Section J Part J1 Compliance Report

Broadwater Public School – Northern Rivers Schools Cluster
9 Byrnes Street, Broadwater, NSW 2472

Project No.	P00700
Revision	6
Issued	08 January 2024
Client	ADCO

E-LAB Consulting
Where science and engineering inspire design.

Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	14/08/2023	REF Issues	BC	CM
2	24/10/2023	Update	BC	CM
3	9/11/2023	For Construction	BC	CM
4	10/11/2023	Updated Plans	BC	CM
5	18/12/2023	Update	BC	CM
6	08/01/2024	Minor Update	BC	CM

Qualifications:

Information has been based on E-LAB's understanding of the documented development within the information provided. This report outlines the compliance requirements for NCC 2019 Section J Part J1 compliance only.

The project design and construction team are required to review and consider the implications of these recommendations on their design for the project.

The design team shall coordinate with any specific condensation, acoustic, wind, structural, safety, constructability, maintenance or Architectural Design requirements for a particular project.

Insulation values are whole of system values. The impact of framing can significantly derate performance and must be accounted for in the building's design.

Confidentiality:

This document contains commercial information which has been prepared exclusively for the use by The Principal. The document in entirety is confidential. No information contained in this document may be released in part or whole to any third party without the approval of the Author or The Principal.

Authorised by:

Engineering Lab NSW Pty Ltd

Chris Mann | Associate

Sustainability

Table of Content

Executive Summary

E-LAB have been engaged by ADCO to provide Section J JV3 Consultancy Services for the proposed Broadwater Public School development, located at 9 Byrnes Street, Broadwater, NSW 2472. This report covers the building envelope for the development.

The intent of the assessment is to confirm the minimum performance requirements to satisfy Section J, Part J1 (Building Fabric and Glazing).

E-LAB have assessed the development and confirm the design will comply with NCC 2019, using the JV3 Performance Verification method and the performance requirements outlined in this report.

This assessment is made through comparing the energy consumption of a modelled building using actual performance criteria for the design and comparing its annual energy consumption to that of an equivalent, minimum Deemed-to-Satisfy (DtS) compliant building.

The key results are summarised below:

MODEL	HEATING	COOLING	LIGHTS & EQUIPMENT	TOTAL ($KGCO2_E$/ANNUM)
REFERENCE	1,413	46,341	16,451	64,204
PROPOSED	1,364	45,632	16,451	63,447
REDUCTION				**1.2%**
OUTCOME				Compliant

The key façade performance requirements to demonstrate compliance are outlined in the table below. Deviation from these values may impact the compliance of the development for Section J JV3.

Glazed Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE*
Glazing (External Fixed windows)	U Value 4.2 SHGC 0.63
Glazing (External louvres)	U Value 5.4 SHGC 0.4
Glazing (Hinged Door)	U Value 4.9 SHGC 0.5
Glazing (Sliding Door)	U Value 4.3 SHGC 0.55
Glazing (Internal windows)	U Value 5.9 SHGC 0.77

*Glazing performance values are whole system performance values (i.e. glass + frame)

Solid Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE**
New Roof/Ceiling	R-Value = 3.7 m2.K/W
New External and Internal Walls	R-Value = 2.0 m2.K/W
New Floor	R-Value = 2.0 m2.K/W

**R-Value represents whole system, including thermal breaks, air gaps, bulk insulation, and metal-on-metal contact.

Note: This report provides certification for the design of the building fabric only against NCC 2019 Part J1. This does not certify the installation, nor other parts of Section J such as services, air tightness or energy monitoring.

Model Geometry

The figure below shows the IES 3D model of the building for the purpose of this JV3 assessment. The building geometry is used for both Case 1 - Reference Building and Case 2 - Proposed Building simulations.

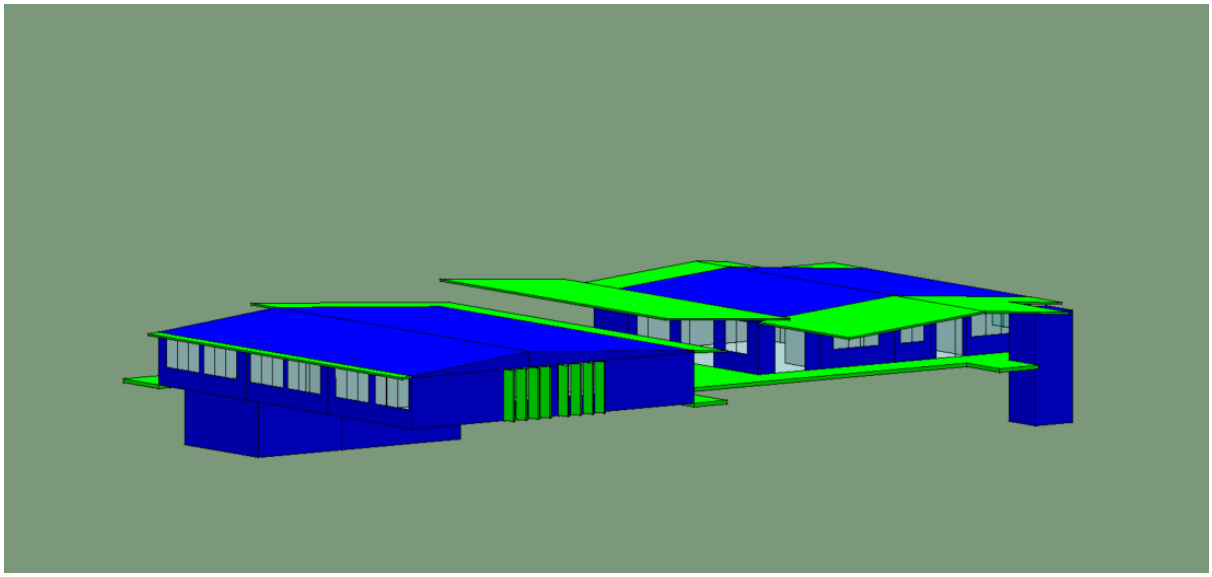


Figure 1 IES model

1 INTRODUCTION

1.1 PURPOSE

The existing buildings at Broadwater Public School, 9 Byrnes Street, Broadwater (Lot 4 & 5, Deposited Plan (DP) 1043232 and Lot 501 DP 755624) were significantly inundated during the February 2022 floods and most of the structures are no longer habitable due to the damages caused by the flood waters. As a result, the NSW Department of Education is proposing to demolish the existing school buildings and construct a new elevated school building to replace it. The floor level of the new building will be located above the design flood level to increase flood resistance and create useable undercroft spaces.

This report has been prepared by E-LAB Consulting (E-LAB) at the request of ADCO to demonstrate compliance with the NCC 2019 Volume 1, Section J requirements for Part J1, to support a development application for the site. The report also highlights the steps undertaken to demonstrate compliance, documents the results, and highlights the required performance for the development.

The development, subject of this report, is for the development of the Public School which has been assessed using the DtS Pathway. The design has been found to comply with the Requirements of Part J1 of the NCC 2019, provided systems are installed in line with the values stated in this report.

1.2 PROJECT OVERVIEW

Works will comprise the following:

- Site preparation including site establishment works, earthworks and relocation of heritage bell.
- Demolition of existing school buildings.
- Construction of a new elevated school building, with at-grade (undercroft) amenities and storage, including:
  - Ground Level:
    - Open undercroft space for covered outdoor learning and play
    - Male and female amenities and accessible toilet / change room facility.
    - Cleaners Store.
    - Sports Store.
    - Equipment and general store.
  - Elevated Level:
    - New administration comprising interview room, clerical spaces, Principal's office, staff room, sick bay, store and male, female and accessible amenities.
    - School library with computer room, store, main communications room and library office.
    - Three (3) General Learning Spaces (GLS) with learning commons and multi-purpose space.
    - Canteen with open servery space.
    - Store.
    - Male, female and accessible amenities.
    - Mechanical plant.
- New hard and soft landscaping including replacement playing field, playground, half games court and vegetable garden and new yarning circle.

It is not proposed to increase staff or student numbers as a result of these works.

Figure 2 Proposed Site

1.3 LOCATION

The site is located at 9 Byrnes Street, Broadwater, NSW 2472 within the Richmond Valley Council LGA. Figure 2 highlights the location of the site.

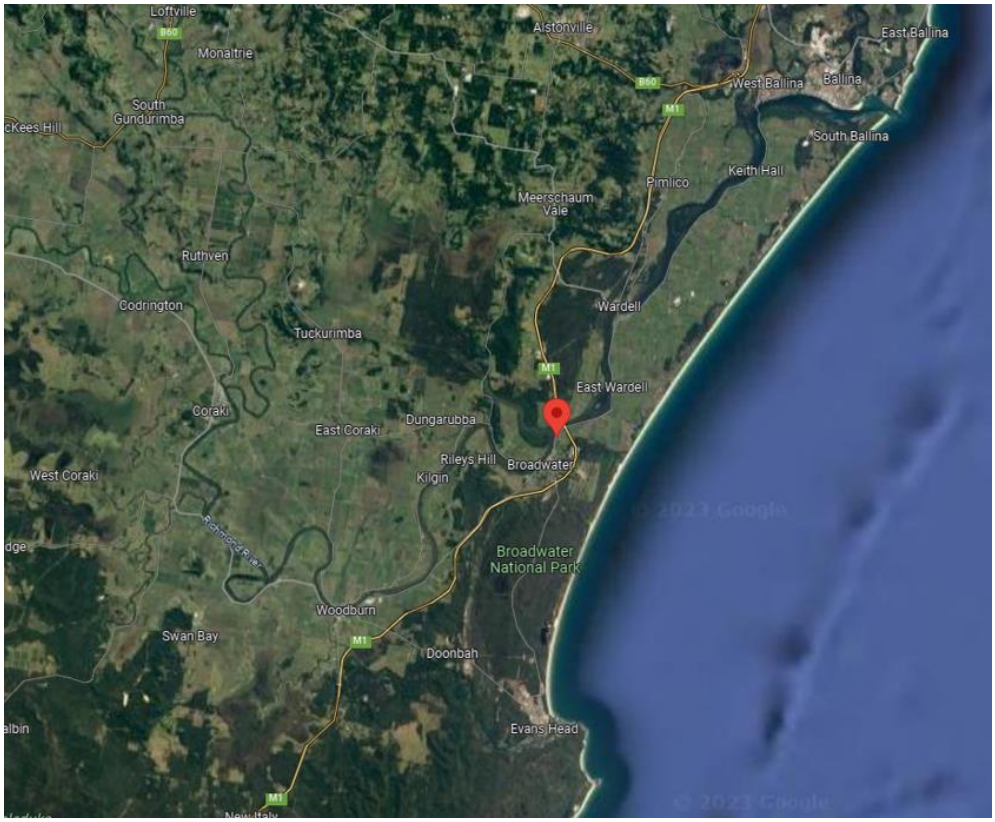


Figure 3 Site and Local Context (Source: Google Map)

The Broadwater Public school is located in 9 Byrnes Street, Broadwater, NSW which is within Climate Zone 2 (Warm humid summer, mild winter).

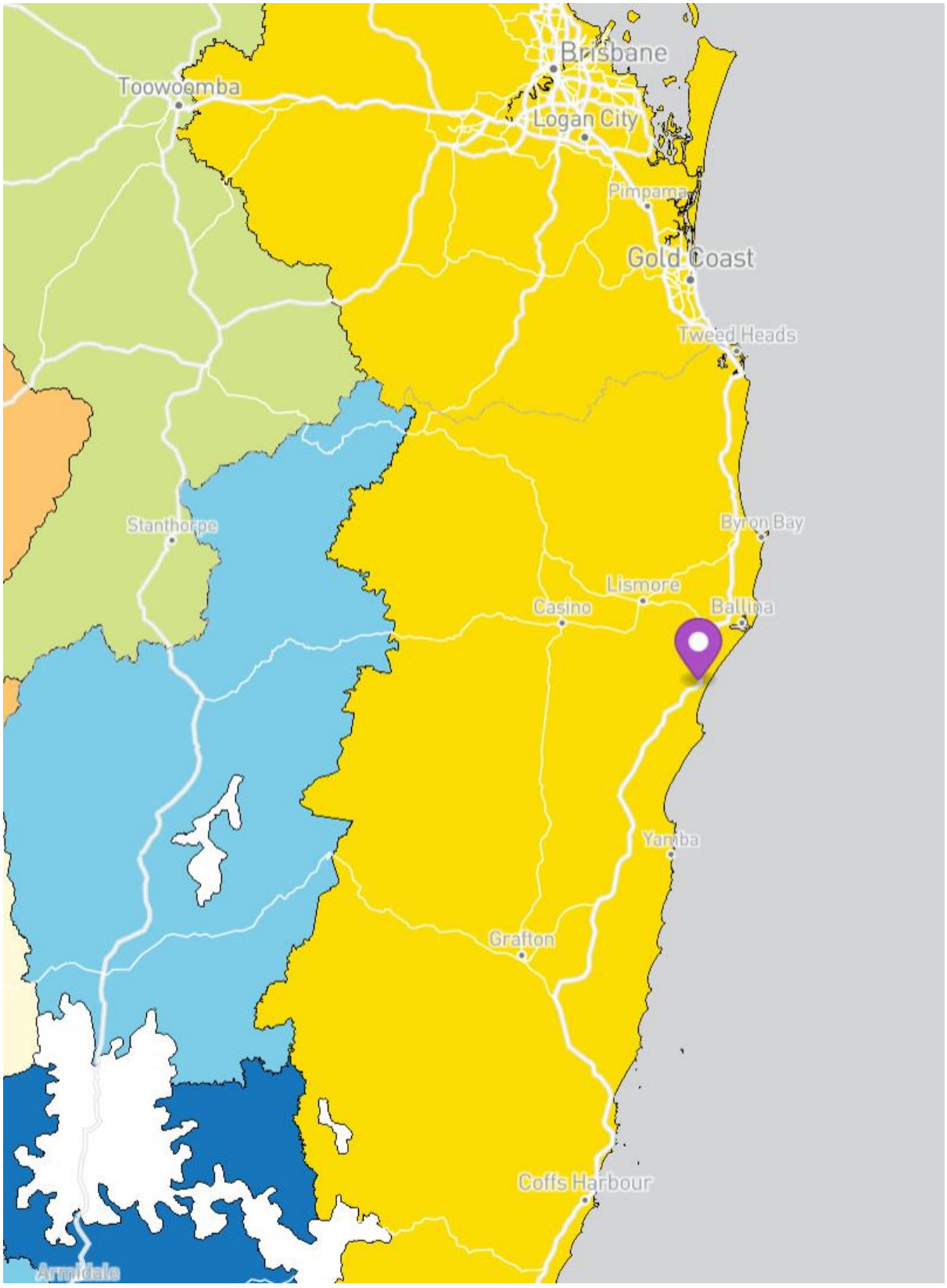


Figure 4 Climate Zone 2

1.4 DESIGN SKETCHES

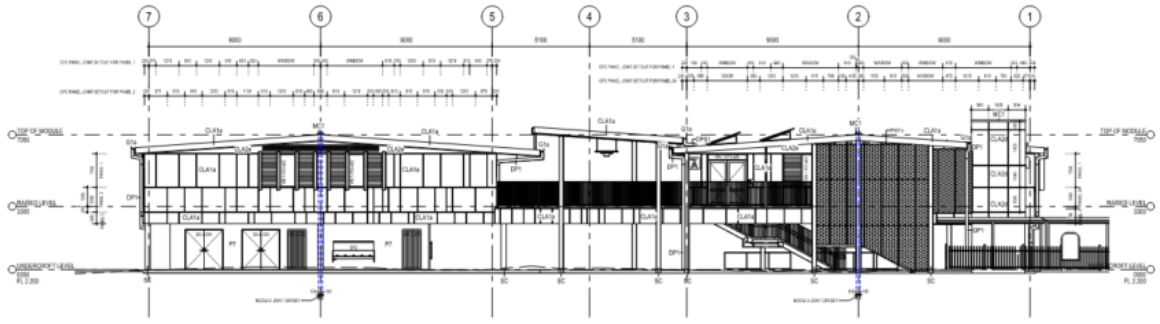


Figure 5 West Façade

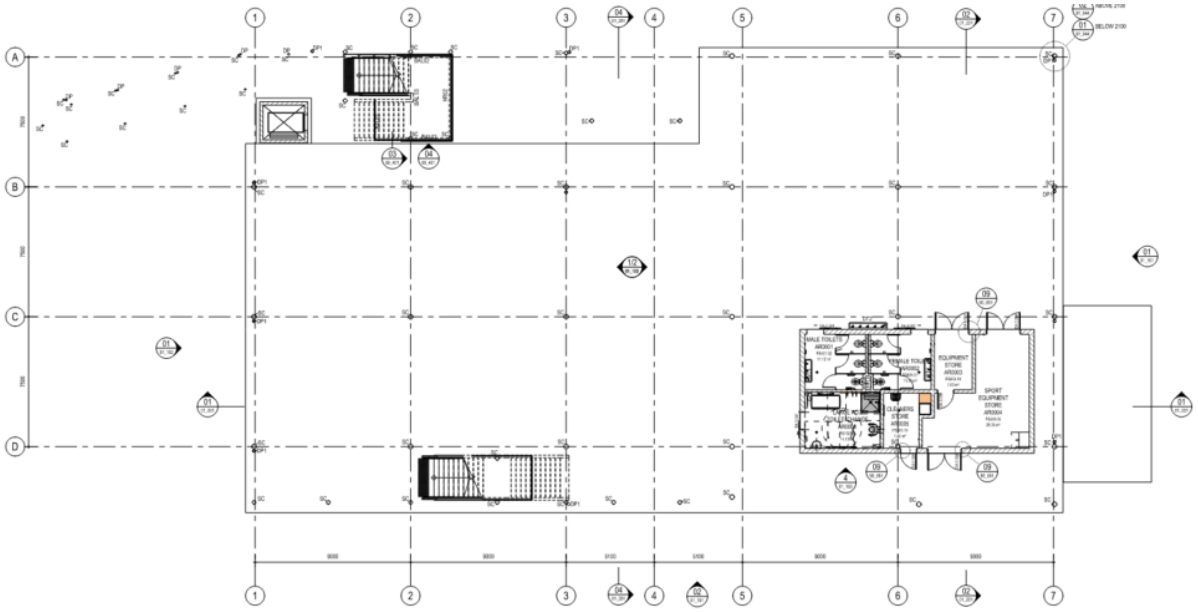


Figure 6 Undercroft Floor Plan

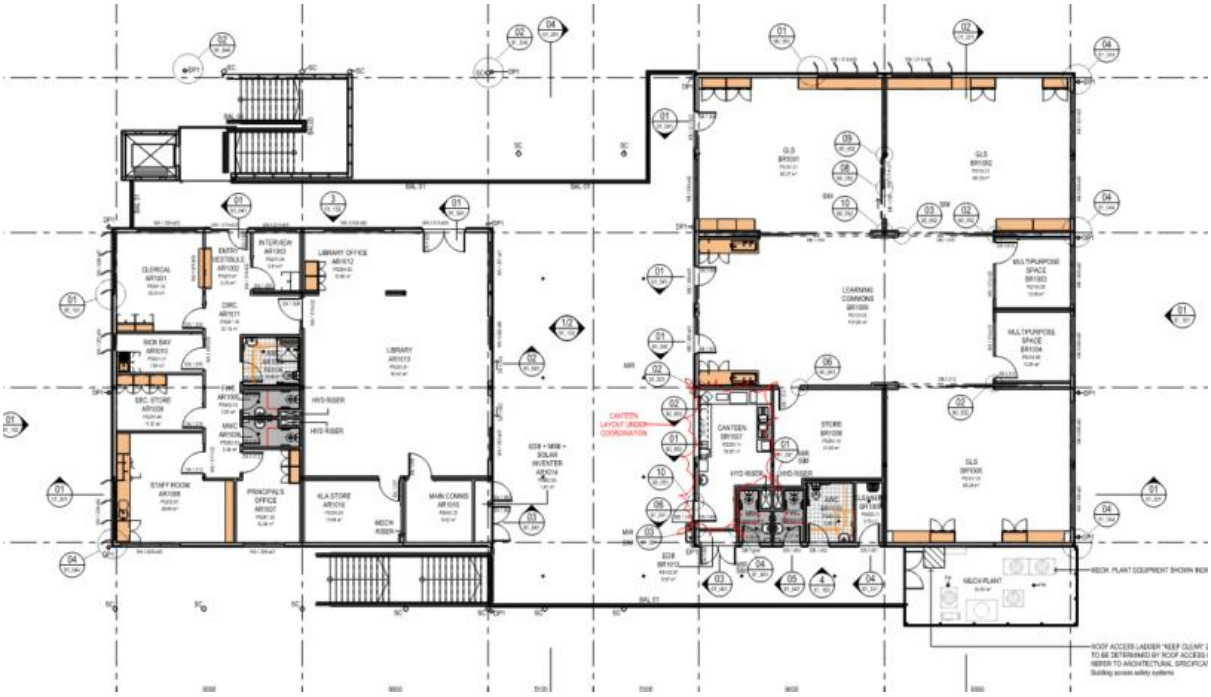


Figure 7 Raised Level Floor Plan

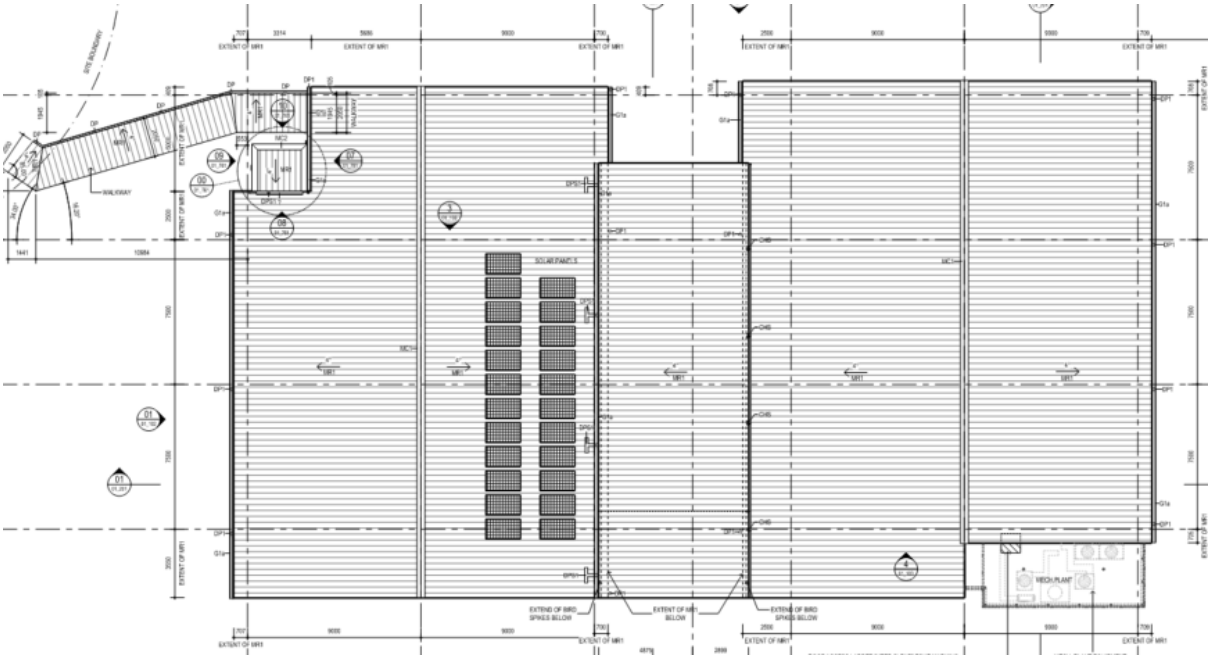


Figure 8 Roof Plan

2 BUILDING ENVELOPE REQUIREMENTS

2.1 GLAZING

The following method mentioned below outline the glazing performance modelled in the J1 compliance solution. This is the minimum performance required to Section J. Any relaxation of these values will need to be confirmed for compliance in writing by the Section J Certifying consultant.

The below values are whole of system values, including the impact of framing.

Glazed Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE*
Glazing (External Fixed windows)	U Value 4.2 SHGC 0.63
Glazing (External louvres)	U Value 5.4 SHGC 0.4
Glazing (Hinged Door)	U Value 4.9 SHGC 0.5
Glazing (Sliding Door)	U Value 4.3 SHGC 0.55
Glazing (Internal windows)	U Value 5.9 SHGC 0.77

*Glazing performance values are whole system performance values (i.e. glass + frame)

2.2 BUIDING FABRIC

The following outlines the building fabric performance requirements as modelled in the J1 Proposed solution. This is the minimum performance required to Section J.

SECTION J GLAZING ELEMENT	PERFORMANCE**
New Roof/Ceiling	R-Value = 3.7 m2.K/W
New External Walls	R-Value = 2.0 m2.K/W
New Floor	R-Value = 2.0 m2.K/W

**R-Value represents whole system, including thermal breaks, air gaps, bulk insulation, and metal-on-metal contact.

3 RESULTS

A JV3 Assessment has been completed in line with the requirements for NCC 2019 Section J. This included:

- Modelling a reference building with reference services, using DtS Provisions for as outlined in Specification JV3 and Part J1, J3, J5 and J6 of the code.
- Modelling a proposed building fabric with reference services, using the actual constructions for the fabric and glazing, and DtS provisions for part J3, J5 and J6.

The annual Greenhouse Gas Emissions of each scenario has been modelled using appropriate software and methods. The study has found the school building complies with NCC 2019 Section J for Part J1, using the JV3 Compliance Pathway Performance Solution.

The modelled results are per the below table.

MODEL	HEATING	COOLING	LIGHTS & EQUIPMENT	TOTAL ($KGCO2_E$/ANNUM)
REFERENCE	1,413	46,341	16,451	64,204
PROPOSED	1,364	45,632	16,451	63,447
REDUCTION				**1.2%**
OUTCOME				Compliant

All other elements of the NCC Section J are required to meet DtS provisions, or compliance shall be demonstrated by the relevant consultant through an alternate pathway. This report does not relieve any other party of their duties, and certification is subject to the performance targets in this report being met.

APPENDIX A FAÇADE CALCULATORS

Façade

Report

Calculator

Project Summary

Date
17/10/2023

Name
Chris Mann

Company
E-LAB

Position
Senior Engineer

Building Name / Address
Broadwater Public School
9 Byrnes Street Broadwater NSW 2472

Building State

NSW

Climate Zone

Climate Zone 2 - Warm humid summer, mild winter

Building Classification

Class 9b - schools

Storeys Above Ground
1

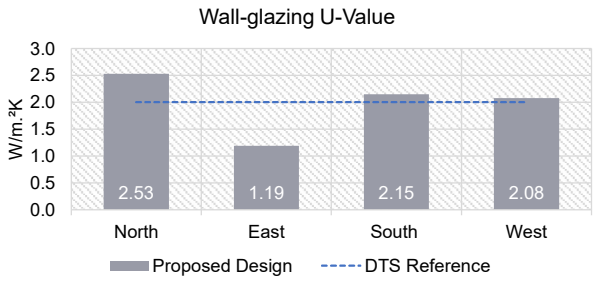
Tool Version
1.2 (June 2020)

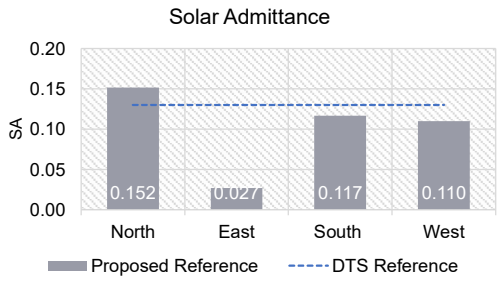
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

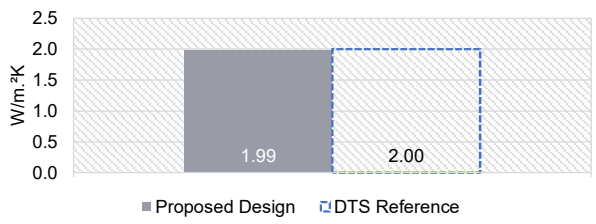
	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	2.53	1.19	2.15	2.08	1.99
Solar Admittance	0.15	0.03	0.12	0.11	
AC Energy Value					63

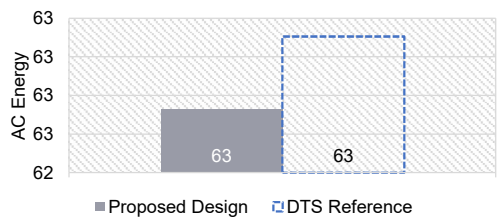
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	52.1	8.925	39.85	36.25
Glazing to Façade Ratio	49%	9%	38%	35%
Glazing References	Glazing 1 Glazing 2	Glazing 1 Glazing 2 Glazing 3	Glazing 1 Glazing 2 Glazing 3	Glazing 1 Glazing 2 Glazing 3
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Frame Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Average Glazing U-Value (W/m².K)	4.22	4.22	4.22	4.22
Average Glazing SHGC	0.31	0.31	0.31	0.31
Shading Systems				
Wall Area (m²)	54.325	94	66.1	66.1
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	DTS Wall<80%	DTS Wall<80%	DTS Wall<80%	DTS Wall<80%
Wall Thickness	100	100	100	100
Average Wall R-value (m².K/W)	1.11	1.11	1.11	1.11
Solar Absorptance	0.6	0.6	0.6	0.6

APPENDIX B INSULATION MARKUP

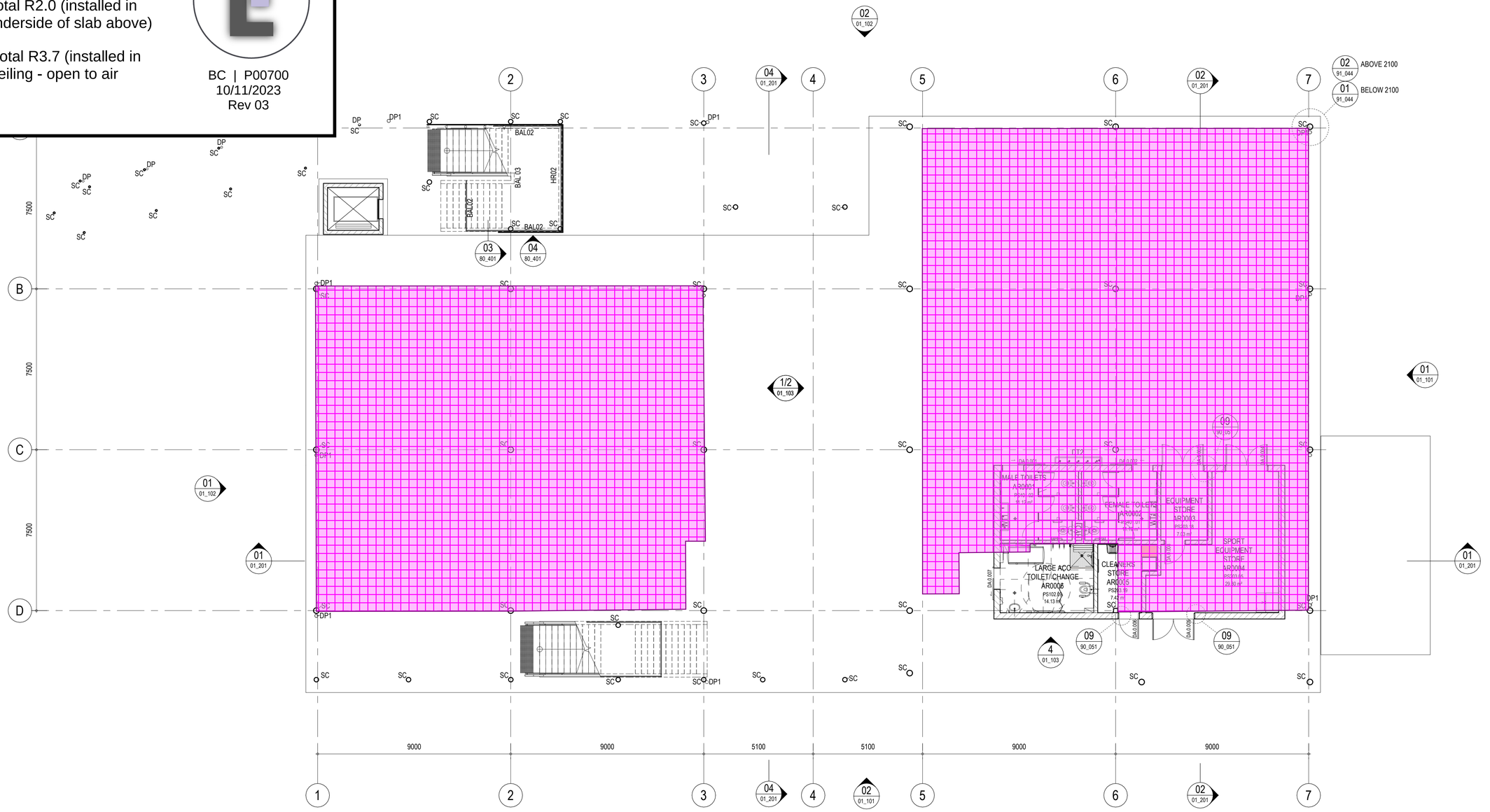
Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
- Total R2.0 (Walls separating internal spaces)
- Total R2.0 (installed in underside of slab above)
- Total R3.7 (installed in ceiling - open to air)

BROADWATER PUBLIC SCHOOL
9 BYRNES ST, BROADWATER

BC | P00700
10/11/2023
Rev 03



AMENDMENTS			
REV	BY	DATE	DESCRIPTION
	SG	19/09/2023	ITEMS UNDER COORDINATION
A	SG	19/09/2023	DRAFT DD ISSUE FOR COORDINATION
1	SG	31/10/2023	ISSUE FOR CONSTRUCTION
2	SG	07/11/2023	ISSUE FOR CONSTRUCTION

PLEASE NOTE:

THE FOLLOWING ITEMS REQUIRE FURTHER CONFIRMATION AND COORDINATION WITH SINSW, ADCO AND SUB-CONTRACTORS:

1. ALL SERVICES LAYOUTS FROM SUB-CONTRACTORS INCLUDING RCPs, DRLs, DOWNPIPES, RISERS ETC. AND FOR ALL SERVICES PENETRATIONS REFER TO SUB-CONTRACTORS DRAWINGS
2. H&H AND MODSCAPE STRUCTURAL DESIGN INCLUDING SECONDARY STEEL AND WALKWAY STRUCTURE
3. SCHOOL EQUIPMENTS, MACHINERY, PLANT AND ANY REQUIRED SERVICES FOR THOSE ITEMS

ADCO

MODULAR DESIGN & CONSTRUCTION Modscape 0393 166 020	PLANNING EPM 0294 528 300
STRUCTURAL & CIVIL H&H Engineers 0423 222 338	ACCESSIBILITY AND BCA MBC Group 0450 704 964
SERVICES JHA Consulting 0404 552 673	LANDSCAPE ARCHITECT Taylor Brammer 0418 264 111
FIRE ENGINEERING AND ESD E-Lab 0447 343 458	BUSHFIRE Blackash Bushfire Consulting 0419 203 853

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NOMINATED ARCHITECT:
VINCE PEDAVOLI
NSW ARB No. 5045

PEDAVOLI ARCHITECTS

BROADWATER PUBLIC SCHOOL

9 BYRNES STREET BROADWATER NSW 2472

DRAWING NAME

UNDERCROFT LEVEL PLAN

TRUE NORTH

NORTH

0 1000 2000 3000 4000 5000 10000

SCALE 1 : 100 @ A1

NOVEMBER 2023

DRAWING NUMBER					REVISION
PROJECT	DISCIPLINE	PHASE	TYPE	SERIES NUMBER	
BRO - ARC - CD - DWG - 01_011					2

Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
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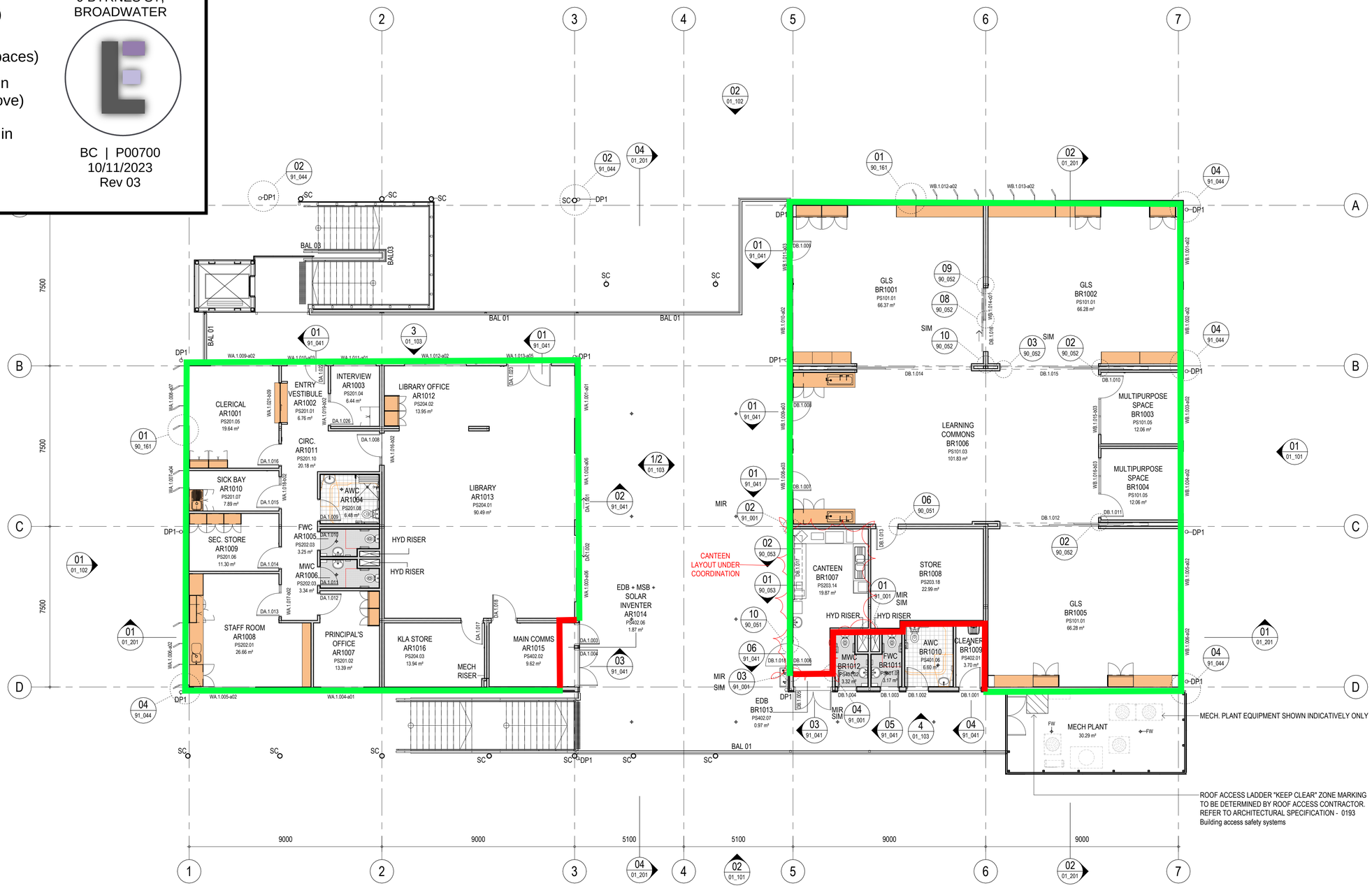
BROADWATER PUBLIC SCHOOL
9 BYRNES ST, BROADWATER

BC | P00700
10/11/2023
Rev 03



AMENDMENTS			
REV	BY	DATE	DESCRIPTION
A	SG	19/09/2023	DRAFT DD ISSUE FOR COORDINATION
1	SG	31/10/2023	ISSUE FOR CONSTRUCTION
	SG	06/11/2023	SLIDING DOOR'S SETOUT UPDATED
	SJ	06/11/2023	SCREEN ADDED, DOOR HEIGHT ADJUSTED
	SG	06/11/2023	ACCESS LADDER "KEEP CLEAR" ZONE ADDED
2	SJ	06/11/2023	REISSUE FOR CONSTRUCTION
	SG	07/11/2023	ITEMS UNDER COORDINATION
3	SG	07/11/2023	ISSUE FOR CONSTRUCTION

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ADCO

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NSW ARB No. 5045

PEDAVOLI ARCHITECTS

BROADWATER PUBLIC SCHOOL

9 BYRNES STREET BROADWATER NSW 2472

DRAWING NAME

RAISED LEVEL PLAN

TRUE NORTH

NORTH

0 1000 2000 3000 4000 5000 10000

SCALE 1 : 100 @ A1

NOVEMBER 2023

DRAWING NUMBER					REVISION
PROJECT	DISCIPLINE	PHASE	TYPE	SERIES NUMBER	
BRO - ARC - CD - DWG - 01_012					3

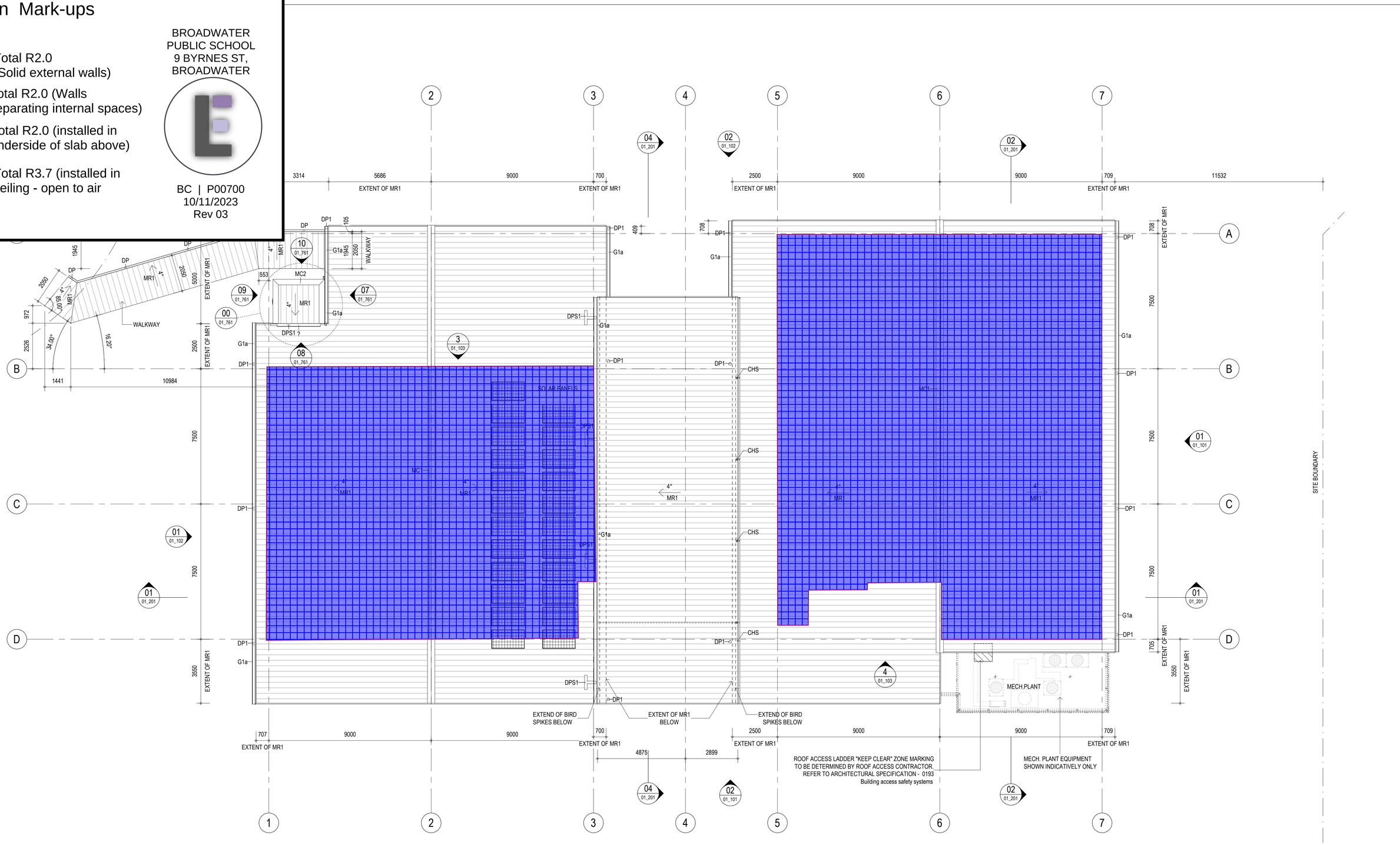
Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
- Total R2.0 (Walls separating internal spaces)
- Total R2.0 (installed in underside of slab above)
- Total R3.7 (installed in ceiling - open to air)

BROADWATER PUBLIC SCHOOL
9 BYRNES ST, BROADWATER

BC | P00700
10/11/2023
Rev 03



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NSW ARB No. 5045

PEDAVOLI ARCHITECTS

BROADWATER PUBLIC SCHOOL

9 BYRNES STREET BROADWATER NSW 2472

DRAWING NAME

ROOF PLAN

TRUE NORTH

NORTH

0 1000 2000 3000 4000 5000 10000

SCALE 1 : 100 @ A1

NOVEMBER 2023

DRAWING NUMBER					REVISION
PROJECT	DISCIPLINE	PHASE	TYPE	SERIES NUMBER	
BRO - ARC - CD - DWG - 01_021					1

APPENDIX C Profiles and Performance Inputs

INPUT	REFERENCE	PROPOSED
Climate Zone (Weather File)	Climate Zone 2 (Ballina.Byron.Gateway TMY)	
Geometry	To match the proposed	As per the design
Profiles	As outlined in Specification JVc and detailed in this appendix	
Lighting Levels	Per Part J6 Maximum	
Occupant Density	Per Design Limits for Class 5 and Class 9	
Internal Heat Gains	As outlined in Specification JVc and detailed in this appendix	
Construction Thermal Performance	Per Part J1 Façade Calculator	As outlined in Section 3.2
Glazing Suite Performance	Per Part J1 DtS Standards, documented in Appendix A	Per the proposed glazing suite, outlined in Section 3.1
Building Services Design	Cooling - (Air-cooled chiller with capacity < 528 kWr) Heating – (Gas Boiler consuming less than 500MJ/hour)	
Cooling COP	Air cooled chiller per NCC 2019 2.866	Air cooled chiller per NCC 2019 2.866
Heating COP	Gas boiler per NCC 2019 0.86	Gas boiler per NCC 2019 0.86
Cooling Fuel	Grid Electricity	Grid Electricity
Heating Fuel	Grid Electricity	Grid Electricity
Space Temperature Range	21 – 24 °C	21 – 24 °C
Outdoor Air Rate	In line with code minimum for Part F4.5(b) Modelled at 7.5L/s/person	
Infiltration Air Change Rate	Per Specification JVb, Part 2(d): 0.7 ACH when plant is not operating 0.35 ACH when plant is operating	

APPENDIX D Applicable Clauses

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.

J0.4 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.

Part J3 Building sealing

Deemed-to-Satisfy Provisions

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.

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