Proposed Alterations and Additions to The Stables Resort Perisher

20 Candle Heath Road
Perisher Valley, NSW

Compliance Report

NCC - Building Code of Australia (2022)
Volume 1 - Section J – Energy Efficiency
Deemed-to-Satisfy Provisions (DtS)

Department of Planning and Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No 23/3582

Granted on the 1 December 2023

Signed S Butler

Sheet No 4 of 17

October 2023

FR1

Application Solutions

Application Solutions

73 Proctor Pde
CHESTER HILL NSW 2162

Telephone (02) 9868-4339 Facsimile (02) 9868-2655

This report has been prepared by:
Application Solutions
73 Proctor Pde
CHESTER HILL NSW 2121
Telephone: 9868 4339
Email: info@applicationsolutions.com.au

The reader's attention is drawn to the following important information:

Disclaimer

Scope Limitations: This report is to assess the proposed development (named above), with reference to the documents listed in the report, with respect to compliance with the Building Code of Australia (2022 – Volume 1) Section J - Energy Efficiency (Including NSW Appendix) provisions and report the results of the assessment to the client. This report covers the Deemed-to-Satisfy (DtS) assessment results for the development.

Exclusive Use: This report has been prepared for the exclusive use of Application Solutions' client to meet their particular objectives and by its nature is limited in scope. The client's exclusive use includes use by its consultants and the Principal Certifier or principal certifying authority associated with this development. The material contained in this report should not be used for any other purpose or by other persons or entities without contacting Application Solutions. No warrantee is given in relation to the material in this report used for other purposes or by other persons or entities without the consent of Application Solutions.

Document Control

Document Number:	AS1919	
FR1		
Issue Date:	12/10/2023	
Description:	The proposed development comprises the enclosing of 6 x balconies to form part of the building envelope and replacement of wall cladding to the existing building.	
Prepared By:	Thomas Harris	*Cert IV. HSA and Thermal Performance Assessment.* *Accredited NatHERS Assessor. ABSA* *Dip. Bldg Surv. MAIBS*
		
Reviewed By	Andrew Latimer	B. Eng. (Civil)
		

Table of Contents

Executive Summary

The development has been assessed against the DtS provisions of Section J (Energy Efficiency) of the Building Code of Australia (Including NSW Appendix). The items outlined below are the requirements for this development to achieve compliance with Section J. It is understood that the relevant contractors and consultants responsible for the compliant design and construction of the development must ensure that the requirements of this report are incorporated into their respective design and installations. These requirements have been determined based on the information provided to Application Solutions at the time of carrying out this assessment. Any design changes should be checked to ensure these requirements remain correct and accurate. Contact Application Solutions for assistance if reassessment is required.

Section J: Sign-Off - On Completion of Construction

Documentation of Compliance During Construction

It is important to document compliance for each item noted in the Executive Summary throughout construction. Refer to the “Section J: Sign-Off – on Completion of Construction” section of this report for guidance. If further assistance is required, contact Application Solutions.

NSW Part J1 – Energy Efficiency Performance Requirements

This Part applies.

Part J2 – Energy Efficiency

This Part applies.

Part J3 – Elemental provisions for a sole-occupancy unit of a Class 2 building or a Class 4 part of a building

This Part does not apply as stated in NCC Schedule 5 for NSW, as it relates to Class 2 and Class 4 building matters which are regulated under BASIX in NSW.

Part J4 – Building Fabric

1. Construction Requirements – Installation of Insulation

NSWJ4D3 (1) (2), (3), (4) and (5)

Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:
(i) abuts or overlaps adjoining insulation other than at supporting members; and
(ii) forms a continuous barrier and
(iii) does not affect the safe or effective operation of a service or fitting.
Reflective insulation must be installed with:
(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
(ii) the reflective insulation closely fitted against any penetration, door or window opening; and
(iii) the reflective insulation adequately supported by framing members; and
(iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.
Bulk insulation must be installed so that:
(i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

2. Construction Requirements – Roof and Ceiling Insulation

J4D4 (1) and (2)

The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA J4D4 (1) is R4.8.
To achieve compliance, insulation of at least R4.4 is required to be incorporated into the roof/ceiling system which forms part of the envelope. See Appendix for roof calculations and envelope/insulation mark-up plans showing the thermal envelope.
NOTE: A thermal break is not required as continuous insulation is proposed. Should the insulation not be installed continuously, or installed between roof framing members, contact Application Solutions to re-assess.
There is no maximum solar absorptance value for the upper surface of a roof specified by BCA J4D4(2) for climate zone 8.

Roof Summary

Description	Insulation Required*	Solar Absoptance**	Thermal Break*	R-value Achieved
Metal Sheet Roof - with pitch >5 degrees	R4.4	N/A	N/A	R4.83

**See Appendix for full details*
Tziallas Architects - Perisher Valley

3. Maximum U-value

NSW J4D6(1)

NOTE: The maximum U-Value for the wall-glazing system is U0.9, compliance with this clause is calculated in accordance with J4D6(3) See below.

4. Calculation of U-value

NSW J4D6(3)

The wall-glazing system U-Values for the development is U0.9, which is not more than the max permitted in J4D6 See Appendix for full calculations.
To achieve compliance, new walls which form part of the envelope must be insulated as shown below.
To achieve compliance, the glazing U-Values are shown with the SHGC Values under J4D6(6) Calculation of Solar admittance. See below.
NOTE 1: Thermal breaks are not required as part of the minimum requirements as compensation for loss of R-Value due to thermal bridging has been calculated.
Thermal breaks are not required as part of the minimum requirements. However as good energy efficient practice, it is advised for when external and internal linings are fixed directly to the same metal frame, that the use of thermal breaks are installed at all points of contact between the external cladding and the metal frame when possible.
NOTE 2: In the cases where the development is determined as NCC Type A or Type B Construction by the Principal Certifier, selected wall insulation may be required to be non-combustible.

Wall Summary	Insulation Required*	Thermal Break*	Total Wall System R-value achieved	Total Wall System U-value achieved
Metal Clad Timber Frame Wall	R2.7	N/A	2.66	0.38
Metal Clad Brick Veneer Wall	R2.3	N/A	3.13	0.32
Existing Walls - No Requirements	-	-	-	-

**See Appendix for full details*
Tziallas Architects - Perisher Valley

5. Calculation of Wall R-value

NSW J4D6(4)

NOTE: The wall component of the wall-glazing system for the development is less than 80% of the total area, therefore the minimum R-value is R1.0. This minimum R-value is achieved.
See Appendix for walls forming part of the envelope.

6. Max Solar admittance Permitted

NSW J4D6(5)

Using NSW Table J4D6c

Max Solar Admittance Permitted			
East	North	South	West
0.08	0.08	0.08	0.08

NOTE:-

7. Calculation of Solar Admittance

NSW J4D6(6)

Calculation of Solar Admittance for the proposed development has been carried out in accordance with Specification 37. See Appendix for calculation sheet.
The proposed building complies with J4D6(6) – Solar Admittance of wall-glazing construction when installed with the following glazing and frame system U and SHGC Values.
The SHGC values for glazing have been calculated using the shading as shown on the architectural design plans. Should the shading design be revised, contact Application Solutions to re-assess.
There are no glazing U and SHGC Values specified for the North and South orientations as there is no proposed new glazing to these parts of the building. Should the design change, contact Application Solutions to re-assess.
The resultant system U and SHGC Values for glazing are as shown below: *(selected glazed product values can be lower)*

Glazing Summary	U-Value	SHGC Value
East	2.90	0.81
North	-	-
South	-	-
West	2.90	0.33

Tziallas Architects - Perisher Valley

NOTE: The Total System U-Value and Total System SHGC Value for selected glazed products must be rated in accordance with the AFRC Protocol.

Part J5 – Building Sealing

8. Construction Requirements – Window and Door Sealing

NSW J5D5(2) and (3)

A door, openable window or the like must be sealed when forming part of the envelope
The seal may be a foam or rubber compression strip, fibrous seal or the like.
For the bottom edge of an external swing door, a draft protection device must be installed.
For exemptions to this clause see body of report.

9. Construction Requirements – Building Entrance Sealing

NSW J5D5(4)

An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.

10. Construction Requirements – Exhaust Fan Sealing

J5D6

An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.

11. Construction Requirements – Roof, Wall and Floor Sealing

J5D7(1), (2) and (3)

Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR sealed with expanding foam, rubber compressible strip, caulking or the like at bottom plates or skirting; and cornices and shadow lines; and gaps around ceiling, wall or floor penetrations

Part J6 – Air-conditioning and Ventilation

12. Construction Requirements – Deactivation Capability

J6D3(1)(a)

Any air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.

13. Construction Requirements – Air-conditioning Zones

J6D3(1)(b)

Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.

14. Construction Requirements – Economy Cycle

J6D3(1)(c)

Where the air-conditioning system provides the required mechanical ventilation and has a total air flow rate of greater than or equal to 4000 L/s, it shall have an outdoor air economy cycle.

15. Construction Requirements – Variable Speed Fans

J6D3(1)(e)

Where the air-conditioning system has an air flow rate greater than 1000 L/s it must have variable speed fans.

16. Construction Requirements – Class 3 Controls

J6D3(1)(f)

When serving a sole-occupancy unit in a Class 3 building, the air-conditioning system 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.

17. Construction Requirements – Controls

J6D3(1)(g)

The 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.

18. Construction Requirements – Dead Band

J6D3(1)(h)

The air-conditioning system must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications.

19. Construction Requirements – Balancing Dampers and Valves

J6D3(1)(i)

The 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 at each component as required to meet the needs of the system at its maximum operating condition.

20. Construction Requirements – Motorised Damper

J6D3(1)(l)

When deactivated, the air conditioning system must close any motorised outdoor air and return air damper.

21. Construction Requirements – Control Sequences

J6D3(2)

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.

22. Construction Requirements – Time Switch

A time switch must be provided to control all air-conditioning systems of more than 2 kWr and heaters of more than 1 $kW_{heating}$. The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

23. Construction Requirements – Ventilation Operation

J6D3(4)(1)(a)

A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.

24. Construction Requirements – Mechanical Ventilation of Conditioned Space

J6D4(1)(b)

Any mechanical ventilation system that is serving a conditioned space and has an outside air flow greater than 250 L/s shall have an energy reclaiming system in accordance with (i)(A) or modulating control in accordance with (i)(B).
The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.

25. Construction Requirements – Variable Speed Fans

J6D4(1)(c)

Any mechanical ventilation system that is serving a conditioned space and has an air flow rate of more than 1000 L/s, shall have variable speed fans unless the downstream air flow is required by Part F6 to be constant.

26. Construction Requirements – Exhaust System

J6D4(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.
This clause does not apply to an exhaust system in a sole-occupancy unit in a Class 3 building.

27. Construction Requirements –Ventilation Time Switch Control

J6D4(4)

Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch and be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days See J6D4(c) below for any appropriate exclusions to this requirement.

28. Construction Requirements –Fans

J6D5(1)

Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must
(a) separately comply with BCA J5.3 (b), (c), (d), (e) and (f); or
(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 BCA J5.4 (b), (c), (d), (e) and (f) together.

29. Construction Requirements – Fans Static Pressure Not More Than 200Pa

J6D5(2)(a) and (b)

Fans in systems with a static pressure not more than 200Pa must have an efficiency calculated using the formula in J6D5

30. Construction Requirements – Fans Static Pressure Above 200Pa

J6D5(2)(c)

Fans in systems with a static pressure more than 200Pa must have an efficiency calculated using the formula in J6D5(c)

31. Construction Requirements – Ductwork

J6D5(3)(a)

The average pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed a pressure drop of 1 Pa/m. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.

32. Construction Requirements – Ductwork

J6D5(3)(b)

Flexible ductwork must not account for more than 6m in length in any duct run.

33. Construction Requirements – Ductwork

J6D5(3)(c)

The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.

34. Construction Requirements – Ductwork

J6D5(3)(d)

Turning vanes must be included in all rigid ductwork bends of 90º or more acute except where the inclusion of turning vanes presents a fouling risk or a long radius bend in accordance with AS4254.2.

35. Construction Requirements – Ductwork

J6D5(4)(a) to (n)

This clause contains detailed design criteria which must be met for any ductwork installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA.

36. Construction Requirements – Ductwork Insulation

J6D6(1) and (2)

J5.6 (1)Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
(a)complying with AS/NZS 4859.1; and
(b)having an insulation *R-Value* greater than or equal to—
(i)for flexible ductwork, 1.0; or
(ii)for cushion boxes, that of the connecting ductwork; or
(iii)that specified in Table J6D6.
(2)Insulation must—
(a)be protected against the effects of weather and sunlight; and
(b)be installed so that it—
(i)abuts adjoining insulation to form a continuous barrier; and
(ii)maintains its position and thickness, other than at flanges and supports; and
(c)when conveying cooled air—
(i)be protected by a vapour barrier on the outside of the insulation; and
(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
(B)are bonded or taped together.

37. Construction Requirements – Ductwork

J6D6(3)

(3)The requirements of J6D6 (1) do not apply to—
(a)ductwork and fittings located within the only or last room served by the system; or
(b)fittings that form part of the interface with the *conditioned space*; or
(c)return air ductwork in, or passing through, a *conditioned space*; or
(d)ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or
(e)the floor of an in-situ air-handling unit; or
(f)packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or
(g)flexible fan connections.

38. Construction Requirements – Ductwork Sealing

J6D7

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.

39. Construction Requirements – Heaters

J6D10(1)

Any heater planned to be used must be a solar heater, a gas heater or a heat pump heater.
If an electric heater is planned, refer to the detail requirements and limitations in the body of the report.

40. Construction Requirements – Electric Heaters

NSW J6D10 (2)

An electric heater may be used for heating a bathroom in a Class 3 building if the heating capacity is not more than 1.2 kW and the heater has a timer.

41. Construction Requirements – Outdoor Heaters

J6D10(3)

If any outdoor heaters are installed, they must be configured to automatically shut down if there are no occupants in the space served, or one hours has elapse since the last activation of the heater or the space has reached the design temperature.

42. Construction Requirements – Unitary Air-conditioning Equipment

J6D12

Any unitary air-conditioning equipment must comply with MEPS and if over 65kWr
For water cooled have a minimum energy efficiency ratio of 4.0 Wr/Winput for cooling and for air cooled have a minimum energy efficiency ratio of 2.9 Wr/Winput for cooling.
Refer to the body of the report or to the BCA for the testing requirements.

43. Construction Requirements – Efficiency Ratios

J6D13

Packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J6D12.

Part J7 – Artificial Lighting and Power

44. Construction Requirements – Maximum Interior Illumination Power Load

NSW J7D3(2)

The total maximum allowed interior illumination power load for the development is:
191W.
The aggregate design illumination power load must not exceed this allowed wattage.
NOTE 1: The total has been calculated using adjustment factors for enclosed spaces with a Room Aspect Ratio of less than 1.5.
NOTE 2: Emergency lighting and signage lighting are exempted from this requirement.
NOTE 3: If the Lux level for any areas specified in the Appendix is proposed to be greater in order to meet Australian Standards requirements, contact Application Solutions to reassess.
See Appendix for detailed calculation of allowed interior illumination power load.

45. Construction Requirements –

Illumination Power Load

J7D3(3)

Note:
The requirements of (2) do not apply to the following:
(a) emergency lighting in accordance with BCA Part E4.
(b) signage, display lighting within cabinets and display cases that are fixed in place.
(c) lighting for accommodation within the residential part of a detention centre.
(d) a heater where the heater also emits light, such as in bathrooms.
(e) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.
(f) lighting of performances such as theatrical or sporting.
(g) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.
(h) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.

46. Construction Requirements – Lighting Control

J7D3(4)

For the purposes of Table J7D3b, lighting timers, motion detectors, daylight sensors and dynamic lighting control devices must comply with specification 40.

47. Construction Requirements – Lighting Control

J7D4(1)

Artificial lighting of a room or space must be individually operated by a switch or other control device.

48. Construction Requirements – Lighting Control

J7D4 (2)

An occupant activated device, such as a room security device, a motion detector in accordance with BCA Specification 40, or the like, must be provided in the sole occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the sole-occupancy unit is unoccupied.

49. Construction Requirements – Lighting Control (Switching)

J7D4(3)

Artificial lighting switches must be located in a visible and accessible position in the room or space being switched or in an adjacent room or space from where 90% of the lighting being switched is visible.

50. Construction Requirements – Lighting in Fire Stair

J7D4(6)

Artificial lighting in a fire-isolated stairway, passage or ramp must be controlled by a motion detector in accordance with Specification 40.

51. Construction Requirements – Lighting in Foyer, Corridor and Other Circulation Spaces

J7D4(7)

Artificial lighting in a foyer, corridor and other circulation spaces of more than 250 W within a single zone and adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.

52. Construction Requirements – Exceptions

J7D4(9)(10)

The requirements of (a), (b), (c), (d), (e), (f), (g) and (h) J7D4 (1), (2), (3), (4), (5), (6), (7) and (8) do not apply to the following:
(i)emergency lighting in accordance with Part E4.
(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.
(j) The requirements of (d) do not apply to the following:
(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a patient care area in a Class 9a building or in a Class 9c building or a plant room, lift motor room, or a workshop where power tools are used.
(ii) a heater where the heater also emits light, such as in bathrooms.

53. Construction Requirements – Decorative or Display Lighting

J7D5(1)

Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined).
Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification 40.

54. Construction Requirements – Window Display Lighting

J7D5(2)

Window display lighting must be controlled separately from other display lighting.

55. Construction Requirements – Exterior Lighting

J7D6(1)

Artificial lighting attached or directed at the facade of the building must be controlled by a daylight sensor or a time switch in accordance with Specification 40.
When the total perimeter lighting load exceeds 100 W
(i) Use LED luminaries for 90% of total lighting load or
(ii) be controlled by a motion detector in accordance with Specification 40. And
(iii) When used for decorative purposes have a separate time switch in accordance with Specification 40.
Note: The requirements of J7D6 (1)(b) do not apply to emergency lighting in accordance with Part E4.

56. Construction Requirements – Boiling/Chilled Water Storage Units

J7D7

The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification 40.

Part J8 – Heated Water Supply and Swimming Pool and Spa Pool Plant

57. Construction Requirements – Hot Water Heater

J8D2

Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.

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

58. Roof Area Allocated for Future Solar PV

J9D5(2)

At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels.

Compliance Summary Part J1- Building fabric

DTS Compliance Summary		Requirement	Achieved			
Item	**Description**					
Roof	*Total System Requirement*	**R4.8**				✓
Total System R-value Achieved	*Metal Sheet Roof - with pitch >5 degrees*		**R4.83**			✓
				Thermal Break	**Roof Insultaion**	
Insulation Required	*Metal Sheet Roof - with pitch >5 degrees*		**R4.4**	**N/A**		✓
					Roof Solar Absorptance	
Maximum Solar Absorptance	Metal Sheet Roof - with pitch >5 degrees	**N/A**	see note at left			✓
There is no maximum solar absorptance value for the upper surface of a roof specified by BCA J4D4(2) for climate zone 8.						
Roof Light	Roof Lights (As Designed): There are no roof lights in the proposed building, therefore, this part is not applicable				**Roof Light U and SHGC Values**	✓
Maximum U-value	Max U-value for wall-glazing system	**0.9**	**U = 0.9**			✓
Minimum R-value for walls		**R1.0**				✓
Total System R-Value Achieved						
	Metal Clad Timber Frame Wall		**2.66**			✓
	Metal Clad Brick Veneer Wall		**3.13**			✓
	Existing Walls - No Requirements		**-**			✓
Insulation Required in walls				**Thermal Break**	**Wall Insulation**	
	Metal Clad Timber Frame Wall		**R2.7**	**N/A**		✓
	Metal Clad Brick Veneer Wall		**R2.3**	**N/A**		✓
	Existing Walls - No Requirements		**-**	**-**		✓
Solar Admittance	East	**0.08**	**0.12**			
	North	**0.08**	**0.00**			
	South	**0.08**	**0.00**			
	West	**0.08**	**0.08**			
E_R of Reference Building versus Proposed Building		**16.23**	**16.13**		**Glazing U and SHGC Values**	✓
					U-Values	
Glazing	U Values - East		**2.90**			✓
	U Values - North		**-**			✓
	U Values - South		**-**			✓
	U Values - West		**2.90**			✓
					SHGC Values	✓
	SHGC Values - East		**0.81**			✓
	SHGC Values - North		**-**			✓
	SHGC Values - South		**-**			✓
	SHGC Values - West		**0.33**			✓
Display Glazing						
There is no display glazing in the proposed building therefore this part has not been assessed						
Floors						
.	There are no proposed works affected by this part therefore this part has not been assessed	.	.		**No Slab Edge Beam Requirements**	✓

Tziallas Architects - Perisher Valley

Introduction

Application Solutions has been engaged to provide a compliance assessment of the proposed development with respect to the Building Code of Australia (BCA) 2022 – Volume 1, Section J – Energy Efficiency (Including NSW Appendix). The BCA is part of the National Construction Code Series (NCC).

The assessment is based on the Deemed-to-Satisfy (DtS) provisions of the BCA. The assessment references the National provisions of the BCA and the NSW Appendix to the BCA.

For the purposes of calculating compliance with J4D6 wall-glazing construction, and J7D3(2) Artificial lighting, Application Solutions has created its own calculating tools in accordance with the specifications and formulas provided in the BCA. All calculations are provided as an appendix to this report.

Throughout this report, reference is made to the ***envelope*** of a building. This is an important term in the application of Section J and is defined in the BCA as follows:

Envelope,
For the purposes of—
(a)Section J in NCC Volume One, the parts of a building's fabric that separate a conditioned space or habitable room from
(i) the exterior of the building; or
(ii) a non-conditioned space including—
(A)the floor of a rooftop plant room, lift-machine room or the like; and
(B)the floor above a carpark or warehouse; and the common wall with a carpark, warehouse or the like;

For complete understanding, the term ***conditioned space*** *and* ***wall-glazing construction*** is also referred to and is defined in the BCA as follows:

Conditioned space
For the purposes of—
(a)Volume One, a space within a building, including a 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 its temperature controlled by air-conditioning;

Air-conditioning, *for the purposes of Section J of volume One, means a service that actively cools or heats the air within a space, but does not include a service that directly*
(a) cools or heats cold or hot rooms; or
(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

Wall-glazing construction, *for the purposes of Section J in Volume One, the combination of wall and glazing components comprising the envelope of a building, excluding—*
(a)display glazing; and
(b)opaque non-glazed openings such as doors, vents, penetrations and shutters.

Display glazing *glazing used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant.*

Habitable room *a room used for normal domestic activities, and—*
(a)includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room sewing room, study, playroom, family room, home theatre and sunroom; but
(b)excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Required *required to satisfy a Performance Solution or a Deemed-to-Satisfy Provision of the NCC as appropriate.*

References are also made to Specifications and additional information contained within the BCA. It is important to be aware of these details as relevant to Section J compliance. Copies of these are now available free of charge through the Australian Building Codes Board at www.abcb.gov.au
Contact Application Solutions if you need assistance in accessing the online version of the BCA.

Proposed Development

The proposed development comprises the enclosing of 6 x balconies to form part of the building envelope and replacement of wall cladding to the existing building.

The proposed development has been classified:

Hotel resort accommodation Class 3

If a different classification is determined by the Principal Certifier, contact Application Solutions to re-assess.

The development is in the Local Government Area (LGA) of Snowy Monaro Regional Council

and therefore, the relevant climate zone is Climate Zone 8

The designer for the proposed development is:
Tziallas Architects
Studio 7, The Mill
210-224 Bon Bong Street
Bowral, NSW

Assessment Outline

This Assessment examines each Part of Section J (Including NSW Appendix) in turn and provides an opinion on whether the Part applies in this case and if so whether the DtS provisions have been met. In some cases, further clarification is specified in the form of notes to be included on the plans and/or specifications. It is understood that the relevant contractors and consultants responsible for the compliant design and construction of the development must ensure that the requirements of this report are incorporated into their respective design and installations, in which case the development will comply with BCA 2022 - Section J.

A summary of items required to achieve Section J compliance is provided at the beginning of this report. These matters will need to be incorporated into the Construction Certificate/Complying Development documentation before a Construction Certificate/Complying Development Certificate is granted.
In the preparation of this assessment, reference was made to the following drawings and documentation:

Site Plan	15025 – DA-00	Rev J
Prop. Cladding & Window Elevations	15025 – DA-01	Rev J
Prop. Ground Floor Plan	15025 – DA-02	Rev H
Prop. Elevation and Section	15025 – DA-03	Rev K
Prop. Window Schedule	15025 – DA-04	Rev G
Prop. Waste Management Plan	15025 – DA-05	Rev H
Neighbour Notification	15025 – DA-06	Rev I
Prop. External Colour Schedule	15025 – DA-07	Rev C
Ex. U20-U25 First Floor Plan	15025 – MD-01	Rev D
Ex. U20-U25 Ground Floor Plan	15025 – MD-02	Rev D
Ex. Basement	15025 – MD-03	Rev D

Section J: Sign-Off - On Completion of Construction

This report sets out the Section J compliance requirements for this project based on the drawings listed above and on various assumptions outlined in each point of the report. In some cases, where information was not available at the time of preparing the report, we have identified the requirement and it is up to the developer/builder of the project to ensure compliance is met.

It is critical that the developer/builder takes the time to understand the requirements outlined in this report and the underlying assumptions. If the design, construction methods or materials are changed after this report was prepared, please contact Application Solutions to reassess to ensure compliance is maintained.

The Executive Summary provides the documentation of Section J requirements which apply to this proposed development. Attention is drawn to the need to provide documentation during construction that each requirement has been met for submission at the Occupation Certificate (OC) stage.

This should include, where relevant.

- Certificates from specific suppliers and contractors
- Photographic record and
- Site inspections

It is important that the information in this report be forwarded to the person/s responsible on site to ensure all work is carried out in compliance and that each item is documented appropriately.

INSPECTIONS:
Where Application Solutions is asked to prepare a sign-off report at the OC stage, several crucial phase inspections will be required during construction. These inspections points may be different for different projects but generally will include:

1. Commencement site meeting with the site supervisor. The meeting may include the site project manager and contract administrator depending on the project's management structure. The purpose of the meeting is to go through the Section J report and identify critical issues. It will also look at the best method of demonstrating compliance at the OC stage.
2. The commencement meeting will identify crucial phase inspection points to take place during construction. Typically, it will include an inspection(s) to create a record of insulation installation, thermal break installation and structural build up.
3. A completion inspection will be conducted at the end of the project. Prior to the completion inspection and at the direction of the developer/builder, Application Solutions will prepare a Completion Check List to be used by the developer/builder to ensure relevant trade/supplier certificates are obtained.

CERTIFICATES:
Typically, a range of certificates will be required as part of the sign-off process at the OC stage. These may include, work involved in insulation/thermal breaks, glazing, mechanical and electrical works. The requirement for a certificate from relevant trades (or suppliers) should be set out in the terms of engagement of the trade/supplier. The certificates should be obtained immediately after the work is done rather than at the end of construction. Particular issues related to a particular project can be addressed at the commencement site meeting to ensure a smooth path for achieving the OC sign-off. Some general notes are provided below:

The NCC provides methods for demonstrating that any given aspect of construction meets the codes requirements. For this project it is likely to involve critical trades/suppliers providing a certificate of compliance.

With the heightened focus on demonstrating compliance, greater attention must be given to this area. It is also important to realise that all participants in the building process have a share of responsibility for the successful outcome of the project

The genesis of the compliance certificate is found in the A5G3(1) Of relevance to this project is A5G3(1)(e): See below.

> ***A5G3(1)(e): A certificate or report from a professional engineer or other appropriately qualified person that—***
>
> ***(i)certifies that a material, product, form of construction or design fulfils specific requirements of the BCA; and***
>
> ***(ii)sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon to demonstrate it fulfils specific requirements of the BCA.***

The clause is in 2 parts. Part (i) The certificate and Part (ii) a supporting document setting out the basis on which the certificate is given.

Part (i): Clearly Identify the person giving the certificate:

- Full Name
- Job Title
- Company Details (letter head)
- Qualifications and Experience

Statement of the matters being certified and that they comply
Signed and Dated

Part (ii) We recommend that the supporting document be created using the Executive Summary from this report. The Executive Summary contains a list of compliance items relevant to this project, extract the relevant items and make a compliance statement under each item. The compliance statement should include what was actually installed relevant to the particular item. If an item is not relevant or not applicable, then the reason for this should be stated.

Section J: Sign-Off - On Completion of Construction

Documentation of Compliance During Construction	**It is important to document compliance for each item noted in the Executive Summary throughout construction. Refer to the "Section J: Sign-Off – on Completion of Construction" section of this report for guidance. If further assistance is required, contact Application Solutions.**

NSW Part J1 – Energy Efficiency Performance Requirements

NOTE: In NSW, Part J1 is replaced with NSW Part J1.

Introduction to this Part

BCA extract	*This Part sets the thermal performance properties of building fabric, the energy efficiency of key energy using equipment and the features a building must have to facilitate the future installation of distributed energy resources.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies.** **See body of report for requirements.**

Performance Requirement NSW J1P1 – Energy Use

BCA extract	*A building including its services, must have features that facilitate the efficient use of energy appropriate to—* *(a) the function and use of the building; and* *(b) the level of human comfort required for the building use; and* *(c) solar radiation being—* *(i) utilised for heating; and* *(ii) controlled to minimise energy for cooling; and* *(d) the energy source of the services; and* *(e) the sealing of the building envelope against air leakage; and operation, of not more than—* *for a conditioned space, achieving an hourly regulated energy consumption, averaged over the annual (f) hours of* *(i) for a Class 6 building, 80 kJ/m².hr; and* *(ii) for a Class 5, 7b, 8 or 9a building other than a ward area, or a Class 9b school, 43 kJ/m².hr; and* *(iii) for all other building classifications, 15 kJ/m².hr.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement applies.** **See body of report for requirements.**

Applications
NSW J1P1 does not apply to a Class 2 building or a Class 4 part of a building.

Performance Requirement J1P2 – Thermal performance of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building

BCA extract	*(1) The total heating load of the habitable rooms and conditioned spaces in a sole-occupancy unit of a Class 2 building or a Class 4 part of a building must not exceed the heating load limit in Specification 44.* *(2) The total cooling load of the habitable rooms and conditioned spaces in a sole-occupancy unit of a Class 2 building or a Class 4 part of a building must not exceed the cooling load limit in Specification 44.* *(3) The total thermal energy load of the habitable rooms and conditioned spaces in a sole-occupancy unit of a Class 2 building or a Class 4 part of a building must not exceed the thermal energy load limit in Specification 44.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement does not apply, as it relates to Class 2 and Class 4 building matters which are regulated under BASIX in NSW.**

Performance Requirement J1P3 - Energy usage of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building

BCA extract	*(1) The energy value of the domestic services of a sole-occupancy unit of a Class 2 building or Class 4 part of a building must not exceed the energy value with— (a)a 3-star ducted heat pump, rated under the 2019 GEMS determination, heating all spaces that are provided with heating; and* *(b)a 3-star ducted heat pump, rated under the 2019 GEMS determination, cooling all spaces that are provided with cooling; and* *(c)a 5-star instantaneous gas water heater, rated under the 2017 GEMS determination, providing all domestic hot water; and* *(d)a lighting power density of 4 W/m2 serving all internal spaces that are provided with artificial lighting.* *(2) Domestic services, including any associated distribution system and components must, to the degree necessary, have features that facilitate the efficient use of energy appropriate to— (a)the domestic service and its usage; and* *(b)the geographic location of the building; and* *(c)the location of the domestic service; and* *(d)the energy source.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement does not apply, as it relates to Class 2 and Class 4 building matters which are regulated under BASIX in NSW.**

Performance Requirement NSW J1P4 – Renewable energy and electric vehicle charging

BCA extract	*A building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement applies.** **See body of report for requirements.**

Performance Requirement NSW J1P5 – Building fabric—Class 2 building and Class 4 parts of a building

BCA extract	*(1) Thermal insulation in a building must be installed in a manner and have characteristics, which facilitate the efficient use of energy for artificial heating and cooling.* *(2) A building must have, to the degree necessary, thermal breaks installed between the framing and external cladding, to facilitate efficient thermal performance of the building envelope.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement does not apply, as the proposed development is not a Class 2 building or Class 4 part of a building.** **See body of report for requirements.**

Explanatory Information
(1) NSW J1P5 only applies to a Class 2 building or a Class 4 part of a building.
(2) NSW J1P5(1) only applies to thermal insulation in a building where a development consent specifies that the insulation is to be provided as part of the development.
(3) NSW J1P5(2) only applies to a metal framed roof and metal framed wall.

Performance Requirement NSW J1P6 – Building sealing—Class 2 building and Class 4 parts of a building

BCA extract	*A building must have, to the degree necessary, a level of building sealing against air leakage to facilitate the efficient use of energy for artificial heating and cooling appropriate to—* *(a) the function and use of the building; and* *(b) the internal environment; and* *(c) the geographic location of the building.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement does not apply, as the proposed development is not a Class 2 building or Class 4 part of a building.** **See body of report for requirements.**

Applications
NSW J1P6 only applies to a Class 2 building or Class 4 part of a building, except—
(a) a building in climate zones 2 and 5 where the only means of air-conditioning is by using an evaporative cooler; and
(b) a permanent building opening in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; and
(c) parts that cannot be fully enclosed.

Performance Requirement NSW J1P7 – Services—Class 2 building and Class 4 parts of a building

BCA extract	*A building's services must have features that, to the degree necessary, facilitate the efficient use of energy appropriate to—* *(a) the function and use of the service; and* *(b) the internal environment; and* *(c) the geographic location of the building; and* *(d) the energy source of the service.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Performance Requirement does not apply, as the proposed development is not a Class 2 building or Class 4 part of a building.** **See body of report for requirements.**

Applications
NSW J1P7 only applies to a Class 2 building or Class 4 part of a building.

Part J2 – Energy Efficiency

Introduction to this Part

BCA extract	*This Part sets out the application of the Deemed-to-Satisfy Provisions in Parts J3 to J9.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies.** **See body of report for requirements.**

Delete J2D1(1) and insert NSW J2D1(1) as follows:

NSW J2D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J2D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P4 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J 9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J2D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**This clause applies to the proposed development, however a Performance Solution is not proposed for this development.**

Delete J2D2 and insert NSW J2D2 as follows:

NSW J2D2 Application of Section J

BCA extract	*NSW J2D2 (1) For a Class 3 and 5 to 9 building, Performance Requirement NSW J1P1 is satisfied by complying with—* *(a) Part J4, for the building fabric; and* *(b) Part J5, for building sealing; and* *(c) Part J6, for air-conditioning and ventilation; and* *(d) Part J7, for artificial lighting and power; and* *(e) Part J8, for heated water supply and swimming pool and spa pool plant; and* *(f) J9D3, for facilities for energy monitoring.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*NSW J2D2 (2) For a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, Performance Requirement NSW J1P5 is satisfied by complying with—* *(a) J3D5 and J3D6, for thermal breaks; and* *(b) J4D3, for general thermal construction; and* *(c) J3D10(3), J3D10(5) and J3D10(6), for floor edge insulation.*
Application to Development	**These clauses do not apply as the proposed development is not a Class 2 building or Class 4 part of a building.**

BCA extract	*NSW J2D2 (3) For a Class 2 building or a Class 4 part of a building, Performance Requirement NSW J1P6 is satisfied by complying with Part J5 for building sealing.*
Application to Development	**These clauses do not apply as the proposed development is not a Class 2 building or Class 4 part of a building.**

BCA extract	*NSW J2D2 (4) For a Class 2 building or a Class 4 part of a building, Performance Requirement NSW J1P7 is satisfied by complying with—* *(a)Part J6, for air-conditioning and ventilation; and* *(b)J8D2, for heated water supply; and* *(c)J9D3, for facilities for energy monitoring.*
Application to Development	**These clauses do not apply as the proposed development is not a Class 2 building or Class 4 part of a building.**

BCA extract	*NSW J2D2 (5) For a Class 2 to 9 building, Performance Requirement NSW J1P4 is satisfied by complying with J9D4 and J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

Part J3 – Elemental provisions for a sole-occupancy unit of a Class 2 building or a Class 4 part of a building

Introduction to this Part

BCA extract	*This Part contains Deemed-to-Satisfy Provisions (elemental) for compliance with Part J1. It sets out provisions for the insulation of building fabric and the energy efficiency of domestic services of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building.*
Application to Development	**Hotel resort accommodation** / **Class 3** / **This Part does not apply as stated in NCC Schedule 5 for NSW, as it relates to Class 2 and Class 4 building matters which are regulated under BASIX in NSW.**

Part J4 – Building Fabric

Delete J4D1(1) and insert NSW J4D1(1) as follows:

NSW J4D1 Deemed-to-Satisfy Provisions

BCA extract	*(1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J4D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**This clause applies to the proposed development, however a Performance Solution is not proposed for this development.**

Delete J4D2 and insert NSW J4D2 as follows:

NSW J4D2 Application of Part

BCA extract	*NSW (1) The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of a Class 3 and Class 5 to 9 building.* *(2) NSW J4D3, applies to building elements forming the envelope of a sole-occupancy unit in a Class 2 building and a Class 4 part of a building.* *(3) (2) only applies to thermal insulation in a sole-occupancy unit in a Class 2 building and a Class 4 part of a building where a development consent specifies that the insulation is to be provided as part of the development.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **Clause (1) of this Part applies to building elements forming part of the envelope.** **Clause (2) and (3) do not apply as the proposed development is not a sole-occupancy unit in a Class 2 building or Class 4 part of a building.** **See body of report for requirements.**

Delete J4D3 and insert NSW J4D3 as follows:

NSW J4D3 Thermal construction – general

BCA extract	*NSW J4D3 (1) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it—* *(a) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and* *(b) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and* *(c) does not affect the safe or effective operation of a service or fitting.* *(2) Where required, reflective insulation must be installed with—* *(a) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and* *(b) the reflective insulation closely fitted against any penetration, door or window opening; and* *(c) the reflective insulation adequately supported by framing members; and* *(d) each adjoining sheet of roll membrane being— (i)overlapped not less than 50 mm; or* *(ii) taped together.* *(3) Where required, bulk insulation must be installed so that—* *(a) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and* *(b) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.* *(4) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification 36.* *(5) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be—* *(a) calculated in accordance with AS/NZS 4859.2 for a roof or floor; or* *(b) determined in accordance with Specification 37 for wall-glazing construction; or determined in accordance with Specification 39 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.*
Application to Development	**These clauses apply where insulation is required in the proposed development.**
1. Construction Requirements – Installation of Insulation ***NSWJ4D3 (1) (2), (3), (4) and (5)***	**Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:** **(i) abuts or overlaps adjoining insulation other than at supporting members; and** **(ii) forms a continuous barrier and** **(iii) does not affect the safe or effective operation of a service or fitting.** **Reflective insulation must be installed with:** **(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and** **(ii) the reflective insulation closely fitted against any penetration, door or window opening; and** **(iii) the reflective insulation adequately supported by framing members; and** **(iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.** **Bulk insulation must be installed so that:** **(i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and** **(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.**

J4D4 Roof and ceiling construction

BCA extract	*J4D4* *(1)* A roof or ceiling must achieve a *Total R-Value* greater than or equal to— *(a) in climate zones 1, 2, 3, 4 and 5, 3.7 for a downward direction of heat flow; and* *(b) In climate zone 6, 3.2 for a downward direction of heat flow; and* *(c) In climate zone 7, 3.7 for an upward direction of heat flow; and* *(d) In climate zone 8, 4.8 for an upward direction of heat flow* *(2) In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45*
	These clauses apply to the proposed development. The roof/ceiling system which forms part of the envelope must have a minimum total R-Value as required by BCA J4D4(1). There is no maximum solar absorptance value for the upper surface of a roof specified by BCA J4D4(2) for climate zone 8. **A summary of the roof system calculations is tabulated below.**
2. Construction Requirements – Roof and Ceiling Insulation ***J4D4 (1) and (2)***	**The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA J4D4 (1) is R4.8.** **To achieve compliance, insulation of at least R4.4 is required to be incorporated into the roof/ceiling system which forms part of the envelope. See Appendix for roof calculations and envelope/insulation mark-up plans showing the thermal envelope.** **NOTE: A thermal break is not required as continuous insulation is proposed. Should the insulation not be installed continuously, or installed between roof framing members, contact Application Solutions to re-assess.** **There is no maximum solar absorptance value for the upper surface of a roof specified by BCA J4D4(2) for climate zone 8.**

Roof Summary

Description	Insulation Required*	Solar Absoptance**	Thermal Break*	R-value Achieved
Metal Sheet Roof - with pitch >5 degrees	R4.4	N/A	N/A	R4.83

**See Appendix for full details*

Tziallas Architects - Perisher Valley

J4D5 Roof lights

BCA extract	*Roof lights must have—* *J4D5 (a) have a total area not more than 5% of the floor area of the room or space served; and* *(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—* *(i) for Total system SHGC, in accordance with Table J4D5; and* *(ii) for Total system U-Value, not more than U3.9.*
Application to Development	**These clauses do not apply to the proposed development as there are no roof lights shown proposed which form part of the envelope.**

Delete J4D6 and insert NSW J4D6 as follows:

NSW J4D6 Walls and Glazing

BCA extract	*NSW J4D6 (1) The Total System U-Value of wall-glazing construction, including wall-glazing construction which wholly or partly forms the envelope internally, must not be greater than—* *(a) for a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, U2.0; and* *(b) for a Class 3 or 9c building or a Class 9a ward area—* *(i) in climate zones 1, 3, 4, 6 or 7, U1.1; or* *(ii) in climate zones 2 or 5, U2.0; or* *(iii) in climate zone 8, U0.9.*
Application to Development	**Clause (1)(b)(iii) above applies to the proposed development.**
3. Maximum U-value ***NSW J4D6(1)***	**NOTE: The maximum U-Value for the wall-glazing system is U0.9, compliance with this clause is calculated in accordance with J4D6(3) See below.**

BCA extract	*NSW J4D6 (2) The Total System U-Value of display glazing must not be greater than U5.8.*
Application to Development	**This clause does not apply to the development as there is no proposed display glazing.**

BCA extract	*NSW J4D6 (3) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification 37.*
Application to Development	**This clause applies to the proposed development. The assessment is based on 3 wall types as summarized below. A breakdown of the wall types is tabled in the Appendix.**
4. Calculation of U-value ***NSW J4D6(3)***	**The wall-glazing system U-Values for the development is U0.9, which is not more than the max permitted in J4D6 See Appendix for full calculations.** **To achieve compliance, new walls which form part of the envelope must be insulated as shown below.** **To achieve compliance, the glazing U-Values are shown with the SHGC Values under J4D6(6) Calculation of Solar admittance. See below.** **NOTE 1: Thermal breaks are not required as part of the minimum requirements as compensation for loss of R-Value due to thermal bridging has been calculated. Thermal breaks are not required as part of the minimum requirements. However as good energy efficient practice, it is advised for when external and internal linings are fixed directly to the same metal frame, that the use of thermal breaks are installed at all points of contact between the external cladding and the metal frame when possible.** **NOTE 2: In the cases where the development is determined as NCC Type A or Type B Construction by the Principal Certifier, selected wall insulation may be required to be non-combustible.**

Wall Summary	Insulation Required*	Thermal Break*	Total Wall System R-value achieved	Total Wall System U-value achieved
Metal Clad Timber Frame Wall	R2.7	N/A	2.66	0.38
Metal Clad Brick Veneer Wall	R2.3	N/A	3.13	0.32
Existing Walls - No Requirements	-	-	-	-

**See Appendix for full details*

Tziallas Architects - Perisher Valley

BCA extract	*NSW J4D6(4) Wall components of a wall-glazing construction must achieve a minimum Total R-Value* of— *(a) where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or* *(b) where the wall is 80% or more of the area of the wall-glazing construction, the value specified in NSW Table J4D6a.*
Application to Development	**This clause applies to the proposed development. The wall components of the wall-glazing construction comprise less than 80% of the total. Therefore, clause (a) above applies.**
5. Calculation of Wall R-value ***NSW J4D6(4)***	**NOTE: The wall component of the wall-glazing system for the development is less than 80% of the total area, therefore the minimum R-value is R1.0. This minimum R-value is achieved.** **See Appendix for walls forming part of the envelope.**

BCA extract	*NSW J4D6 (5) The solar admittance of externally facing wall-glazing construction, excluding wall-glazing construction which is wholly internal, must not be greater than—* *(a) for a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, the values specified in NSW Table J4D6b; and* *(b) for a Class 3 or 9c building or a Class 9a ward area, the values specified in NSW Table J4D6c.*
Application to Development	**Clause (b) above applies to Class 3 buildings. See maximum Solar Admittance values permitted in table below.**
6. Max Solar admittance Permitted ***NSW J4D6(5)***	**NOTE:-** Using NSW Table J4D6c

Max Solar Admittance Permitted			
East	**North**	**South**	**West**
0.08	0.08	0.08	0.08

BCA extract	*NSW J4D6(6) The solar admittance of a wall-glazing construction must be calculated in accordance with Specification 37.*
Application to Development	**Calculation of Solar Admittance has been carried out in accordance with Specification 37. The representative air-conditioning energy value (E) for the proposed building is less than the E value for the reference building therefore it complies. See Appendix for calculation sheet.**

7. Calculation of Solar Admittance ***NSW J4D6(6)***	**Calculation of Solar Admittance for the proposed development has been carried out in accordance with Specification 37. See Appendix for calculation sheet.** **The proposed building complies with J4D6(6) – Solar Admittance of wall-glazing construction when installed with the following glazing and frame system U and SHGC Values.** **The SHGC values for glazing have been calculated using the shading as shown on the architectural design plans. Should the shading design be revised, contact Application Solutions to re-assess.** **There are no glazing U and SHGC Values specified for the North and South orientations as there is no proposed new glazing to these parts of the building. Should the design change, contact Application Solutions to re-assess.** **The resultant system U and SHGC Values for glazing are as shown below: *(selected glazed product values can be lower)*** **Glazing Summary** / **U-Value** / **SHGC Value** East 2.90 0.81 North - - South - - West 2.90 0.33 *Tziallas Architects - Perisher Valley* **NOTE: The Total System U-Value and Total System SHGC Value for selected glazed products must be rated in accordance with the AFRC Protocol.**

BCA extract	*NSW J4D6(7) The Total system SHGC of display glazing must not be greater than 0.81 divided by the applicable shading factor specified in S37C7.*
Application to Development	**This clause does not apply to the development as there is no display glazing proposed.**

J4D7 Floors

BCA extract	*J4D7(1) A floor must achieve the Total R-Value specified in Table JD47.* *(2) For the purposes of (1), a slab-on-ground that does not have an in-slab heating or cooling system is considered to achieve a Total R-Value of R2.0, except—* *(a) in climate zone 8; or* *(b) a Class 3, Class 9a ward area or Class 9b building in climate zone 7 that has a floor area to floor perimeter ratio of less than or equal to 2.* *(3) A floor must be insulated around the vertical edge of its perimeter with insulation having an R-Value greater than or equal to 1.0 when the floor—* *(a) is a concrete slab-on-ground in climate zone 8; or* *(b) has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.* *(4) Insulation required by (3) for a concrete slab-on-ground must— (a)be water resistant; and* *(b) be continuous from the adjacent finished ground level— (i)to a depth not less than 300 mm; or for the full depth of the vertical edge of the concrete slab-on-ground.*
Application to Development	**These clauses do not apply to the development as there are no proposed new floor structure works which form part of the envelope.**

Part J5 – Building Sealing

Delete J5D1(1) and insert NSW J5D1(1) as follows:

NSW J5D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J5D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J5D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**This clause applies to the proposed development, however a Performance Solution is not proposed for this development.**

Delete J5D2 and insert NSW J5D2 as follows:

NSW J5D2 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 to 9 building, other than—* *(a) a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or* *(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or* *(c) in a Class 3 or Class 5 to 9 building, a building or space where the mechanical ventilation required by Part F6 provides sufficient pressurisation to prevent infiltration; or* *(d) parts of buildings that cannot be fully enclosed.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies.** **See body of report for requirements**

J5D3 Chimneys and flues

BCA extract	*The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.*
Application to Development	**This clause does not apply as there is no chimney or flue of an open solid-fuel burning appliance shown proposed.**

J5D4 Roof lights

BCA extract	*J5D4 (1) A roof light must be sealed, or capable of being sealed,* *(a) when serving a conditioned space; or* *(b) in climate zones 4, 5, 6, 7 and 8.* *(2) A roof light required by **(a)** to be sealed, or capable of being sealed, must be constructed with* *(a) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or* *(b) a weatherproof seal; or* *(c) a shutter system readily operated either manually, mechanically or electronically by the occupant; and*
Application to Development	**These clauses do not apply to the development as there are no roof lights shown proposed which form part of the envelope.**

Delete J5D5 and insert NSW J5D5 as follows:

NSW J5D5 Windows and doors

BCA extract	*NSW J5D5* *(1) A door, openable window or the like must be sealed—* *(a) when forming part of the envelope; or* *(b) in climate zones 4, 5, 6, 7 or 8.* *(2) The requirements of (1) do not apply to—* *(a) a window complying with AS 2047; or* *(b) a fire door or smoke door; or* *(c) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.* *(3) A seal to restrict air infiltration—* *(a) for the bottom edge of a door, must be a draft protection device; and* *(b) for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.*
Application to Development	**These clauses apply to the development.**
8. Construction Requirements – Window and Door Sealing ***NSW J5D5(2) and (3)***	**A door, openable window or the like must be sealed when forming part of the envelope** **The seal may be a foam or rubber compression strip, fibrous seal or the like.** **For the bottom edge of an external swing door, a draft protection device must be installed.** **For exemptions to this clause see body of report.**

BCA extract	*NSW J5D5 (4) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than—* *(a) where the conditioned space has a floor area of not more than 50 m2; or* *(b) where a café, restaurant, open front shop or the like has—* *(i) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and* *(ii) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.*
Application to Development	**This clause applies to the development.**
9. Construction Requirements – Building Entrance Sealing ***NSW J5D5(4)***	**An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.**

BCA extract	*NSW J5D5(5) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.*
Application to Development	**This clause does not apply to the development as no loading dock which leads to a conditioned space is shown proposed.**

J5D6 Exhaust fans

BCA extract	*J5D6 An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—* *(a) a conditioned space; or* *(b) a habitable room in climate zones 4, 5, 6, 7 or 8.*
Application to Development	**This clause applies to the development if an exhaust fan is installed.**
10. Construction Requirements – Exhaust Fan Sealing ***J5D6***	**An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.**

J5D7 Construction of ceilings walls and floors

BCA extract	*J5D7(1) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (2)—* *(a) when forming part of the envelope; or* *(b)in climate zones 4, 5, 6, 7 or 8.* *(2) Construction required by (1) must be—* *(a)enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or* *(b)sealed at junctions and penetrations with—* *(i)close fitting architrave, skirting or cornice; or* *(ii)expanding foam, rubber compressible strip, caulking or the like.* *(3) The requirements of (1) do not apply to openings, grilles or the like required for smoke hazard management*
Application to Development	**These clauses apply to the development.**
11. Construction Requirements – Roof, Wall and Floor Sealing ***J5D7(1), (2) and (3)***	**Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR sealed with expanding foam, rubber compressible strip, caulking or the like at bottom plates or skirting; and cornices and shadow lines; and gaps around ceiling, wall or floor penetrations**

J5D8 Evaporative coolers

BCA extract	*An evaporative cooler must be fitted with a self-closing damper or the like-* *J5D8 (a) when serving a heated space; or* *(b) in climate zones 4, 5, 6, 7 and 8.*
Application to Development	**This clause does not apply to the development as there is no evaporative cooler shown proposed.**

Continues next page…

Part J6 – Air-conditioning and Ventilation

Delete J6D1(1) and insert NSW J6D1(1) as follows:

NSW J6D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J6D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J6D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**This clause applies to the proposed development, however a Performance Solution is not proposed for this development.**

Delete J6D2 and insert NSW J6D2 as follows:

NSW J6D2 Application of Part

BCA extract	*NSW J6D2 (1) The Deemed-to-Satisfy Provisions of this Part do not apply to a Class 8 electricity network substation.* *(2) J6D10 does not apply to a Class 2 building or a Class 4 part of a building.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies.** **See body of report for requirements**

J6D3 Air-conditioning system control

BCA extract	*J6D3 (1) An air-conditioning system-* *(a) must be capable of being deactivated when the building or part of a building served is not occupied; and*
Application to Development	**This clause applies to the development.**
12. Construction Requirements – Deactivation Capability ***J6D3(1)(a)***	**Any air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.**

BCA extract	*J6D3 (1) (b) 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* *(ii) not control the temperature by mixing actively heated air and actively cooled air; and* *(iii) limit reheating to not more than-* *(A) for a fixed supply air rate, a 7.5 K rise in temperature; and* *(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; and*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup.**
13. Construction Requirements – Air-conditioning Zones ***J6D3(1)(b)***	**Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.**

BCA extract	*J6D3 (1) (c) 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**; and-*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup and where the air flow rate of any air side component of the air-conditioning system is equal or greater than 4000L/s.**
14. Construction Requirements – Economy Cycle ***J6D3(1)(c)***	**Where the air-conditioning system provides the required mechanical ventilation and has a total air flow rate of greater than or equal to 4000 L/s, it shall have an outdoor air economy cycle.**

BCA extract	*J6D3 (1) (d) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and*
Application to Development	**This clause is not applicable as the proposed air-conditioning system is a packaged DX unit. i.e. is not water based.**

BCA extract	*J6D3 (1) (e) 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;*
Application to Development	**This clause applies if the air-conditioning system air-flow rate is greater than 1000 L/s.**
15. Construction Requirements – Variable Speed Fans ***J6D3(1)(e)***	**Where the air-conditioning system has an air flow rate greater than 1000 L/s it must have variable speed fans.**

BCA extract	*J6D3 (1) (f) 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; and*
Application to Development	**This clause applies to the development.**
16. Construction Requirements – Class 3 Controls ***J6D3(1)(f)***	**When serving a sole-occupancy unit in a Class 3 building, the air-conditioning system 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.**

BCA extract	*J6D3 (1) (g) 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; and*
Application to Development	**This clause applies to the development.**
17. Construction Requirements – Controls ***J6D3(1)(g)***	**The 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.**

BCA extract	*J6D3 (1) (h) must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications; and*
Application to Development	**This clause applies to the development.**
18. Construction Requirements – Dead Band ***J6D3(1)(h)***	**The air-conditioning system must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications.**

BCA extract	*J6D3 (1) (i) must be provided with balancing dampers and balancing valves, as required to meet the needs of the system at its maximum operating condition, that ensure the maximum design air or fluid flow is achieved but not exceeded by more than 15% above design at each—* *(i)component; or* *(ii) group of components operating under a common control in a system containing multiple components; and*
Application to Development	**This clause may apply to the development depending on how the air-con system is designed**
19. Construction Requirements – Balancing Dampers and Valves ***J6D3(1)(i)***	**The 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 at each component as required to meet the needs of the system at its maximum operating condition.**

BCA extract	*J6D3 (1) (j) must ensure that each independently operating space of over 1000 m² 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; and*
Application to Development	**This clause does not apply to the development as each independent operating space is not more than 1000m² and each separate floor contains independent operating systems.**

BCA extract	*J6D3 (1) (k) must have automatic variable temperature operation of heated water and chilled water circuits; and*
Application to Development	**This clause is not applicable as the proposed air-conditioning system is a packaged DX unit. i.e. is not water based.**

BCA extract	*J6D3 (1) (l) when deactivated, must close any motorised outdoor air and return air damper that is not otherwise being actively controlled.*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup.**
20. Construction Requirements – Motorised Damper ***J6D3(1)(l)***	**When deactivated, the air conditioning system must close any motorised outdoor air and return air damper.**

BCA extract	*J6D3 (2) 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.*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup.**
21. Construction Requirements – Control Sequences ***J6D3(2)***	**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.**

BCA extract	*J6D3 (3) Time switches—* *(a)A time switch must be provided to control—* *(i)an air-conditioning system of more than 2 kWr; and* *(ii)a heater of more than 1 kWheating used for air-conditioning.* *(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.* *(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; or* *(B)a Class 4 part of a building; or* *(ii)a conditioned space where air-conditioning is needed for 24-hour continuous use..*
Application to Development	**This clause may apply to the development depending on air-conditioning system and/or heater selection.**
22. Construction Requirements – Time Switch	**A time switch must be provided to control all air-conditioning systems of more than 2 kWr and heaters of more than 1 $kW_{heating}$. The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.**

J6D4 Mechanical Ventilation system control

BCA extract	*J6D4 (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; and*
Application to Development	**This clause applies to the development if mechanical ventilation systems are installed.**
23. Construction Requirements – Ventilation Operation ***J6D3(4)(1)(a)***	**A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.**

BCA extract	*J6D4 (1) (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 efficacy of 60%; or* *(B) demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and* *(ii) not exceed the minimum outdoor air quantity required by **BCA Part F6**, by more than 20%, except where* *(A) additional unconditioned outdoor air is supplied for free cooling; or* *(B) additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or* *(C) an energy reclaiming system preconditions all the outdoor air.*
Application to Development	**This clause applies where mechanical ventilation systems serve a conditioned space.**
24. Construction Requirements – Mechanical Ventilation of Conditioned Space ***J6D4(1)(b)***	**Any mechanical ventilation system that is serving a conditioned space and has an outside air flow greater than 250 L/s shall have an energy reclaiming system in accordance with (i)(A) or modulating control in accordance with (i)(B).** **The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.**

BCA extract	*J6D4 (1) (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.*
Application to Development	**This clause applies where mechanical ventilation systems serve a conditioned space.**
25. Construction Requirements – Variable Speed Fans ***J6D4(1)(c)***	**Any mechanical ventilation system that is serving a conditioned space and has an air flow rate of more than 1000 L/s, shall have variable speed fans unless the downstream air flow is required by Part F6 to be constant.**

BCA extract	*J6D4 (2) **Exhaust systems**— 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.*
Application to Development	**This clause applies to the development if an exhaust fan with an air flow rate of more than 1000 l/s is to be installed.** **This clause does not apply to an exhaust system in a sole-occupancy unit in a Class 3 building.**
26. Construction Requirements – Exhaust System ***J6D4(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.** **This clause does not apply to an exhaust system in a sole-occupancy unit in a Class 3 building.**

BCA extract	*J6D4 (3) **Carpark exhaust systems—** Carpark exhaust systems must have an atmospheric contaminant monitoring system in accordance with –* *(a) clause 4.11.2 of AS 1668.2; or* *(b) clause 4.11.3 of AS 1668.2.*
Application to Development	**This clause does not apply to the development as there is no enclosed carpark shown proposed.**

BCA extract	*J6D4 (4) **Time switches - The following applies:*** *(a) A time switch must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.* *(b) The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.*
Application to Development	**This clause applies to the development where mechanical ventilation systems are installed.**
27. Construction Requirements – Ventilation Time Switch Control ***J6D4(4)***	**Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch and be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days** **See J6D4(c) below for any appropriate exclusions to this requirement.**

BCA extract	*J6D4 (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* *(B) a Class 4 part of a building; or* *(ii) a building where mechanical ventilation is needed for 24-hour occupancy.*

J6D5 Fan and duct systems

BCA extract	*J6D5 mechanical* *(1) Fans, ductwork and duct components that form part of an air-conditioning system or ventilation system must –* *(a) separately comply with **(2), (3), (4) and (5)** or* *(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.*
Application to Development	**This clause applies to the development where mechanical ventilation systems are installed.**
28. Construction Requirements –Fans ***J6D5(1)***	**Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must** **(a) separately comply with BCA J5.3 (b), (c), (d), (e) and (f); or** **(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 BCA J5.4 (b), (c), (d), (e) and (f) together.**

BCA extract	*J6D5 (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: man = 13 x ln(p) - 30* *(b) n the formula at (a)— (i)= the minimum required system static efficiency for installation type A or C or the minimum required system total efficiency installation type B or D; and* *(ii) = the static pressure of the system (Pa); and* *(ii) ln= natural logarithm.*
Application to Development	**This clause applies to fans in systems with a static pressure not more than 200Pa.**
29. Construction Requirements – Fans Static Pressure Not More Than 200Pa ***J6D5(2)(a) and (b)***	**Fans in systems with a static pressure not more than 200Pa must have an efficiency calculated using the formula in J6D5**

BCA extract	*J6D5(2) (c) 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:* *ηmin = 0.85 x (a x ln(P) - b + N) / 100* *(d). In the formula at (c)—* *(i)system total efficiency installation type B or D; and* *(ii) = the motor input power of the fan (kW); and* *(iii) = the minimum performance grade obtained from Table J6D5a; and* *(iv) = regression coefficient a, obtained from Table J6D5b; and* *(v) = regression coefficient b, obtained from Table J6D5c; and* *(vi)= natural logarithm.*
Application to Development	**This clause applies to fans in systems with a static pressure more than 200Pa.**
30. Construction Requirements – Fans Static Pressure Above 200Pa ***J6D5(2)(c)***	**Fans in systems with a static pressure more than 200Pa must have an efficiency calculated using the formula in J6D5(c)**

BCA extract	*J6D5 (2) (e) The requirements of (a), (b), (c) and (d) do not apply to fans that need to be explosion proof*

BCA extract	*J6D5 (3) Ductwork-* *(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.*
Application to Development	**This clause applies to any ductwork installed.**
31. Construction Requirements – Ductwork ***J6D5(3)(a)***	**The average pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed a pressure drop of 1 Pa/m. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.**

BCA extract	*J6D5 (3)(b) Flexible ductwork must not account for more than 6m in length in any duct run.*
Application to Development	**This clause applies to any ductwork installed.**
32. Construction Requirements – Ductwork ***J6D5(3)(b)***	**Flexible ductwork must not account for more than 6m in length in any duct run.**

BCA extract	*J6D5(3) (c) The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.*
Application to Development	**This clause applies to any ductwork installed.**
33. Construction Requirements – Ductwork ***J6D5(3)(c)***	**The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.**

BCA extract	*J6D5(3)(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* *(ii)a long radius bend in accordance with AS 4254.2 is used*
Application to Development	**This clause applies to any ductwork installed.**
34. Construction Requirements – Ductwork ***J6D5(3)(d)***	**Turning vanes must be included in all rigid ductwork bends of 90º or more acute except where the inclusion of turning vanes presents a fouling risk or a long radius bend in accordance with AS4254.2.**

BCA extract	*J6D5* *(4)Ductwork components in the index run: (a)The pressure drop across a coil must not exceed the value specified in Table J6D5d.* *(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* *(ii)the filter design pressure drop when clean at an air velocity of 1.5 m/s.* *(c)Any other air filter must not exceed— (i)the pressure drop specified in Table J6D5e when clean; or* *(ii)the filter design pressure drop when clean at an air velocity of 2.5 m/s.* *(d)The pressure drop across intake louvres must not exceed the higher of— (i)for single stage louvres, 30 Pa; and* *(ii)for two stage louvres, 60 Pa; and* *(iii)for acoustic louvres, 50 Pa; and* *(iv)for other non-weatherproof louvres, 30 Pa.* *(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; and* *(ii)for other units, 25 Pa not including coil pressure losses.* *(f)Rooftop cowls must not exceed a pressure drop of 30 Pa.* *(g)Attenuators must not exceed a pressure drop of 40 Pa.* *(h)Fire dampers must not exceed a pressure drop of 15 Pa when open.* *(i)Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.* *(j)Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.* *(k)Exhaust grilles must not exceed a pressure drop of 30 Pa.* *(l)Transfer ducts must not exceed a pressure drop of 12 Pa.* *(m)Door grilles must not exceed a pressure drop of 12 Pa.* *(n)Active chilled beams must not exceed a pressure drop of 150 Pa.*
Application to Development	**This clause applies to any ductwork installed.**
35. Construction Requirements – Ductwork ***J6D5(4)(a) to (n)***	**This clause contains detailed design criteria which must be met for any ductwork installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA.**

BCA extract	*J6D5 (5)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* *(b)smoke spill fans, except where also used for air-conditioning or ventilation; and* *(c)the power for process-related components; and* *(d)kitchen exhaust systems.*

J6D6 Ductwork Insulation

BCA extract	*J6D6 (1)Ductwork and fittings in an air-conditioning system must be provided with insulation—* *(a)complying with AS/NZS 4859.1; and* *(b)having an insulation R-Value greater than or equal to—* *(i)for flexible ductwork, 1.0; or* *(ii)for cushion boxes, that of the connecting ductwork; or* *(iii)that specified in Table J6D6.* *(2)Insulation must—* *(a)be protected against the effects of weather and sunlight; and* *(b)be installed so that it—* *(i)abuts adjoining insulation to form a continuous barrier; and* *(ii)maintains its position and thickness, other than at flanges and supports; and* *(c)when conveying cooled air—* *(i)be protected by a vapour barrier on the outside of the insulation; and* *(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* *(B)are bonded or taped together.*
Application to Development	**This clause applies to any ductwork installed.**
36. Construction Requirements – Ductwork Insulation ***J6D6(1) and (2)***	**J5.6 (1)Ductwork and fittings in an *air-conditioning* system must be provided with insulation—** **(a)complying with AS/NZS 4859.1; and** **(b)having an insulation *R-Value* greater than or equal to—** **(i)for flexible ductwork, 1.0; or** **(ii)for cushion boxes, that of the connecting ductwork; or** **(iii)that specified in Table J6D6.** **(2)Insulation must—** **(a)be protected against the effects of weather and sunlight; and** **(b)be installed so that it—** **(i)abuts adjoining insulation to form a continuous barrier; and** **(ii)maintains its position and thickness, other than at flanges and supports; and** **(c)when conveying cooled air—** **(i)be protected by a vapour barrier on the outside of the insulation; and** **(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** **(B)are bonded or taped together.**

BCA extract	*J6D6 (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* *(b)fittings that form part of the interface with the conditioned space; or* *(c)return air ductwork in, or passing through, a conditioned space; or* *(d)ductwork for outdoor air and exhaust air associated with an air-conditioning system; or* *(e)the floor of an in-situ air-handling unit; or* *(f)packaged air conditioners, split systems, and variable refrigerant flow air-conditioning equipment complying with MEPS; or* *(g)flexible fan connections.*
Application to Development	**This clause applies to any ductwork installed.**
37. Construction Requirements – Ductwork ***J6D6(3)***	**(3)The requirements of J6D6 (1) do not apply to—** **(a)ductwork and fittings located within the only or last room served by the system; or** **(b)fittings that form part of the interface with the *conditioned space*; or** **(c)return air ductwork in, or passing through, a *conditioned space*; or** **(d)ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or** **(e)the floor of an in-situ air-handling unit; or** **(f)packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or** **(g)flexible fan connections.**

BCA extract	*J6D6 (4)For the purposes of (1), (2) and (3), fittings—* *(a)include non-active components of a ductwork system such as cushion boxes; and* *(b)exclude active components such as air-handling unit components.*

J6D7 Ductwork Sealing

BCA extract	*J6D7 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*
Application to Development	**This clause applies to any ductwork installed in an air-conditioning system with a capacity of 3000 L/s or greater.**
38. Construction Requirements – Ductwork Sealing ***J6D7***	**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.**

J6D8 Pump Systems

BCA extract	*J6D8* *(1) General — Pumps and pipework that form part of an air-conditioning system must either— (a)separately comply with (2), (3) and (4); or* *(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.* *(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.* *(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.* *(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* *(ii)for variable speed systems, the values nominated in Table J6D8b; or* *(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* *(ii)for variable speed systems, the values nominated in Table J6D8d.*
Application to Development	**This clause does not apply as the proposed air-conditioning system will be a DX air to air system and does not include piping and pumps.**

BCA extract	*J6D8 (5) the requirements of (4) do not apply—* *(a)to valves and fittings; or* *(b)where the smallest pipe size compliant with (4) results in a velocity of 0.7 m/s or less at design flow.*

J6D9 Pipework Insulation

BCA extract	*J6D9* *(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* *(b)for piping of heating and cooling fluids, having an insulation R-Value in accordance with Table J6D9a; and* *(c)for vessels, heat exchangers or tanks, having an insulation R-Value in accordance with Table J6D9b; and* *(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.* *(2)Insulation must—* *(a)be protected against the effects of weather and sunlight; and* *(b)be able to withstand the temperatures within the piping, vessel, heat exchanger or tank.* *(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.* *(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* *(b)encased within a concrete slab or panel which is part of a heating or cooling system; or* *(c)supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J6D10, J6D11 and J6D12; or* *(d)inside an air-handling unit, fan-coil unit, or the like.* *(5)For the purposes of (1), (2), (3) and (4)—* *(a)heating fluids include refrigerant, heated water, steam and condensate; and* *(b)cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.*
Application to Development	**This clause does not apply as the proposed air-conditioning system will be a DX air to air system and does not include piping and pumps etc.**

J6D10 Space Heating

BCA extract	*J6D10 (1)A heater used for air-conditioning or as part of an air-conditioning system must be—* *(a)a solar heater; or* *(b)a gas heater; or* *(c)a heat pump heater; or* *(d)a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or* *(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* *(B)40 W/m2 of the floor area of the conditioned space in climate zone 2; or* *(C)the value specified in Table J6D10 where reticulated gas is not available at the allotment boundary; or* *(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* *(iii)the in-duct heater complies with J6D3(1)(b)(iii); or* *(f)any combination of (a) to (e).*
Application to Development	**This clause applies to any heater used for air-conditioning.**
39. Construction Requirements – Heaters ***J6D10(1)***	**Any heater planned to be used must be a solar heater, a gas heater or a heat pump heater. If an electric heater is planned, refer to the detail requirements and limitations in the body of the report.**

Delete J6D10(2) and insert NSW J6D10(2) as follows:

BCA extract	*NSW J6D10 (2) An electric heater may be used for heating a bathroom in a Class 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.*
Application to Development	**This clause applies to the proposed development.**
40. Construction Requirements – Electric Heaters ***NSW J6D10 (2)***	**An electric heater may be used for heating a bathroom in a Class 3 building if the heating capacity is not more than 1.2 kW and the heater has a timer.**

BCA extract	*J6D10 (3)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* *(b)a period of one hour has elapsed since the last activation of the heater; or* *(c)the space served has reached the design temperature.*
Application to Development	**This clause applies to any proposed outdoor heaters.**
41. Construction Requirements – Outdoor Heaters ***J6D10(3)***	**If any outdoor heaters are installed, they must be configured to automatically shut down if there are no occupants in the space served, or one hours has elapse since the last activation of the heater or the space has reached the design temperature.**

BCA extract	*J6D10 (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* *(b)if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.*
Application to Development	**This clause does not apply as no gas water heaters are proposed that are part of an air-conditioning system.**

J6D11 Refrigerant Chillers

BCA extract	*J10D11 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 J10D11a or Table J6D11b when determined in accordance with AHRI 551/591.*
Application to Development	**This clause does not apply as there are no proposed air-conditioning system refrigerant chillers.**

J6D12 Unitary Air-conditioning Equipment

BCA extract	*J6D12 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 / Winput 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* *(b)where air cooled, have a minimum energy efficiency ratio of 2.9 Wr / Winput 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*
Application to Development	**This clause applies to any proposed unitary air-conditioning equipment.**
42. Construction Requirements – Unitary Air-conditioning Equipment ***J6D12***	**Any unitary air-conditioning equipment must comply with MEPS and if over 65kWr For water cooled have a minimum energy efficiency ratio of 4.0 Wr/Winput for cooling and for air cooled have a minimum energy efficiency ratio of 2.9 Wr/Winput for cooling.** **Refer to the body of the report or to the BCA for the testing requirements.**

J6D13 Heat Rejection Equipment

BCA extract	*J6D13 (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.* *(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* *(b) packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J6D12.*
Application to Development	**Clause (2)(b) applies to the proposed development.**
43. Construction Requirements – Efficiency Ratios ***J6D13***	**Packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J6D12.**

Part J7 – Artificial Lighting and Power

Delete J7D1 and insert NSW J7D1as follows:

NSW J7D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J7D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

Delete J7D2 and insert NSW J7D2 as follows:

NSW J7D2 Application of Part

BCA extract	*NSW J7D2 (1) The Deemed-to-Satisfy Provisions of this Part do not apply to a Class 2 building or a Class 4 part of a building.* *(2) J7D3, J7D4 and J7D6(1)(b) do not apply to a Class 8 electricity network substation.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies** **See body of report for requirements.**

Delete J7D3(1) and insert NSW J7D3(1) as follows:

J7D3 Artificial lighting

BCA extract	*NSW J7D3 (1) This subclause does not apply in NSW.*
Application to Development	**This subclause does not apply, as the clause relates to Class 2 and Class 4 building matters which are regulated under BASIX in NSW.**

Delete J7D3(2) and insert NSW J7D3(2) as follows

BCA extract	*NSW J7D3 (2) In a Class 3 or Class 5 to 9 building—* *(a) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in Table J7D3a; and* *(b) the aggregate design illumination power load in (a) is the sum of the design illumination power loads in each of the spaces served; and* *(c) where there are multiple lighting systems serving the same space, the design illumination power load for (b) is— (i)the total illumination power load of all systems; or* *(ii) where a control system permits only one system to operate at a time based on the highest illumination power load; or determined by the formula—* *[H x T/2 + P x(100 - T/2]/100* *(d) In the formula at (c)(ii)—* *(i) H = the highest illumination power load; and* *(ii) T = the time for which the maximum illumination power load will occur, expressed as a percentage; and* *(iii)P = the predominant illumination power load.*
Application to Development	**This clause applies to the development. Refer to Appendix for calculation of maximum allowable lighting power.** **Note: That Table J7D3a allows the maximum power load to be adjusted by a factor provided in the table where lighting is controlled by movement detectors or dimmers. The adjustment would have the effect of increasing the maximum allowable illumination power. At this stage no adjustment has been made.**
44. Construction Requirements – Maximum Interior Illumination Power Load ***NSW J7D3(2)***	**The total maximum allowed interior illumination power load for the development is: 191W.** **The aggregate design illumination power load must not exceed this allowed wattage.** **NOTE 1: The total has been calculated using adjustment factors for enclosed spaces with a Room Aspect Ratio of less than 1.5.** **NOTE 2: Emergency lighting and signage lighting are exempted from this requirement.** **NOTE 3: If the Lux level for any areas specified in the Appendix is proposed to be greater in order to meet Australian Standards requirements, contact Application Solutions to reassess.** **See Appendix for detailed calculation of allowed interior illumination power load.**

BCA extract	*J7D3 (3) The requirements of (1) and (2) do not apply to the following:* *(a) emergency lighting in accordance with **BCA Part E4**.* *(b) signage, display lighting within cabinets and display cases that are fixed in place.* *(c) lighting for accommodation within the residential part of a detention centre.* *(d) a heater where the heater also emits light, such as in bathrooms.* *(e) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.* *(f) lighting of performances such as theatrical or sporting.* *(g) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.* *(h) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.*
Application to Development	**This clause applies to the development.**
45. Construction Requirements – Illumination Power Load **J7D3(3)**	**Note:** **The requirements of (2) do not apply to the following:** **(a) emergency lighting in accordance with BCA Part E4.** **(b) signage, display lighting within cabinets and display cases that are fixed in place.** **(c) lighting for accommodation within the residential part of a detention centre.** **(d) a heater where the heater also emits light, such as in bathrooms.** **(e) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.** **(f) lighting of performances such as theatrical or sporting.** **(g) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.** **(h) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.**

BCA extract	*J7D3 (4) For the purposes of Table J7D3b, the following control devices must comply with Specification 40:* *(a)Lighting timers.* *(b)Motion detectors.* *(c)Daylight sensors and dynamic lighting control devices*
Application to Development	**This clause applies to the development.**
46. Construction Requirements – Lighting Control **J7D3(4)**	**For the purposes of Table J7D3b, lighting timers, motion detectors, daylight sensors and dynamic lighting control devices must comply with specification 40.**

J7D4 Interior artificial lighting and power control

BCA extract	*J7D4 (1) All artificial lighting of a room or space must be individually operated by-* *(a) a switch; or* *(b) other control device; or* *(c) A combination of (a) and (b)*
Application to Development	**This clause applies to the development.**
47. Construction Requirements – Lighting Control **J7D4(1)**	**Artificial lighting of a room or space must be individually operated by a switch or other control device.**

BCA extract	*J7D4 (2) An occupant activated device, such as a room security device, a motion detector in accordance with-**Specification 40**, or the like, must be provided in the sole occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the sole-occupancy unit is unoccupied.*
Application to Development	**This clause applies to the development.**
48. Construction Requirements – Lighting Control ***J7D4 (2)***	**An occupant activated device, such as a room security device, a motion detector in accordance with BCA Specification 40, or the like, must be provided in the sole occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the sole-occupancy unit is unoccupied.**

BCA extract	*J7D4 (3) An artificial lighting switch or other control device in (1) must-* *(a) if an artificial lighting switch, be located in a visible and easily accessed position-* *(i) in the room or space being switched; or* *(ii) in an adjacent room or space from where 90% of the lighting being switched is visible; and* *(b) for other than a single functional space such as an auditorium, theatre, swimming pool, sporting stadium or warehouse-* *(i) not operate lighting for an area of more than 250 m^2 if in a Class 5 building or a Class 8 laboratory; or* *(ii) not operate lighting for an area of more than-* *(A) 250 m^2 for a space of not more than 2000 m^2; or* *(B) 1000 m^2 for a space of more than 2000 m^2, if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.*
Application to Development	**J7D4(3)(a) applies to the development.** **J7D4(3)(b) does not apply to the development as the floor area of any operating space is not more than 250m^2.**
49. Construction Requirements – Lighting Control (Switching) ***J7D4(3)***	**Artificial lighting switches must be located in a visible and accessible position in the room or space being switched or in an adjacent room or space from where 90% of the lighting being switched is visible.**

Delete J7D4(4) and insert NSW J7D4(4) as follows:

BCA extract	*NSW J7D4 (4) 95% of the light fittings in a building or storey of a building, other than a Class 3 building of more than 250 m2 must be controlled by—* *(a) a time switch in accordance with Specification 40; or* *(b) an occupant sensing device such as—* *(i) a security key card reader that registers a person entering and leaving the building; or* *(ii) a motion detector in accordance with Specification 40.*
Application to Development	**This clause does not apply to the development as it is a Class 3 building.**

BCA extract	*J7D4 (5) In a Class 5, 6 or 8 building of more than 250 m^2, artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where-* *(a) the room containing the natural lighting zone is less than 20 m^2; or* *(b) the room's natural lighting zone contains less than 4 luminaires; or* *(c) 70% or more of the luminaires in the room are in the natural lighting zone.*
Application to Development	**This clause does not apply as the development is not a Class 5, 6 or 8 building.**

BCA extract	*J7D4 (6) Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector in accordance with **Specification 40**.*
Application to Development	**This clause applies where fire-isolated stairway, fire-isolated passageway or fire-isolated ramp are required.**
50. Construction Requirements – Lighting in Fire Stair ***J7D4(6)***	**Artificial lighting in a fire-isolated stairway, passage or ramp must be controlled by a motion detector in accordance with Specification 40.**

BCA extract	*J7D4 (7) Artificial lighting in a foyer, corridor and other circulation spaces* *(a) of more than 250 W within a single zone; and* *(b) adjacent to windows,* *must be controlled by a daylight sensor and dynamic lighting control device in accordance with **Specification 40**.*
Application to Development	**This clause applies to the development if artificial lighting in a foyer, corridor or other circulation space is more than 250 W within a single zone and adjacent to windows.**
51. Construction Requirements – Lighting in Foyer, Corridor and Other Circulation Spaces ***J7D4(7)***	**Artificial lighting in a foyer, corridor and other circulation spaces of more than 250 W within a single zone and adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.**

BCA extract	*J7D4 (8) Artificial lighting in the first 19 m of travel in a carpark entry zone must be controlled by a motion sensor in accordance with **Specification 40**.*
Application to Development	**This clause does not apply to the development as there is no enclosed carpark shown proposed.**

BCA extract	*J7D4 (9) The requirements of **(1), (2), (3), (4), (5), (6), (7) and (8)** do not apply to the following:* *(a) emergency lighting in accordance with **BCA Part E4**.* *(b) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.* *J7D4 (10) The requirements of **(4)** do not apply to the following:* *(a) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as* *(i) in a patient care area in a Class 9a building or in a Class 9c building; or* *(ii) a plant room or lift motor room; or* *(iii) a workshop where power tools are used.* *(b) a heater where the heater also emits light, such as in bathrooms.*
Application to Development	**These clauses may apply to the development as applicable.**
52. Construction Requirements – Exceptions ***J7D4(9)(10)***	**The requirements of (a), (b), (c), (d), (e), (f), (g) and (h) J7D4 (1), (2), (3), (4), (5), (6), (7) and (8) do not apply to the following:** **(i)emergency lighting in accordance with Part E4.** **(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.** **(j) The requirements of (d) do not apply to the following:** **(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a patient care area in a Class 9a building or in a Class 9c building or a plant room, lift motor room, or a workshop where power tools are used.** **(ii) a heater where the heater also emits light, such as in bathrooms.**

J7D5 Interior decorative and display lighting

BCA extract	*J7D5 (1) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled-* *(a) separately from other artificial lighting; and* *(b) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and* *(c) by a time switch in accordance with **Specification 40** where the display lighting exceeds 1 kW.*
Application to Development	**This clause applies to the development if interior decorative or display lighting are proposed.**
53. Construction Requirements – Decorative or Display Lighting ***J7D5(1)***	**Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined). Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification 40.**

BCA extract	*J7D5 (2) Window display lighting must be controlled separately from other display lighting.*
Application to Development	**This clause applies to the development if window display lighting is proposed.**
54. Construction Requirements – Window Display Lighting ***J7D5(2)***	**Window display lighting must be controlled separately from other display lighting.**

J7D6 Exterior artificial lighting

BCA extract	*J7D6 (1) Exterior artificial lighting attached to or directed at the facade of a building, must-* *(a) be controlled by-* *(i) a daylight sensor; or* *(ii) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and* *(b) when the total lighting load exceeds 100 W-* *(i) use LED luminaires for 90% of the total lighting load; or* *(ii) be controlled by a motion detector in accordance with Specification 40; and* *(iii)when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with Specification 40*
Application to Development	**This clause applies to the development if external lighting is proposed.**
55. Construction Requirements – Exterior Lighting ***J7D6(1)***	**Artificial lighting attached or directed at the facade of the building must be controlled by a daylight sensor or a time switch in accordance with Specification 40.** **When the total perimeter lighting load exceeds 100 W** **(i) Use LED luminaries for 90% of total lighting load or** **(ii) be controlled by a motion detector in accordance with Specification 40. And** **(iii) When used for decorative purposes have a separate time switch in accordance with Specification 40.** **Note: The requirements of J7D6 (1)(b) do not apply to emergency lighting in accordance with Part E4.**

BCA extract	*J7D6 (2) The requirements of **J7D6 (1)(b)** do not apply to the following:* *(i) emergency lighting in accordance with **Part E4**.* *(ii) lighting around a detention centre*

J7D7 Boiling water and chilled water storage units

BCA extract	*Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with **Specification 40**.*
Application to Development	**This clause applies to the development if boiling water or chilled water storage units are installed.**
56. Construction Requirements – Boiling/Chilled Water Storage Units ***J7D7***	**The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification 40.**

J7D8 Lifts

BCA extract	*J6J7D8 Lifts must-* *(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and* *(b) achieve the idle and standby energy performance level in **Table J7D8a**; and* *(c) achieve-* *(i) the energy efficiency class in **Table 7D8b**, or* *(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.*
Application to Development	**This clause does not apply to the development as there are no lifts shown proposed.**

J7D9 Escalators and moving walkways

BCA extract	*Escalators and moving walkways must slow to between 0.2 m/s and 0.05 m/s when unused for 15 minutes.*
Application to Development	**This clause does not apply to the development as no escalators or moving walkways are shown proposed.**

Continues next page…

Part J8 – Heated Water Supply and Swimming Pool and Spa Pool Plant

Delete J8D1(1) and insert NSW J8D1(1) as follows:

NSW J8D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J8D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J8D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**This clause applies to the proposed development, however a Performance Solution is not proposed for this development.**

Application to Development	<table><tr><td>**Hotel resort accommodation**</td><td>**Class 3**</td><td>**This Part applies**</td></tr></table> **See body of report for requirements.**

J8D2 Heated water supply

BCA extract	*A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with **Part B2 of NCC Volume Three – Plumbing Code of Australia**.*
Application to Development	**This clause applies to the development.**
57. Construction Requirements – Hot Water Heater ***J8D2***	**Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.**

Delete J8D3 and insert NSW J8D3 as follows:

NSW J8D3 Swimming pool heating and pumping

BCA extract	*NSW J8D3 (1) Heating for a swimming pool must be by—* *(a) a solar heater; or* *(b) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or* *(c) a geothermal heater; or* *(d) a gas heater that—* *(i) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or* *(ii) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or* *(e) a heat pump; or* *(f) a combination of (a) to (e).* *(2) Where some or all of the heating required by (1) is by a gas heater or a heat pump, the swimming pool must have—* *(a) a cover with a minimum R-Value of 0.05; and* *(b) a time switch to control the operation of the heater.* *(3) A time switch must be provided to control the operation of a circulation pump for a swimming pool.* *(4) Where required, a time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.* *(5) Pipework carrying heated or chilled water for a swimming pool must comply with the insulation requirements of J6D9.* *(6) For the purpose of J8D3, a swimming pool does not include a spa pool.*
Application to Development	**Clauses J8D3 (1) to (6) do not apply as there is no swimming pool shown proposed.**

Applications
NSW J8D3 does not apply to a Class 2 building or a Class 4 part of a building.

Delete J8D4 and insert NSW J8D4 as follows:

NSW J8D4 Spa pool heating and pumping

BCA extract	*NSW J8D4 (1) Heating for a spa pool that shares a water recirculation system with a swimming pool must be by—* *(a) a solar heater; or* *(b) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or* *(c) a geothermal heater; or* *(d) a gas heater that—* *(i) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or* *(ii) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or* *(e) a heat pump; or* *(f) a combination of (a) to (e).* *(2) Where some or all of the heating required by (1) is by a gas heater or a heat pump, the spa pool must have—* *(a) a cover with a minimum R-Value of 0.05; and* *(b) a push button and a time switch to control the operation of the heater.* *(3) A time switch must be provided to control the operation of a circulation pump for a spa pool having a capacity of 680 L or more.* *(4) Where required, a time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.* *(5) Pipework carrying heated or chilled water for a spa pool must comply with the insulation requirements of J6D9.*
Application to Development	**Clauses J8D4(1) to (5) do not apply as there is no spa pool shown proposed.**

Applications
NSW J8D4 does not apply to a Class 2 building or a Class 4 part of a building.

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

Delete J9D1(1) and insert NSW J9D1(1) as follows:

NSW J9D1 Deemed-to-Satisfy Provisions

BCA extract	*NSW J9D1 (1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements NSW J1P1 to NSW J1P7 are satisfied by complying with—* *(a) NSW J2D2; and* *(a) NSW J3D2 to J3D10; and* *(b) NSW J4D2 to J4D7; and* *(c) NSW J5D2 to J5D8; and* *(d) NSW J6D2 to J6D13; and* *(e) NSW J7D2 to J7D9; and* *(f) J8D2 to NSW J8D4; and* *(g) J9D2 to J9D5.*
Application to Development	**These clauses apply to the proposed development. See body of report for requirements.**

BCA extract	*J9D1 (2) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2G2(3) and A2G4(3) as applicable.*
Application to Development	**These clauses apply to the proposed development, however a Performance Solution is not proposed for this development.**

J9D2 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part do not apply-* *(a) within a sole-occupancy unit of a Class 2 building or a Class 4 part of a building; or* *(b) to a Class 8 electricity network substation.*
Application to Development	**Hotel resort accommodation** | **Class 3** | **This Part applies** **See body of report for requirements.**

J9D3 Facilities for energy monitoring

BCA extract	*J9D3 (1) A building or sole-occupancy unit with a floor area of more than 500 m^2 must have an energy meter configured to record the time of use consumption of gas and electricity.*
Application to Development	**This clause does not apply as the floor area of the proposed development is not more than 500m^2.**

BCA extract	*J9D3 (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—* *(a)air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and* *(b)artificial lighting; and* *(c)appliance power; and* *(d)central hot water supply; and* *(e)internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and* *(f)on-site renewable energy equipment; and* *(g)on-site electric vehicle charging equipment; and* *(h)on-site battery systems; and* *(i) other ancillary plant.*
Application to Development	**This clause does not apply as the floor area of the proposed development is not more than 2,500m^2.**

BCA extract	*J9D3 (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.*
Application to Development	**This clause does not apply as the floor area of the proposed development is not more than 2,500m^2.**

BCA extract	*J9D3 (4)The provisions of (2) do not apply to energy meters serving—* *(a) a Class 2 building where the total floor area of the common areas is less than 500 m2; or* *(b) individual sole-occupancy units with a floor area of less than 2 500 m2.*
Application to Development	**This clause does not apply to the proposed development.**

J9D4 Facilities for electric vehicle charging equipment

BCA extract	*J9D4 (1) 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—* *(a) in accordance with Table J9D4 in each storey of the carpark; and* *(b) labelled to indicate use for electric vehicle charging equipment.*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

BCA extract	*J9D4 (2) Electrical distribution boards dedicated to serving electric vehicle charging in a carpark must—* *(a)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*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

BCA extract	*J9D4 (2) (b) 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*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development, and the development is not a Class 2 building.**

BCA extract	*J9D4 (2) (c)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*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development, and the development is not a Class 5 to 9 building.**

BCA extract	*J9D4 (2) (d)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*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

BCA extract	*J9D4 (2) (e) be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in— (i)100% of the car parking spaces associated with a Class 2 building; or (ii)10% of car parking spaces associated with a Class 5 or 6 building; (iii) or 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

BCA extract	*J9D4 (2) (f) 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*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

BCA extract	*J9D4 (2) (g) be labelled to indicate the use of the space required by (f) is for the future installation of metering equipment.*
Application to Development	**This clause does not apply to the development as there is no carpark shown proposed which forms part of this development.**

J9D5 Facilities for solar photovoltaic and battery systems

BCA extract	*J9D5(1) The main electrical switchboard of a building must—* *(a)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;*
Application to Development	**This development involves an alteration of an existing building and there is no new work proposed affecting the main electrical switch board, therefore this clause is not applicable.**

BCA extract	*J9D5(1) The main electrical switchboard of a building must—* *(b)be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.*
Application to Development	**This development involves an alteration of an existing building and there is no new work proposed affecting the main electrical switch board, therefore this clause is not applicable.**

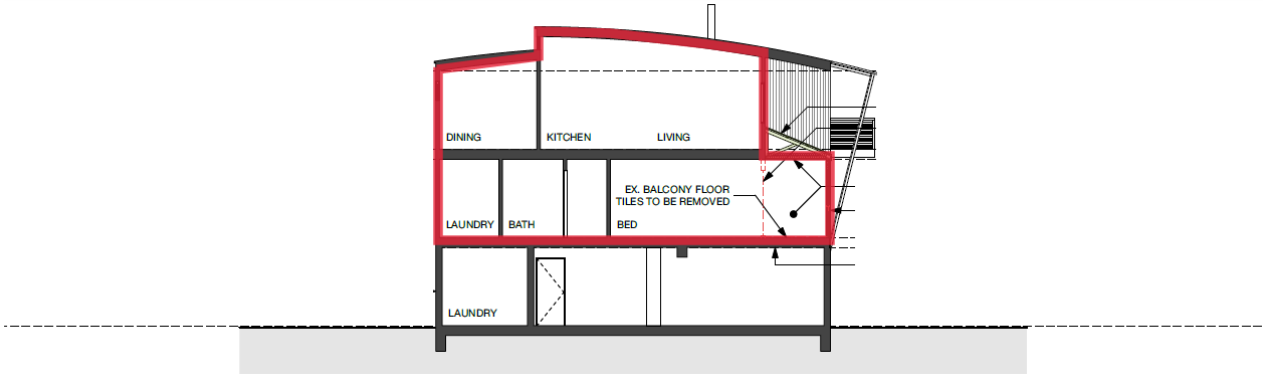
BCA extract	*J9D5(2) At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings—* *(a)with installed solar photovoltaic panels on—* *(i)at least 20% of the roof area; or* *(ii)an equivalent generation capacity elsewhere on-site; or* *(b)where 100% of the roof area is shaded for more than 70% of daylight hours; or* *(c)with a roof area of not more than 55 m2; or* *(d)where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like.*
Application to Development	**This clause applies to the proposed development.**
58. Roof Area Allocated for Future Solar PV ***J9D5(2)***	**At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels.**

Limitations

(1) The requirements of J9D5(1)(a)(i) and (b) do not apply to a building with solar photovoltaic panels installed on at least 20% of the roof area.

(2) The requirements of J9D5(1)(a)(ii) and (b) do not apply to a building with battery systems installed.

Appendix 1 – Envelope and Insulation Markup



Roof-ceiling, Walls, & Floors Forming Part of the Envelope

Appendix 2 – Roof Types

Assessment

Item	Description	Thermal Conductivity W/m.K	Thickness (m)	R-Value for Roof	R-Value for Structure	Note
	Metal Sheet Roof - with pitch >5 degrees					
1	Outdoor air film			0.03		*from specification 36*
2	Metal sheet	47.5	0.000	0.00		*from specification 36*
3	**Thermal Break**				**N/A**	*Iterated*
4	Airspace			0.18		*from specification 36*
5	**Insulation**			**4.4**		*Iterated*
6	Plasterboard	0.17	0.010	0.06		*from specification 36*
7	Indoor air film			0.16		*from specification 36*
TOTALS				**4.83**	**0.00**	
		Weighting Factor		100.00%	0.00%	-
		R-Value for Each Component		4.83	0.00	
		Combined R-Value		**4.83**		✓

Required System R-Value (J1.3) is:	**R4.8**	*J4D4(1)*

Requirements for Metal Sheet Roof - with pitch >5 degrees

Insulation Required:	**R4.4**
Thermal Break Required	**N/A**
Maximum Solar Absorptance *(Refer to sample roof colors in report for guidance)*	**no maximum**

Note: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45. There is no maximum solar absorptance value specified for climate zone 8

Tziallas Architects - Perisher Valley

Appendix 3 – Wall Types

Metal Clad Timber Frame Wall						
Item	Description	Thickness (m)	Thermal Conductivity W/m.K	R-Value	R-Value for Structure	Note
1	Outdoor air film			0.03		*from specification 36*
2	Metal sheet cladding	0.0048	47.5	0.00	0.00	*from specification 36*
3	**Thermal Break**				**N/A**	*Iterated*
4	Timber frame	0.09	0.1	0.12	0.12	*from specification 36*
5	Plasterboard	0.01	0.17	0.06	0.06	*from specification 36*
6	Indoor air film			0.12		*from specification 36*
7	**Added Insulation**			**2.7**		*Iterated*
	TOTAL R-value			**3.03**	**0.18**	
	Weighting Factor			87.0%	13.0%	*Based on proportional area of each component*
	R-Value for Each Component			2.63	0.02	
	Combined R-Value			**2.66**		
	Combined Total U-Value			**0.38**		

Required minimum R-Value for wall component:	**R1.0** ✔ *R-value of wall component is greater than min required*
Requirements for Metal Clad Timber Frame Wall	
Insulation Required:	**R2.7**
Thermal break required:	**N/A**

Tziallas Architects - Perisher Valley

Metal Clad Brick Veneer Wall						
Item	Description	Thickness (m)	Thermal Conductivity W/m.K	R-Value	R-Value for Structure	Note
1	Indoor air film			0.12		*from specification 36*
2	Metal sheet cladding	0.0048	47.5	0.00		*from specification 36*
3	**Thermal Break**				**N/A**	*Iterated*
4	Top hats + airspace			0.17		*from specification 36*
5	Cement render	0.01	0.53	0.02		*from specification 36*
6	Brick	0.11	0.65	0.17		*from specification 36*
7	Airspace			0.17		*from specification 36*
8	Timber frame	0.09	0.1	0.00		*from specification 36*
9	Plasterboard	0.01	0.17	0.06		*from specification 36*
10	Indoor air film			0.12		*from specification 36*
11	**Added Insulation**			**2.3**		*Iterated*
	TOTAL R-value			**3.13**	**0.00**	
	Weighting Factor			100.0%	0.0%	-
	R-Value for Each Component			3.13	0.00	
	Combined R-Value			**3.13**		
	Combined Total U-Value			**0.32**		

Required minimum R-Value for wall component:	**R1.0** ✔ *R-value of wall component is greater than min required*
Requirements for	
Insulation Required:	**R2.3**
Thermal Break is not required:	**N/A**

Tziallas Architects - Perisher Valley

Appendix 4 – Calculation of U-value

Calculation of U-value - Multiple Aspects

Maximum Total Allowed U-value from J1.5(a)	0.9	
Maximum U-value for display glazing from J1.5 (b)	U=5.8	
Calculated U-value (see below)	0.9	✔ Calculated U-value is less than max permitted - complies

FAÇADE

Taiallas Architects - Perisher Valley

Element	Orientation	Width	Height	Area	Adopted Area
Facade 1 area	East			193.17	193.1680
Façade 2 area	North			82.85	82.8480
Façade 3 area	South			87.65	87.6480
Façade 4 area	West			193.17	193.1680
TOTAL Façade Area					**556.83**

WALLS

Taiallas Architects - Perisher Valley

Element	Wall Type	Description	Orientation	Width	Height	Area	Lookup	Glazing	Area (net of opaque openings and glazing)	Weighting Factor	U-values of Elements	Weighted U-values
Wall Element 1	Wall Type 1	*Metal Clad Timber Frame Wall*	East	17.00	2.4	40.80	*2.00*	3.38	37.43	0.0672	0.38	0.0255
Wall Element 2	Wall Type 3	*Existing*	East			152.37	*4.00*	30.23	122.14	0.2194	0.38	0.0834
Wall Element 3	Wall Type 3	*Existing*	North	10.00	2.4	24.00	*4.00*	-	24.00	0.0431	0.38	0.0164
Wall Element 4	Wall Type 2	*Metal Clad Brick Veneer Wall*	North			58.85	*3.00*	-	58.85	0.1057	0.32	0.0338
Wall Element 5	Wall Type 3	*Existing*	South	12.00	2.4	28.80	*4.00*	-	28.80	0.0517	0.38	0.0197
Wall Element 6	Wall Type 1	*Metal Clad Timber Frame Wall*	South			58.85	*2.00*	-	58.85	0.1057	0.38	0.0402
Wall Element 7	Wall Type 1	*Metal Clad Timber Frame Wall*	West			193.17	*2.00*	82.44	110.73	0.1989	0.38	0.0756
									440.79			**0.29**

OPAQUE OPENNINGS

Taiallas Architects - Perisher Valley

Element	Wall Type	Description	Orientation	Width	Height	Area
Doors and other opaque openings	Wall Type 1	*Metal Clad Timber Frame Wall*	East			0
Doors and other opaque openings	Wall Type 3	*Existing*	East			0
Doors and other opaque openings	Wall Type 3	*Existing*	North			0
Doors and other opaque openings	Wall Type 2	*Metal Clad Brick Veneer Wall*	North			0
Doors and other opaque openings	Wall Type 3	*Existing*	South			0
Doors and other opaque openings	Wall Type 1	*Metal Clad Timber Frame Wall*	South			0
Doors and other opaque openings	Wall Type 1	*Metal Clad Timber Frame Wall*	West			0
						-

GLAZING

Taiallas Architects - Perisher Valley

Element	Wall Type	Description	Orientation	Width	Height	Area	Adopted Area	Weighting Factor	U-values of Elements	Weighted U-values
Glazing Element 1	Wall Type 1	*existing ground W1*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 2	Wall Type 1	*existing ground W2*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 3	Wall Type 1	*existing ground W3*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 4	Wall Type 3	*existing ground W4*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 5	Wall Type 3	*existing ground W5*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 6	Wall Type 3	*existing ground W6*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 7	Wall Type 3	*existing ground W7*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 8	Wall Type 3	*existing ground W8*	East	0.900	1.25	1.13	1.125	0.0020	2.90	0.0059
Glazing Element 9	Wall Type 3	*W25*	East	1.60	1.2	1.92	1.92	0.0034	2.90	0.0100
Glazing Element 10	Wall Type 3	*W26*	East	0.6	0.6	0.36	0.36	0.0006	2.90	0.0019
Glazing Element 11	Wall Type 3	*W27*	East	1.60	1.2	1.92	1.92	0.0034	2.90	0.0100
Glazing Element 12	Wall Type 3	*W28*	East	0.6	0.6	0.36	0.36	0.0006	2.90	0.0019
Glazing Element 13	Wall Type 3	*W29*	East	3	0.6	1.80	1.8	0.0032	2.90	0.0094
Glazing Element 14	Wall Type 3	*W30*	East	0.6	0.6	0.36	0.36	0.0006	2.90	0.0019
Glazing Element 15	Wall Type 3	*W31*	East	3	0.6	1.80	1.8	0.0032	2.90	0.0094
Glazing Element 16	Wall Type 3	*W32*	East	0.6	0.6	0.36	0.36	0.00	2.90	0.0019
Glazing Element 17	Wall Type 3	*W33*	East	3	0.6	1.80	1.8	0.0032	2.90	0.0094
Glazing Element 18	Wall Type 3	*W34*	East	0.6	0.6	0.36	0.36	0.0006	2.90	0.0019
Glazing Element 19	Wall Type 3	*W35*	East	1.60	1.2	1.92	1.92	0.0034	2.90	0.0100
Glazing Element 20	Wall Type 3	*W36*	East	0.6	0.6	0.36	0.36	0.0006	2.90	0.0019
Glazing Element 21	Wall Type 3	*W37*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 22	Wall Type 3	*W38*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 23	Wall Type 3	*W39*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 24	Wall Type 3	*W40*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 25	Wall Type 3	*W41*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 26	Wall Type 3	*W42*	East	4.7	0.4	1.88	1.88	0.0034	2.90	0.0098
Glazing Element 27	Wall Type 1	*W01*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 28	Wall Type 1	*W02*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 29	Wall Type 1	*W03*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 30	Wall Type 1	*W04*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 31	Wall Type 1	*W05*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 32	Wall Type 1	*W06*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 33	Wall Type 1	*W07*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 34	Wall Type 1	*W08*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 35	Wall Type 1	*W09*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 36	Wall Type 1	*W10*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 37	Wall Type 1	*W11*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 38	Wall Type 1	*W12*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 39	Wall Type 1	*W13*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 40	Wall Type 1	*D01*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 41	Wall Type 1	*W14*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 42	Wall Type 1	*W15*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 43	Wall Type 1	*D02*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 44	Wall Type 1	*W16*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 45	Wall Type 1	*W17*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 46	Wall Type 1	*D03*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 47	Wall Type 1	*W18*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 48	Wall Type 1	*W19*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 49	Wall Type 1	*D04*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 50	Wall Type 1	*W20*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 51	Wall Type 1	*W21*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 52	Wall Type 1	*D05*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 53	Wall Type 1	*W22*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
Glazing Element 54	Wall Type 1	*W23*	West	0.8	1.2	0.96	0.96	0.0017	2.90	0.0050
Glazing Element 55	Wall Type 1	*D06*	West	3	2.1	6.30	6.3	0.0113	2.90	0.0328
Glazing Element 56	Wall Type 1	*W24*	West	1.8	1.2	2.16	2.16	0.0039	2.90	0.0112
							116.04	0.208393196		

Weighted Average U-value	**0.9000**
Weighted Aveage R-value	**1.11**

Taiallas Architects - Perisher Valley

Appendix 5 – Solar Admittance Calculations

Calculation of Solar Admittance

Stralloa Architects - Perisher Valley

Area of Wall-Glazing

Element	Orientation	A Adopted Area	Less Internal Areas	Net Area	% of Glazing	Alpha From Table 6a	Weighting Coefficient	SA	E
Façade 1 area	East	193.17		193.17	17%	1.26	0.00	0.12	-
Façade 2 area	North	82.85		82.85	0%	1.24	0.00	-	-
Façade 3 area	South	87.65		87.65	0%	1	0.00	-	-
Façade 4 area	West	193.17		193.17	43%	1.05	1.05	0.08	16.13
									16.13

< Weighting Factor set to zero when % of glazing less than 20%
< Weighting Factor set to zero when % of glazing less than 20%
< Weighting Factor set to zero when % of glazing less than 20%

Stralloa Architects - Perisher Valley

Data carried forward from J1.5(c) - Wall-Glazing System U

Lookup Shade Multiplier - Using Table S37C6b

Go to Display Glazing Page

J1.5(g)

Glazing Element	Description	Orientation	A Area	Weighting Coefficient	Window Height	Effective Shade Projection P	Shade Height H	G	P/H	G/H	Row	Column	S Shade Multiplier	SHGC SHGC	SA Total Wall-Glazing area		Is it display glazing?	Max Permitted SHGC	
Glazing Element 1 -	existing ground W1	East	1.13	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 2 -	existing ground W2	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 3 -	existing ground W3	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 4 -	existing ground W4	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 5 -	existing ground W5	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 6 -	existing ground W6	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 7 -	existing ground W7	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 8 -	existing ground W8	East	1.125	-	1.25	2.00	1.60	0.35	1.25	0.22	4	12	0.47	0.810	193.168	0.0022	0.00217176 NO	-	0.81
Glazing Element 9 -	W25	East	1.92	-	1.20	0.15	1.34	0.14	0.11	0.10	3	3	0.95	0.810	193.168	0.0076	0.00648472 NO	-	0.81
Glazing Element 10 -	W26	East	0.36	-	0.60	0.15	0.73	0.13	0.21	0.18	3	4	0.89	0.810	193.168	0.0013	0.00134351 NO	-	0.81
Glazing Element 11 -	W27	East	1.92	-	1.20	0.15	1.34	0.14	0.11	0.10	3	3	0.95	0.810	193.168	0.0076	0.00648472 NO	-	0.81
Glazing Element 12 -	W28	East	0.36	-	0.60	0.15	0.73	0.13	0.21	0.18	3	4	0.89	0.810	193.168	0.0013	0.00134351 NO	-	0.81
Glazing Element 13 -	W29	East	1.80	-	0.60	0.15	0.73	0.13	0.21	0.18	3	4	0.89	0.810	193.168	0.0067	0.00671572 NO	-	0.81
Glazing Element 14 -	W30	East	0.36	-	0.60	0.15	0.73	0.13	0.21	0.18	3	4	0.89	0.810	193.168	0.0013	0.00134351 NO	-	0.81
Glazing Element 15 -	W31	East	1.80	-	0.60	0.15	0.85	0.25	0.18	0.29	4	3	0.98	0.810	193.168	0.0074	0.00739687 NO	-	0.81
Glazing Element 16 -	W32	East	0.36	-	0.60	0.15	0.85	0.25	0.18	0.29	4	3	0.98	0.810	193.168	0.0015	0.00147935 NO	-	0.81
Glazing Element 17 -	W33	East	1.80	-	0.60	0.15	0.85	0.25	0.18	0.29	4	3	0.98	0.810	193.168	0.0074	0.00739687 NO	-	0.81
Glazing Element 18 -	W34	East	0.36	-	0.60	0.15	0.85	0.25	0.18	0.29	4	3	0.98	0.810	193.168	0.0015	0.00147935 NO	-	0.81
Glazing Element 19 -	W35	East	1.92	-	1.20	0.15	1.49	0.29	0.10	0.19	3	3	0.95	0.810	193.168	0.0076	0.00764872 NO	-	0.81
Glazing Element 20 -	W36	East	0.36	-	0.60	0.15	0.85	0.25	0.18	0.29	4	3	0.98	0.810	193.168	0.0015	0.00147935 NO	-	0.81
Glazing Element 21 -	W37	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 22 -	W38	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 23 -	W39	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 24 -	W40	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 25 -	W41	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 26 -	W42	East	1.88	-	0.40	0.10	0.60	0.20	0.17	0.33	5	3	1	0.810	193.168	0.0079	0.00783293 NO	-	0.81
Glazing Element 27 -	W01	West	2.16	1.05	1.20	0.91	1.55	0.35	0.58	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 28 -	W02	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 29 -	W03	West	2.16	1.05	1.20	0.86	1.55	0.35	0.55	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 30 -	W04	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 31 -	W05	West	2.16	1.05	1.20	0.86	1.55	0.35	0.55	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 32 -	W06	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 33 -	W07	West	2.16	1.05	1.20	0.86	1.55	0.35	0.55	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 34 -	W08	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 35 -	W09	West	2.16	1.05	1.20	0.88	1.55	0.35	0.56	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 36 -	W10	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 37 -	W11	West	2.16	1.05	1.20	0.88	1.55	0.35	0.56	0.23	4	7	0.75	0.330	193.168	0.0028	0.00276539 NO	-	0.33
Glazing Element 38 -	W12	West	2.16	1.05	1.20	0.05	0.05	-	1.00	-	2	12	0.35	0.330	193.168	0.0013	0.00129151 8 NO	-	0.33
Glazing Element 39 -	W13	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 40 -	D01	West	6.30	1.05	2.10	1.15	2.10	-	0.55	-	2	7	0.57	0.330	193.168	0.0061	0.00613712 NO	-	0.33
Glazing Element 41 -	W14	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
Glazing Element 42 -	W15	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 43 -	D02	West	6.30	1.05	2.10	1.15	2.10	-	0.55	-	2	7	0.57	0.330	193.168	0.0061	0.00613712 NO	-	0.33
Glazing Element 44 -	W16	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
Glazing Element 45 -	W17	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 46 -	D03	West	6.30	1.05	2.10	1.15	2.10	-	0.55	-	2	7	0.57	0.330	193.168	0.0061	0.00613712 NO	-	0.33
Glazing Element 47 -	W18	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
Glazing Element 48 -	W19	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 49 -	D04	West	6.30	1.05	2.10	1.15	2.10	-	0.55	-	2	7	0.57	0.330	193.168	0.0061	0.00613712 NO	-	0.33
Glazing Element 50 -	W20	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
Glazing Element 51 -	W21	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 52 -	D05	West	6.30	1.05	2.10	2.05	2.10	-	0.98	-	2	11	0.38	0.330	193.168	0.0041	0.00408980 8 NO	-	0.33
Glazing Element 53 -	W22	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
Glazing Element 54 -	W23	West	0.96	1.05	1.20	0.20	1.75	0.55	0.11	0.31	5	3	1	0.330	193.168	0.0016	0.00164023 NO	-	0.33
Glazing Element 55 -	D06	West	6.30	1.05	2.10	2.05	2.10	-	0.98	-	2	11	0.38	0.330	193.168	0.0041	0.00408980 8 NO	-	0.33
Glazing Element 56 -	W24	West	2.16	1.05	1.20	2.10	1.75	0.55	1.20	0.31	5	12	0.57	0.330	193.168	0.0021	0.00210333 NO	-	0.33
															0.1975				

	SHGC Data Entry *Iterate*		
East	0.81	0.12	147%
North		-	0%
South		-	0%
West	0.33	0.08	99%

Stralloa Architects - Perisher Valley

Comparison with Reference Building

ER	A_N	Alpha	SA	E_R
East	193.17	0.00 when % of glazing less than	0.12	-
North	82.85	0.00 when % of glazing less than	-	-
South	87.65	0.00 when % of glazing less than	-	-
West	193.17	1.05	0.08	16.13

Proposed Building 16.13 Complies ✔
ER

ER	A_N	Alpha	SA	E_R
East	193.17	0.000	0.08	-
North	82.85	0.000	0.08	-
South	87.65	0.000	0.08	-
West	193.17	1.050	0.08	16.23

Reference Building 16.23

Stralloa Architects - Perisher Valley

% of Proposed to Reference
0.6% *Iterate SHGC to approach 0%*

Appendix 6 – Lighting

NCC(BCA) 2022 Section J - Artificial Lighting Power Assessment

Proposed Alterations and Additions to The Stables, 20 Candle Heath Road, Perisher Valley

Spaces		Space Categories	Area (m^2)	Power Density (W/m^2)	Perimeter (m)	Floor-to-Ceiling Height (m)	Room Aspect Ratio	Room Aspect Ratio Adjustment Table J6.2a Note 2	Adjustment Factors	Maximum Power Load (W)	Adjusted Maximum Power Load (W)
Unit 25 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Unit 24 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Unit 23 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Unit 22 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Unit 21 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Unit 20 BED 2		Sole-occupancy unit of a Class 3 or 9c building	3.60	5.00	7.60	2.4	0.20	0.57	1.00	18	32
Total			21.60							108	**191**