BOARDING HOUSE

CLASS 3 DEVELOPMENT

AENEC
WWW.AENEC.COM.AU
INFO@AENEC.COM.AU
Dimitri Harakidas
Mechanical Engineer

BCA 2019 SECTION J

DTS REPORT

This Section J Report is to be used in conjunction with BASIX Certificate Number: 1270911M_03

See page 3 for more details.

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1 CONTENTS

1 DISCLAIMER – PROJECT DETAILS

Please read carefully the following information:

1.1 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 current Building Code of Australia 2019 Section J Energy Efficiency provisions and report the results of the assessment to the client. While care has been taken in the preparation of this report, it may not be complete or up to date. AENEC will not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of rely on this report to the extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this report/calculations or information appears in this document, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law.

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In the preparation of this assessment, reference was made to the following documents provided by the designer and suppliers.

PROJECT DETAILS	
JOB NUMBER	**AE3055**
ISSUE DATE	**AS DATED ON HEADER**
ADDRESS	**54 Adderton Road, Telopea, NSW 2117**
BCA CLASSIFICATION	**3**
CLIMATE ZONE	**6**
PROJECT DESIGNER	**Texco Design**
DRAWING VERSION	**2113 S34, RevID 03, 23/12/2021**
PREPARED BY	**DL, JKK, TZ**

2 INTRODUCTION

AENEC has been engaged to provide an assessment of the proposed development with respect to the current Building Code of Australia BCA 2019, Section J – Energy Efficiency. The BCA is part of the National Construction Series.

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.

Assessment outline

A summary of items assessed as per Section J (DTS) is provided at the beginning of this report. These matters will need to be incorporated into the Construction Certificate documentation before the Construction Certificate is issued.

Special conditions

Since the local LGA requires a BASIX certification prior to approving this Class 3 project, certain conditions were adopted such as:

1. That a BASIX certificate is issued where the water and energy components only will be taken into account and not thermal comfort. This Section J report addresses the thermal comfort requirements as such.
2. Both documents should be used in conjunction so that the full intent of the regulation can be applied.
3. All 3 colour tones (light, medium & dark) are used for the external walls of this building and the average – medium has been calculated for all external walls.
4. North facing façade windows (WS-type) have not been included in this assessment as they do not form part of an envelope.

3 DOCUMENTATION & REQUIREMENTS

The following Section J summary must be incorporated into the Construction Certificate documentation. Refer to the relevant section of the report for more detail.

- **Summary of J1**
  1. Roof System Type: For all roof sections add insulation with minimum insulation rating of R2.85. **NOTE: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface must not be more than 0.45 – you must ensure that the colour chosen meets this requirement.**
  2. For 150mm AFS veneer external walls, R2.00 insulation is to be installed throughout.
  3. For glazing specifications refer to the Façade report at average U-value and SHGC tables for each orientation. Note that Method 2 was used to calculate. U-value to be installed shall be 3.03 or lower and the SHGC to be 0.36 or lower; (see relevant façade report on pages 14-15).
  4. For concrete slab on ground, above carpark and exposed subfloors that are located below conditioned spaces add insulation with minimum rating of R1.69.

- **Summary of J2** - Not Applicable

- **Summary of J3**
  See corresponding section in this report for commitments to comply with building code.

- **Summary of J4** – Not Applicable.

- **Summary of J5**
  For calculations of this section a HVAC engineer must be engaged. Section is included in this document for easy information reference. Split system units are specified in BASIX for space conditioning for every room.

- **Summary of J6**
  Design illumination power load is 4795 Watts. Maximum system illumination power load allowance is 4918 Watts.

- **Summary of J7**
  See corresponding section in this report for commitments to comply with building code.

- **Summary of J8**
  See corresponding section in this report for commitments to comply with building code.

4 When Construction is Completed

The section above provides the documentation of Section J requirements which apply to the proposal development. Attention is drawn to the need to provide documentation during construction that each requirement has been assessed and attained.

This should include when applicable:

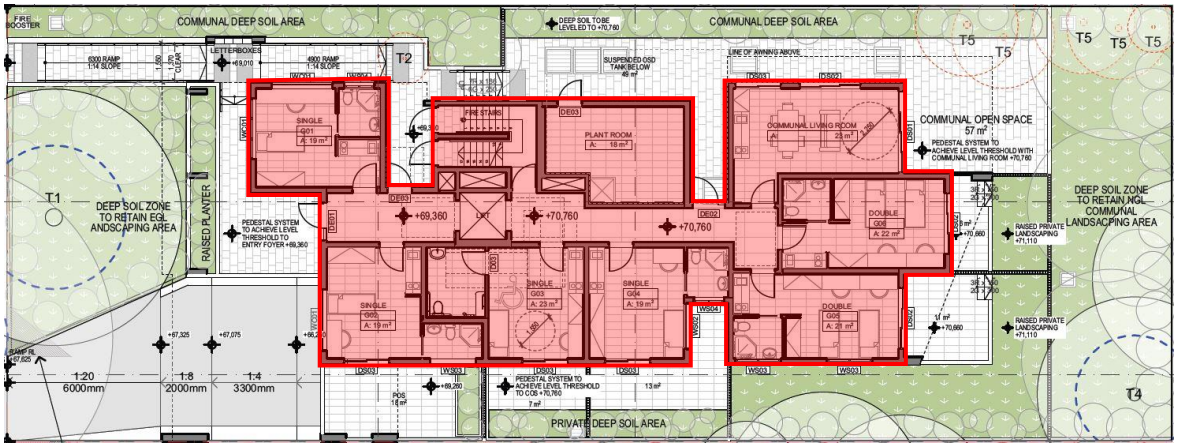
- Certificates from specific suppliers and contractors such as insulation ratings installed, U-Value and SHGC of glazed components installed, etc
- Site inspections records if required by PCA.
- It is imperative that the information in this report to be forwarded to the person in charge of this project, to ensure that all work is carried out in accordance with each and every item that has been documented in this report.

5 SECTION J DTS ASSESSMENT

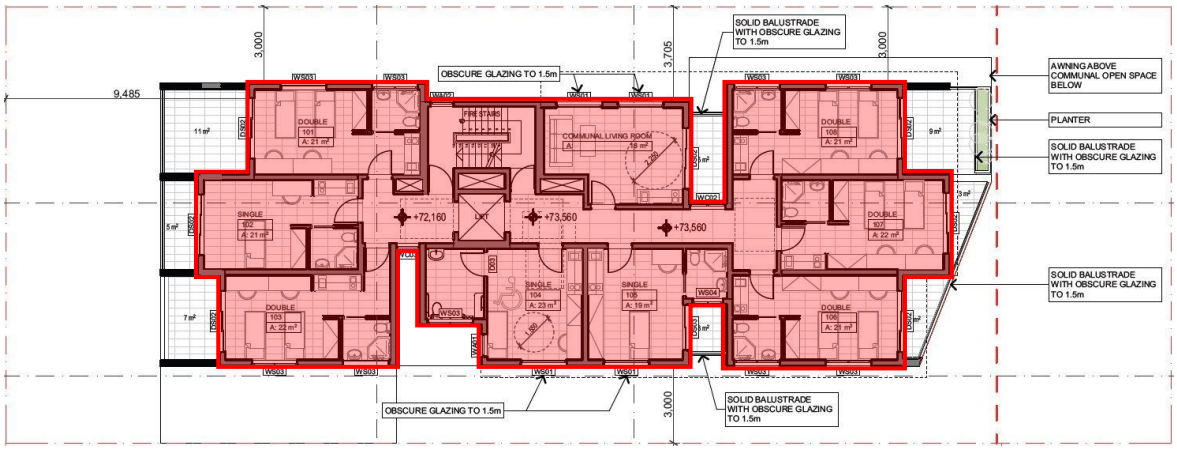
Building Envelope is contained within green highlighted areas below. Items outside of this perimeter and not considered part of the envelope and do not form part of this assessment.

SECTION J REVIEW

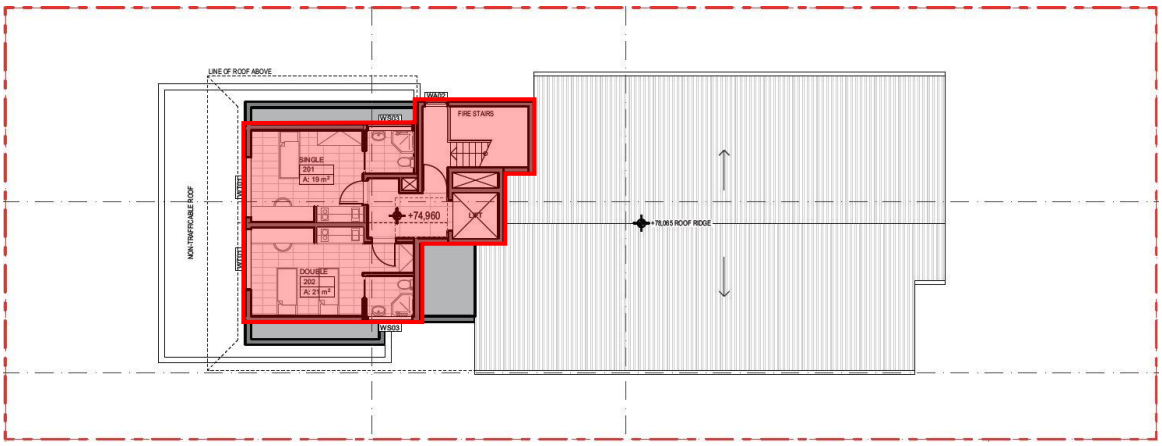
AREA	CLASSIFICATION	CONDITIONED?
CLASS 3 BUILDING	3	Y



Ground Floor



Level 1


LINE OF ROOF ABOVE
W303
W303
FIRE STAIRS
SINGLE
201
A: 19 m²
+74,960
DN
+78,065 ROOF RIDGE
NON-TRAFFICABLE ROOF
DOUBLE
202
A: 21 m²
W303

Attic

6 PART J0 ENERGY EFFICIENCY

J0.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J0.1 Application of Section J

Performance Requirement JP1 is satisfied by complying with—
(a)for reducing the heating or cooling loads—
(i)of *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, J0.2 to J0.5; and
(ii)of a Class 2 to 9 building, other than the *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, Parts J1 and J3; and
(b)for *air-conditioning* and ventilation, Part J5; and
(c)for artificial lighting and power, Part J6; and
(d)for heated water supply and *swimming pool* and spa pool plant, Part J7; and
(e)for facilities for monitoring, Part J8.

J0.2 Heating and cooling loads of sole-occupancy units of a Class 2 building or a Class 4 part

The *sole-occupancy units* of a Class 2 building or a Class 4 part of a building must—
(a)for reducing the heating or cooling loads—
(i)collectively achieve an average energy rating of not less than 6 stars, including the separate heating and cooling load limits; and
(ii)individually achieve an energy rating of not less than 5 stars, including the separate heating and cooling load limits,
using *house energy rating software* and the load limits specified in the ABCB Standard for NatHERS Heating and Cooling Load Limits.
(b)for general thermal construction, comply with J1.2; and
(c)for thermal breaks, comply with J0.4 and J0.5; and
(d)for floor edge insulation, comply with J1.6(b) and J1.6(c); and
(e)for building sealing, comply with Part J3.

J0.3 Ceiling fans

Ceiling fans *required* as part of compliance with J0.2(a), must—

(a)be permanently installed; and
(b)have a speed controller; and
(c)serve the whole room, with the *floor area* that a single fan serves not exceeding—
(i)15 m^2 if it has a blade rotation diameter of not less than 900 mm; and
(ii)25 m^2 if it has a blade rotation diameter of not less than 1 200 mm.

J0.4 Roof thermal breaks

For compliance with J0.2(c), a roof that—
(a)has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
(b)does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens,
must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

J0.5 Wall thermal breaks

For compliance with J0.2(c), a wall that—

(a) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame; and;

(b) has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame,

must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.

6.1 NSW SECTION J ENERGY EFFICIENCY SUBSECTION

Replace Section J with NSW Section J as follows:

Note 1:

From 1 May 2019 to 30 April 2020 Section J of NCC 2016 Volume One Amendment 1 may apply instead of Section J of NCC 2019. From 1 May 2020 Section J of NCC 2019 applies.

Note 2:

NSW Section J consists of two Subsections J(A) and J(B).

NSW Subsection J(A) Energy Efficiency - Class 2 buildings and Class 4 parts

This Subsection contains energy efficiency requirements for Class 2 buildings and Class 4 parts of buildings.

The need for separating these requirements from the requirements for Class 3 buildings arises because, in NSW, Class 2 buildings and Class 4 parts of buildings are subject to BASIX (the Building Sustainability Index), however Class 3 buildings are not.

BASIX is the web-based planning tool designed to assess the potential performance of certain residential buildings against a range of sustainability indices including thermal comfort and energy. Commitments made under BASIX become a condition of the relevant development consent or complying development certificate.

BASIX applies in NSW to all new Class 1 and 2 buildings, and Class 4 parts of buildings; and to alterations and additions to buildings of those classes where the work is subject to BASIX and also where an applicant elects to comply with BASIX.

The provisions of NSW Subsection J(A) are therefore designed to complement requirements that arise under BASIX and which are implemented via the development consent. Where BASIX is not applied to alterations and additions to Class 1 and 2 buildings, and Class 4 parts of buildings, these provisions will also complement council development controls that require energy efficiency measures to be incorporated as part of the alterations and additions.

NSW Subsection J(B) Energy Efficiency - Class 3 and Class 5 to 9 buildings

This subsection contains energy efficiency requirements for Class 3 and Class 5 to 9 buildings.

As Class 3 and Class 5 to 9 buildings are not subject to BASIX, NSW Subsection J(B) applies the provisions of the national Section J relevant to Class 3 and Class 5 to 9 buildings, with minor variations.

Note 3.

All definitions in Schedule 3 that are applicable to the national Section J are also applicable to NSW Section J.

6.2 BUILDING FABRIC

J1.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J1.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to building elements forming the *envelope* of a Class 2 to 9 building other than J1.2(e), J1.3, J1.4, J1.5 and J1.6(a) which do not apply to a Class 2 *sole-occupancy unit* or a Class 4 part of a building.

J1.2 Thermal construction — general

(a)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 such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
(ii)forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
(iii)does not affect the safe or effective operation of a *service* or fitting.
(b)Where *required*, *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—
(A)overlapped not less than 50 mm; or
(B)taped together.
(c)Where *required*, bulk insulation must be installed so that—
(i)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
(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.
(d)Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.
(e)The *required Total R-Value* and *Total System U-Value*, including allowance for thermal bridging, must be—

(i)calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
(ii)determined in accordance with Specification J1.5a for *wall-glazing construction*; or
(iii)determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

J1.3 Roof and ceiling construction

(a)A roof or ceiling must achieve a *Total R-Value* greater than or equal to—
(i)in *climate zones* 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow; and
(ii)in *climate zone* 6, R3.2 for a downward direction of heat flow; and
(iii)in *climate zone* 7, R3.7 for an upward direction of heat flow; and
(iv)in *climate zone* 8, R4.8 for an upward direction of heat flow.
(b)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.
SA J1.3(c)

J1.4 Roof lights

Roof lights must have—
(a)a total area of 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 J1.4; and
(ii)for *Total system U-Value*, not more than U3.9.

Table J1.4 Roof lights - Total system SHGC

Roof light shaft index Note 1	Total area of *roof lights* up to 3.5% of the *floor area* of the room or space	Total area of *roof lights* more than 3.5% and up to 5% of the *floor area* of the room or space
< 1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Notes to Table J1.4:
1.The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2.The area of a *roof light* is the area of the roof opening that allows light to enter the building. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.

J1.5 Walls and glazing

(a)The *Total System U-Value* of *wall-glazing construction* must not be greater than—
(i)for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*, U2.0; and
(ii)for a Class 3 or 9c building or a Class 9a *ward area*—
(A)in *climate zones* 1, 3, 4, 6 or 7, U1.1; or
(B)in *climate zones* 2 or 5, U2.0; or
(C)in *climate zone* 8, U0.9.
(b)The *Total System U-Value* of *display glazing* must not be greater than U5.8.
(c)The *Total System U-Value* of *wall-glazing construction* must be calculated in accordance with Specification J1.5a.

(d)Wall components of a *wall-glazing construction* must achieve a minimum *Total R-Value* of—
(i)where the wall is less than 80% of the area of the *wall-glazing construction*, R1.0; or
(ii)where the wall is 80% or more of the area of the *wall-glazing construction*, the value specified in Table J1.5a.

Table J1.5a Minimum wall Total R-Value - Wall area 80% or more of wall-glazing construction area

Climate zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*	Class 3 or 9c building or Class 9a *ward area*
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

(e)The *solar admittance* of externally facing *wall-glazing construction* must not be greater than—
(i)for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*, the values specified in Table J1.5b; and
(ii)for a Class 3 or 9c building or a Class 9a *ward area*, the values specified in Table J1.5c.
(f)The *solar admittance* of a *wall-glazing construction* must be calculated in accordance with Specification J1.5a.
(g)The *Total system SHGC* of *display glazing* must not be greater than 0.81 divided by the applicable shading factor specified in Clause 7 of Specification J1.5a.

Table J1.5b Maximum wall-glazing construction solar admittance - Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

Table J1.5c Maximum wall-glazing construction solar admittance - Class 3 or 9b building or Class 9a ward area

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.07	0.07	0.10	0.07
2	0.10	0.10	0.10	0.10
3	0.07	0.07	0.07	0.07
4	0.07	0.07	0.07	0.07
5	0.10	0.10	0.10	0.10
6	0.07	0.07	0.07	0.07
7	0.07	0.07	0.08	0.07
8	0.08	0.08	0.08	0.08

J1.6 Floors

(a)A floor must achieve the *Total R-Value* specified in Table J1.6.
(b)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—
(i)is a concrete slab-on-ground in *climate zone* 8; or
(ii)has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.
(c)Insulation *required* by (b) for a concrete slab-on-ground must—
(i)be water resistant; and
(ii)be continuous from the adjacent finished ground level—
(A)to a depth not less than 300 mm; or
(B)for the full depth of the vertical edge of the concrete slab-on-ground.

Table J1.6 Floors - Minimum Total R-Value

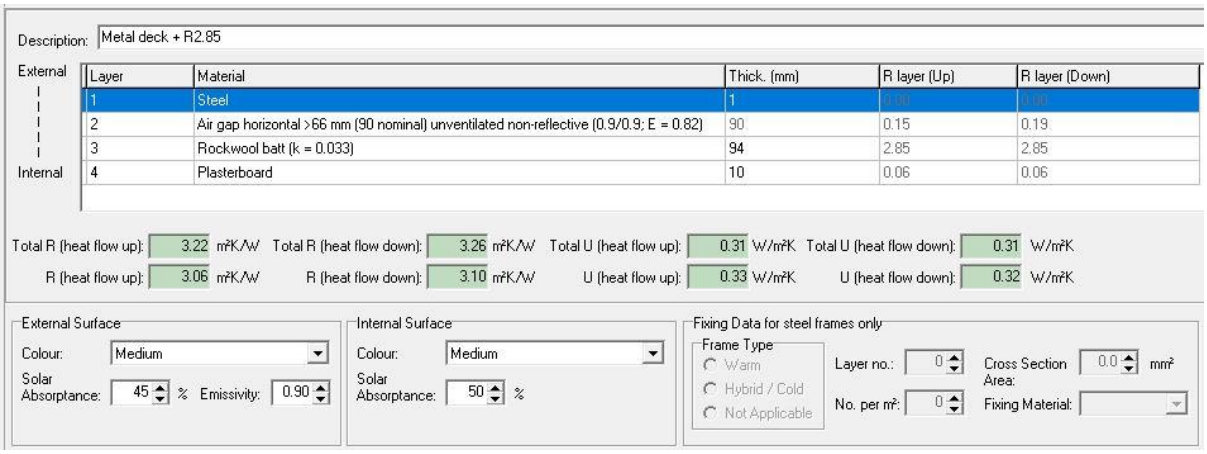
Location	*Climate zone* 1 — upwards heat flow	*Climate zones* 2 and 3 — upwards and downwards heat flow	*Climate zones* 4, 5, 6 and 7 — downwards heat flow	*Climate zone* 8 — downwards heat flow
A floor without an in-slab heating or cooling system	2.0	2.0	2.0	3.5
A floor with an in-slab heating or cooling system	3.25	3.25	3.25	4.75

Note to Table J1.6: For the purpose of calculating the *Total R-Value* of a floor, the sub-floor and soil *R-Value* must be calculated in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A.

6.2.1 Building Fabric Calculations

6.2.1.1 J1.3 Roof and ceiling construction

Roof System Type: Roof – roof space system
NOTE: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface must not be more than 0.45 – you must ensure that the colour chosen meets this requirement.



6.2.1.2 J1.4 Roof lights

J1.4 Roof lights

Roof lights must have—

(a) a total area of 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 J1.4; and

(ii) for *Total system U-Value*, not more than U3.9.

Table J1.4 Roof lights - Total system SHGC

Roof light shaft index [Note 1]	Total area of *roof lights* up to 3.5% of the *floor area* of the room or space	Total area of *roof lights* more than 3.5% and up to 5% of the *floor area* of the room or space
< 1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Notes to Table J1.4:

1. The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2. The area of a *roof light* is the area of the roof opening that allows light to enter the building. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.

6.2.1.3 J1.5 Walls and glazing report and inputs (façade)

Façade Report

Façade
Report

Calculator

Project Summary

Date
22/12/2021

Name
Dimitris Harakidas

Company
AENEC

Position
Managing Director

Building Name / Address
54 Adderton Road, Telopea
0

Building State
NSW

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification
Class 3 - other

Storeys Above Ground
3

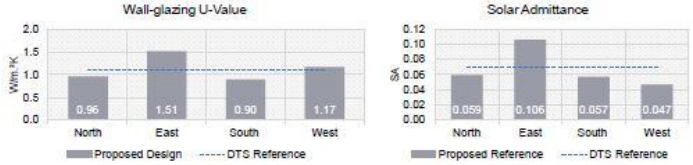
Tool Version
1.2 (June 2020)

The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

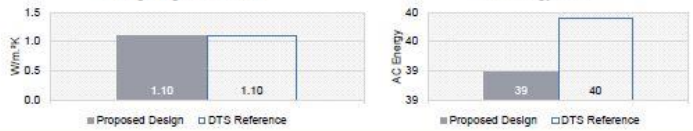
Compliant Solution =
Non-Compliant Solution =

	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	0.96	1.51	0.90	1.17	1.10
Solar Admittance	0.06	0.11	0.06	0.05	
AC Energy Value					39

Method 1



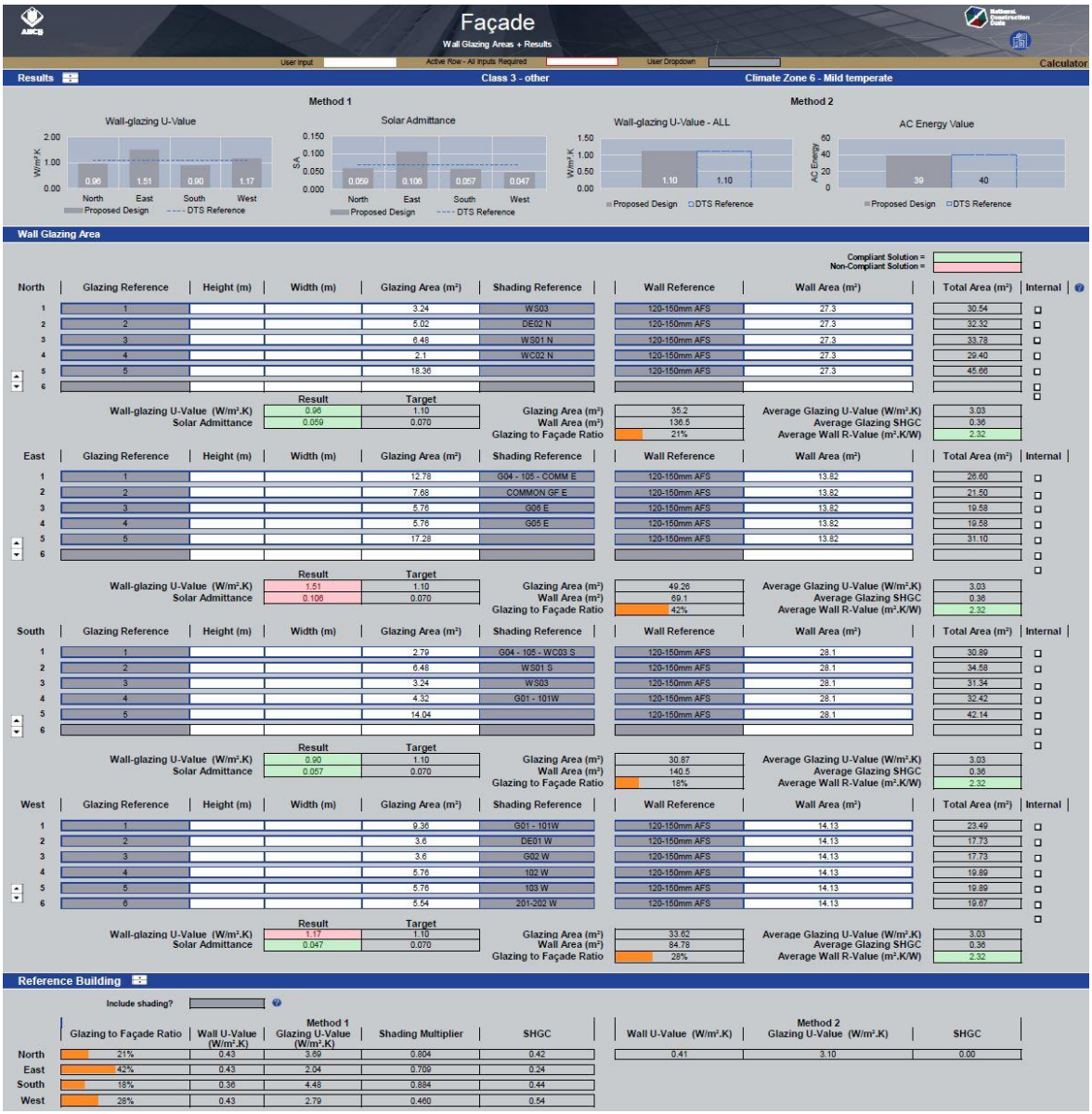
Method 2



Project Details

	North	East	South	West
Glazing Area (m²)	35.2	49.26	30.87	33.62
Glazing to Façade Ratio	21%	42%	18%	28%
Glazing References	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6
Glazing System Types	All Types	All Types	All Types	All Types
Glass Types	Full Glazing System off	Full Glazing System off	Full Glazing System off	Full Glazing System off
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	3.03	3.03	3.03	3.03
Average Glazing SHGC	0.36	0.36	0.36	0.36
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	136.5	69.1	140.5	84.78
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	120-150mm AFS Veneer	120-150mm AFS Veneer	120-150mm AFS Veneer	120-150mm AFS Veneer
Wall Thickness	270	270	270	270
Average Wall R-value (m².K/W)	2.32	2.32	2.32	2.32
Solar Absorptance	0.5	0.5	0.5	0.5

Façade Inputs

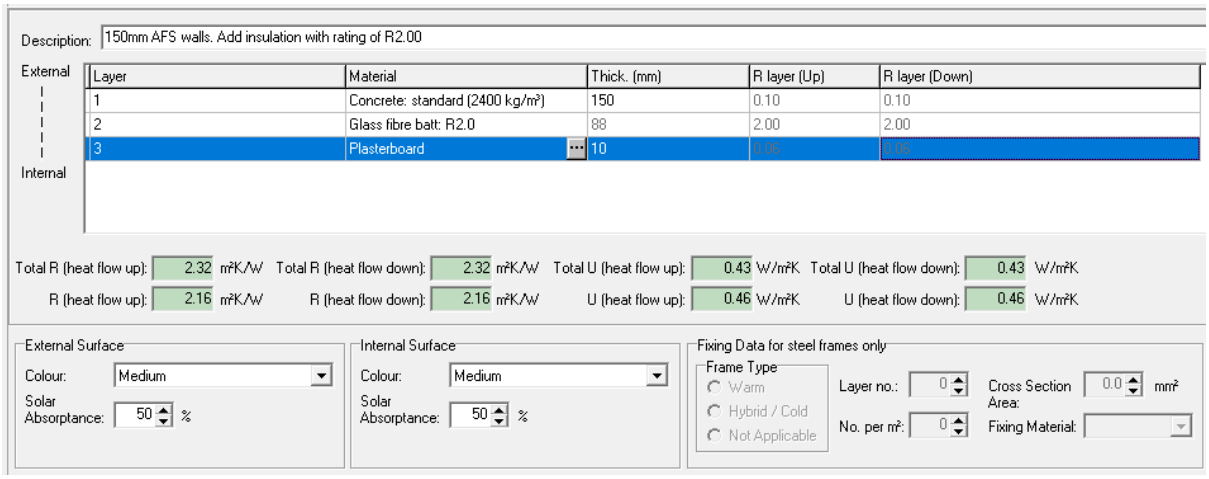


Glazing Systems

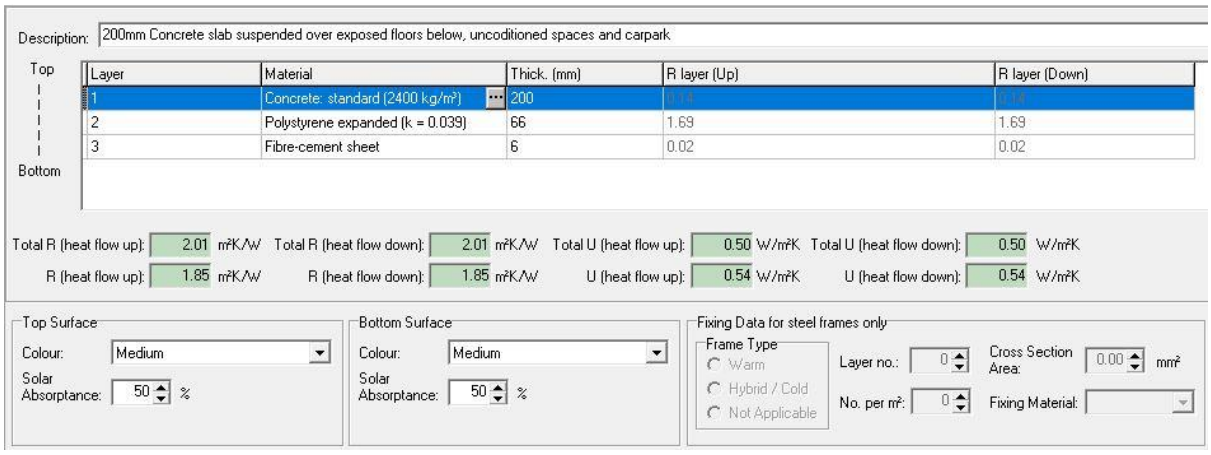
Glazing Systems

	Glazing Reference	System Type	Glass Type	Frame Type	Glass U-Value (W/m².K)	Glass SHGC	Total System U-Value (W/m².K)	Total System SHGC
1	1.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36
2	2.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36
3	3.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36
4	4.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36
5	5.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36
6	6.00	All Types	Full Glazing System off	Aluminium	3.03	0.36	3.03	0.36

6.2.1.4 J1.5 Walls – construction



6.2.1.5 J1.6 Floors



7 PART J2

The content of Part J2 for *glazing*, which existed in NCC 2016, has been removed. *Glazing* provisions are now included in Part J1.
The Part number Part J2 has been retained so as not to change the numbering of the current NCC from that of NCC 2016.

8 PART J3 – BUILDING SEALING

J3.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and

(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J3.1 Application of Part

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)a building or space where the mechanical ventilation *required* by Part F4 provides sufficient pressurisation to prevent infiltration.
NSW J3.1(d)

J3.2 Chimneys and flues

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.

J3.3 Roof lights

(a)A *roof light* must be sealed, or capable of being sealed, when serving—
(i)a *conditioned space*; or
(ii)a *habitable room* in *climate zones* 4, 5, 6, 7 or 8.
(b)A *roof light required* by (a) to be sealed, or capable of being sealed, must be constructed with—
(i)an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
(ii)a weatherproof seal; or
(iii)a shutter system readily operated either manually, mechanically or electronically by the occupant.

J3.4 Windows and doors

(a)A door, openable *window* or the like must be sealed—
(i)when forming part of the *envelope*; or
(ii)in *climate zones* 4, 5, 6, 7 or 8.

(b)The requirements of (a) do not apply to—
(i)a *window* complying with AS 2047; or
(ii)a fire door or smoke door; or
(iii)a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.
(c)A seal to restrict air infiltration—
(i)for the bottom edge of a door, must be a draft protection device; and
(ii)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.
(d)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—
(i)where the *conditioned space* has a *floor area* of not more than 50 m_2; or
(ii)where a café, restaurant, open front shop or the like has—
(A)a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and
(B)at all other entrances to the café, restaurant, open front shop or the like, *self-closing* doors.
(e)A loading dock entrance, if leading to a *conditioned space*, must be fitted with a *rapid roller door* or the like.

J3.5 Exhaust fans

(a)An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—
(i)a *conditioned space*; or
(ii)a *habitable room* in *climate zones* 4, 5, 6, 7 or 8.

J3.6 Construction of ceilings, walls and floors

(a)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 (b) when forming part of—
(i)the *envelope*; or
(ii)in *climate zones* 4, 5, 6, 7 or 8.
(b)Construction *required* by (a) must be—
(i)enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
(ii)sealed at junctions and penetrations with—
(A)close fitting architrave, skirting or cornice; or
(B)expanding foam, rubber compressible strip, caulking or the like.
(c)The requirements of (a) do not apply to openings, grilles or the like *required* for smoke hazard management.

J3.7 Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like—
(a)when serving a heated space; or
(b)in *climate zones* 4, 5, 6, 7 or 8.

9 PART J4

This Part has deliberately been left blank.

10 PART J5 – AIR CONDITIONING AND VENTILATION SYSTEMS

NOTE: THIS SECTION IS HERE FOR REFERENCE ONLY. A HVAC ENGINEER MUST CARRY OUT ALL NECESSARY CALCULATIONS FOR ALL RELATED SYSTEMS IN THIS SECTION.

J5.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J5.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply to a Class 8 *electricity network substation*.

J5.2 Air-conditioning system control

(a)An *air-conditioning* system—
(i)must be capable of being deactivated when the building or part of a building served by that system is not occupied; and
(ii)when serving more than one *air-conditioning* zone or area with different heating or cooling needs, must—
(A)thermostatically control the temperature of each zone or area; and
(B)not control the temperature by mixing actively heated air and actively cooled air; and
(C)limit reheating to not more than—
(aa)for a fixed supply air rate, a 7.5 K rise in temperature; and
(bb)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
(iii)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 J5.2; and
(iv)which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and
(v)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; and
(vi)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
(vii)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
(viii)must have a control dead band of not less than 2°C, except where a smaller range is *required* for specialised applications; and
(ix)must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded by more than 15% above design at each—
(A)component; or
(B)group of components operating under a common control in a system containing multiple components, as *required* to meet the needs of the system at its maximum operating condition; and
(x)must ensure that each independently operating space of more than 1 000 m_2 and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times; and
(xi)must have automatic variable temperature operation of heated water and chilled water circuits; and
(xii)when deactivated, must close any motorised outdoor air or return air damper that is not otherwise being actively controlled.

Table J5.2 Requirement for an outdoor air economy cycle

Climate zone	Total air flow rate *requiring* an economy cycle (L/s)
2	9000
3	7500
4	3500
5	3000
6	2000
7	2500
8	4000

(b)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.
(c)**Time switches—**
(i)A time switch must be provided to control—
(A)an *air-conditioning* system of more than 2 kWr; and
(B)a heater of more than 1 $kW_{heating}$ used for *air-conditioning*.
(ii)The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.
(iii)The requirements of (i) and (ii) do not apply to—
(A)an *air-conditioning* system that serves—

(aa)only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or
(bb)a Class 4 part of a building; or
(B)a *conditioned space* where *air-conditioning* is needed for 24 hour continuous use.

J5.3 Mechanical ventilation system control

(a)**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—
(i)be capable of being deactivated when the building or part of the building served by that system is not occupied; and
(ii)when serving a *conditioned space*, except in periods when evaporative cooling is being used—
(A)where specified in Table J5.3, have—
(aa)an energy reclaiming system that preconditions outdoor air at a minimum sensible heat transfer effectiveness of 60%; or
(bb)demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and
(B)not exceed the minimum outdoor air quantity *required* by Part F4 by more than 20%, except where—
(aa)additional unconditioned outdoor air is supplied for free cooling; or
(bb)additional mechanical ventilation is needed to balance the *required* exhaust or process exhaust; or
(cc)an energy reclaiming system preconditions all the outdoor air; and

(iii)for an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is *required* by Part F4 to be constant.

Table J5.3 Required outdoor air treatment

Climate zone	Outdoor air flow (L/s)	*Required* measure
1	>500	Modulating control
2	-	No *required* measure
3	>1000	Modulating control
4 and 6	>500	Modulating control or energy reclaiming system
5	>1000	Modulating control or energy reclaiming system
7 and 8	>250	Modulating control or energy reclaiming system

(b)**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.
(c)***Carpark* exhaust systems —** *Carpark* exhaust systems must have a control system in accordance with—
(i)4.11.2 of AS 1668.2; or
(ii)4.11.3 of AS 1668.2.
(d)**Time switches—**
(i)A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.
(ii)The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.
(iii)The requirements of (i) and (ii) do not apply to—
(A)a mechanical ventilation system that serves—
(aa)only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or
(bb)a Class 4 part of a building; or
(B)a building where mechanical ventilation is needed for 24 hour occupancy.

J5.4 Fan systems

(a)Fans, ductwork and duct components that form part of an *air-conditioning* system or mechanical ventilation system must—
(i)separately comply with (b), (c), (d) and (e); or

(ii)achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (b), (c), (d) and (e) together.

(b)**Fans—**

(i)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:

$\eta_{min} = 13 \times \ln(p) - 30$

where—

η_{min} = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency for installation type B or D; and

p = the static pressure of the system (Pa).

(ii)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:

$\eta_{min} = 0.85 \times (a \times \ln(P) - b + N) / 100$

where— η_{min} = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency for installation type B or D; and

P = the motor input power of the fan (kW); and

N = the minimum performance grade obtained from Table J5.4a; and

a = regression coefficient a, obtained from Table J5.4b; and

b = regression coefficient b, obtained from Table J5.4c; and

ln = natural logarithm.

(iii)The requirements of (i) and (ii) do not apply to fans that need to be explosion proof.

Table J5.4a Minimum fan performance grade

Fan type	Installation type A or C	Installation type B or D
Axial — as a component of an air handling unit or fan coil unit	46.0	51.5
Axial — other	42.0	61.0
Mixed flow — as a component of an air handling unit or fan coil unit	46.0	51.5
Mixed flow – other	52.5	65.0
Centrifugal forward-curved	46.0	51.5
Centrifugal radial bladed	46.0	51.5
Centrifugal backward-curved	64.0	64.0

Notes to Table J5.4a:

1. **Installation type A** means an arrangement where the fan is installed with free inlet and outlet conditions.
2. **Installation type B** means an arrangement where the fan is installed with a free inlet and a duct at its outlet.
3. **Installation type C** means an arrangement where the fan is installed with a duct fitted to its inlet and with free outlet conditions.
4. **Installation type D** means an arrangement where the fan is installed with a duct fitted to its inlet and outlet.

Table J5.4b Fan regression coefficient a

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	2.74	0.78
Mixed flow	4.56	1.1
Centrifugal forward-curved	2.74	0.78
Centrifugal radial bladed	2.74	0.78
Centrifugal backward-curved	4.56	1.1

Table J5.4c Fan regression coefficient b

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	6.33	1.88
Mixed flow	10.5	2.6
Centrifugal forward-curved	6.33	1.88
Centrifugal radial bladed	6.33	1.88
Centrifugal backward-curved	10.5	2.6

(c)**Ductwork—**

(i)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.
(ii)Flexible ductwork must not account for more than 6 m in length in any duct run.
(iii)The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.

(iv)Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—

(A)the inclusion of turning vanes presents a fouling risk; or
(B)a long radius bend in accordance with AS 4254.2 is used.
(d)**Ductwork components in the index run—**
(i)The pressure drop across a coil must not exceed the value specified in Table J5.4d.

Table J5.4d Maximum coil pressure drop

Number of rows	Maximum pressure drop (Pa)
1	30
2	50
4	90
6	130
8	175
10	220

(ii) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of—
(A) a pressure drop of 200 Pa when clean; or
(B) the filter design pressure drop when clean at an air velocity of 1.5 m/s.
(iii) Any other air filter must not exceed—
(A) the pressure drop specified in Table J5.4e when clean; or
(B) the filter design pressure drop when clean at an air velocity of 2.5 m/s.

Table J5.4e Maximum clean filter pressure drop

Filter minimum efficiency reporting value	Maximum pressure drop (Pa)
9	55
11	65
13	95
14	110

(iv)The pressure drop across intake louvres must not exceed the higher of—
(A)for single stage louvres, 30 Pa; and
(B)for two stage louvres, 60 Pa; and
(C)for acoustic louvres, 50 Pa; and
(D)for other non-weatherproof louvres, 30 Pa.
(v)The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed—
(A)for units with electric reheat, 100 Pa; and
(B)for other units, 25 Pa not including coil pressure losses.
(vi)Rooftop cowls must not exceed a pressure drop of 30 Pa.
(vii)Attenuators must not exceed a pressure drop of 40 Pa.
(viii)Fire dampers must not exceed a pressure drop of 15 Pa when open.
(ix)Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.
(x)Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.
(xi)Exhaust grilles must not exceed a pressure drop of 30 Pa.
(xii)Transfer ducts must not exceed a pressure drop of 12 Pa.

(xiii)Door grilles must not exceed a pressure drop of 12 Pa.

(xiv)Active chilled beams must not exceed a pressure drop of 150 Pa.
(e)The requirements of (a), (b), (c) and (d) do not apply to—

(i)fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 L/s; and
(ii)smoke spill fans, except where also used for *air-conditioning* or ventilation; and
(iii)the power for process-related components; and
(iv)kitchen exhaust systems.

J5.5 Ductwork insulation

(a)Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
(i)complying with AS/NZS 4859.1; and
(ii)having an insulation *R-Value* greater than or equal to—
(A)for flexible ductwork, 1.0; or
(B)for cushion boxes, that of the connecting ductwork; or
(C)that specified in Table J5.5.
(b)Insulation must—
(i)be protected against the effects of weather and sunlight; and
(ii)be installed so that it—
(A)abuts adjoining insulation to form a continuous barrier; and
(B)maintains its position and thickness, other than at flanges and supports; and
(iii)when conveying cooled air—
(A)be protected by a vapour barrier on the outside of the insulation; and
(B)where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—
(aa)overlap by at least 50 mm; and
(bb)are bonded or taped together.
(c)The requirements of (a) do not apply to—
(i)ductwork and fittings located within the only or last room served by the system; or
(ii)fittings that form part of the interface with the *conditioned space*; or
(iii)return air ductwork in, or passing through, a *conditioned space*; or
(iv)ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or
(v)the floor of an in-situ air-handling unit; or
(vi)packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or
(vii)flexible fan connections.
(d)For the purposes of (a), (b) and (c), fittings—
(i)include non-active components of a ductwork system such as cushion boxes; and
(ii)exclude active components such as air-handling unit components.

Table J5.5 Ductwork and fittings - Minimum insulation R-Value

Location of ductwork and fittings	*Climate zone* 1, 2, 3, 4, 5, 6 or 7	*Climate zone* 8
Within a conditioned space	1.2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

J5.6 Ductwork sealing

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.

J5.7 Pump systems

(a)**General —** Pumps and pipework that form part of an *air-conditioning* system must either—
(i)separately comply with (b), (c) and (d); or
(ii)achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (b), (c) and (d) together.
(b)**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.
(c)**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.
(d)**Pipework —** Straight segments of pipework along the index run, forming part of an *air-conditioning* system—

(i)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—
(A)for constant speed systems, the values nominated in Table J5.7a; or
(B)for variable speed systems, the values nominated in Table J5.7b; or
(ii)in any other pipework system, must achieve an average pressure drop of not more than—
(A)for constant speed systems, the values nominated in Table J5.7c; or
(B)for variable speed systems, the values nominated in Table J5.7d.
(e)the requirements of (d) do not apply—
(i)to valves and fittings; or
(ii)where the smallest pipe size compliant with (d) results in a velocity of 0.7 m/s or less at design flow.

Table J5.7a Maximum pipework pressure drop - Non-distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	350
65	400	350
80	400	350
100	400	200
125	400	200
150 or more	400	200

Table J5.7b Maximum pipework pressure drop - Non-distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	400
65	400	400
80	400	400
100	400	300
125	400	300
150 or more	400	300

Table J5.7c Maximum pipework pressure drop - Distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating between 2000 hours/annum and 5000 hours/annum (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	300	150
25	400	220	100
32	400	220	100
40	400	220	100
50	400	220	100
65	400	400	170
80	400	400	170
100	400	400	170
125	400	400	170
150 or more	400	400	170

Table J5.7d Maximum pipework pressure drop - Distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	250
25	400	180
32	400	180
40	400	180
50	400	180
65	400	300
80	400	300
100	400	300
125	400	300
150 or more	400	300

J5.8 Pipework insulation

(a)*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—
(i)complying with AS/NZS 4859.1; and
(ii)for *piping* of heating and cooling fluids, having an insulation *R-Value* in accordance with Table J5.8a; and

(iii)for vessels, heat exchangers or tanks, having an insulation *R-Value* in accordance with Table J5.8b; and
(iv)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.
(b)Insulation must—
(i)be protected against the effects of weather and sunlight; and
(ii)be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.
(c)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.
(d)The requirements of (a) and (b) do not apply to *piping*, vessels or heat exchangers—
(i)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
(ii)encased within a concrete slab or panel which is part of a heating or cooling system; or
(iii)supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J5.9, J5.10 and J5.11; or
(iv)inside an air-handling unit, fan-coil unit, or the like.
(e)For the purposes of (a), (b), (c) and (d)—
(i)heating fluids include refrigerant, heated water, steam and condensate; and
(ii)cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Table J5.8a Piping — Minimum insulation R-Value

Fluid temperature range	Minimum insulation *R-Value* — nominal pipe diameter ≤ 40 mm	Minimum insulation *R-Value* — nominal pipe diameter > 40 mm and ≤ 80 mm	Minimum insulation *R-Value* — nominal pipe diameter between > 80 mm and ≤ 150 mm	Minimum insulation *R-Value* — nominal pipe diameter > 150 mm
Low temperature chilled — ≤ 2°C	1.3	1.7	2.0	2.7
Chilled — > 2°C but ≤ 20°C	1.0	1.5	2.0	2.0
Heated — > 30°C but ≤ 85°C	1.7	1.7	1.7	1.7
High Temperature heated — > 85°C	2.7	2.7	2.7	2.7

Note to Table J5.8a: The minimum *required R-Value* may be halved for *piping* penetrating a structural member.

Table J5.8b Vessels, heat exchangers and tanks — Minimum insulation R-Value

Fluid temperature range	Minimum insulation *R-Value*
Low temperature chilled — ≤ 2°C	2.7
Chilled — > 2°C but ≤ 20°C	1.8
Heated — > 30°C but ≤ 85°C	3.0
High temperature heated — > 85°C	3.0

J5.9 Space heating

ACT Appendix
(a)A heater used for *air-conditioning* or as part of an *air-conditioning* system must be—
(i)a solar heater; or

(ii)a gas heater; or
(iii)a heat pump heater; or
(iv)a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
(v)an electric heater if—
(A)the heating capacity is not more than—
(aa)10 W/m2 of the *floor area* of the *conditioned space* in *climate zone* 1; or
(bb)40 W/m2 of the *floor area* of the *conditioned space* in *climate zone* 2; or
(cc)the value specified in Table J5.9 where reticulated gas is not available at the allotment boundary; or
(B)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
(C)the in-duct heater complies with J5.2(a)(ii)(C); or
(vi)any combination of (i) to (v).
(b)An electric heater may be used for heating a bathroom in a Class 2, 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.
(c)A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—
(i)there are no occupants in the space served; or
(ii)a period of one hour has elapsed since the last activation of the heater; or
(iii)the space served has reached the design temperature.
(d)A gas water heater, that is used as part of an *air-conditioning* system, must—
(i)if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or
(ii)if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.

Table J5.9 Maximum electric heating capacity

Floor area of the *conditioned space*	W/m² of *floor area* in *climate zone* 3	W/m² of *floor area* in *climate zone* 4	W/m² of *floor area* in *climate zone* 5	W/m² of *floor area* in *climate zone* 6	W/m² of *floor area* in *climate zone* 7
≤ 500 m²	50	60	55	65	70
> 500 m²	40	50	45	55	60

J5.10 Refrigerant chillers

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 J5.10a or Table J5.10b when determined in accordance with AHRI 551/591.

Table J5.10a Minimum energy efficiency ratio for refrigerant chillers — Option 1

Chiller type	Full load operation (W_r / $W_{input\ power}$)	Integrated part load (W_r / $W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.985	4.048
Air-cooled chiller with a capacity > 528 kWr	2.985	4.137
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.694	5.867
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.889	6.286
Water-cooled positive displacement	5.334	6.519

Chiller type	Full load operation (W_r / $W_{input\ power}$)	Integrated part load (W_r / $W_{input\ power}$)
chiller with a capacity > 528 kWr but ≤ 1055 kWr		
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.800	6.770
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.286	7.041
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.771	6.519
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	6.286	6.770
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.286	7.041

Table J5.10b Minimum energy efficiency ratio for refrigerant chillers — Option 2

Chiller type	Full load operation (W_r / $W_{input\ power}$)	Integrated part load (W_r / $W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.866	4.669
Air-cooled chiller with a capacity > 528 kWr	2.866	4.758
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.513	7.041
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.694	7.184
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.177	8.001
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.633	8.586
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.018	9.264
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.065	8.001
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.544	8.001
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	5.917	9.027
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.018	9.264

J5.11 Unitary air-conditioning equipment

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 W_r / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or

(b)where air cooled, have a minimum energy efficiency ratio of 2.9 W_r / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

J5.12 Heat rejection equipment

(a)The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J5.12.

(b)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—

(i)a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in J5.10; or
(ii)packaged air-conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment that complies with the energy efficiency ratios in J5.11.

Table J5.2 Requirement for an outdoor air economy cycle

Climate zone	Total air flow rate *requiring* an economy cycle (L/s)
2	9000
3	7500
4	3500
5	3000
6	2000
7	2500
8	4000

11 PART J6 – ARTIFICIAL LIGHTING AND POWER

Part J6Artificial lighting and power

Deemed-to-Satisfy Provisions

J6.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J6.1 Application of Part

J6.2, J6.3 and J6.5(a)(ii) do not apply to a Class 8 *electricity network substation*.

J6.2 Artificial lighting

(a)In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—
(i)the *lamp power density* or *illumination power density* of artificial lighting must not exceed the allowance of—
(A)5 W/m2 within a *sole-occupancy unit*; and
(B)4 W/m2 on a verandah, balcony or the like attached to a *sole-occupancy unit*; and
(ii)the *illumination power density* allowance in (i) may be increased by dividing it by the *illumination power density* adjustment factor for a control device in Table J6.2b as applicable; and
(iii)when designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and
(iv)halogen lamps must be separately switched from fluorescent lamps.
(b)In a building other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—
(i)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 J6.2a; and
(ii)the aggregate design illumination power load in (i) is the sum of the design illumination power loads in each of the spaces served; and

(iii)where there are multiple lighting systems serving the same space, the design illumination power load for (ii) is—
(A)the total illumination power load of all systems; or
(B)where a control system permits only one system to operate at a time—
(aa)based on the highest illumination power load; or
(bb)determined by the formula—
[H x T/2 + P x (100 - T/2)] / 100
where—
H = the highest illumination power load; and
T = the time for which the maximum illumination power load will occur, expressed as a percentage; and
P = the predominant illumination power load.
(c)The requirements of (a) and (b) do not apply to the following:
(i)Emergency lighting provided in accordance with Part E4.
(ii)Signage, display lighting within cabinets and display cases that are fixed in place.
(iii)Lighting for accommodation within the residential part of a *detention centre*.
(iv)A heater where the heater also emits light, such as in bathrooms.
(v)Lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.
(vi)Lighting of performances such as theatrical or sporting.
(vii)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.
(viii)Lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.
(d)For the purposes of Table J6.2b, the following control devices must comply with Specification J6:
(i)Lighting timers.
(ii)Motion detectors.
(iii)Daylight sensors and dynamic lighting control devices.

Table J6.2a Maximum illumination power density

Space	Maximum *illumination power density* (W/m²)
Auditorium, church and public hall	8
Board room and conference room	5
Carpark - general	2
Carpark - entry zone (first 15 m of travel) during the daytime	11.5
Carpark - entry zone (next 4 m of travel) during the day	2.5
Carpark - entry zone (first 20 m of travel) during nighttime	2.5
Common rooms, spaces and corridors in a Class 2 building	4.5
Control room, switch room and the like - intermittent monitoring	3
Control room, switch room and the like - constant monitoring	4.5
Corridors	5
Courtroom	4.5
Dormitory of a Class 3 building used for sleeping only	3
Dormitory of a Class 3 building used for sleeping and study	4
Entry lobby from outside the building	9
Health-care - infants' and children's wards and emergency department	4
Health-care - examination room	4.5
Health-care - examination room in intensive care and high dependency ward	6
Health-care - all other *patient care areas* including wards and corridors	2.5
Kitchen and food preparation area	4
Laboratory - artificially lit to an ambient level of 400 lx or more	6
Library - stack and shelving area	2.5
Library - reading room and general areas	4.5
Lounge area for communal use in a Class 3 or 9c building	4.5
Museum and gallery - circulation, cleaning and service lighting	2.5
Office - artificially lit to an ambient level of 200 lx or more	4.5

Space	Maximum *illumination power density* (W/m²)
Office - artificially lit to an ambient level of less than 200 lx	2.5
Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	4
Plant rooms with a horizontal illuminance target of 80 lx	2
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	14
Retail space including a museum and gallery whose purpose is the sale of objects	14
School - general purpose learning areas and tutorial rooms	4.5
Sole-occupancy unit of a Class 3 or 9c building	5
Storage	1.5
Service area, cleaner's room and the like	1.5
Toilet, locker room, staff room, rest room and the like	3
Wholesale storage area with a vertical illuminance target of 160 lx	4
Stairways, including *fire-isolated stairways*	2
Lift cars	3

Notes to Table J6.2a:

1.In areas not listed above, the maximum *illumination power density* is—
a.for an illuminance not more than 80 lx, 2 W/m2; and
b.for an illuminance more than 80 lx and not more than 160 lx, 2.5 W/m2; and
c.for an illuminance more than 160 lx and not more than 240 lx, 3 W/m2; and
d.for an illuminance more than 240 lx and not more than 320 lx, 4.5 W/m2; and
e.for an illuminance more than 320 lx and not more than 400 lx, 6 W/m2; and
f.for an illuminance more than 400 lx and not more than 600 lx, 10 W/m2; and
g.for an illuminance more than 600 lx and not more than 800 lx, 11.5 W/m2.
2.For enclosed spaces with a Room Aspect Ratio of less than 1.5, the maximum *illumination power density* may be increased by dividing it by an adjustment factor for room aspect which is—
0.5 + (Room Aspect Ratio/3)
The Room Aspect Ratio of the enclosed space is determined by the formula—
A/(H x C),
where—
a.A is the area of the enclosed space; and
b.H is the height of the space measured from the floor to the highest part of the ceiling; and
c.C is the perimeter of the enclosed space at floor level.
3.In addition to 2, the maximum *illumination power density* may be increased by dividing it by the *illumination power density* adjustment factor in Table J6.2b and Table J6.2c and where the control device is not installed to comply with J6.3.
4.Circulation spaces are included in the allowances listed in the Table.

Table J6.2b Illumination power density adjustment factor for a control device

Item [Note 1]	Description	*Illumination power density* adjustment factor
Motion detector	In a toilet or change room, other than a public toilet, in a Class 6 building	0.4
Motion detector	Where a group of light fittings serving less than 100 m² is controlled by one or more detectors	0.6
Motion detector	Where a group of light fittings serving 100 m² or more is controlled by	0.7

Item Note 1	Description	*Illumination power density* adjustment factor
	one or more detectors	
Programmable dimming system Note 2	Where not less than 75% of the area of a space is controlled by programmable dimmers	0.85
Fixed dimming Notes 2 and 3	All fittings with fixed dimming	Whichever is greater of (a) 0.5; or (b) 0.2+0.8L where L = the illuminance turndown for the fixed dimming.
Lumen depreciation dimming Note 2	All fittings with lumen depreciation dimming	0.85
Two stage sensor - equipped lights with minimum power of 30 % of peak power or less	Fire stairs and other spaces not used for regular transit	0.4
Two stage sensor - equipped lights with minimum power of 30% of peak power or less	Transitory spaces in regular use or in a *carpark*	0.7
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height	0.5 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	Serving a Class 3 or 9c building, or a Class 9a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height	0.75 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 2 and 4	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*, where the lights are adjacent *roof lights*.	0.6 Note 2
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Note 2 and 4	In a Class 3 or 9c building, or a Class 9a *ward area*, where the lights are adjacent *roof lights*	0.8 Note 2

Notes to Table J6.2b:

1. A maximum of two *illumination power density* adjustment factors for a control device can be applied to an area. Where more than one *illumination power density* adjustment factor (other than for room aspect) apply to an area, they are to be combined using the following formula:

A x (B + [(1 - B) / 2]),
where—
a.A is the lowest applicable *illumination power density* adjustment factor; and
b.B is the second lowest applicable *illumination power density* adjustment factor.
2.The adjustment factor does not apply to tungsten, halogen or other incandescent sources.
3.Includes luminaires with a pre-programmed function which provides dimming from ON to OFF (one-stage dimming).
4.The *illumination power density* adjustment factor is only applied to lights controlled by daylight sensors between 8:00am and 7:00pm.

Table J6.2c Illumination power density adjustment factor for light colour

Light source	Description	*Illumination power density* adjustment factor
CRI ≥ 90	Where lighting with good colour rendering is used	0.9
CCT ≤ 3500 K Note	Where lighting with a warm appearance is used	0.8
CCT ≥ 4500 K	Where lighting with a cool appearance is used	1.1

Note to Table J6.2c: Includes luminaires that can adjust their CCT to 3500 K or below.

J6.3 Interior artificial lighting and power control

(a)All artificial lighting of a room or space must be individually operated by–
(i)a switch; or
(ii)other control device; or
(iii)a combination of (i) and (ii).
(b)An occupant activated device, such as a room security device, a motion detector in accordance with Specification J6, 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.
(c)An artificial lighting switch or other control device in (a) must—
(i)if an artificial lighting switch, be located in a visible and easily accessed position—
(A)in the room or space being switched; or
(B)in an adjacent room or space from where 90% of the lighting being switched is visible; and
(ii)for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse—
(A)not operate lighting for an area of more than 250 m^2 if in a Class 5 building or a Class 8 laboratory; or
(B)not operate lighting for an area of more than—
(aa)250 m^2 for a space of not more than 2000 m^2; or
(bb)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.
(d)95% of the light fittings in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part of a building, of more than 250 m^2 must be controlled by—
(i)a time switch in accordance with Specification J6; or
(ii)an occupant sensing device such as—
(A)a security key card reader that registers a person entering and leaving the building; or
(B)a motion detector in accordance with Specification J6.
(e)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—
(i)the room containing the natural lighting zone is less than 20 m^2; or
(ii)the room's natural lighting zone contains less than 4 luminaires; or
(iii)70% or more of the luminaires in the room are in the natural lighting zone.
(f)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 J6.
(g)Artificial lighting in a foyer, corridor and other circulation spaces—
(i)of more than 250 W within a single zone; and
(ii)adjacent to *windows*,
must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.
(h)Artificial lighting for daytime travel in the first 19 m of travel in a *carpark* entry zone must be controlled by a daylight sensor in accordance with Specification J6.
(i)The requirements of (a), (b), (c), (d), (e), (f), (g) and (h) 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—
(A) in a *patient care area* in a Class 9a building or in a Class 9c building; or
(B)a plant room or lift motor room; or
(C)a workshop where power tools are used.
(ii)A heater where the heater also emits light, such as in bathrooms.

J6.4 Interior decorative and display lighting

(a)Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—
(i)separately from other artificial lighting; and
(ii)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
(iii)by a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW.
(b)Window display lighting must be controlled separately from other display lighting.

J6.5 Exterior artificial lighting

(a)Exterior artificial lighting attached to or directed at the facade of a building, must—
(i)be controlled by—
(A)a daylight sensor; or
(B)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
(ii)when the total lighting load exceeds 100 W—
(A)use LED luminaires for 90% of the total lighting load; or
(B)be controlled by a motion detector in accordance with Specification J6; or
(C)when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with Specification J6.
(b)The requirements of (a)(ii) do not apply to the following:
(i)Emergency lighting in accordance with Part E4.
(ii)Lighting around a *detention centre*.

J6.6 Boiling water and chilled water storage units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

J6.7 Lifts

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 6.7a; and
(c)achieve—
(i)the energy efficiency class in Table 6.7b; or
(ii)if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.

Table 6.7a Lift idle and standby energy performance level

Rated load	Idle and standby [Note] energy performance level in accordance with ISO 25745-2
Less than or equal to 800 kg	2
801 kg to less than or equal to 2000 kg	3
2001 kg to less than or equal to 4000 kg	4
Greater than 4000 kg	5

Note to Table 6.7a: Applies to the standby power used after 30 minutes.

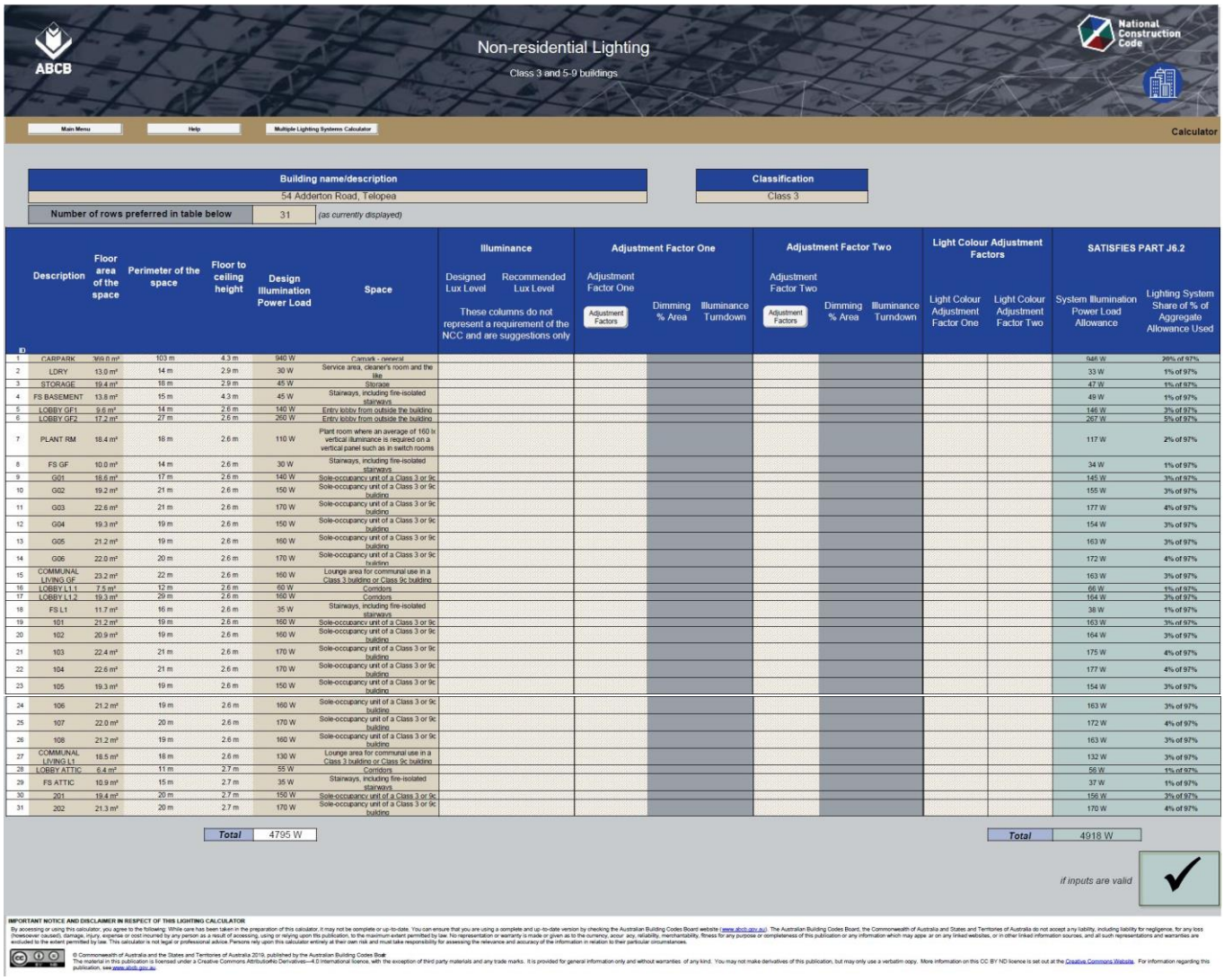
Table 6.7b Lift energy efficiency class

Usage category in accordance with ISO 25745-2	Energy efficiency class in accordance with ISO 25745-2
1 - 4	C
> 5	D

J6.8 Escalators and moving walkways

Escalators and moving walkways must have the ability to slow to between 0.2 m/s and 0.05 m/s when unused for more than 15 minutes.

11.1 LIGHTING CALCULATIONS



ABCB — Non-residential Lighting — Class 3 and 5-9 buildings — National Construction Code

Main Menu | Help | Multiple Lighting Systems Calculator | Calculator

Building name/description	Classification
54 Adderton Road, Telopea	Class 3

Number of rows preferred in table below: 31 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Illuminance: Designed Lux Level	Illuminance: Recommended Lux Level	Adjustment Factor One	Adjustment Factor One: Dimming % Area	Adjustment Factor One: Illuminance Turndown	Adjustment Factor Two	Adjustment Factor Two: Dimming % Area	Adjustment Factor Two: Illuminance Turndown	Light Colour Adjustment Factors: Light Colour Adjustment Factor One	Light Colour Adjustment Factors: Light Colour Adjustment Factor Two	SATISFIES PART J6.2: System Illumination Power Load Allowance	SATISFIES PART J6.2: Lighting System Share of % of Aggregate Allowance Used
							These columns do not represent a requirement of the NCC and are suggestions only		Adjustment Factors			Adjustment Factors						
1	CARPARK	366.0 m²	103 m	4.3 m	940 W	Carpark - general											946 W	20% of 97%
2	LDRY	13.0 m²	14 m	2.9 m	30 W	Service area, cleaner's room and the like											33 W	1% of 97%
3	STORAGE	19.4 m²	18 m	2.9 m	45 W	Storage											47 W	1% of 97%
4	FS BASEMENT	13.8 m²	15 m	4.3 m	45 W	Stairways, including fire-isolated stairways											49 W	1% of 97%
5	LOBBY GF1	9.6 m²	14 m	2.6 m	140 W	Entry lobby from outside the building											146 W	3% of 97%
6	LOBBY GF2	17.2 m²	27 m	2.6 m	260 W	Entry lobby from outside the building											267 W	5% of 97%
7	PLANT RM	18.4 m²	18 m	2.6 m	110 W	Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms											117 W	2% of 97%
8	FS GF	10.0 m²	14 m	2.6 m	30 W	Stairways, including fire-isolated stairways											34 W	1% of 97%
9	G01	18.6 m²	17 m	2.6 m	140 W	Sole-occupancy unit of a Class 3 or 9c											145 W	3% of 97%
10	G02	19.2 m²	21 m	2.6 m	150 W	Sole-occupancy unit of a Class 3 or 9c building											155 W	3% of 97%
11	G03	22.6 m²	21 m	2.6 m	170 W	Sole-occupancy unit of a Class 3 or 9c building											177 W	4% of 97%
12	G04	19.3 m²	19 m	2.6 m	150 W	Sole-occupancy unit of a Class 3 or 9c building											154 W	3% of 97%
13	G05	21.2 m²	19 m	2.6 m	160 W	Sole-occupancy unit of a Class 3 or 9c building											163 W	3% of 97%
14	G06	22.0 m²	20 m	2.6 m	170 W	Sole-occupancy unit of a Class 3 or 9c buildings											172 W	4% of 97%
15	COMMUNAL LIVING GF	23.2 m²	22 m	2.6 m	160 W	Lounge area for communal use in a Class 3 building or Class 9c building											163 W	3% of 97%
16	LOBBY L1.1	7.5 m²	12 m	2.6 m	60 W	Corridors											66 W	1% of 97%
17	LOBBY L1.2	19.3 m²	29 m	2.6 m	160 W	Corridors											164 W	3% of 97%
18	FS L1	11.7 m²	16 m	2.6 m	35 W	Stairways, including fire-isolated stairways											38 W	1% of 97%
19	101	21.2 m²	19 m	2.6 m	160 W	Sole-occupancy unit of a Class 3 or 9c											163 W	3% of 97%
20	102	20.9 m²	19 m	2.6 m	160 W	Sole-occupancy unit of a Class 3 or 9c building											164 W	3% of 97%
21	103	22.4 m²	21 m	2.6 m	170 W	Sole-occupancy unit of a Class 3 or 9c building											175 W	4% of 97%
22	104	22.6 m²	21 m	2.6 m	170 W	Sole-occupancy unit of a Class 3 or 9c building											177 W	4% of 97%
23	105	19.3 m²	19 m	2.6 m	150 W	Sole-occupancy unit of a Class 3 or 9c building											154 W	3% of 97%
24	106	21.2 m²	19 m	2.6 m	160 W	Sole-occupancy unit of a Class 3 or 9c building											163 W	3% of 97%
25	107	22.0 m²	20 m	2.6 m	170 W	Sole-occupancy unit of a Class 3 or 9c building											172 W	4% of 97%
26	108	21.2 m²	19 m	2.6 m	160 W	Sole-occupancy unit of a Class 3 or 9c building											163 W	3% of 97%
27	COMMUNAL LIVING L1	18.5 m²	18 m	2.6 m	130 W	Lounge area for communal use in a Class 3 building or Class 9c building											132 W	3% of 97%
28	LOBBY ATTIC	6.4 m²	11 m	2.7 m	55 W	Corridors											56 W	1% of 97%
29	FS ATTIC	10.9 m²	15 m	2.7 m	35 W	Stairways, including fire-isolated stairways											37 W	1% of 97%
30	201	19.4 m²	20 m	2.7 m	150 W	Sole-occupancy unit of a Class 3 or 9c											156 W	3% of 97%
31	202	21.3 m²	20 m	2.7 m	170 W	Sole-occupancy unit of a Class 3 or 9c building											170 W	4% of 97%

Total: 4795 W — Total: 4918 W

if inputs are valid ✓

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4795 Watts Design Illumination Power Load

4918 Watts System Illumination Power Load Allowance

12 PART J7 – HEATED WATER SUPPLY, SWIMMING POOL AND SPA PLANT

J7.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirement* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J7.1 * * * * *

J7.2 Heated water supply

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.

J7.3 Swimming pool heating and pumping

ACT Appendix
(a)Heating for a *swimming pool* must be by—
(i)a solar heater; or
(ii)a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
(iii)a geothermal heater; or
(iv)a gas heater that—
(A)if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or
(B)if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or
(v)a heat pump; or
(vi)a combination of (i) to (v).
(b)Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the *swimming pool* must have—
(i)a cover with a minimum *R-Value* of 0.05; and
(ii)a time switch to control the operation of the heater.
(c)A time switch must be provided to control the operation of a circulation pump for a *swimming pool*.
(d)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.
(e)Pipework carrying heated or chilled water for a *swimming pool* must comply with the insulation requirements of J5.8.
(f)For the purpose of J7.3, a *swimming pool* does not include a spa pool.

J7.4 Spa pool heating and pumping

ACT Appendix
(a)Heating for a spa pool that shares a water recirculation system with a *swimming pool* must be by—
(i)a solar heater; or
(ii)a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
(iii)a geothermal heater; or
(iv)a gas heater that—
(A)if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or
(B)if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or

(v)a heat pump; or
(vi)a combination of (i) to (v).
(b)Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the spa pool must have—
(i)a cover with a minimum *R-Value* of 0.05; and
(ii)a push button and a time switch to control the operation of the heater.
(c)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.
(d)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.
(e)Pipework carrying heated or chilled water for a spa pool must comply with the insulation requirements of J5.8.

13 PART J8 – FACILITIES FOR ENERGY MONITORING

J8.0 Deemed-to-Satisfy Provisions

(a)Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—
(i)J0.1 to J0.5; and
(ii)J1.1 to J1.6; and
(iii)J3.1 to J3.7; and
(iv)J5.1 to J5.12; and
(v)J6.1 to J6.8; and
(vi)J7.1 to J7.4; and
(vii)J8.1 to J8.3.
(b)Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J8.1 Application of Part

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*.

J8.2 * * * * *

J8.3 Facilities for energy monitoring

(a)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.
(b)A building with a *floor area* of more than 2 500 m^2 must have energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (c), of the energy consumption of—
(i)*air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and
(ii)artificial lighting; and
(iii)appliance power; and
(iv)central hot water supply; and
(v)internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
(vi)other ancillary plant.
(c)Energy meters *required* by (b) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.
(d)The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2 500 m^2 where the total area of the common areas is less than 500 m^2.

14 NSW SUBSECTIONS

14.1 NSW PART J(A) – CLASS 2 BUILDING AND CLASS 4 BUILDING PARTS

NSW Subsection J(A)	Energy efficiency — Class 2 building and Class 4 parts

Performance Requirements

NSW J(A)P1

(a) 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.

(b) 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:

(a) NSW J(A)P1(a) only applies to thermal insulation in a Class 2 building or Class 4 part of a building where a development consent specifies that the insulation is to be provided as part of the development.

(b) In (a), the term development consent has the meaning given by the Environmental Planning and Assessment Act 1979.

(c) NSW J(A)P1(b) only applies to a metal framed roof and a metal framed wall.

NSW J(A)P2

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:

NSW J(A)P2 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

NSW J(A)P3

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:

NSW J(A)P3 only applies to a Class 2 building or Class 4 part of a building.

NSW J(A)V1 Building sealing

Compliance with NSW J(A)P2 is verified when a building *envelope* is sealed in accordance with JV4 of the national provisions.

14.2 NSW PART J(A)1 – BUILDING FABRIC

NSW J(A)1.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* NSW J(A)P1 is satisfied by complying with NSW J(A)1.1 and NSW J(A)1.2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

NSW J(A)1.1 Application of Part

(a) The *Deemed-to-Satisfy Provisions* only apply to thermal insulation in a Class 2 building or Class 4 part of a building where a development consent or complying development certificate specifies that the insulation is to be provided as part of the development.

(b) In (a), development consent and complying development certificate, have the meaning given to these terms by the Environmental Planning and Assessment Act 1979.

(c) The *Deemed-to-Satisfy Provisions* of this Part for thermal breaks apply to all Class 2 buildings and Class 4 parts.

NSW J(A)1.2 Compliance with BCA provisions

The *sole-occupancy units* of a Class 2 building and a Class 4 part of a building must comply with the national BCA provisions of J0.2(b) to (d) - except that the reference to "Where *required*" in J1.2 is deemed to refer to "Where a development consent or a complying development certificate specifies that insulation is to be provided as part of the development."

Note: Compliance is not *required* with the national BCA provisions of J0.2(a) as those matters are regulated under BASIX and the national BCA provisions of J0.2(e) are covered by NSW J(A)2.2.

14.3 NSW PART J(A)2

NSW J(A)2.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* NSW J(A)P2 is satisfied by complying with NSW J(A)2.1 and NSW J(A)2.2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

NSW J(A)2.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 building and a Class 4 part of a building, other than—

(a) a building in *climate zones* 2 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) parts of buildings that cannot be fully enclosed.

NSW J(A)2.2 Compliance with BCA provisions

Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—

(a) J3.2 Chimneys and flues; and

(b) J3.3 Roof lights; and

(c) J3.4(a) to (d) Windows and doors; and

(d) J3.5 Exhaust fans; and

(e) J3.6 Construction of ceilings, walls and floors; and

(f) J3.7 Evaporative coolers.

14.4 NSW PART J(A)3 – AIR-CONDITIONING AND VENTILATION SYSTEMS

NSW J(A)3.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* NSW J(A)P3 is satisfied by complying with NSW J(A)3.1 and NSW J(A)3.2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

NSW J(A)3.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building and a Class 4 part of a building.

NSW J(A)3.2 Compliance with BCA provisions

Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—

(a) for air-conditioning system control: J5.2; and

(b) for mechanical ventilation system control: J5.3; and

(c) for fan systems: J5.4; and

(d) for ductwork insulation: J5.5; and

(e) for ductwork sealing: J5.6; and

(f) for pump systems: J5.7; and

(g) for pipework insulation: J5.8; and

(h) for refrigerant chillers: J5.10; and

(i) for unitary air-conditioning equipment: J5.11; and

(j) for heat rejection equipment: J5.12.

Note: Compliance is not *required* with the national BCA provisions of J5.9 as those matters are regulated under BASIX.

14.5 NSW PART J(A)4 – HEATED WATER SUPPLY

NSW J(A)4.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* NSW J(A)P3 is satisfied by complying with NSW J(A)4.1 and NSW J(A)4.2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

NSW J(A)4.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building and a Class 4 part of a building.

NSW J(A)4.2 Compliance with BCA provisions

Class 2 buildings and Class 4 parts of buildings must comply with the national BCA provisions of J7.2 Heated water supply.

Note: Compliance is not *required* with the national BCA provisions of J7.3 and J7.4 as those matters are regulated under BASIX.

14.6 NSW PART J(A)4 – FACILITIES FOR ENERGY MONITORING

NSW J(A)5.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* NSW J(A)P3 is satisfied by complying with NSW J(A)5.1 and NSW J(A)5.3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

NSW J(A)5.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building except within a *sole-occupancy unit*.

NSW J(A)5.2 * * * * *

NSW J(A)5.3 Compliance with BCA provisions

Class 2 buildings must comply with the national BCA provisions of J8.3.

14.7 NSW SUBSECTION J(B) – ENERGY EFFICIENCY – CLASS 3 & CLASS 5 TO 9 BUILDINGS

For buildings of Class 3 and Class 5 to 9, the energy efficiency provisions of the national BCA as varied by the NSW Appendix, are applicable, as follows—

NSW J(B)1 Compliance with BCA provisions

Class 3 and Class 5 to 9 buildings must comply with all of the provisions of the national Section J that are applicable to the relevant classifications, except as varied by NSW J3.1 Application of Part.

Add NSW J3.1(d) as follows:

NSW J3.1 Application of Part

(d) parts of buildings that cannot be fully enclosed.