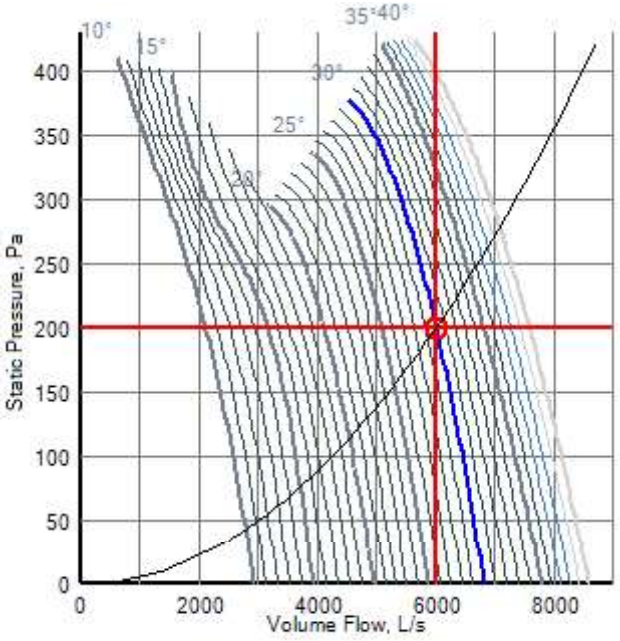
Location: 16 **Designation:** LSF 9-4

Performance - Required

Air Flow :	6000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	6008 L/s
Static Pressure:	201 Pa
Total Pressure:	287 Pa

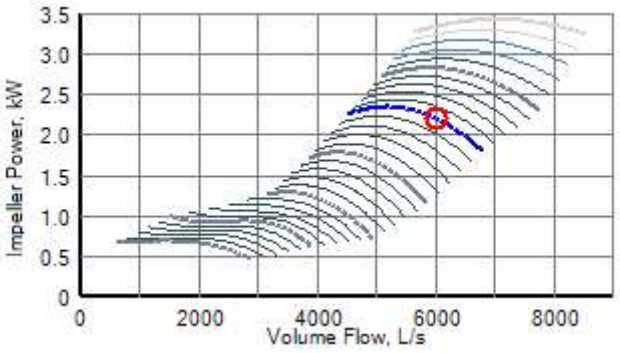


Fan Data

Catalogue Code:	APGV0806CP12/30 (APGV0806CP12B030)		
Description:	BladeVane Adj Pitch Fans		
Diameter:	800 mm	Hub:	350 mm
Impeller Type:	Axial	Pitch:	30°
Blade Material:	GRP	Blades:	12
Speed:	960 r/min @50 Hz		
Power, Abs:	2.21 kW	Form:	A
Input Power:	2.55 kW	Peak:	2.35 kW
Efficiency Total:	78.0%		
Fan Weight:	128.5 kg	Static:	54.6%

Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D132S	
Motor Power:	3.30kW (AOM)	(3.00kW IEC)
FLC/Start:	7.82A (AOM) / 43.37A	(7.11A FL IEC)
Motor Speed:	6 pole	
Motor Efficiency:	86.4%	



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	80	83	81	76	74	70	63	89	62
Outlet (dB):	88	84	85	82	78	76	71	67	92	64
Breakout (dB):	86	77	72	65	57	52	42	37	87	48

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	1226.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	11.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	3.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 18 **Designation:** SF 9-1

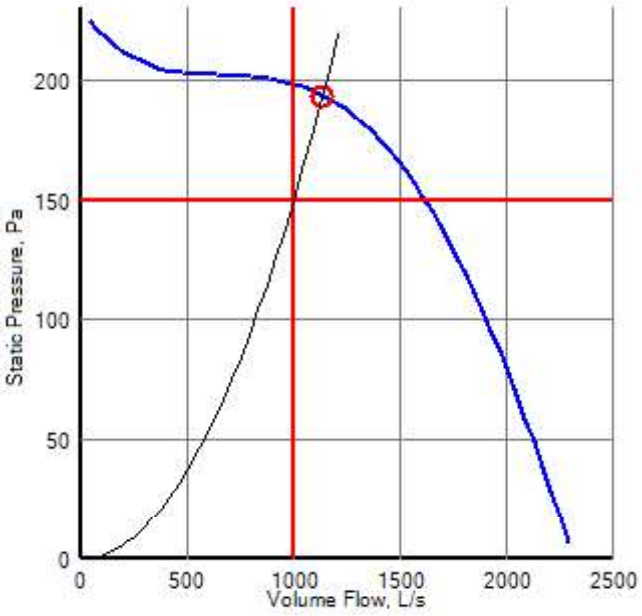
Performance - Required

Air Flow :	1000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

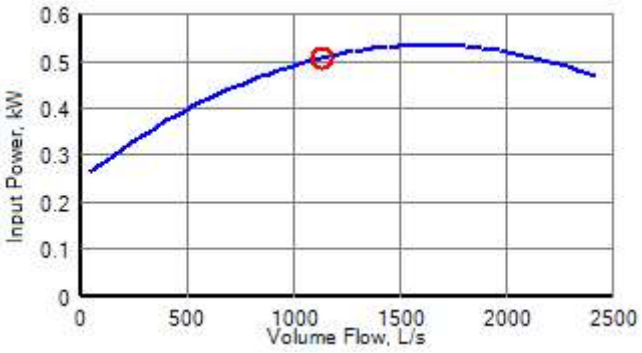
Air Flow:	1136 L/s
Static Pressure:	194 Pa
Total Pressure:	196 Pa

14% additional capacity available



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.51 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	243.5
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 18

Designation: SF 9-2

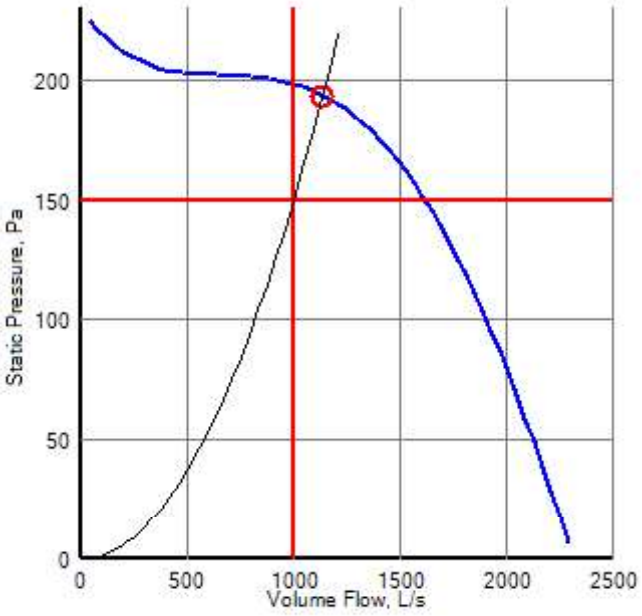
Performance - Required

Air Flow :	1000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

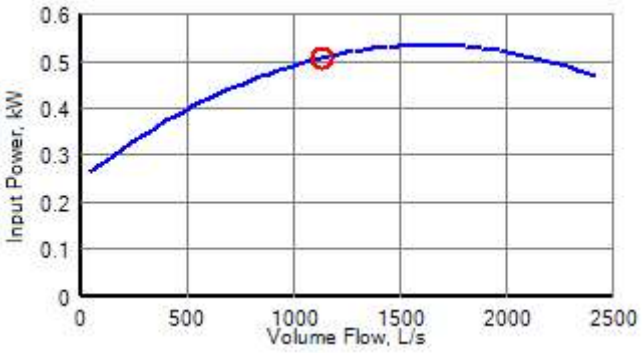
Air Flow:	1136 L/s
Static Pressure:	194 Pa
Total Pressure:	196 Pa

14% additional capacity available



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.51 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	243.5
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 18 **Designation** SF 9-3

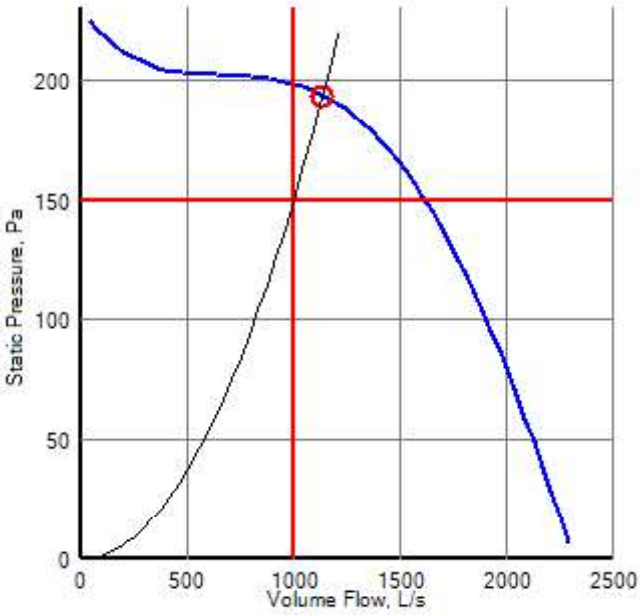
Performance - Required

Air Flow :	1000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

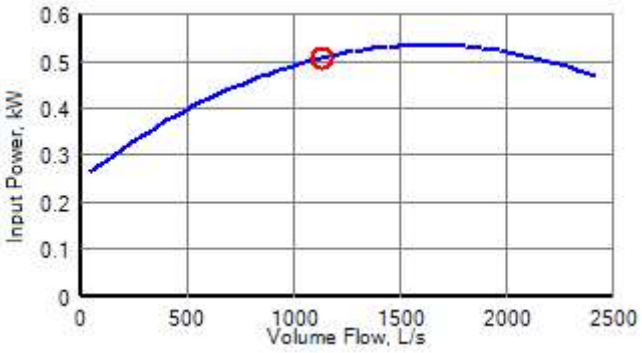
Air Flow:	1136 L/s
Static Pressure:	194 Pa
Total Pressure:	196 Pa

14% additional capacity available



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.51 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	243.5
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUD568ER

Location: 18

Designation SF 9-4

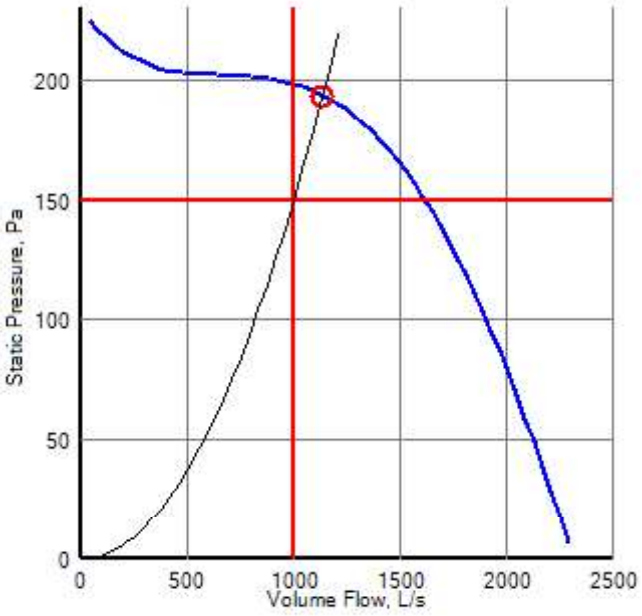
Performance - Required

Air Flow :	1000 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

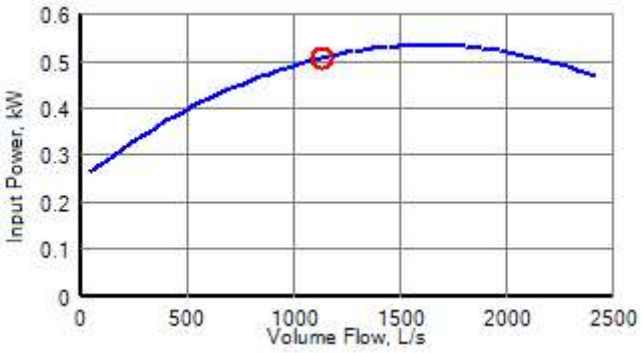
Air Flow:	1136 L/s
Static Pressure:	194 Pa
Total Pressure:	196 Pa

14% additional capacity available



Fan Data

Catalogue Code:	PUD568ER		
Description:	PowerLine Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	790 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.51 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	55.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	137
Motor Power:	0.62kW
FLC/Start (DOL):	1.10A / 3.30A
Motor Speed:	8 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	69	73	67	61	59	57	53	46	76	45
Outlet (dB):	72	73	68	67	66	63	58	50	77	50

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	243.5
DaysPerYear:	300	Annual GH Gas (Tonnes):	2.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.6
Cost per kWh ($):	0.16		

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Technical Data - Fan Model AP0804KP9/31

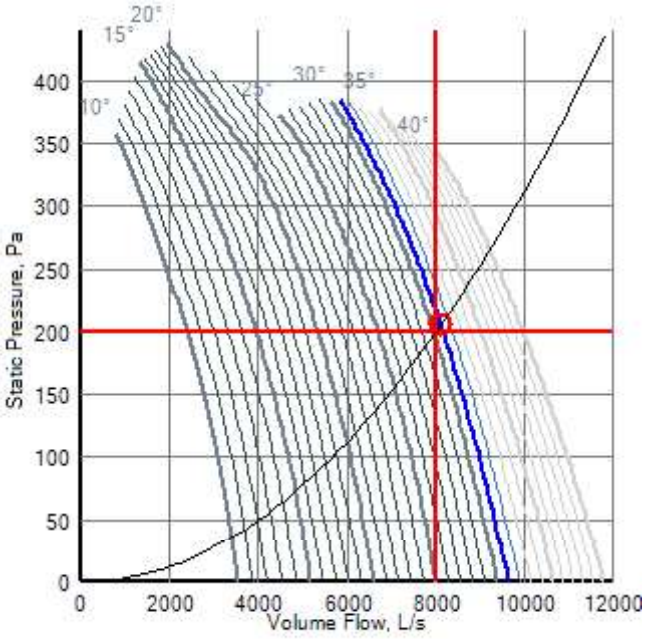
Location: 19 **Designation:** SP R-1

Performance - Required

Air Flow :	8000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

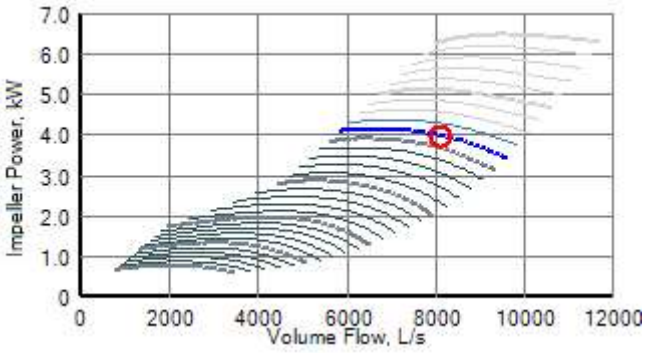
Actual

Air Flow:	8115 L/s
Static Pressure:	206 Pa
Total Pressure:	363 Pa



Fan Data

Catalogue Code:	AP0804KP9/31 (AP0804KP9B040)		
Description:	AP Series In-Line Direct Drive		
Diameter:	800 mm	Hub:	181 mm
Impeller Type:	Axial	Pitch:	31°
Blade Material:	GRP	Blades:	9
Speed:	1440 r/min @50 Hz		
Power, Abs:	4.00 kW	Form:	B
Input Power:	4.51 kW	Peak:	4.14 kW
Efficiency Total:	73.7%		
Fan Weight:	94.2 kg	Static:	41.8%



Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D112M	
Motor Power:	4.40kW (AOM)	(4.00kW IEC)
FLC/Start:	9.02A (AOM) / 49.20A	(8.20A FL IEC)
Motor Speed:	4 pole	
Motor Efficiency:	88.6%	

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	78	82	82	83	82	79	77	91	68
Outlet (dB):	88	82	80	82	83	81	80	80	92	68

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	2163.8
DaysPerYear:	300	Annual GH Gas (Tonnes):	19.8
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	5.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model AP0804KP9/31

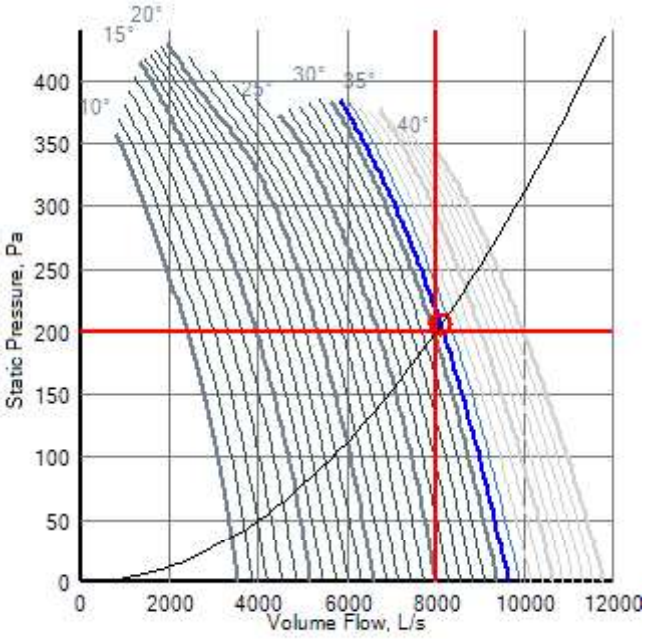
Location: 20 **Designation:** SP R-2

Performance - Required

Air Flow :	8000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

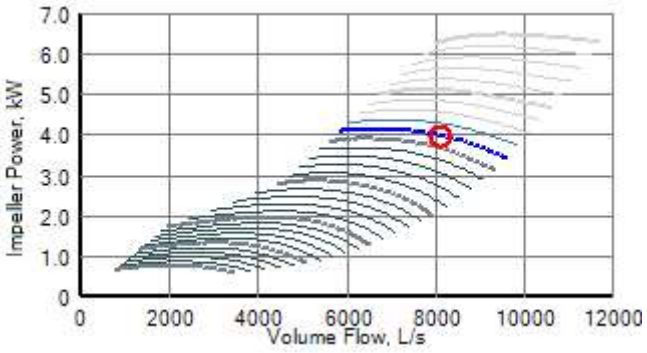
Actual

Air Flow:	8115 L/s
Static Pressure:	206 Pa
Total Pressure:	363 Pa



Fan Data

Catalogue Code:	AP0804KP9/31 (AP0804KP9B040)		
Description:	AP Series In-Line Direct Drive		
Diameter:	800 mm	Hub:	181 mm
Impeller Type:	Axial	Pitch:	31°
Blade Material:	GRP	Blades:	9
Speed:	1440 r/min @50 Hz		
Power, Abs:	4.00 kW	Form:	B
Input Power:	4.51 kW	Peak:	4.14 kW
Efficiency Total:	73.7%		
Fan Weight:	94.2 kg	Static:	41.8%



Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D112M	
Motor Power:	4.40kW (AOM)	(4.00kW IEC)
FLC/Start:	9.02A (AOM) / 49.20A	(8.20A FL IEC)
Motor Speed:	4 pole	
Motor Efficiency:	88.6%	

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2006 - 2009, 2013 - 2016, 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	85	78	82	82	83	82	79	77	91	68
Outlet (dB):	88	82	80	82	83	81	80	80	92	68

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	2163.8
DaysPerYear:	300	Annual GH Gas (Tonnes):	19.8
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	5.4
Cost per kWh ($):	0.16		

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Technical Data - Fan Model HC1258FP6/25

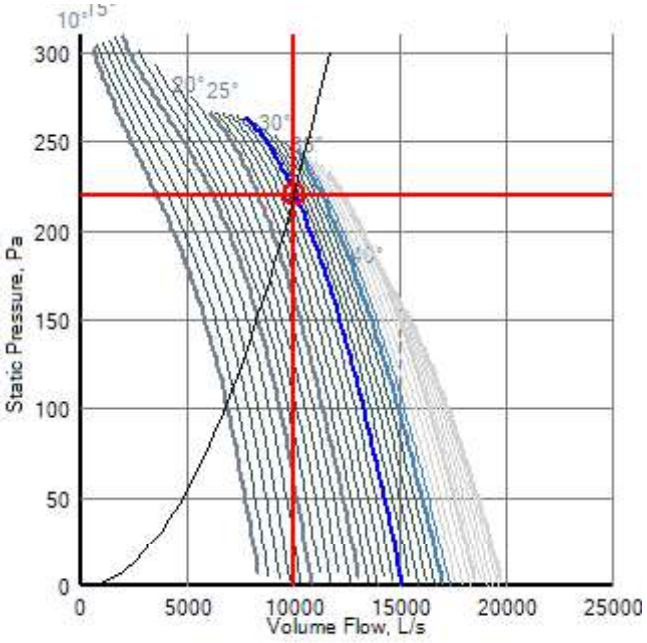
Location: 24 **Designation:** LRF R-1

Performance - Required

Air Flow :	10000 L/s
Static Pressure :	220 Pa
Selection Pressure:	220 Pa
Installation Type:	TYPE -
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

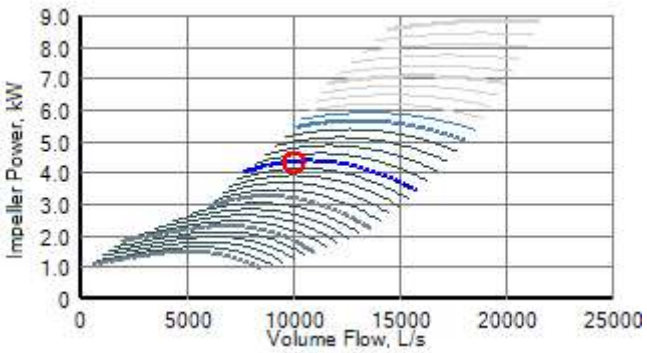
Actual

Air Flow:	10030 L/s
Static Pressure:	221 Pa
Total Pressure:	262 Pa



Fan Data

Catalogue Code:	HC1258FP6/25 (HC1258FP6B055)		
Description:	HC Series		
Diameter:	1250 mm	Hub:	550 mm
Impeller Type:	Axial	Pitch:	25°
Blade Material:	GRP	Blades:	6
Speed:	720 r/min @50 Hz		
Power, Abs:	4.36 kW	Form:	A
Input Power:	4.94 kW	Peak:	4.38 kW
Efficiency Total:	60.2%		
Fan Weight:	409.1 kg	Static:	51.0%



Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D160M	
Motor Power:	6.05kW (AOM)	(5.50kW IEC)
FLC/Start:	14.08A (AOM) / 74.24A	(12.80A FL IEC)
Motor Speed:	8 pole	
Motor Efficiency:	88.2%	

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	91	83	84	88	80	78	75	69	94	67
Outlet (dB):	92	84	83	86	81	78	75	72	94	66

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	2370.1
DaysPerYear:	300	Annual GH Gas (Tonnes):	21.7
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	5.9
Cost per kWh ($):	0.16		

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Technical Data - Fan Model HC1258FP6/25

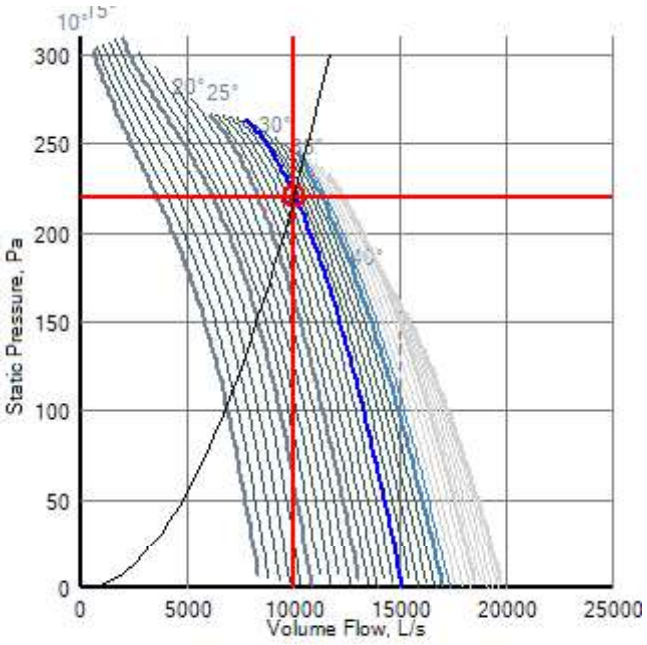
Location: 24 **Designation:** LRF R-2

Performance - Required

Air Flow :	10000 L/s
Static Pressure :	220 Pa
Selection Pressure:	220 Pa
Installation Type:	TYPE -
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

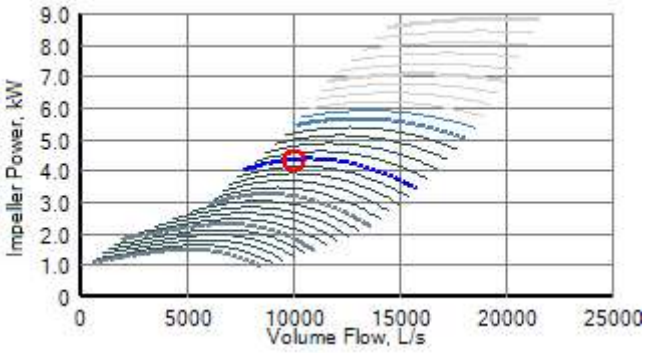
Actual

Air Flow:	10030 L/s
Static Pressure:	221 Pa
Total Pressure:	262 Pa



Fan Data

Catalogue Code:	HC1258FP6/25 (HC1258FP6B055)		
Description:	HC Series		
Diameter:	1250 mm	Hub:	550 mm
Impeller Type:	Axial	Pitch:	25°
Blade Material:	GRP	Blades:	6
Speed:	720 r/min @50 Hz		
Power, Abs:	4.36 kW	Form:	A
Input Power:	4.94 kW	Peak:	4.38 kW
Efficiency Total:	60.2%		
Fan Weight:	409.1 kg	Static:	51.0%



Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D160M	
Motor Power:	6.05kW (AOM)	(5.50kW IEC)
FLC/Start:	14.08A (AOM) / 74.24A	(12.80A FL IEC)
Motor Speed:	8 pole	
Motor Efficiency:	88.2%	

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	91	83	84	88	80	78	75	69	94	67
Outlet (dB):	92	84	83	86	81	78	75	72	94	66

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	2370.1
DaysPerYear:	300	Annual GH Gas (Tonnes):	21.7
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	5.9
Cost per kWh ($):	0.16		

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Technical Data - Fan Model AP0564LP12/20

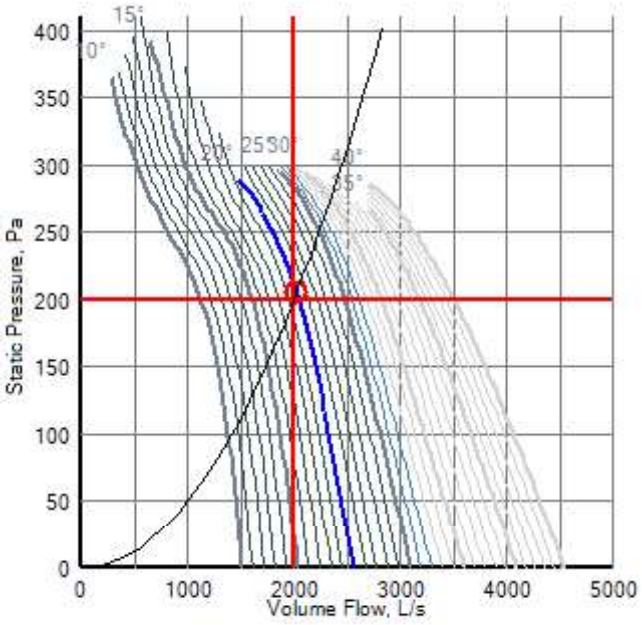
Location: 24 **Designation:** LRF R-3

Performance - Required

Air Flow :	2000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

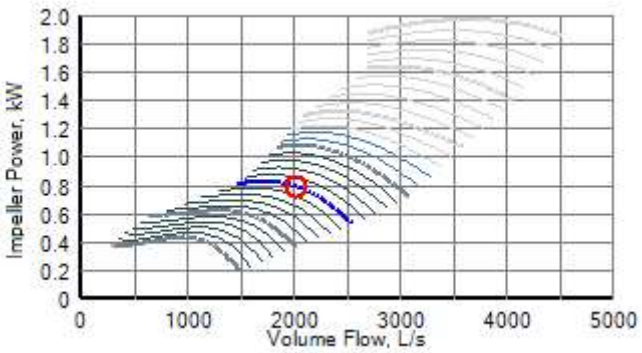
Actual

Air Flow:	2026 L/s
Static Pressure:	205 Pa
Total Pressure:	246 Pa



Fan Data

Catalogue Code:	AP0564LP12/20 (AP0564LP12B011)		
Description:	AP Series In-Line Direct Drive		
Diameter:	560 mm	Hub:	251 mm
Impeller Type:	Axial	Pitch:	20°
Blade Material:	GRP	Blades:	12
Speed:	1440 r/min @50 Hz		
Power, Abs:	0.79 kW	Form:	B
Input Power:	0.93 kW	Peak:	0.83 kW
Efficiency Total:	63.0%		
Fan Weight:	45.1 kg	Static:	52.5%



Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D90S	
Motor Power:	1.21kW (AOM)	(1.10kW IEC)
FLC/Start:	2.95A (AOM) / 15.01A	(2.68A FL IEC)
Motor Speed:	4 pole	
Motor Efficiency:	85.1%	

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	75	75	74	70	67	67	62	55	80	53
Outlet (dB):	81	76	75	72	68	69	63	58	84	55
Breakout (dB):	77	68	61	53	46	43	32	27	78	37

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	446.7
DaysPerYear:	300	Annual GH Gas (Tonnes):	4.1
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	1.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model AP0564LP12/20

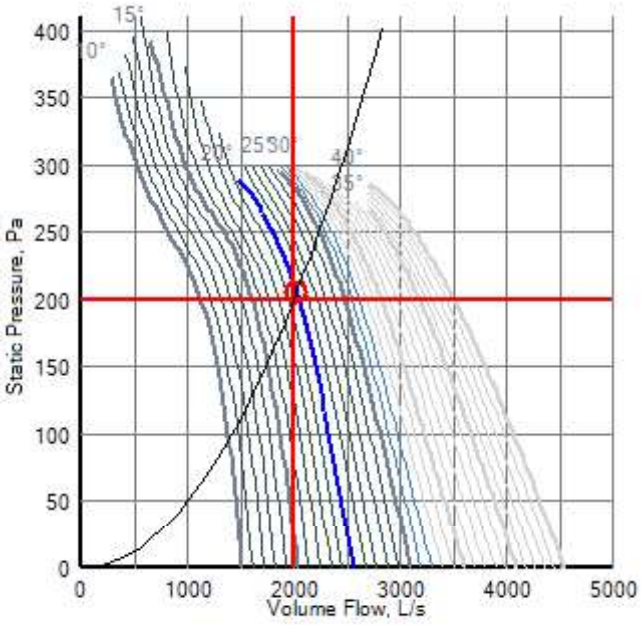
Location: 24 **Designation:** LRF R-4

Performance - Required

Air Flow :	2000 L/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	2026 L/s
Static Pressure:	205 Pa
Total Pressure:	246 Pa

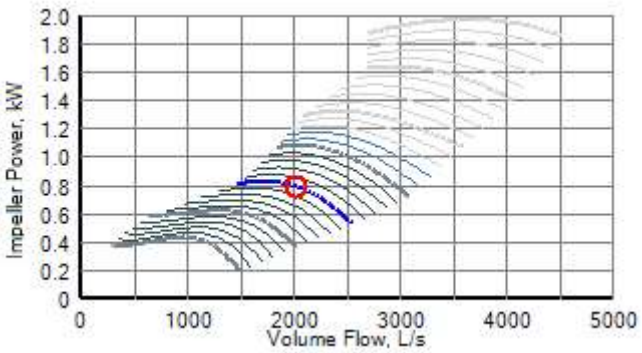


Fan Data

Catalogue Code:	AP0564LP12/20 (AP0564LP12B011)		
Description:	AP Series In-Line Direct Drive		
Diameter:	560 mm	Hub:	251 mm
Impeller Type:	Axial	Pitch:	20°
Blade Material:	GRP	Blades:	12
Speed:	1440 r/min @50 Hz		
Power, Abs:	0.79 kW	Form:	B
Input Power:	0.93 kW	Peak:	0.83 kW
Efficiency Total:	63.0%		
Fan Weight:	45.1 kg	Static:	52.5%

Motor Data (at STP)

Motor Type:	Standard	
Electrical Supply:	415V 3ph 50Hz	
Motor Frame:	D90S	
Motor Power:	1.21kW (AOM)	(1.10kW IEC)
FLC/Start:	2.95A (AOM) / 15.01A	(2.68A FL IEC)
Motor Speed:	4 pole	
Motor Efficiency:	85.1%	



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2006 - 2009, 2010 - 2012, 2013 - 2016
+ 2015 - 2016 Carpark, 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	75	75	74	70	67	67	62	55	80	53
Outlet (dB):	81	76	75	72	68	69	63	58	84	55
Breakout (dB):	77	68	61	53	46	43	32	27	78	37

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Fan Breakout Sound Power Levels exclude the breakout from any attached ductwork or flexible connections and are calculated from the Inlet and Outlet Sound Power Levels, considering the Sound Reduction Index of the Fan Casing.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	446.7
DaysPerYear:	300	Annual GH Gas (Tonnes):	4.1
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	1.1
Cost per kWh ($):	0.16		

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Technical Data - Fan Model HUD564

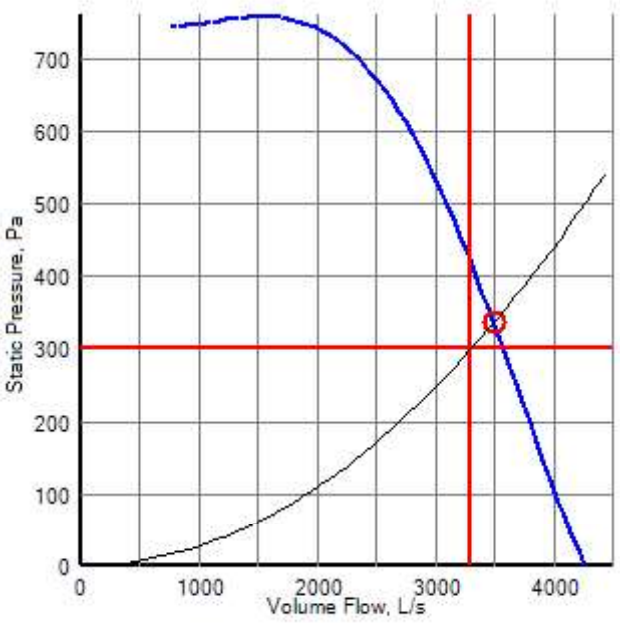
Location: 25 **Designation:** KEF R-1

Performance - Required

Air Flow :	3300 L/s
Static Pressure :	300 Pa
Selection Pressure:	300 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

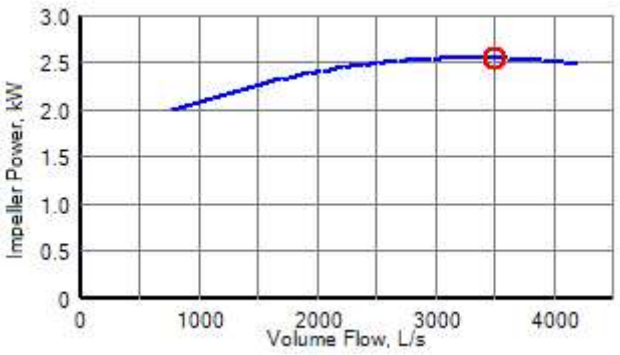
Actual

Air Flow:	3493 L/s
Static Pressure:	336 Pa
Total Pressure:	392 Pa



Fan Data

Catalogue Code:	HUD564		
Description:	Heritage Ultra Series		
Diameter:	560 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	1480 r/min @50 Hz		
Power, Abs:	2.55 kW		
Input Power:	2.89 kW	Peak:	2.55 kW
Efficiency Total:	53.8%		
Fan Weight:	97.0 kg	Static:	46.1%



Motor Data (at STP)

Motor Type:	
Electrical Supply:	415V 3ph 50Hz
Motor Frame:	D100L
Motor Power:	3.00kW
FLC/Start:	6.34A / 36.77A
Motor Speed:	4 pole
Motor Efficiency:	88.0%

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2006 - 2009, 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	78	83	81	79	77	71	66	67	87	61
Outlet (dB):	81	88	86	86	85	77	72	70	93	68

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	1389.6
DaysPerYear:	300	Annual GH Gas (Tonnes):	12.7
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	3.5
Cost per kWh ($):	0.16		

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Technical Data - Fan Model CEEC31V

Location: 26 NON-STERILE SOTRE **Designation:** EF R-1 AHU Exhaust fan

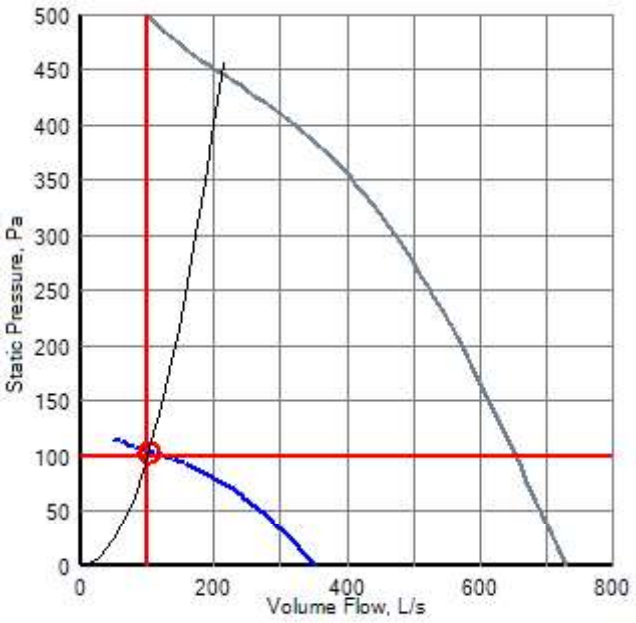
48% Speed, 111% additional capacity available

Performance - Required

Air Flow :	100 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	102 L/s
Static Pressure:	104 Pa
Total Pressure:	104 Pa

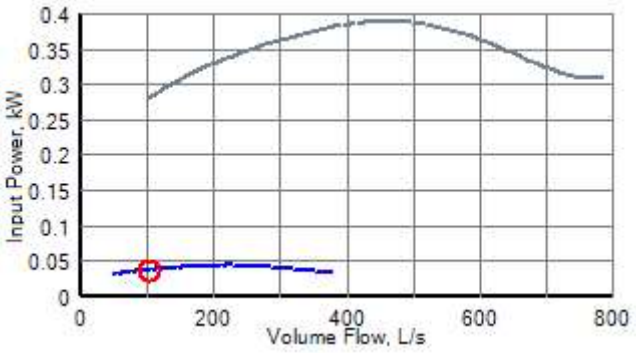


Fan Data

Catalogue Code:	CEEC31V		
Description:	Gamma EC Vertical		
Diameter:	315 mm		
Impeller Type:	Centrifugal		
Blade Material:	-		
Speed:	972 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.04 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	11.0 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.37kW
FLC/Start:	1.65A / 1.65A
Motor Speed:	2 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	56	56	64	65	61	59	52	57	70	46

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels are estimated at 50% speed.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	18.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.0
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 27 OP5

Designation: EF R-2 AHU Exhaust fan

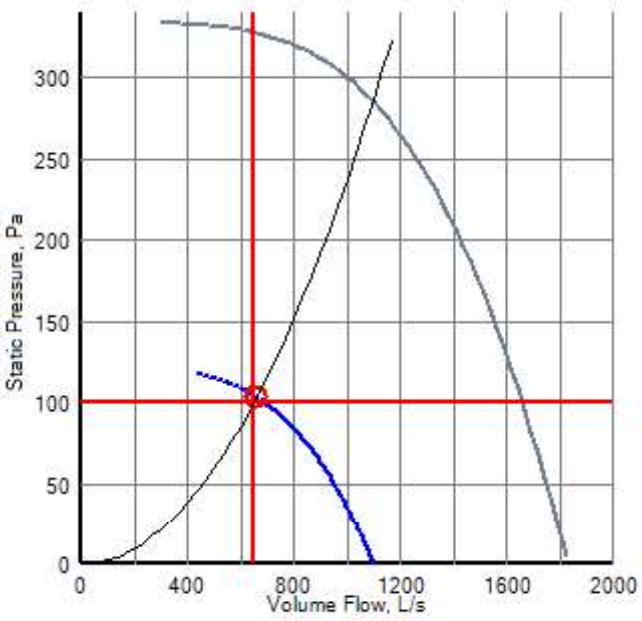
60% Speed, 69% additional capacity available

Performance - Required

Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

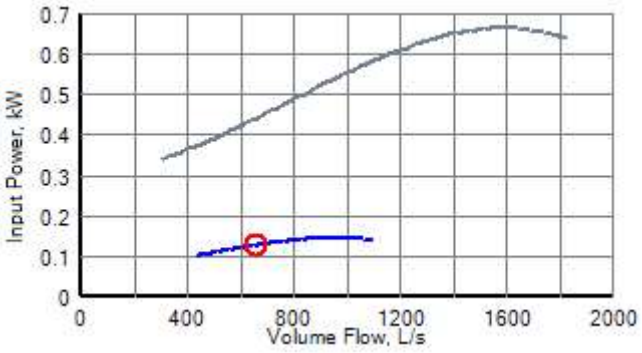
Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa



Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model CEEC31V

Location: 28 STERILE STORE

Designation: EF R-3 AHU Exhaust fan

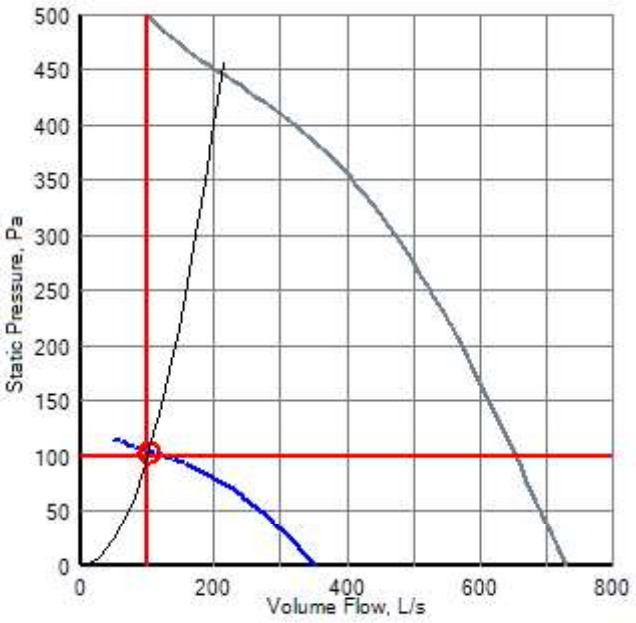
48% Speed, 111% additional capacity available

Performance - Required

Air Flow :	100 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	102 L/s
Static Pressure:	104 Pa
Total Pressure:	104 Pa

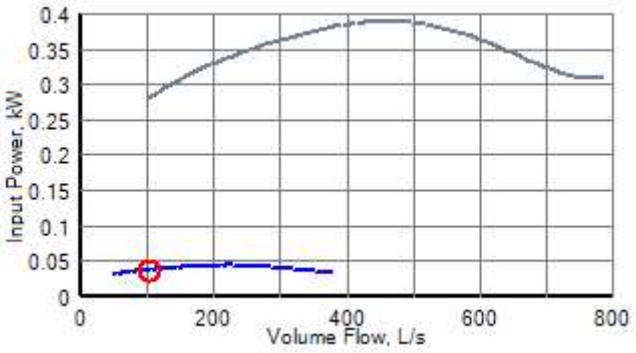


Fan Data

Catalogue Code:	CEEC31V		
Description:	Gamma EC Vertical		
Diameter:	315 mm		
Impeller Type:	Centrifugal		
Blade Material:	-		
Speed:	972 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.04 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	11.0 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.37kW
FLC/Start:	1.65A / 1.65A
Motor Speed:	2 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	56	56	64	65	61	59	52	57	70	46

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels are estimated at 50% speed.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	18.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.0
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 29 OP6

Designation: EF R-4 AHU Exhaust fan

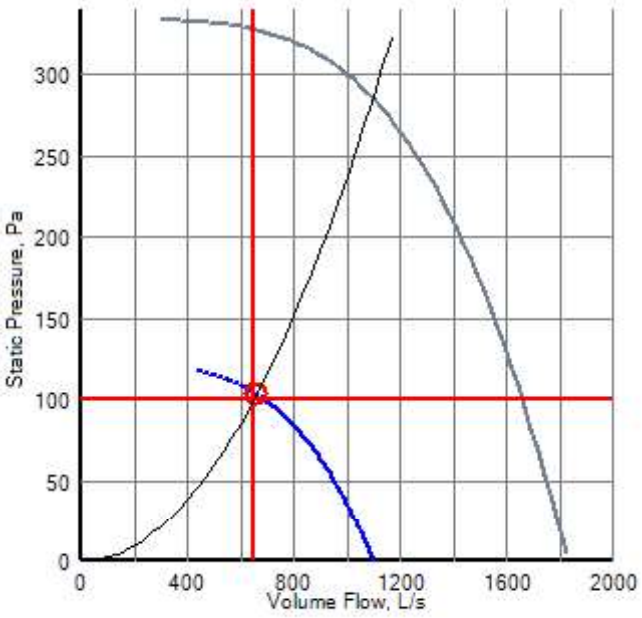
60% Speed, 69% additional capacity available

Performance - Required

Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

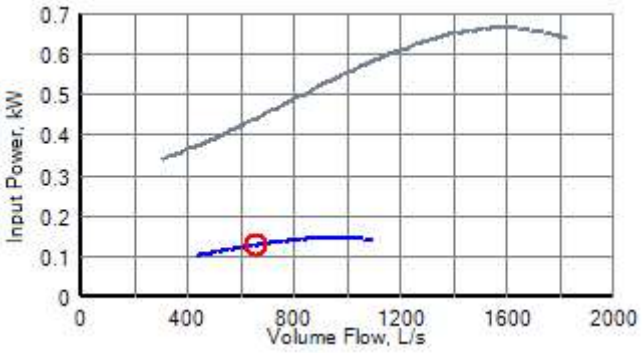
Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa



Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only. Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model CEEC31V

Location: 30 DECONTAMINATION **Designation:** EF R-5 AHU Exhaust fan

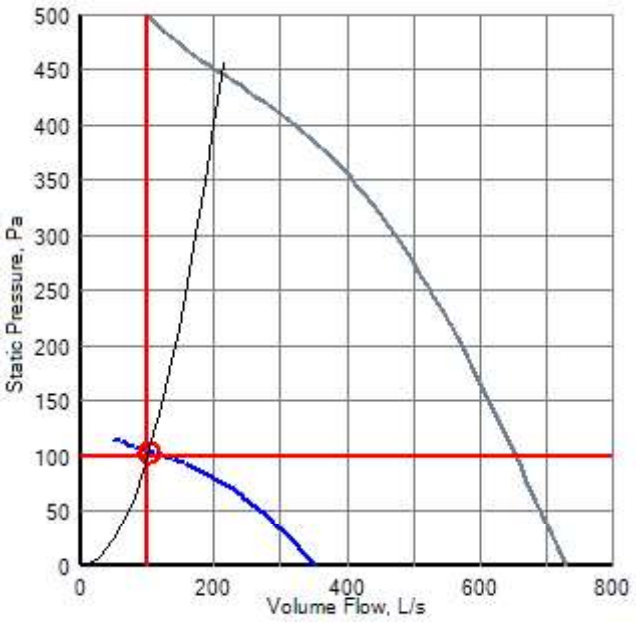
48% Speed, 111% additional capacity available

Performance - Required

Air Flow :	100 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

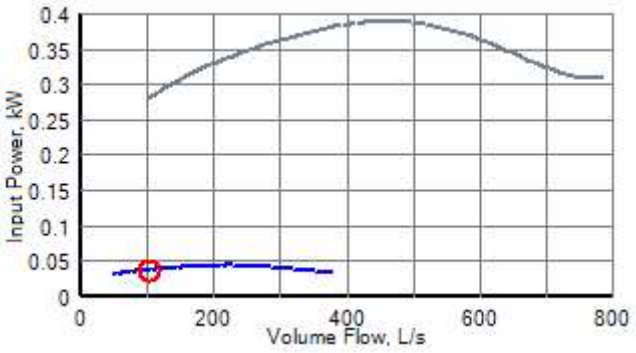
Actual

Air Flow:	102 L/s
Static Pressure:	104 Pa
Total Pressure:	104 Pa



Fan Data

Catalogue Code:	CEEC31V		
Description:	Gamma EC Vertical		
Diameter:	315 mm		
Impeller Type:	Centrifugal		
Blade Material:	-		
Speed:	972 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.04 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	11.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.37kW
FLC/Start:	1.65A / 1.65A
Motor Speed:	2 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	56	56	64	65	61	59	52	57	70	46

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels are estimated at 50% speed.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	18.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.2
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.0
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 31 OP4

Designation: EF R-6 AHU Exhaust fan

60% Speed, 69% additional capacity available

Performance - Required

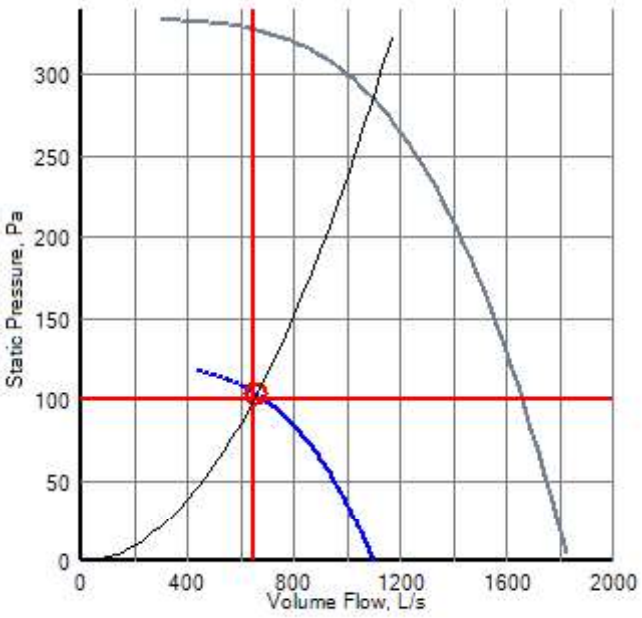
Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa

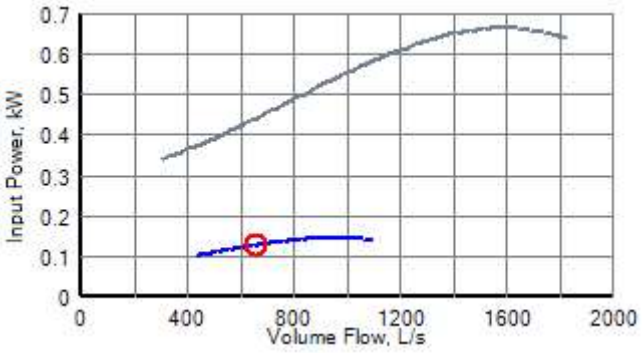
Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant

+ 2019

Energy Efficiency, H1/VM3 2021 compliant

+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only. Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 32 OP3

Designation: EF R-7 AHU Exhaust fan

60% Speed, 69% additional capacity available

Performance - Required

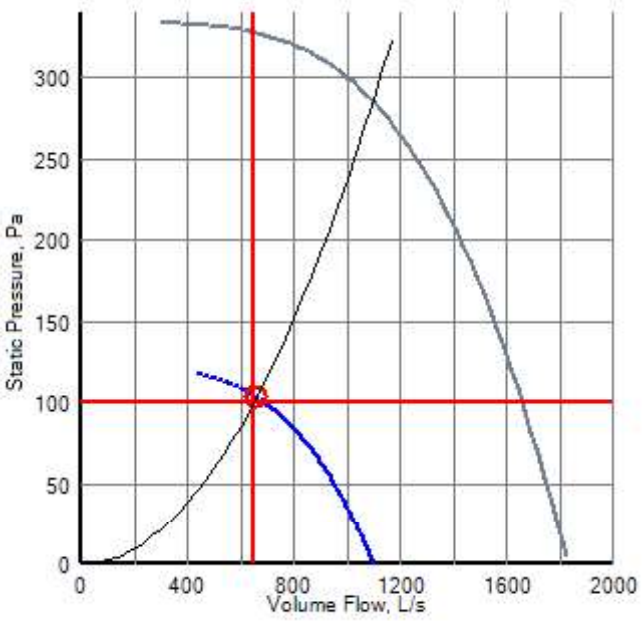
Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa

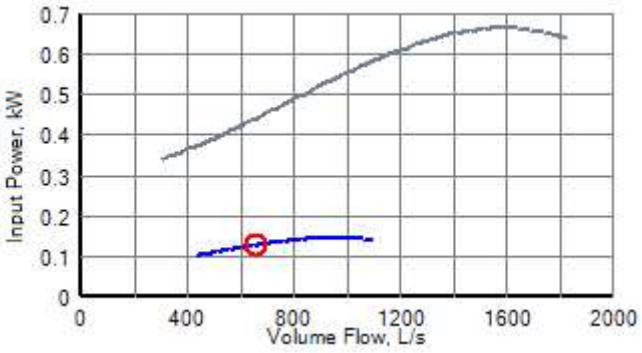
Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model CEEC31V

Location: 33 CORRIDOR

Designation: EF R-8 AHU Exhaust fan

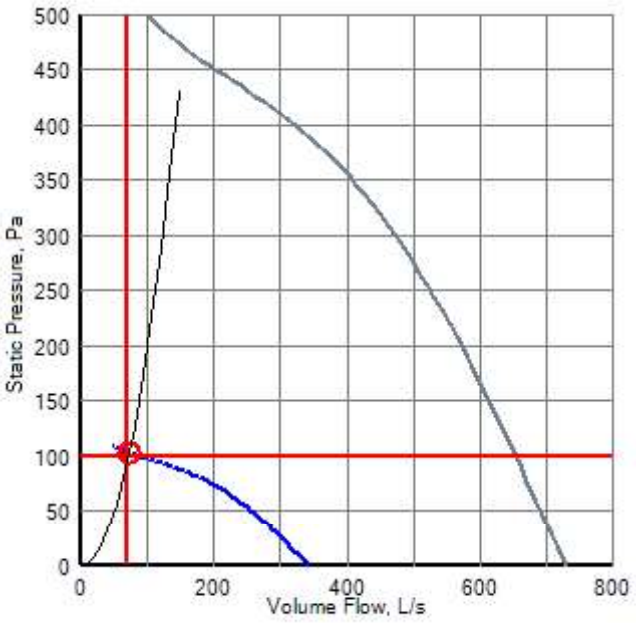
46% Speed, 118% additional capacity available

Performance - Required

Air Flow :	70 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

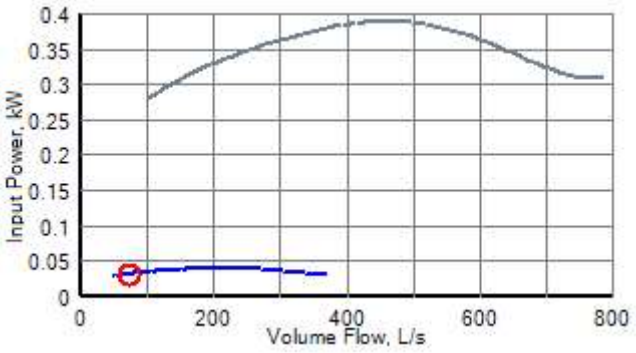
Actual

Air Flow:	72 L/s
Static Pressure:	104 Pa
Total Pressure:	104 Pa



Fan Data

Catalogue Code:	CEEC31V		
Description:	Gamma EC Vertical		
Diameter:	315 mm		
Impeller Type:	Centrifugal		
Blade Material:	-		
Speed:	943 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.03 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	11.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.37kW
FLC/Start:	1.65A / 1.65A
Motor Speed:	2 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	56	56	64	65	61	59	52	57	70	46

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.
Sound levels are estimated at 50% speed.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	15.4
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.1
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.0
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 35 OP2

Designation: EF R-9 AHU Exhaust fan

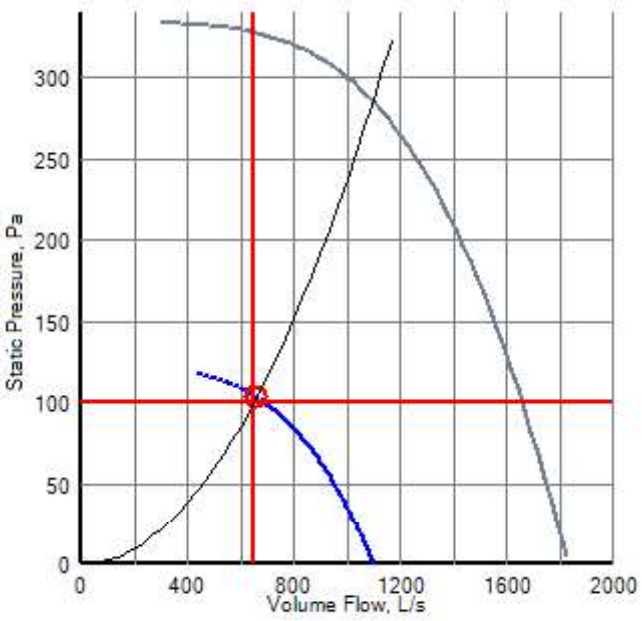
60% Speed, 69% additional capacity available

Performance - Required

Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

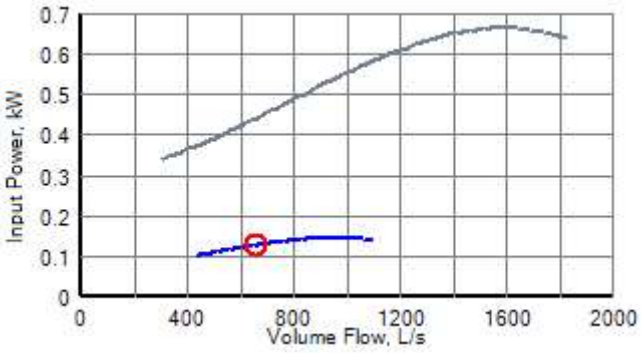
Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa



Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model GUEEC45V

Location: 36 OP1

Designation EF R-10 AHU Exhaust fan

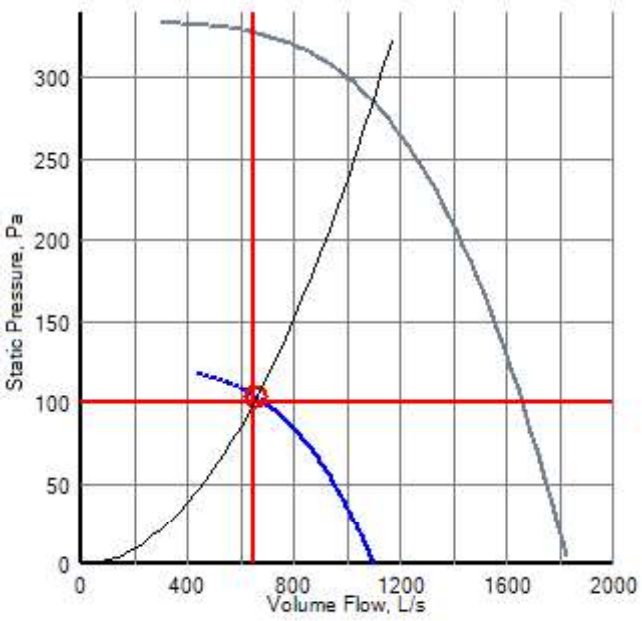
60% Speed, 69% additional capacity available

Performance - Required

Air Flow :	650 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

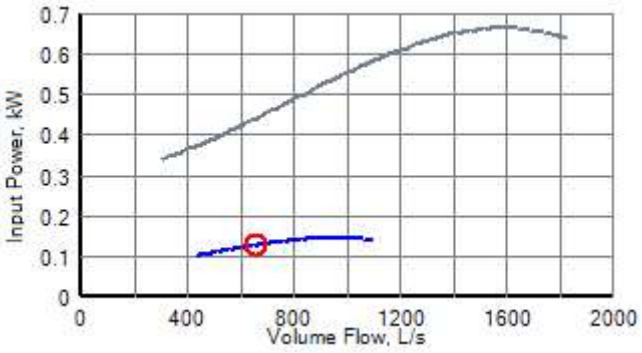
Actual

Air Flow:	660 L/s
Static Pressure:	103 Pa
Total Pressure:	103 Pa



Fan Data

Catalogue Code:	GUEEC45V		
Description:	Gamma Ultra EC - Vertical		
Diameter:	450 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	734 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	28.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	112
Motor Power:	0.64kW
FLC/Start (DOL):	3.30A / 3.30A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	63	65	59	57	54	49	43	71	42
Outlet (dB):	63	70	73	65	64	57	52	44	76	48

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.
Sound levels for fans running at non-standard speeds are estimated.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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Technical Data - Fan Model PUE284ER

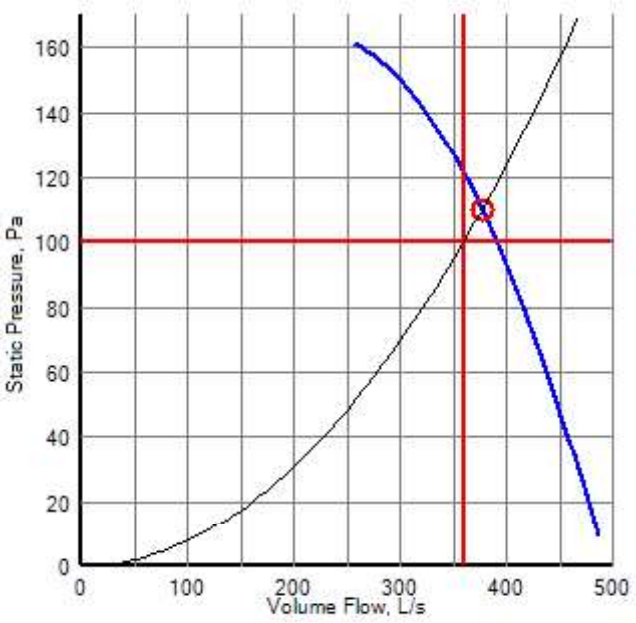
Location: 37 **Designation:** GEF G-3

Performance - Required

Air Flow :	360 L/s
Static Pressure :	100 Pa
Selection Pressure:	100 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

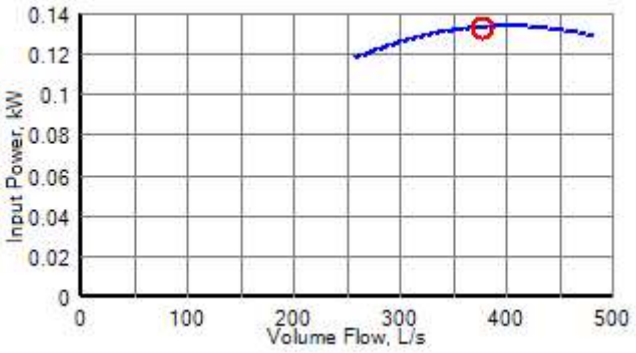
Actual

Air Flow:	377 L/s
Static Pressure:	110 Pa
Total Pressure:	116 Pa



Fan Data

Catalogue Code:	PUE284ER		
Description:	PowerLine Ultra Series		
Diameter:	280 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	1430 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	14.0 kg	Static:	-



Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	85
Motor Power:	0.13kW
FLC/Start (DOL):	0.66A / 1.98A
Motor Speed:	4 pole
Motor Efficiency:	-

Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	64	59	60	58	56	55	52	45	68	41
Outlet (dB):	64	61	62	61	62	63	58	50	70	47

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	64.0
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

As part of our continuous improvement processes, Fantech reserves the right to make changes in design or specification to products without notice.

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Technical Data - Fan Model RIL-200SW (Hi speed)

Location: 37

Designation: OAF G-1

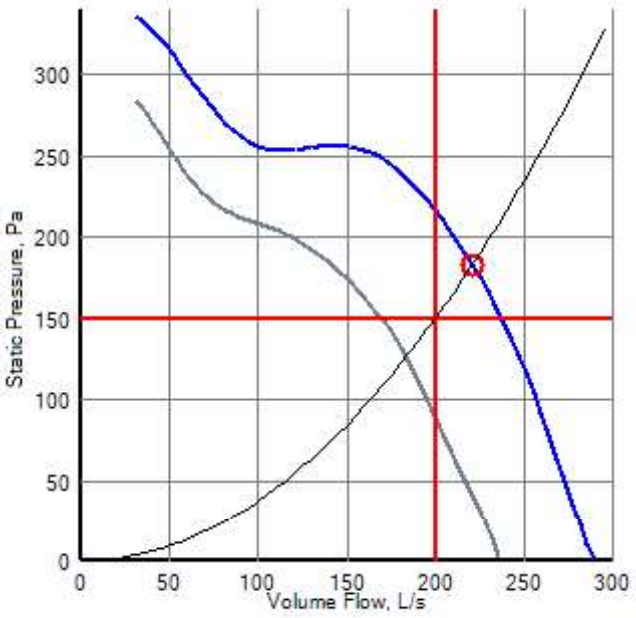
10% additional capacity available

Performance - Required

Air Flow :	200 L/s
Static Pressure :	150 Pa
Selection Pressure:	150 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

Actual

Air Flow:	221 L/s
Static Pressure:	183 Pa
Total Pressure:	213 Pa

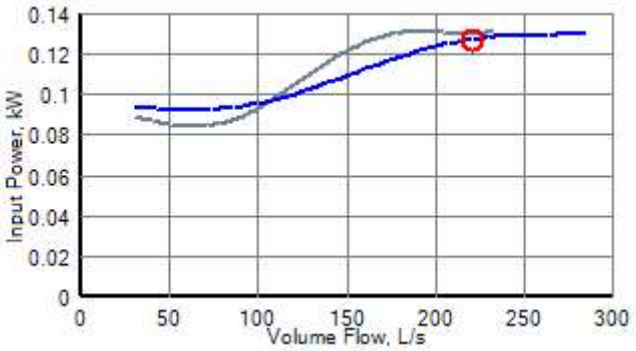


Fan Data

Catalogue Code:	RIL-200SW (Hi speed) (RIL-200SWBULK)		
Description:	ProVent Series (Bulk)		
Diameter:	200 mm		
Impeller Type:	Mixed Flow		
Blade Material:	-		
Speed:	2500 r/min @50 Hz		
Power, Abs:	-		
Input Power:	0.13 kW	Peak:	-
Efficiency Total:	-		
Fan Weight:	4.9 kg	Static:	-

Motor Data (at STP)

Motor Type:	
Electrical Supply:	240V 1ph 50Hz
Motor Frame:	
Motor Power:	0.12kW
FLC/Start:	0.50A / 1.50A
Motor Speed:	2 pole
Motor Efficiency:	-



Energy Efficiency, NCC/BCA Vol. 1, Section J compliant
+ 2019

Energy Efficiency, H1/VM3 2021 compliant
+ H1/VM3 2021

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	51	56	60	61	62	63	59	52	69	47
Outlet (dB):	58	54	61	64	67	64	59	52	71	50
Breakout (dB):	45	53	51	46	49	50	40	31	58	34

Sound levels are quoted as free-field values. dB(A) values are average spherical free-field for comparative use only.

Energy Sustainability Data

Hours Per Day:	10	Annual Electricity Cost ($):	61.2
DaysPerYear:	300	Annual GH Gas (Tonnes):	0.6
CO2 per kWh (kg):	1.467	Annual Carbon Usage (Tonnes):	0.2
Cost per kWh ($):	0.16		

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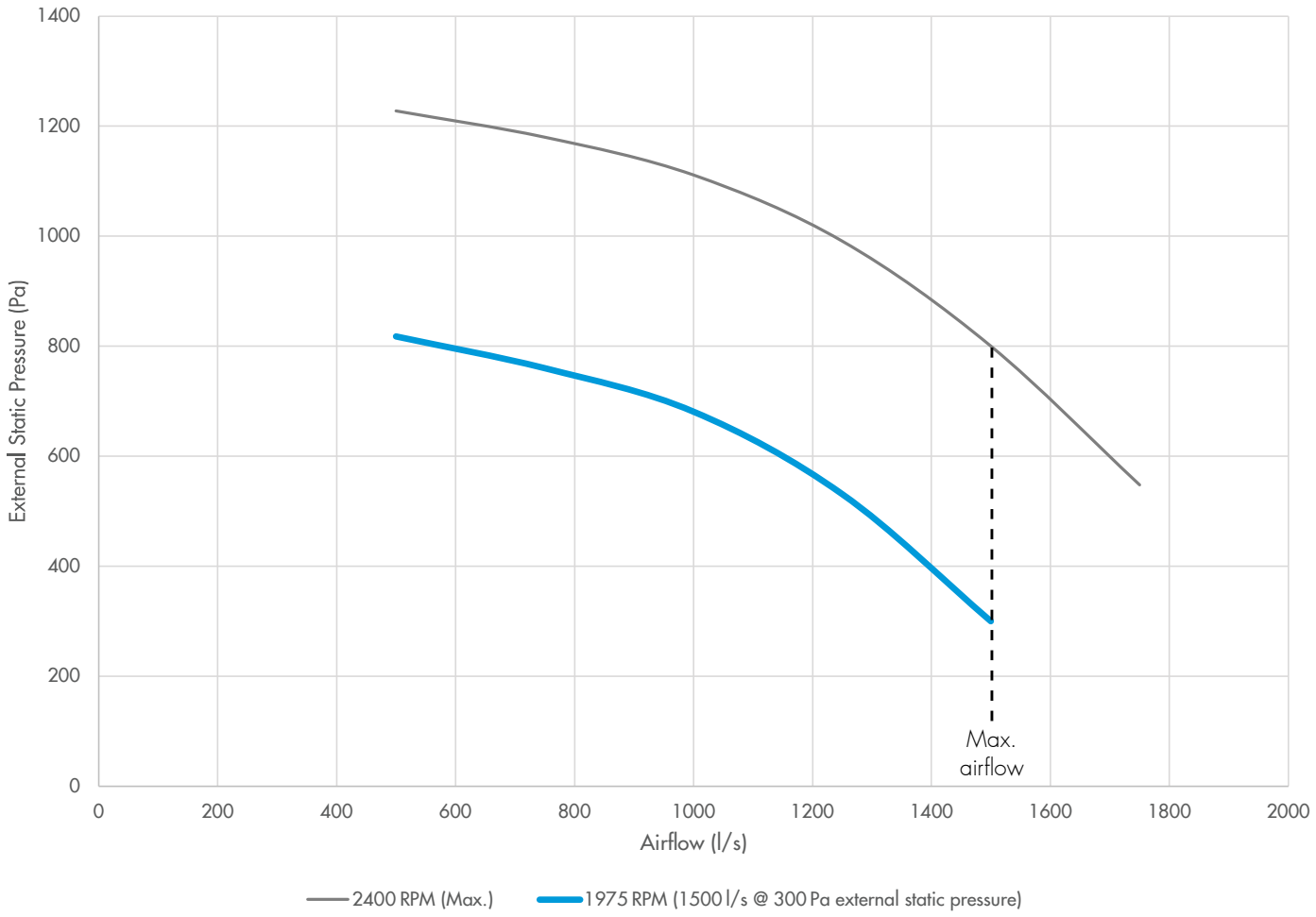
AHUs ON ROOF

PCU-N-D 15

Airflow & Noise

APPROVED

Supply Air Fan Curve*



* Fan curve makes allowance for internal pressure drop of unit (excluding filters). This pressure drop is subject to change, depending on project requirements. Supply air fan selection options are available.

Supply Air Fan Acoustics (Sound Power)†

1500 l/s @ 300 Pa External Static Pressure									
Inlet									
Frequency (Hz)	sum	63	125	250	500	1000	2000	4000	8000
A-weighted (dB)	75	40	49	65	69	66	67	65	69
Non A-weighted (dB)	79	65	64	74	73	66	66	65	70
Outlet									
Frequency (Hz)	sum	63	125	250	500	1000	2000	4000	8000
A-weighted (dB)	81	43	52	70	74	77	74	71	72
Non A-weighted (dB)	84	68	67	79	77	77	72	70	73

† Noise data considers supply air fans only, excluding compressor noise and condenser fan noise. Noise attenuation by the cabinet is also not considered. Filter pressure drop to be factored into the 300 Pa external static pressure.

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VIKING INDUSTRIAL

HALO1000-C | HALO SERIES

FEATURES

CUMMINS DIESEL ENGINE
110% BUNDED SKID BASE WITH FORK POCKETS
LIFTING LUGS
IP23 LEROY SOMER LSA 49.3 L10 ALTERNATOR
50 DEGREE RADIATOR
CHNT 4 POLE MANUAL CIRCUIT BREAKER
COMAP MRS16 CONTROL PANEL
ABB RD2 ADJUSTABLE RCD
BATTERY AND STARTER ISOLATOR
LOCKABLE ACCESS DOORS
1 X 32A OUTLET & 2 X 15A OUTLET
1.6MM STANDARD STEEL CANOPY

GENERATOR RATINGS

VOLTAGE	240/415
FREQUENCY	50
PHASE	3
POWER FACTOR	0.8
STANDBY AMPS	1529A
STANDBY RATINGS (KW/KVA)	880kW/1100kVA
PRIME RATINGS (KW/KVA)	800kW/1000kVA
CONTINUOUS POWER RATINGS (KW/KVA)	616kW/770kVA

COMPLIANCE

AS3000, AS3008, AS3012, AS3017, AS3010, ISO3046

PRIME POWER (PRP): The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capablility is available for aperiod of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

STANDBY POWER RATING (ESP): Appliable for supplying emergency power for 1 hour from genset starting. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the standby Power rating.

CONTINUOUS POWER RATING (COP): Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

SOUND

NOISE LEVEL	78dBA @ 7M

GENERATOR DATA

ENGINE	CUMMINS KTA38-G5
ALTERNATOR	LEROY SOMER LSA 49.3 L10
AIR INTAKE SYSTEM	Turbocharged & Aftercooled
FUEL SYSTEM	Cummins PT™, Direct Inj.
CYLINDER ARRANGEMENT	V-12
DISPLACEMENT	37.8L
GOVENOR TYPE	Electronically controlled actuator
RATED RPM	1500

DIMENSIONS

LENGTH	6058MM
WIDTH	2440MM
HEIGHT	2896MM
DRY WEIGHT	13000KG

FUEL SYSTEM

FUEL TANK CAPACITY	1000L
100% PRIME LOAD	209.0L/HR
75% PRIME LOAD	161.0L/HR
50% PRIME LOAD	113.0L/HR

Materials and specifications are subject to change each quarter, specsheets are current to 12/03/2021
The International System of Units (SI) is used in this publication

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