Section J Compliance

Wathaurong Hub Redevelopment

Wathaurong Aboriginal Co-Operative

27 November 2024

→ **The Power of Commitment**

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1. Introduction

This report provides an assessment of compliance of the proposed concept design of the Wathaurong Hub Morgan Street Redevelopment in accordance with the Deemed to Satisfy Solution requirements of Section J Energy Efficiency of the National Construction Code (NCC) 2022 Building Code of Australia – Volume 1.

1.1 Referenced standards

This report has been undertaken with reference to the following:

– The National Construction Code 2022
– NCC 2022 Volume One Façade Calculator
– AS4859.2-2018 and NSZ4214-2006 where applicable as per NCC (Amendment 1) Section J
– CIBSE Guide A where applicable

1.2 Referenced site information.

– Architectural drawings received from Woods Bagot: A-0001 to A-6500 40% CD package 26/09/2024 and drawings A3200 – A3201 Rev H dated 17/10/2024
– Mechanical drawings prepared by GHD: M000 and M100 rev 2 dated 01/10/2024.

1.3 Purpose of this report

This report is intended to provide a clause-by-clause analysis of the documented building design for compliance in relation to our interpretation of the Performance Requirements J1P1 of Section J of the NCC 2022.

1.4 Scope and limitations

This report: has been prepared by GHD for Wathaurong Aboriginal Co-Operative and may only be used and relied on by Wathaurong Aboriginal Co-Operative for the purpose agreed between GHD and Wathaurong Aboriginal Co-Operative as set out in Section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Wathaurong Aboriginal Co-Operative arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect. GHD has prepared this report on the basis of information provided by Wathaurong Aboriginal Co-Operative, and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Definitions and classifications

2.1 Definitions

The following applicable definitions and classifications apply:

Conditioned Space means a space within a building including ceiling or under-floor supply air plenum or return air plenum, where the environment is likely by the intended use of the space to have temperature controlled by air conditioning.

Envelope for the purposes of Section J, the building envelope means the parts of the building fabric that separate a conditioned space from the exterior of a building or a non-conditioned space.

Habitable Room means a room used for normal domestic activities.

Thermal Envelope refers to the building fabric separating a conditioned space (a space likely, due to its intended use, to have its temperature controlled by air conditioning) or habitable room from the exterior of the building or an unconditioned space. The accepted thermal envelope is marked up in Appendix A.

2.2 NCC Building classification

The proposed building is classified as Class 9B (Assembly Building) and Class 5 (Office) under NCC.

2.3 NCC Climate zone classification

The proposed building is located in Climate Zone 6 (mild temperature) as per NCC climate zone maps.

2.4 Assessment method

The compliance assessment method applied is outlined below:

The building will comply with NCC2022 Section J Clauses as below:

– J4 Building fabric: J1V3 Performance Solution
– J5 -J9: Deemed to satisfy provisions of the relevant Section J clauses

These requirements are assessed below.

3. J1V3 Verification using a Reference Building

Verification Method J1V3 assessment of the proposed Wathaurong Hub, in North Geelong, has been completed in accordance with the 2022 National Construction Code (NCC) and is intended only to determine building fabric performance necessary for Section J compliance. Provided the building services (Mechanical and electrical) are compliant with the Deemed to Satisfy (DTS) requirements, and provided the envelope thermal performance is as described in documentation described in Section 1.2 andTable 3.2, then compliance with section J will be achieved.

A J1V3 approach is required due to the following building fabric non-compliances with a DTS approach:

– The upper surface of the roof does not meet the solar absorptance requirement of <0.45

To compensate, the thermal performance of the walls and roofs of the airconditioned envelope has been improved beyond minimum requirements.

Two models are developed as per Table 3.1.

Table 3.1 Naming and definition of models

Model	Building Fabric	Building Services
Model 1	Reference - DTS requirements	Reference – DTS requirements
Model 2	Proposed	Reference – DTS requirements

By comparing annual Greenhouse gas emissions predicted by each model, it is possible to determine whether the building with proposed building fabrics results in less energy consumption than the reference, DTS compliant building. These 2 models are run with DTS compliant services. Compliance with the NCC Section J is achieved provided Model 2 Greenhouse gas emissions are less than Model 1 Greenhouse gas emissions. Proposed building with proposed building services does not need to be modelled provided checks in column 5 of Table 3.2 are carried out and services confirm compliance to DTS requirements of their respective sections, including J9.

3.1 Assessment

3.1.1 Building form

Figure 3.1 and Figure 3.2 show graphical outputs of the IES VE 2024 simulation model geometry. This geometry was based on the architectural documents listed in Section 1.2 and was used for both simulation models.

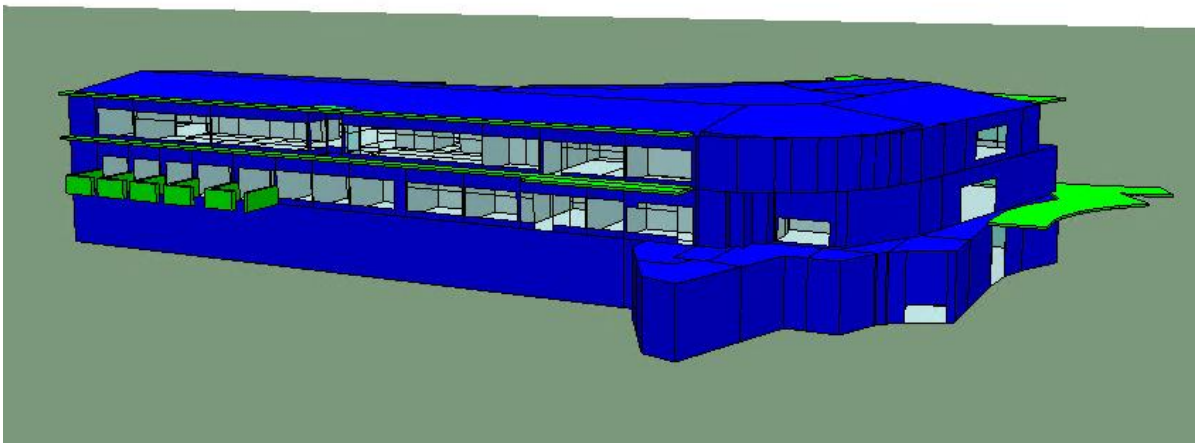


Figure 3.1 Building geometry view 1

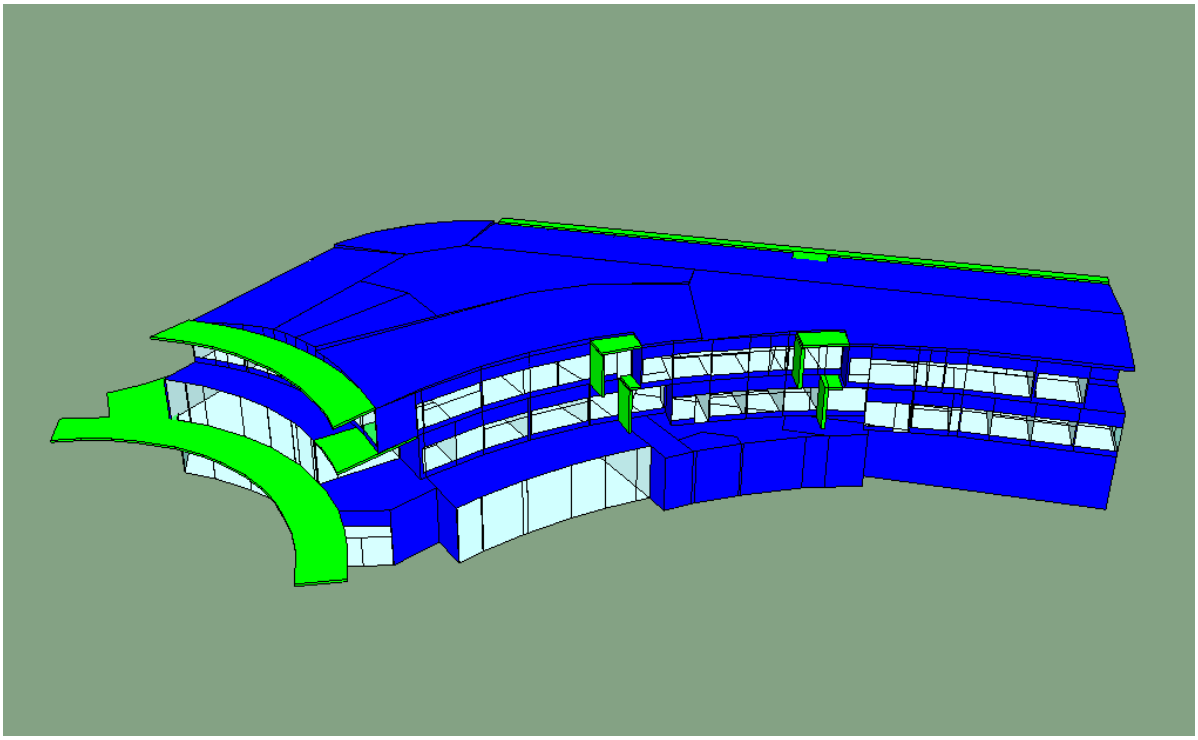


Figure 3.2 Building geometry view 2

3.2 Assessment inputs

Table 3.2 below summarises the main attributes of each model and the corresponding section of the NCC.

Table 3.2 Main models attributes

Element of design	Model 1 ref building with reference services	Model 2 proposed building with reference services	Corresponding section in NCC 2022	Checks to carry out to not need to check Model 3
Weather file	MelbourneIWEC.fwt			
Climate Zone	6			
Building classification	9b & 5			
Thermal envelope				
Envelope Walls North, East, South, and West	**R1, SA<0.6**	**R1.4,** **SA<0.6**	J4 + envelope calculator in appendix D Summary in Table 3.3	
Glazing including frame U-value (W/m2K)	**U3.91**	**U2.4 – U4.5** **Referenced glazing areas per architectural drawings A3200 – A3201 Revision H, dated 17.10.2024**	J4 + envelope calculator in appendix D Summary in Table 3.3	
Glazing including frame SHGC	**SHGC 0.52**	**SHGC 0.25 – 0.34**	J4 + envelope calculator in appendix D Summary in Table 3.3	
External shading	**As per architectural drawings.**			
Envelope Floor	**R2**	**R2**	J4	

Element of design	Model 1 ref building with reference services	Model 2 proposed building with reference services	Corresponding section in NCC 2022	Checks to carry out to not need to check Model 3
Envelope Roofs	**R3.2, SA<0.45**	**R3.6, SA =0.70-0.85** Proposed roof 'UniCote Weathered Iron'. UniCote has specified the solar absorptance range to be between 0.7 and 0.85. For the purposes of this assessment, the model has been run with both SA values and results have been taken from the model with the smallest energy improvement (SA 0.7).	J4	
Roof lights	**U 3.9** **SHGC 0.45**	**U 3.9** **SHGC 0.45**	J4D5	
infiltration	As per specification S34C2.d) 0.7 air changes per hour throughout all zones when there is no mechanically supplied outdoor air 0.35 air changes per hour throughout all zones at all other times			
Internal loads				
AC profiles	As per Table S35C2c and S35C2d from specification S35C		specification S35C.	
Internal gains people	Occupants 75WS/55WL Occupancies as per tables S35C2n and S35C2l in specification S35C2		Occupancy D2D18 specification S35C	
Occupancy profiles	As per Table S35C2i in specification S35C2		specification S35C	
Equipment profiles	As per Table S35C2i in specification S35C2			
Internal lighting gains	As proposed level of artificial lighting.		Table J7D3a	
People, equipment gain	As per Table S35C2l, S35C2m and S35C2n in specification S35C		specification S35C.	Proposed lighting power density<max DTS illumination power
HVAC				
AC temp setpoints in primary spaces	18 to 25 °C for transitory spaces (n/a) 21 to 24 °C for air conditioned spaces		as per specification S34C2 c) i)	
Outside air rates	Based on AS 1668.2 and occupant density		As per specification S35C	
DHW, Lifts, escalators	Omitted as same for both models		As per specification S34C4	
HVAC system	Compliant with DTS provisions Parts J6, J7 and J8 Controls as per specification JVb			Proposed mechanical services compliance with J6, J7, J8, J9
System EER Full load/IPLV	dX system as per MEPs and DTS		J6	dX as per J6D12

Element of design	Model 1 ref building with reference services	Model 2 proposed building with reference services	Corresponding section in NCC 2022	Checks to carry out to not need to check Model 3
System COP Heat	dX system as per MEPs and DTS		J6	dX as per J6D12
FCU and OA, SA fans	Max DTS absorbed power (based on sensible load per sqm)		J6	Proposed fan power < max DTS fan power
PMV				
PMV clothing level (CLO)	Summer 0.47, winter 0.81			
PMV Activity level (MET)	40 W/m^2 (seated at rest)			
PMV nominal air velocity (M/s)	0.15			
Greenhouse gas factors	Electricity 220 kg CO2/GJ No gas			

The location of the DTS and proposed envelope walls, roofs and floors can be found on marked up drawings in appendix C.

The DTS thermal envelope modelled is based on Method 2 of the calculator with values noted in Table 3.3:

Table 3.3 Reference Building

	Envelope Walls	Method 2 U-Value Check	Method 2 SHGC Check
Whole building	R1.0	3.91	0.52

3.3 Proposed Building Thermal Fabric

3.3.1 Roof/Ceiling

Summary of roof/ceiling compliance can be found in Table 3.4.

Table 3.4 Summary of roof compliance

Roof	Required R-Value/SA	Proposed Insulation	Achieved R-Value and SA	Compliance?
Roof (R0:01)	R_T3.2	Roof level: 80mm bulk insulation min R1.8 + 60mm insulation spacer **AND** Ceiling level: Min R1.7 Glasswool batts along suspended plasterboard ceiling	R3.63 SA 0.70-0.85	**Y**

Ceiling	Required R-Value	Proposed Insulation	Achieved R-Value	Compliance?
Ground floor, level 1 & 2 ceiling areas (as identified in the	R_T3.2	R2.6 Rigid board insulation fixed to the underside of slab.	R_T3.20	**Y**

Ceiling	Required R-Value	Proposed Insulation	Achieved R-Value	Compliance?
Thermal Envelope mark-up)		Application of either bulk or rigid board insulation to be extended an extra 500mm beyond areas required to account for thermal losses.		

3.3.2 Walls

Table 3.5 provides a summary of proposed wall thermal performance that forms part of the thermal envelope.

Table 3.5 Walls R value compliance

Wall Type	Proposed R-Value	Insulation requirement	Comply?
PD:15	R_T1.41	R2.2 Glasswool insulation + Thermal break (min R0.2)	**Y**
PD:33	R_T1.41	R2.2 Glasswool insulation + Thermal break (min R0.2)	**Y**
PD:04	R_T1.38	R1.8 Glasswool insulation + Thermal break (min R0.2)	**Y**
PD:03	R_T1.46	R1.8 Glasswool insulation + Thermal break (min R0.2)	**Y**
PD:14	R_T1.41	R2.2 Glasswool insulation + Thermal break (min R0.2)	**Y**
PD:34	R_T1.38	R1 unbridged rigid board insulation	**Y**

3.3.3 Glazing

Summary of proposed glazing can be found in Table 3.6.

Table 3.6 Summary of proposed glazing total system (glass + frame)

	U Value	SHGC
WD:01	2.7 W/m^{2}K	0.32
CU:01	2.4 W/m^{2}K	0.34
AGS 50 Awning	4.5 W/m^{2}K	0.23
AGS 900 Sliding Door	2.9 W/m^{2}K	0.28
AGS 225 Hinged Door	4.0 W/m^{2}K	0.25

3.3.4 Floors

Summary of floor compliance can be found in **Error! Reference source not found.**.

Table 3.7 Summary of floor compliance

Location	Required R-Value	Proposed Insulation	Achieved R-Value	Compliance?
Ground floor Concrete slab on Ground	R_T2.0	NA	R_T2.0 – met by soil contact for Climate Zone 6 CSOG	**Y**
Level 1 & 2 floor areas (as identified in	R_T2.0	R2.6 Rigid board insulation fixed to the underside of soffit of the ceiling level below. i.e floor	R_T3.20	**Y**

Location	Required R-Value	Proposed Insulation	Achieved R-Value	Compliance?
the Thermal Envelope mark-up)		insulation for Level 1 achieved by fixing rigid board insulation to the soffit of the carpark ceiling on ground floor. Application of insulation to be extended an extra 500mm beyond areas required to account for thermal losses.		

3.4 Modelling results

The following table presents the results of the energy calculations for Models 1 and 2.

Table 3.8 J1V3 Annual Greenhouse gas emissions

Annual Greenhouse gas emission	Model 1	Model 2
	Reference Building with Reference Services	Proposed Building with Reference Services
VRF Heating/Cooling Greenhouse gas emissions	18,098.1	16,910.3
VRF Fans Greenhouse gas emissions	2,764.6	2,559.7
DOAS Fans Greenhouse gas emissions	3,905.9	3,905.9
Total Greenhouse gas emissions	24,768.6	23,375.9
% reduction over DTS		5.6%

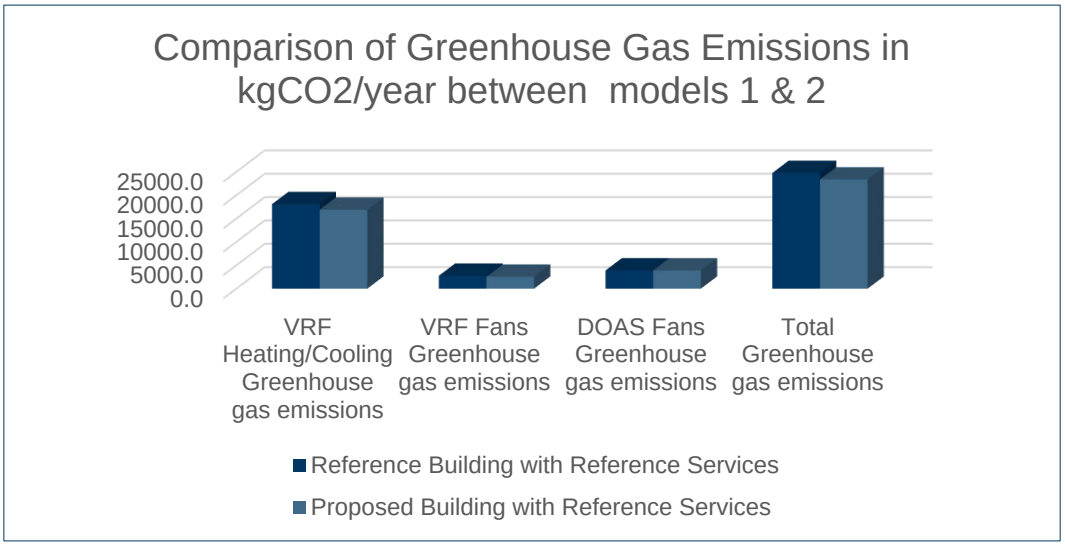


Figure 3.3 Comparison of energy modelling results

The results of energy modelling carried out in accordance with J1V3 Verification Method indicate that the relative Greenhouse gas emissions of the proposed building with reference services is less than the Reference Building

with reference services. This confirms that the building fabrics of the proposed building will be higher performing than the minimum required by Section J.

4. Clause by clause analysis

4.1 J2 – Energy efficiency

4.1.1 J2D1 – Deemed to satisfy provisions

The building will comply with J1P1 to J1P4 by complying with the relevant Section J Clauses as below:

– J4 Building fabric: J1V3 Performance Solution
– J5 -J9: Deemed to satisfy provisions of the relevant Section J clauses

These requirements are assessed below.

4.1.2 J2D2 – Application of Section J

(1) For a Class 2 to 9 building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, Performance Requirement J1P1 is satisfied by complying with—

– Part J4, for the building fabric
– Part J5, for building sealing
– Part J6, for air-conditioning and ventilation
– Part J7, for artificial lighting and power
– Part J8, for heated water supply and swimming pool and spa pool plant
– J9D3, for facilities for energy monitoring

(2) For a sole-occupancy unit of a Class 2 building or a Class 4 part of a building

Not applicable for this class of building.

4.2 J5 – Building sealing

4.2.1 J5D2 – Application of part

The deemed to satisfy provisions of this part apply to the thermal envelope of the building.

4.2.2 J5D3 – Chimneys and flues

Any solid-fuel burning fires must be provided with a damper or flap that can be closed to seal the chimney or flue.

4.2.3 J5D4 – Roof Lights

The proposed roof light must be sealed, or capable of being sealed and must be constructed with either; an imperforate ceiling diffuser installed at the ceiling or internal lining level, a weatherproof seal, or a shutter system readily operated by the occupant.

4.2.4 J5D5 - Windows and doors

This clause requires a seal to restrict air infiltration to be fitted to each edge of all new doors, openable windows and the like. This applies to internal and external doors. This must consist of a foam or rubber compressible strip, fibrous seal or equivalent to achieve compliance, and for the bottom edge of a door must be a draft stop.

These requirements do not extend to fire or smoke doors, roller shutter doors, roller shutter grilles or other security doors or devices installed only for out of hours use. Windows complying with AS2047 are also exempt from compliance.

This clause also requires any entrances to the building that lead to a conditioned space to have an airlock, self-closing door, rapid roller door or the like. There are some concessions to this for certain space types however they are not applicable to this building (instead being for cafes/restaurants).

4.2.5 J5D6 – Exhaust fans

Any new or modified exhaust fans serving a conditioned or habitable space must be fitted with a sealing device such as a self-closing damper or the like. For exhaust fans added to such spaces, this requirement will apply and be met by the mechanical design.

4.2.6 J5D7 – Construction of roof, walls and floors

The building fabric forming part of the thermal envelope or external fabric of a habitable room must be adequately sealed using expanding foam, rubber compressible strip, caulking skirting and cornices to minimise air leakage. Alternatively, the space may be enclosed by an internal lining system fitting closely at the ceiling, wall and floor junctions. This does not apply to openings, grilles or similar needed for smoke management.

The specification document and drawings show good practice construction, reference the need to install materials in line with manufacturer recommendations, and generally appear to reflect and specify adequately sealed construction. On this basis the design is deemed to be compliant with requirements of this clause.

4.2.7 J5D8 – Evaporative coolers

There are no evaporative coolers in the new design and as such this clause is not relevant.

4.3 J6 – Air conditioning and ventilation

4.3.1 J6D3(1) Air conditioning system control

BCA Provision J6D3(1)	Compliance Y/N	Comments
a) An air-conditioning system must be capable of being deactivated when the building or part of a building served by that system is not occupied.	Y	
b) An air-conditioning system when serving more than one air-conditioning zone or area with different heating or cooling needs, must—		
(i) Thermostatically control the temperature of each zone or area; and	Y	
(ii) Not control the temperature by mixing actively heated air and actively cooled air	Y	
(iii) Limit reheating to not more than—		
(A) For a fixed supply air rate, a 7.5K rise in temperature	N/A	No reheat system
(B) For a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.	N/A	No reheat system

BCA Provision J6D3(1)		Compliance Y/N	Comments
c)	An air-conditioning system which provides the required mechanical ventilation, other than in climate zone 1 or where dehumidification control is needed, must have an outdoor air economy cycle if the total air flow rate of any airside component of an air-conditioning system is greater than or equal to the figures in Table J6D3.	N/A	Building is in Climate Zone 6. Airflow does not exceed 2000L/s for any airside component of an air-conditioning system
d)	An air-conditioning system which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating.	N/A	There are no water-based systems
e)	An air-conditioning system with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied.	Y	
f)	An air-conditioning system when serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole- occupancy unit that opens to a balcony or the like, is open for more than one minute.	N/A	Building is not a Class 3
g)	An air-conditioning system must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant.	Y	
h)	An air-conditioning system must have a control dead band of not less than 2°C, except where a smaller range is required for specialised applications.	Y	
i)	An air-conditioning system must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded by more than 15% above design at each—		
	(A) Component.	Y	
	(B) Group of components operating under a common control in a system containing multiple components, as required to meet the needs of the system at its maximum operating condition.	Y	
j)	An air-conditioning system must ensure that each independently operating space of more than 1000 m^2 and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times.	Y	
k)	An air-conditioning system must have automatic variable temperature operation of heated water and chilled water circuits.	N/A	No heated water or chilled water circuits
l)	An air-conditioning system when deactivated, must close any motorised outdoor air or return air damper that is not otherwise being actively controlled.	Y	

4.3.2 J6D3 (2)

BCA Provision J6D3(2)	Compliance Y/N	Comments
When two or more air-conditioning systems serve the same space they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.	Y	

4.3.3 J6D3 (3) Time Switches

BCA Provision J6D3(3)		Compliance Y/N	Comments
a)	A time switch must be provided to control—		
	(i) An air-conditioning system of more than 2 kWr.	Y	
	(ii) a heater of more than 1 kW heating used for air-conditioning.	Y	
b)	The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.	Y	

BCA Provision J6D3(3)	Compliance Y/N	Comments
c) The requirements of (a) and (b) do not apply to—		
(i) An air-conditioning system that serves—		
(A) only one sole-occupancy unit in a Class 2, 3 or 9c building.	N/A	
(B) a Class 4 part of a building.	N/A	
(ii) a conditioned space where air-conditioning is needed for 24-hour continuous use.	N/A	

4.3.4 J6D4 Mechanical ventilation system control

BCA Provision J6D4	Compliance Y/N	Comments
1) General — A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must—		
(a) be capable of being deactivated when the building or part of the building served by that system is not occupied.	Y	
(b) When serving a conditioned space, except in periods when evaporative cooling is being used:		
(i) where specified in Table J6D4, have—		
(A) an energy reclaiming system that preconditions outdoor air at a minimum sensible heat transfer effectiveness of 60%; or	Y	
(B) demand control ventilation in accordance with AS 1668.2 if appropriate to the application.	Y	
(ii) not exceed the minimum outdoor air quantity required by Part F6 by more than 20%, except where—		
(A) Additional unconditioned outdoor air is supplied for free cooling; or	Y	
(B) Additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or	Y	
(C) An energy reclaiming system preconditions all the outdoor air;	Y	
(c) For an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is required by Part F6 to be constant.	Y	
2) An exhaust system with an air flow rate of more than 1000 L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a sole-occupancy unit in a Class 2, 3 or 9c building.	Y	
3) Carpark exhaust systems must have a control system in accordance with—		
(i) 4.11.2 of AS 1668.2; or	Y	
(ii) 4.11.3 of AS 1668.2.	Y	
4) Time switches — The following applies:		
(a) A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.	Y	
(b) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.	Y	
(c) The requirements of (a) and (b) do not apply to—		
(i) a mechanical ventilation system that serves—		
(A) Only one sole-occupancy unit in a Class 2, 3 or 9c building; or	N/A	
(B) a Class 4 part of a building; or	N/A	
(ii) A building where mechanical ventilation is needed for 24-hour occupancy.	Y	

4.3.5 J6D5 Fan systems

BCA Provision J6D5 (1) (2)	Compliance Y/N	Comments
1) Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must—		
(a) separately comply with (2), (3), (4) and (5); or	Y	
(b) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (2), (3), (4) and (5) together.	Y	
2) Fans —		
(a) Fans in systems that have a static pressure of not more than 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula: **η_{min} = 0.13 x ln(p) – 30** where— η_{min} = the minimum required system static efficiency for installation type A or C or the minimum required system total efficiency for installation type B or D; and p = the static pressure of the system (Pa).	Y	
(b) Fans in systems that have a static pressure above 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula: **η_{min} = 0.85 x (a x ln(P) - b + N) / 100** where η_{min} = the minimum required system static efficiency for installation type a or c or the minimum required system. Total efficiency for installation type B or D; and P = the motor input power of the fan (kw); and N = the minimum performance grade obtained from Table J5.4a; and a = regression coefficient a, obtained from Table J5.4b; and b = regression coefficient b, obtained from Table J5.4c; and ln = natural logarithm.	Y	
(c) The requirements of (a) and (b) do not apply to fans that need to be explosion proof.	N/A	

4.3.6 Ductwork

BCA Provision J6D5(3)	Compliance Y/N	Comments
(a) The pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed 1 Pa/m when averaged over the entire length of straight rigid duct and flexible duct. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.	Y	
(b) Flexible ductwork must not account for more than six m in length in any duct run.	Y	
(c) The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.	Y	
(d) Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—		
(i) The inclusion of turning vanes presents a fouling risk; or	Y	
(ii) A long radius bend in accordance with AS 4254.2 is used.	Y	

4.3.7 Ductwork components in the index run.

BCA Provision J6D5(4)	BCA J Provision 6D4(4) Detail	Compliance Y/N	Comments
(a)	The pressure drop across a coil must not exceed the value specified in Table J6D5d.	Y	
(b)	A high efficiency particulate arrestance (hepa) air filter must not exceed the higher of—		
(i)	A pressure drop of 200 Pa when clean; or	N/A	No HEPA filters
(ii)	The filter design pressure drop when clean at an air velocity of 1.5 m/s.	N/A	No HEPA filters
(c)	Any other air filter must not exceed—		
(i)	The pressure drop specified in Table J6D5e when clean; or	Y	
(ii)	The filter design pressure drops when clean at an air velocity of 2.5 m/s.	Y	
(d)	The pressure drop across intake louvres must not exceed the higher of—		
(i)	For single stage louvres, 30 Pa;	Y	
(ii)	For two stage louvres, 60 Pa;	Y	
(iii)	For acoustic louvres, 50 Pa;	Y	
(iv)	For other non-weatherproof louvres, 30 Pa.	Y	
(e)	The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed—		
(i)	For units with electric reheat, 100 Pa;	N/A	No VAV with electric reheat
(ii)	For other units, 25 Pa not including coil pressure losses.	N/A	
(f)	Rooftop cowls must not exceed a pressure drop of 30 Pa.	Y	
(g)	Attenuators must not exceed a pressure drop of 40 Pa.	Y	
(h)	Fire dampers must not exceed a pressure drop of 15 Pa when open.	Y	
(i)	Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.	Y	
(j)	Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.	Y	
(k)	Exhaust grilles must not exceed a pressure drop of 30 Pa.	Y	
(l)	Transfer ducts must not exceed a pressure drop of 12 Pa.	Y	
(m)	Door grilles must not exceed a pressure drop of 12 Pa.	N/A	
(n)	Active chilled beams must not exceed a pressure drop of 150 Pa.	N/A	
The requirements of (1), (2), (3) and (4) do not apply to—			
(a)	Fans in unducted air-conditioning systems with a supply air capacity of less than 1000 l/s; and	N/A	
(b)	Smoke spill fans, except where also used for air-conditioning or ventilation; and	N/A	
(c)	The power for process-related components; and	N/A	
(d)	Kitchen exhaust systems.	Y	
Note: From Table J6D5d, maximum coil pressure drops are: – 1 rows: 30 Pa – 2 rows: 50 Pa – 4 rows: 90 Pa – 6 rows: 130 Pa – 8 rows: 175 Pa – 10 rows: 220 Pa			

Note: From Table J6D5e, maximum clean filter pressure drops are:
– MERV 9: 55 Pa
– MERV 11: 65 Pa
– MERV 13: 95 Pa
– MERV 14: 110 Pa

4.3.8 J6D6 Ductwork insulation

BCA Provision J6D6	Compliance Y/N	Comments
1) Ductwork and fittings in an air-conditioning system must be provided with insulation—		
(a) Complying with AS/NZS 4859.1; and	Y	
(b) Having an insulation R-Value greater than or equal to—		
(i) For Flexible ductwork, 1.0; or	Y	
(ii) For cushion boxes, that of the connecting ductwork; or	Y	
(iii) That specified in Table J6D6	Y	
2) Insulation must—		
(a) be protected against the effects of weather and sunlight; and	Y	
(b) be installed so that it—		
(i) Abuts adjoining insulation to form a continuous barrier; and	Y	
(ii) Maintains its position and thickness, other than at flanges and supports; and	Y	
(c) When conveying cooled air—		
(i) Be protected by a vapour barrier on the outside of the insulation; and	Y	
(ii) Where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—		
(A) Overlap by at least 50 mm; and	Y	
(B) Are bonded or taped together.	Y	
3) The requirements of (1) do not apply to—		
(a) Ductwork and fittings located within the only or last room served by the system; or	Y	
(b) Fittings that form part of the interface with the conditioned space; or	Y	
(c) Return air ductwork in, or passing through, a conditioned space; or	Y	
(d) Ductwork for outdoor air and exhaust air associated with an air-conditioning system; or	Y	
(e) The floor of an in-situ air-handling unit; or	N/A	
(f) Packaged air conditioners, split systems, and variable refrigerant flow air-conditioning equipment complying with MEPS; or	Y	
(g) Flexible fan connections.	Y	
4) For the purposes of (1), (2) and (3), fittings—		
(a) Include non-active components of a ductwork system such as cushion boxes; and	Y	
(b) Exclude active components such as air-handling unit components.	Y	
Note: From Table J6D6, the minimum insulation R-Values for ductwork and fittings shall be – R1.2 within a confined space, – R3.0 where exposed to direct sunlight – R2.0 for all other locations		

4.3.9 J6D7 Ductwork sealing

BCA Provision J6D7	Compliance Y/N	Comments
Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system.	Y	

4.3.10 J6D8 Pump systems

BCA Provision J6D8	Compliance Y/N	Comments
1) General — Pumps and pipework that form part of an air-conditioning system must either—		
(a) separately comply with (2), (3) and (4); or	N/A	
(b) Achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (2), (3) and (4) together.	N/A	
2) Circulator pumps — A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index (EEI) not more than 0.27 calculated in accordance with European Union Commission Regulation No. 622/2012.	N/A	
3) Other pumps — Pumps that are in accordance with Articles 1 and 2 of European Union Commission Regulation No. 547/2012 must have a minimum efficiency index (MEI) of 0.4 or more when calculated in accordance with European Union Commission Regulation No. 547/2012.	N/A	
4) Pipework — Straight segments of pipework along the index run, forming part of an air-conditioning system—		
(a) In pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve an average pressure drop of not more than—		
(i) For constant speed systems, the values nominated in Table J6D8a; or	N/A	
(ii) For variable speed systems, the values nominated in Table J6D8b; or	N/A	
(b) In any other pipework system, must achieve an average pressure drop of not more than—		
(i) For constant speed systems, the values nominated in Table J6D8c; or	N/A	
(ii) For variable speed systems, the values nominated in Table J6D8d.	N/A	
5) The requirements of (4) do not apply		
(a) to valves and fittings; or	Y	
(b) Where the smallest pipe size compliant with (d) results in a velocity of 0.7 m/s or less at design flow.	Y	

4.3.11 J6D9 Pipework insulation

BCA Provision J6D9	Compliance Y/N	Comments
1) Piping, vessels, heat exchangers and tanks containing heating or cooling fluid, where the fluid is held at a heated or cooled temperature, that are part of an air-conditioning system, other than in appliances covered by MEPS, must be provided with insulation—		
(a) Complying with AS/NZS 4859.1; and	Y	
(b) For piping of heating and cooling fluids, having an insulation R-Value in accordance with Table J6D9a; and	Y	

BCA Provision J6D9	Compliance Y/N	Comments
(c) For vessels, heat exchangers or tanks, having an insulation R-Value in accordance with Table J6D9b; and	N/A	
(d) For refill or pressure relief piping, having an insulation R-Value equal to the required insulation R-Value of the connected pipe, vessel or tank within 500 mm of the connection.	N/A	
2) Insulation must—		
(a) Be protected against the effects of weather and sunlight; and	Y	
(b) Be able to withstand the temperatures within the piping, vessel, heat exchanger or tank.	Y	
3) Insulation provided to piping, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.	Y	
4) The requirements of (1) and (2) do not apply to piping, vessels or heat exchangers—		
(a) Located within the only or last room served by the system and downstream of the control device for the regulation of heating or cooling service to that room; or	Y	
(b) Encased within a concrete slab or panel which is part of a heating or cooling system; or	N/A	
(c) Supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J5.9, J5.10 and J5.11; or	Y	
(d) Inside an air-handling unit, fan-coil unit, or the like.	Y	
5) For the purposes of (1), (2), (3) and (4)—		
(a) heating fluids include refrigerant, heated water, steam and condensate; and	Y	
(b) Cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.	Y	

4.3.12 J6D10 Space heating

BCA Provision J6D10	Compliance Y/N	Comments
2) A heater used for air-conditioning or as part of an air-conditioning system must be—		
(a) A solar heater; or	N/A	
(b) A gas heater; or	N/A	
(c) A heat pump heater; or	N/A	
(d) A heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or	N/A	
(e) An electric heater if—		
(i) the heating capacity is not more than—		
(A) 10 W/m2 of the floor area of the conditioned space in climate zone 1; or	N/A	
(B) 40 W/m2 of the floor area of the conditioned space in climate zone 2; or	N/A	
(C) The value specified in Table J6D10 where reticulated gas is not available at the allotment boundary; or	N/A	

BCA Provision J6D10	Compliance Y/N	Comments
(ii) The annual energy consumption for heating is not more than 15 kWh/m2 of the floor area of the conditioned space in climate zones 1, 2, 3, 4 and 5; or	N/A	
(iii) The in-duct heater complies with J6D3(1)(b)(iii); or	N/A	
(f) Any combination of (a) to (e).		
3) An electric heater may be used for heating a bathroom in a Class 2, 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.	N/A	
A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—		
(a) There are no occupants in the space served; or	N/A	
(b) A period of one hour has elapsed since the last activation of the heater; or	N/A	
(c) The space served has reached the design temperature.	N/A	
4) A gas water heater, that is used as part of an air-conditioning system, must—		
(a) If rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or	N/A	
(b) If rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.	N/A	

4.3.13 J6D11 Refrigerated chillers

BCA Provision J6D11	Compliance Y/N	Comments
An air-conditioning system refrigerant chiller must comply with MEPS and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio in Table J6D11a or Table J6D11b when determined in accordance with AHRI 551/591—	N/A	

4.3.14 J6D12 Unitary air-conditioning equipment

BCA Provision J6D12	Compliance Y/N	Comments
Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr—		
(a) Where water cooled, have a minimum energy efficiency ratio of 4.0 Wr / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or	N/A	
(b) Where air cooled, have a minimum energy efficiency ratio of 2.9 W_r / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.	Y	

4.3.15 J6D13 Heat rejection equipment

BCA Provision J6D13	Compliance Y/N	Comments
1) The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J6D13.	N/A	
2) The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for—		
(a) A refrigerant chiller in an air-conditioning system that complies with the energy efficiency ratios in J6D11; or	N/A	
(b) Packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J6D12.	Y	

4.4 J7 – Artificial Lighting and Power

4.4.1 J7D3 Artificial lighting

For all aspects relating to Section J7, please refer to Electrical 'For Tender' Documentation

4.4.2 J7D4 Interior artificial lighting and power control

Item	Criteria	Deemed to satisfy Requirement	Compliance Y/N	Comments
Artificial lighting switch		Located in a visual location	Y	Refer to project plans for switch locations. Typically at room entries where wall switch is utilised.
	< 2000 m^2 floor area	Control < 250 m^2	n/a	Refer to project plans for switch locations
	>2000m^2 floor area	Control < 1000 m^2	Y	Not applicable to building size.
Artificial lighting	Building > 250 m^2	Provided with time switch	Y	Lighting control via occupancy sensing devices and time of day switching. Refer to schematics and specification for control methodology
		Occupant sensing device	Y	Refer to project plans for sensor locations, and schematics and specification for control methodology.
Artificial lighting against windows	Building > 250 m^2	Independently switch controlled	N/A	Not applicable to Class 9b

4.4.3 J7D5 Interior decorative and display lighting.

Not applicable.

4.4.4 J7D6 Exterior artificial lighting

Item	Criteria	Deemed to satisfy Requirement	Compliance Y/N	Comments
Perimeter controlled by daylight sensor or time switch	Perimeter lighting load > 100 W	Use LED luminaires for 90% of the total lighting load	Y	LED lighting nominated for all external fittings. External lights controlled by PE cells with time switch off at set time.
		Controlled by motion detector	N/A	LED lighting nominated for all external fittings, motion sensor control not required
Decorative purposes e.g. façade/signage		Separately time switched	N/A	No decorative or display lighting

4.4.5 J7D7 Boiling water and chilled water storage units

Item	Criteria	Deemed to satisfy Requirement	Compliance Y/N	Comments
Boiling water and chilled water storage units	Controlled by time switch	Complies with Spec J7	Y	Boiling and chilled water units power supplies controlled by contactor with time switch control. Refer schematics.

4.4.6 J7D8 Lifts

Item	Criteria	Deemed to satisfy Requirement	Compliance Y/N	Comments
Lifts	Artificial lighting and ventilation of lift car	Configure to turn off when it is unused for 15 minutes	Y	Lift performance specification requires compliance with NCC
	Idle and standby energy performance	Achieves performance level in Table J7D8a	Y	Lift performance specification requires compliance with NCC
	Energy efficiency	Achieves class in table J7D8b	Y	Lift performance specification requires compliance with NCC

4.4.7 J6D9 Escalators and moving walks.

Not applicable.

4.5 J8 – Heated water supply and swimming pool and spa plant

4.5.1 J8D2 Heated water supply

For details of heated water supply, please refer to the table below.

Item	Criteria	Compliance Y/N	Comments
Part J8D2	Heated water supply systems for food preparation (e.g., kitchen use) and sanitary purposes (e.g., amenities basins) must be designed and installed in accordance with Part B2 of NCC Volume three – Plumbing Code of Australia	Y	Centralized heat pump hot water system
Part J8D3	Swimming pool heating and pumping to be designed in accordance with J8D3 (1.a) to J8D3 (1.f)	N/A	No swimming pools or spas
Part J8D4	Spa pool heating and pumping to be designed in accordance with J8D4(1.a) to J7.4 (1.e)	N/A	No swimming pools or spas

4.6 J9 – Energy monitoring and on-site distributed energy resources

BCA Provision J9D3	Compliance Y/N	Comments
1. A building or *sole-occupancy unit* with a *floor area* of more than 500 m² must have energy meters configured to record the time-of-use consumption of gas and electricity.	Y	Multi-Function Meters provided on each switchboard, and chassis (separate for lighting and power).
2. A building with a floor area of more than 2 500 m2 must have energy meters configured to enable individual time-of-use energy data recording, in accordance with (3), of—		
– air-conditioning plant including, where appropriate, heating plant, cooling plant, and air handling fans; and	N/A	Building less than 2,500sqm.
– artificial lighting; and	Y	Building less than 2,500sqm.
– appliance power; and	Y	Building less than 2,500sqm.
– central hot water supply; and	N/A	Building less than 2,500sqm.
– internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and	Y	Building less than 2,500sqm.
– on-site renewable energy equipment; and	N/A	Building less than 2,500sqm.
– on-site electric vehicle charging equipment; and	Y	Building less than 2,500sqm.
– on-site battery systems; and	N/A	Building less than 2,500sqm.
– other ancillary plant.	N/A	Building less than 2,500sqm.
3. Energy meters required by (2) must be interlinked by a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed and reviewed.	Y	Multifunction meters are connected to a new energy management system, for

		storage and analysis
4. The provisions of (2) do not apply to energy meters serving—		
– a Class 2 building where the total floor area of the common areas is less than 500 m2; or	N/A	
– b) individual sole-occupancy units with a floor area of less than 2 500 m2.	N/A	

For details of facilities for EV charging, please refer to the table below.

BCA Provision J9D4	Compliance Y/N	Comments
Subject to (2), a carpark associated with a Class 2, 3, 5, 6, 7b, 8 or 9 building must be provided with electrical distribution boards dedicated to electric vehicle charging— in accordance with Table J9D4 in each storey of the carpark; and labelled to indicate use for electric vehicle charging equipment	Y	Dedicated DB provided for EV charging.
be fitted with a charging control system with the ability to manage and schedule charging of electric vehicles in response to total building demand; and	Y	
when associated with a Class 2 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 11:00 pm to 7:00 am daily; and	N/A	
when associated with a Class 5 to 9 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 9:00 am to 5:00 pm daily; and	Y	
when associated with a Class 3 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 48 kWh from 11:00 pm to 7:00 am daily; and	N/A	
be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in— 100% of the car parking spaces associated with a Class 2 building; or 10% of car parking spaces associated with a Class 5 or 6 building; or 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and	Y	
contain space of at least 36 mm width of DIN rail per outgoing circuit for individual sub-circuit electricity metering to record electricity use of electric vehicle charging equipment; and	Y	
be labelled to indicate the use of the space required by (f) is for the future installation of metering equipment.	Y	

For details of facilities for solar PV and battery systems , please refer to the table below.

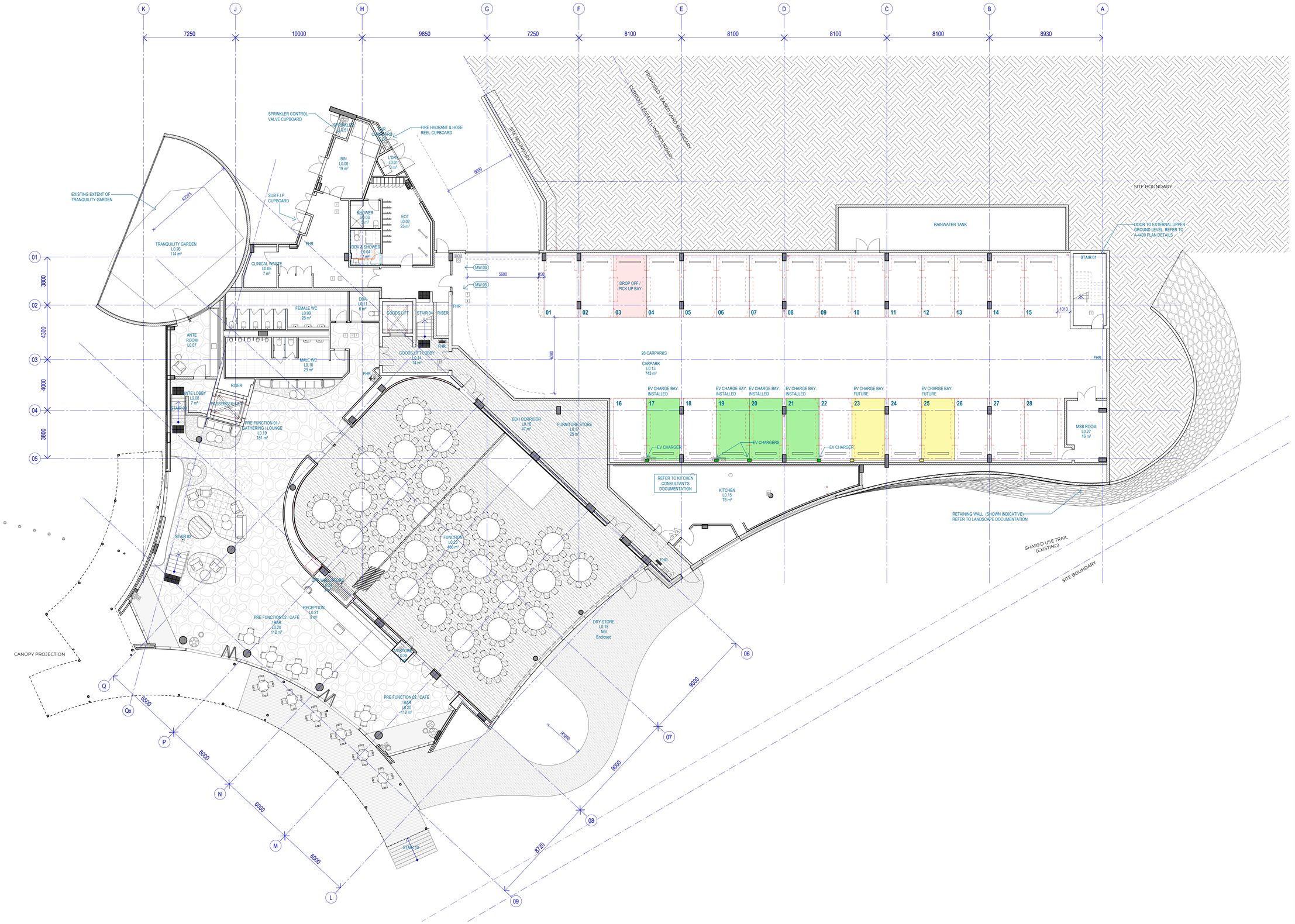
BCA Provision J9D5	**Compliance Y/N**	**Comments**
The main electrical switchboard of a building must— contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for— a solar photovoltaic system; and a battery system; and be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.	Y	MSB has allowances for connection of future PV system.
At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings— with installed solar photovoltaic panels on— at least 20% of the roof area; or an equivalent generation capacity elsewhere on-site; or	Y	More than 20% of roof space is occupied by solar panels

BCA Provision J9D5	Compliance Y/N	Comments
where 100% of the roof area is shaded for more than 70% of daylight hours; or with a roof area of not more than 55 m^2; or where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like.		

Appendices

Appendix A

Thermal Envelope



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Recent revision history

#	Status	Description	Date
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D		WK 10 INTERIM ISSUE	25-07-24
E		100% DEVELOPED DESIGN	09-08-24
F		For Information	05-09-24

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
MORGAN STREET REDEVELOPMENT

Client
WATHAURONG ABORIGINAL CO-OPERATIVE

Issuer
WOODS BAGOT

Project number	Size check	
130882	25mm	
Checked	Approved	Sheet size	Scale
-	-	A0	1 : 100

Sheet title
FLOOR PLAN - GROUND LEVEL

Sheet number
A-2200

Revision
F

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E		100% DEVELOPED DESIGN	09-08-24
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Project
MORGAN STREET REDEVELOPMENT

Client
WATHAURONG ABORIGINAL CO-OPERATIVE

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W–B
WOODS BAGOT

Project number
130882

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25mm

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-

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-

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A0

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1 : 100

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FLOOR PLAN - LEVEL 01

Sheet number
A-2201

Revision
F

Status
DOCUMENTATION

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Project
MORGAN STREET REDEVELOPMENT

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W–B
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130882

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25mm

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Sheet title
FLOOR PLAN - LEVEL 02

Sheet number
A-2202

Revision
F

Status
DOCUMENTATION

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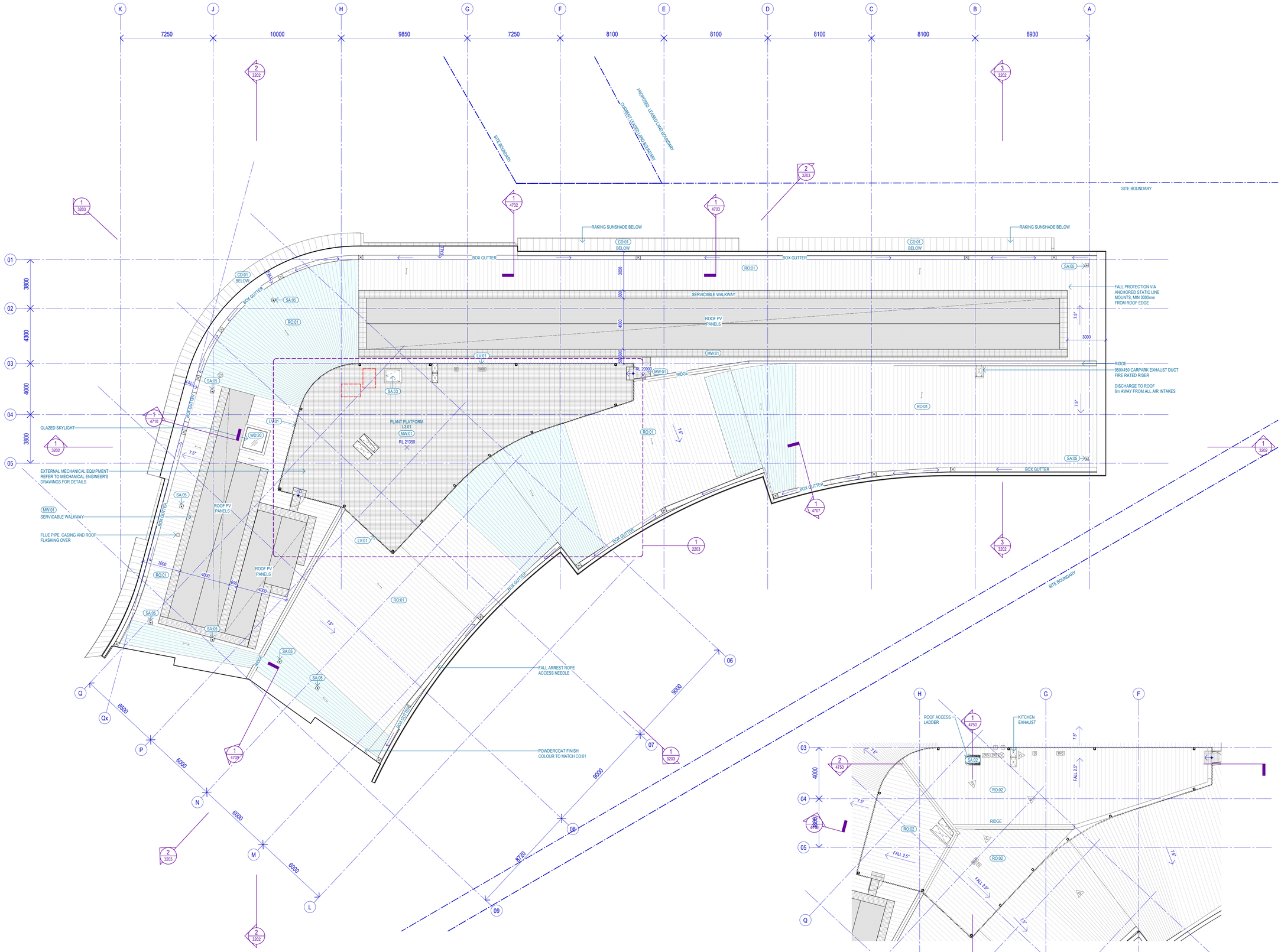

1 PLANT PLATFORM LOWER ROOF DETAIL PLAN
SCALE 1 : 100

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E		For Information	05-09-24

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Do not scale drawings.

LEGEND - CODES

REFER TO ARCHITECTURAL SCHEDULES.

- LV:xx LOUVRE
- RO:xx ROOFING
- SA:xx SAFETY & ACCESS

EXTENT OF TAPERED ROOF SHEET

Project
MORGAN STREET REDEVELOPMENT

Client
WATHAURONG ABORIGINAL CO-OPERATIVE

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Project number	Size check	
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Sheet title
FLOOR PLAN - ROOF LEVEL

Sheet number A-2203
Revision E
Status DOCUMENTATION

Appendix B

DtS Facade calculator report

NCC 2022 Section J4D6 Compliance Summary

Project Name	Wathaurong Hub
Class Type	Daytime Operation (Class: 2 common areas; 5; 6; 7; 8; 9b; 9a non-ward areas
Climate Zone	6
Prepared By	Akasya Aksu
QA'd By	Shane Esmore

Facade Area Summary

Façade	Wall Total Area (m^2)	Glazing Total Area (m^2)	Glazing Proportion
North	791.59	294.63	27.1%
East	148.13	44.66	23.2%
South	1049.12	469.44	30.9%
West	157.40	316.45	66.8%
Internal	0.00	0.00	0.0%
Whole Building	2146.23	1125.18	34.4%

Façade R/U-value Summary

Façade	Wall R-Value (W/m^2k)	Glazing U-Value (W/m^2k)	Overall U-Value (W/m^2k)
North	1.00	3.80	1.76
East	1.00	3.80	1.65
South	1.00	3.80	1.87
West	1.00	3.80	2.87
Internal	0.00	0.00	0.00
Whole Building	1.00	3.80	1.96

Façade Solar Admittance Summary

Façade	Average SHGC	Shading Factor	Solar Admittance / AC Value
North	0.50	0.67	0.09
East	0.50	0.78	0.09
South	0.50	0.93	0.14
West	0.50	0.60	0.20
Internal	Not Applicable		
Whole Building	0.50	0.77	624.24

J4D6 Compliance Summary

Façade	METHOD 1
North	Compliance Met With Method 2
East	Compliance Met With Method 2
South	Compliance Met With Method 2
West	Compliance Met With Method 2
Internal	Compliance Met With Method 2
Whole Building	**METHOD 2**
	Yes

Appendix C

J7 Calculator

ABCB

Non-residential Lighting

National Construction Code

Calculator

Building name/description	Classification
Wathaurong Redevelopment Hub	Class 9b

Number of rows preferred in table below: 122 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance: Designed lux level	Illuminance: Recommended lux level	Adjustment factor 1	Adjustment factor 1: Dimming % area	Adjustment factor 1: Illuminance turndown	Adjustment factor 2	Adjustment factor 2: Dimming % area	Adjustment factor 2: Illuminance turndown	Light colour adjustment factor 1	Light colour adjustment factor 2	SATISFIES PART J7D3: System illumination power load allowance	SATISFIES PART J7D3: Lighting system share of % of aggregate allowance used
							These columns do not represent a requirement of the NCC and are suggestions only.		Adjustment factors			Adjustment factors						
1	PREFUNCTION/GATHERING/LOUNGE/CAFÉ	309.0 m²	100 m	4.0 m	451 W	An illuminance more than 160 lx to 240 lx											1220 W	4% of 51%
2	FUNCTION CENTRE	414.0 m²	80 m	4.0 m	720 W	Board room and conference room											2226 W	6% of 51%
3	ANTE LOBBY	9.0 m²	12 m	4.0 m	9 W	An illuminance more than 80 lx to 160 lx											41 W	0% of 51%
4	ANTE ROOM	21.0 m²	18 m	2.5 m	36 W	An illuminance more than 80 lx to 160 lx											80 W	0% of 51%
5	CIRCULATION	17.0 m²	18 m	2.4 m	27 W	Corridors											135 W	0% of 51%
6	FEMALE WC	31.0 m²	25 m	2.7 m	108 W	Toilet, locker room, staff room, rest room and the like											143 W	1% of 51%
7	MALE WC	31.0 m²	25 m	2.7 m	99 W	Toilet, locker room, staff room, rest room and the like											143 W	1% of 51%
8	DDA	6.0 m²	9 m	2.7 m	9 W	An illuminance more than 160 lx to 240 lx											31 W	0% of 51%
9	CLINICAL WASTE	9.5 m²	13 m	2.3 m	45 W	An illuminance more than 80 lx to 160 lx											*39 W*	0% of 51%
10	LOADING	24.0 m²	25 m	2.7 m	180 W	An illuminance more than 80 lx to 160 lx											*97 W*	1% of 51%
11	BIN	22.0 m²	18 m	2.7 m	135 W	An illuminance of not more than 80 lx											*68 W*	1% of 51%
12	LAUNDRY	2.6 m²	7 m	2.3 m	45 W	An illuminance more than 240 lx to 320 lx											*21 W*	0% of 51%
13	EOT	24.3 m²	21 m	2.3 m	180 W	Toilet, locker room, staff room, rest room and the like											*109 W*	1% of 51%
14	SHOWER/CHANGE	6.0 m²	9 m	2.3 m	9 W	Toilet, locker room, staff room, rest room and the like											31 W	0% of 51%
15	DDA SHOWER/CHANGE	6.0 m²	10 m	2.3 m	18 W	An illuminance more than 160 lx to 240 lx											31 W	0% of 51%
16	CIRCULATION	23.0 m²	29 m	2.7 m	225 W	Corridors											*192 W*	2% of 51%
17	BOH CORRIDOR	48.0 m²	54 m	2.4 m	495 W	Corridors											*387 W*	4% of 51%
18	FURNITURE STORE	25.0 m²	24 m	2.4 m	180 W	Service area, cleaner's room and the like											*59 W*	1% of 51%
19	KITCHEN	85.7 m²	46 m	3.0 m	627 W	Kitchen and food preparation area											*483 W*	5% of 51%
20	PARKING	772.0 m²	134 m	4.5 m	1587 W	Carpark - general											1660 W	13% of 51%
21	MSB ROOM	10.0 m²	14 m	4.5 m	90 W	Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms											*73 W*	1% of 51%
22	L1-ARRIVAL/LOBBY	84.0 m²	52 m	3.0 m	81 W	Entry lobby from outside the building											1112 W	1% of 51%
23	SERVICES ROOM	7.4 m²	11 m	3.0 m	90 W	Service area, cleaner's room and the like											*19 W*	1% of 51%
24	RECEPTION	20.0 m²	19 m	2.7 m	71 W	An illuminance more than 80 lx to 160 lx											79 W	1% of 51%
25	GATHERING	194.0 m²	65 m	3.0 m	198 W	An illuminance more than 80 lx to 160 lx											584 W	2% of 51%
26	RADIO ROOM	10.0 m²	13 m	3.0 m	52 W	An illuminance more than 240 lx to 320 lx											76 W	0% of 51%
27	COMMUNITY RELIEF	38.0 m²	28 m	2.7 m	27 W	An illuminance of not more than 80 lx											113 W	0% of 51%

ABCB

Non-residential Lighting

National Construction Code

Calculator

Building name/description	Classification
Wathaurong Redevelopment Hub	Class 9b

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ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance: Designed lux level	Illuminance: Recommended lux level	Adjustment factor 1	Adjustment factor 1: Dimming % area	Adjustment factor 1: Illuminance turndown	Adjustment factor 2	Adjustment factor 2: Dimming % area	Adjustment factor 2: Illuminance turndown	Light colour adjustment factors: Light colour adjustment factor 1	Light colour adjustment factors: Light colour adjustment factor 2	SATISFIES PART J7D3: System illumination power load allowance	SATISFIES PART J7D3: Lighting system share of % of aggregate allowance used
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28	BOH CORRIDOR	36.6 m²	38 m	3.0 m	54 W	Corridors											300 W	0% of 51%
29	CONTACT ROOM	20.0 m²	19 m	3.0 m	55 W	An illuminance more than 240 lx to 320 lx											145 W	0% of 51%
30	WAITING AREA	11.0 m²	14 m	3.0 m	18 W	An illuminance more than 160 lx to 240 lx											56 W	0% of 51%
31	POWDER RM	4.0 m²	10 m	2.7 m	18 W	Toilet, locker room, staff room, rest room and the like											22 W	0% of 51%
32	AFLDM	45.0 m²	27 m	3.0 m	104 W	An illuminance more than 160 lx to 240 lx											196 W	1% of 51%
33	KIDS	6.2 m²	10 m	2.7 m	9 W	An illuminance more than 160 lx to 240 lx											33 W	0% of 51%
34	HEALTH BOH	24.0 m²	25 m	2.7 m	132 W	An illuminance of not more than 80 lx											*77 W*	1% of 51%
35	DDA	7.0 m²	10 m	2.7 m	27 W	An illuminance more than 160 lx to 240 lx											36 W	0% of 51%
36	MALE WC	20.0 m²	19 m	2.7 m	81 W	Toilet, locker room, staff room, rest room and the like											95 W	1% of 51%
37	FEMALE WC	15.6 m²	16 m	2.7 m	72 W	Toilet, locker room, staff room, rest room and the like											76 W	1% of 51%
38	STAFF TOILETS	10.0 m²	12 m	2.7 m	36 W	Toilet, locker room, staff room, rest room and the like											50 W	0% of 51%
39	HEALTH EXEC OFFICE	10.0 m²	13 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											78 W	0% of 51%
40	MEDICAL WORKPLACE	48.3 m²	31 m	3.0 m	61 W	Office - artificially lit to an ambient level of 200 lx or more											324 W	0% of 51%
41	FAMILY CONSULT	19.0 m²	19 m	3.0 m	36 W	Office - artificially lit to an ambient level of 200 lx or more											141 W	0% of 51%
42	KIDS LOOKOUT	32.5 m²	24 m	2.7 m	27 W	An illuminance more than 80 lx to 160 lx											121 W	0% of 51%
43	MEDICAL CIRCULATION	363.0 m²	270 m	3.0 m	645 W	Office - artificially lit to an ambient level of 200 lx or more											2514 W	5% of 51%
44	TYP CONSULT	12.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											92 W	0% of 51%
45	TYP CONSULT	12.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											92 W	0% of 51%
46	TYP CONSULT	12.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											92 W	0% of 51%
47	TYP CONSULT	12.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											92 W	0% of 51%
48	WAITING	20.8 m²	21 m	3.0 m	18 W	An illuminance more than 80 lx to 160 lx											85 W	0% of 51%
49	TYP CONSULT	17.0 m²	17 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											126 W	0% of 51%
50	TYP CONSULT	14.0 m²	16 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											105 W	0% of 51%
51	TYP CONSULT	13.0 m²	16 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											100 W	0% of 51%
52	TYP CONSULT	13.0 m²	16 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											100 W	0% of 51%
53	TYP CONSULT	14.0 m²	16 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											105 W	0% of 51%
54	TYP CONSULT	15.5 m²	17 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											117 W	0% of 51%

ABCB

Non-residential Lighting

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Calculator

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Wathaurong Redevelopment Hub	Class 9b

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55	AHP/SEWB	11.4 m²	13 m	3.0 m	18 W	An illuminance more than 80 lx to 160 lx											48 W	0% of 51%
56	MEDICAL RECEPTION	14.0 m²	16 m	2.7 m	26 W	An illuminance more than 80 lx to 160 lx											57 W	0% of 51%
57	MEDICAL & DENTAL STORE	10.0 m²	12 m	2.7 m	72 W	An illuminance more than 240 lx to 320 lx											75 W	1% of 51%
58	PHARMACY CONSULT	11.0 m²	12 m	2.7 m	72 W	An illuminance more than 160 lx to 240 lx											*53 W*	1% of 51%
59	PHARMACY STORE	8.6 m²	12 m	2.7 m	36 W	An illuminance more than 160 lx to 240 lx											44 W	0% of 51%
60	DECONTAM MED WASTE	17.0 m²	18 m	2.7 m	135 W	An illuminance more than 80 lx to 160 lx											*69 W*	1% of 51%
61	MEDICAL STAFF DESK	16.6 m²	17 m	2.7 m	122 W	Office - artificially lit to an ambient level of 200 lx or more											*121 W*	1% of 51%
62	DDA	6.0 m²	10 m	2.7 m	9 W	An illuminance more than 160 lx to 240 lx											31 W	0% of 51%
63	DDA	6.0 m²	10 m	2.7 m	9 W	An illuminance more than 160 lx to 240 lx											31 W	0% of 51%
64	CLEANERS ROOM	3.4 m²	8 m	2.7 m	45 W	An illuminance more than 160 lx to 240 lx											*18 W*	0% of 51%
65	WHEEL CHAIR STORE	2.8 m²	7 m	2.4 m	45 W	An illuminance of not more than 80 lx											*11 W*	0% of 51%
66	MEDICAL CONSUMABLES STORE	23.0 m²	20 m	2.7 m	180 W	An illuminance of not more than 80 lx											*72 W*	1% of 51%
67	WAITING COLLAB	15.3 m²	16 m	2.7 m	38 W	An illuminance more than 80 lx to 160 lx											61 W	0% of 51%
68	TYP CONSULT	15.5 m²	16 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											115 W	0% of 51%
69	MATERNAL CHILD HEALTH CONSULT	18.2 m²	18 m	3.0 m	36 W	Office - artificially lit to an ambient level of 200 lx or more											132 W	0% of 51%
70	KOORI MATERNITY CONSULT	21.0 m²	18 m	3.0 m	36 W	Office - artificially lit to an ambient level of 200 lx or more											151 W	0% of 51%
71	DENTAL PROCEDURE	20.0 m²	18 m	3.0 m	144 W	Office - artificially lit to an ambient level of 200 lx or more											145 W	1% of 51%
72	TREATMENT ROOM	14.0 m²	15 m	3.0 m	144 W	Office - artificially lit to an ambient level of 200 lx or more											*105 W*	1% of 51%
73	TREATMENT ROOM	14.0 m²	15 m	3.0 m	144 W	Office - artificially lit to an ambient level of 200 lx or more											*105 W*	1% of 51%
74	TYP CONSULT ACCESS	17.0 m²	17 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											126 W	0% of 51%
75	MENTAL HEALTH	17.0 m²	17 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											126 W	0% of 51%
76	MENTAL HEALTH	14.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											105 W	0% of 51%
77	MENTAL HEALTH	14.0 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											105 W	0% of 51%
78	TYP CONSULT	13.5 m²	15 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											102 W	0% of 51%
79	L2-FOH WORKPLACE	150.0 m²	71 m	3.0 m	343 W	An illuminance more than 80 lx to 160 lx											507 W	3% of 51%

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80	WELLNESS & PARENTS RM	13.0 m²	14 m	3.0 m	28 W	An illuminance more than 80 lx to 160 lx											55 W	0% of 51%
81	SERVICES ROOM	7.5 m²	11 m	3.0 m	90 W	An illuminance more than 240 lx to 320 lx											*59 W*	1% of 51%
82	LOUNGE	16.0 m²	15 m	3.0 m	30 W	An illuminance more than 80 lx to 160 lx											65 W	0% of 51%
83	BOARDROOM	46.0 m²	28 m	3.0 m	32 W	Office - artificially lit to an ambient level of 200 lx or more											304 W	0% of 51%
84	8/10P MEETING ROOM	27.0 m²	21 m	3.0 m	97 W	Office - artificially lit to an ambient level of 200 lx or more											188 W	1% of 51%
85	CEO OFFICE	20.0 m²	19 m	3.0 m	52 W	Office - artificially lit to an ambient level of 200 lx or more											145 W	0% of 51%
86	MALE WC	25.5 m²	26 m	2.7 m	99 W	Toilet, locker room, staff room, rest room and the like											124 W	1% of 51%
87	FEMALE WC	23.0 m²	24 m	2.7 m	108 W	Toilet, locker room, staff room, rest room and the like											111 W	1% of 51%
88	DDA	6.0 m²	10 m	2.7 m	18 W	An illuminance more than 160 lx to 240 lx											32 W	0% of 51%
89	AMENTIIES LOBBY	23.0 m²	28 m	3.0 m	36 W	An illuminance more than 80 lx to 160 lx											98 W	0% of 51%
90	BREAKOUT	20.0 m²	18 m	3.0 m	54 W	An illuminance more than 80 lx to 160 lx											81 W	0% of 51%
91	STAFF KITCHEN	60.0 m²	31 m	3.0 m	115 W	Kitchen and food preparation area											333 W	1% of 51%
92	6/8P MEETING	18.0 m²	17 m	3.0 m	62 W	Office - artificially lit to an ambient level of 200 lx or more											131 W	0% of 51%
93	OFFICE	10.0 m²	13 m	3.0 m	44 W	Office - artificially lit to an ambient level of 200 lx or more											76 W	0% of 51%
94	4P MEETING	10.0 m²	12 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											76 W	0% of 51%
95	6P MEETING	13.0 m²	14 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											98 W	0% of 51%
96	LOCKERS	12.0 m²	19 m	2.4 m	26 W	Toilet, locker room, staff room, rest room and the like											61 W	0% of 51%
97	MAIL/DELIVERY	11.7 m²	14 m	3.0 m	72 W	An illuminance more than 80 lx to 160 lx											*48 W*	1% of 51%
98	COMMS	13.0 m²	16 m	3.0 m	225 W	An illuminance more than 240 lx to 320 lx											*100 W*	2% of 51%
99	IT BUILD	13.0 m²	14 m	3.0 m	108 W	An illuminance more than 160 lx to 240 lx											*65 W*	1% of 51%
100	STORE	9.0 m²	14 m	3.0 m	90 W	An illuminance of not more than 80 lx											*32 W*	1% of 51%
101	OFFICE	12.0 m²	14 m	3.0 m	27 W	Office - artificially lit to an ambient level of 200 lx or more											90 W	0% of 51%
102	2P	7.0 m²	11 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											56 W	0% of 51%
103	PHONE POD	5.0 m²	9 m	3.0 m	44 W	Office - artificially lit to an ambient level of 200 lx or more											*41 W*	0% of 51%
104	DEPUTY CEO OFFICE	15.0 m²	17 m	3.0 m	36 W	Office - artificially lit to an ambient level of 200 lx or more											113 W	0% of 51%
105	WORKPLACE	306.5 m²	252 m	3.0 m	539 W	An illuminance of not more than 80 lx											958 W	4% of 51%
106	1P	6.0 m²	10 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											47 W	0% of 51%
107	1P	6.0 m²	10 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											47 W	0% of 51%

Non-residential Lighting

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108	OFFICE	10.0 m²	13 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											76 W	0% of 51%
109	4P MEETING	10.0 m²	13 m	3.0 m	18 W	Office - artificially lit to an ambient level of 200 lx or more											76 W	0% of 51%
110	UTLIITY	13.0 m²	16 m	3.0 m	27 W	Office - artificially lit to an ambient level of 200 lx or more											100 W	0% of 51%
111	1P	4.0 m²	9 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											*33 W*	0% of 51%
112	1P	6.0 m²	9 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											47 W	0% of 51%
113	1P	7.0 m²	11 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											56 W	0% of 51%
114	1P	5.0 m²	10 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											41 W	0% of 51%
115	2P	7.0 m²	10 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											55 W	0% of 51%
116	1P	6.0 m²	9 m	3.0 m	35 W	Office - artificially lit to an ambient level of 200 lx or more											47 W	0% of 51%
117	6/8P MEETING	22.0 m²	19 m	3.0 m	62 W	Office - artificially lit to an ambient level of 200 lx or more											157 W	0% of 51%
118	COLLAB	15.4 m²	16 m	3.0 m	27 W	An illuminance more than 80 lx to 160 lx											64 W	0% of 51%
119	4P HR MEETING	23.0 m²	18 m	3.0 m	52 W	Office - artificially lit to an ambient level of 200 lx or more											163 W	0% of 51%
120	STAIR 01	15.0 m²	17 m	3.0 m	90 W	Stairways, including fire-isolated stairways											*50 W*	1% of 51%
121	STAIR 04	15.0 m²	17 m	3.0 m	90 W	Stairways, including fire-isolated stairways											*50 W*	1% of 51%
122	WORKPLACE DESK AREA	403.5 m²	256 m	3.0 m	546 W	Office - artificially lit to an ambient level of 200 lx or more											2671 W	4% of 51%

Total	12494 W

Total	24457 W

if inputs are valid ✓

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