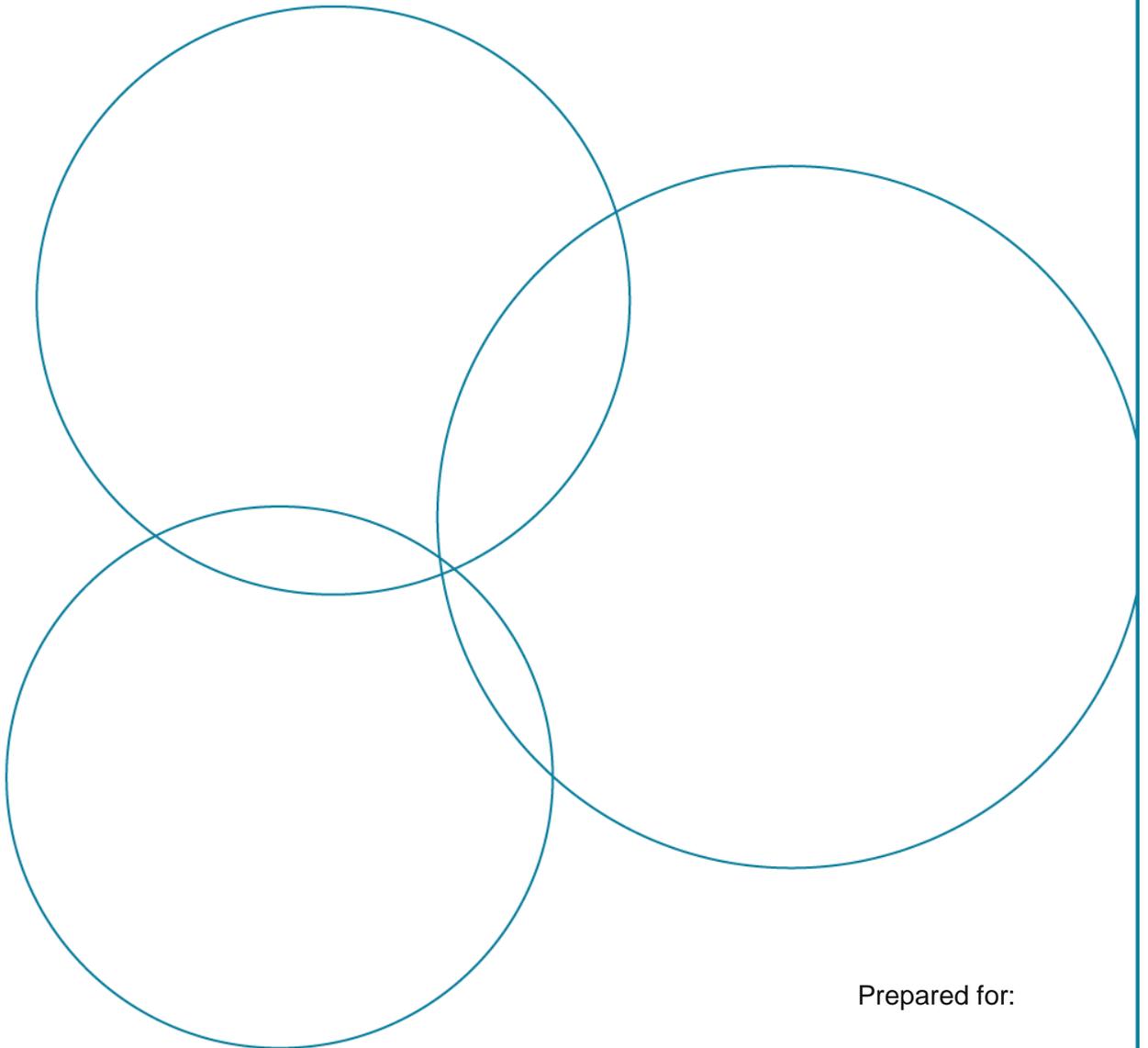


CUNDALL

05/09/2018

NCC Section J1, J2 & J3 Review

1018826 – St. Peter and Paul Primary School



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-	Initial review	03/09/2018
A	Minor updates	05/09/2018
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<p>The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.</p>		

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Executive Summary

This report has been prepared for the proposed Saints Peter and Paul Primary School to identify compliance with NCC 2016 Section J deemed-to-satisfy (DTS) Energy Efficiency requirements (Parts J1, J2 and J3).

Part J1 – Building Fabric

The minimum building fabric requirements are summarised in the table below:

Building Envelope Element	Total R value required
Roof	R3.2
External walls	R2.8
External walls (South facing without shading)	R2.3
External walls (South facing with shading)	R1.8
Suspended floor	R2.0

Part J2 – External Glazing

Based on the current design the glazing requirements are summarised in the following tables.

Teaching, Administration, Library & Canteen Building

Part J2 glazing DTS calculator results for Ground Floor of Building B (Teaching, Administration, Library & Canteen) are summarised in the table below:

Table 1: Building B, Ground Floor deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building B (Teaching, Admin, Library, Canteen) Ground Floor	North	≥ 4.0	≤ 0.26
	East	≤ 2.4	≤ 0.24
	South West	≤ 2.9	≥ 0.45
	North East	≥ 4.0	≤ 0.16
	South East	≤ 1.6	≥ 0.45
	South	≤ 3.4	≥ 0.45
	West	≤ 2.2	≤ 0.22

Part J2 glazing DTS calculator results for Level 1 of Building B (Teaching & Administration) are summarised in the table below:

Table 2: Building B, Level 1 deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building B (Teaching, Admin, Library, Canteen) Level 1	North	≥ 4.0	≤ 0.40
	East	≤ 3.4	≤ 0.34
	South West	≤ 2.1	≥ 0.45
	North East	≥ 2.0	≤ 0.80
	South East	≤ 1.9	≥ 0.45
	South	≤ 2.7	≥ 0.45
	West	≤ 1.9	≤ 0.20
	North West	≥ 4.0	≤ 0.32

Hall Building

Part J2 glazing DTS calculator results for Building A (Hall) are summarised in the table below:

Table 3: Building A, Ground Floor deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building A (Hall) Ground Floor	North	≥ 4.0	≤ 0.38
	East	≤ 4.0	≤ 0.29
	South	≤ 2.4	≥ 0.45
	West	≤ 1.7	≤ 0.18

Note: All glazing properties are based on AFRC figures and are values for the total glazing system.

The above values indicate extremely high-performance glazing may be required to meet the requirements of Section J2: DTS Glazing calculator. It is therefore recommended that some design changes are made to improve thermal performance of the fabric such as improved shading or reduced extent of glazing. Alternative compliance via the JV3 modelling pathway could be considered.

Part J3 – Building Sealing

All buildings in all NCC 2016 climate zones must achieve compliance with the DTS parameters as set out in Part J3. Please refer to Section 4 of this report for the list of minimum requirements.

1 Introduction

NCC Section J energy efficiency provisions are required to be included in the design of the Saints Peter and Paul Primary School design and documentation.

The purpose of this review is to identify any major non-compliances and, in particular, check that glazing and shading arrangements meet the NCC Section J1, J2 & J3 requirements.

The review has been completed based on the following documentation provided by PMDL Architecture + Design in July 2018.

Drawing / Model Number
DA 121 Ground Floor
DA 122 1 st Floor
DA 123 Roof Plan
DA 201 Elevations – North & South
DA 202 Elevations – East & West
DA 301 Longitudinal Sections
DA 302 Cross Sections

The development is identified as a Class 9b Assembly Building as per the NCC building classifications.

The NCC climate zone of the project location is 6, a cool temperate climate.

The above class is modelled as “other” in the NCC Volume One Glazing Calculator (first issued with NCC 2014).

2 Part J1 - Building Fabric

2.1 Overview

Insulation reduces the radiation and conduction of heat between internal and external conditions reducing heating, cooling and thus total energy loads over the course of the building's life. This has a two-fold saving through a smaller plant capacity along with direct energy consumption savings.

2.2 Responsible Designer

The responsible designers for this part of the NCC are the architect and the facade engineer (where applicable). The NCC minimum requirements for insulation are required to be incorporated in order to assist with improving thermal performance.

2.3 Summary of Requirements

Part J1 establishes minimum construction and performance requirements, which vary depending on the climate zone and type of building construction, for the following:

- Installation of insulation (J1.2)
- Roof / ceiling insulation (J1.3)
- Roof lights (J1.4)
- Wall insulation (J1.5)
- Floor insulation (J1.6)

Insulation to meet NCC deemed-to-satisfy requirements is recommended as it will generally assist with meeting the building's energy performance target.

2.4 J1.2 Installation of Insulation

Installation of insulation must comply with section J1.2 of the NCC. The installation must ensure that the insulation creates a continuous thermal barrier to reduce energy losses. Additionally, it is important that the insulation must not hinder the safe or effective operation of any service or fitting. Specific installations requirements are outlined in Part J1.2 for reflective and bulk insulation.

The insulation used must comply with AS4859.1.

2.5 J1.3 Roof & Ceiling

The deemed-to-satisfy provision for roof and ceiling insulation is dependent on the climate zone of the development.

The total R-Value for the roof and ceiling in climate zone 6 is detailed below:

Direction of heat flow	Minimum Total R-Value for Roof or Ceiling
Downwards	R3.2

Note – adjustments of the minimum R-Value may be required where, for safety reasons, the area of ceiling insulation is reduced adjacent to exhaust fans, flues or recessed downlights.

2.6 J1.4 Roof Lights

No roof lights within the thermal envelope are currently indicated on the drawings. If roof lights are considered during design development the following deemed-to-satisfy requirements apply;

If the roof lights are not required for compliance with Part F4 then the total area of roof lights must not exceed 5% of the floor area that it serves. The performance of the roof lights will be determined based on the percentage of the roof light area to the floor area that it serves.

2.7 J1.5 Walls

The deemed-to-satisfy provisions specify minimum insulation levels for each external wall of a conditioned space and for internal walls separating conditioned space with non-conditioned space. The requirements for climate zone 6 are summarised in the below table:

Wall type	Minimum Total R-value for Wall
External walls (North east and north west facing, south east and south west without shading)	R2.8
External walls (South facing without shading)	R2.3
External walls (South, south east and south west facing with shading)	R1.8

2.8 J1.6 Floors

The deemed-to-satisfy provisions specify minimum insulation levels for conditioned spaces, including the ground floor and suspended floors above a non-conditioned space.

The relevant requirements for climate zone 6 are as follows:

Floor type	Minimum Total R-value for Floor
Concrete slab-on-ground	None required
Suspended floor	R2.0

2.9 Results Summary

The minimum building fabric requirements are summarised in the following table:

Building Envelope Element	Total R value required
Roof	R3.2
External walls	R2.8
External walls (South facing without shading)	R2.3
External walls (South facing with shading)	R1.8
Suspended floor	R2.0

Please refer to Appendix A: Insulation Requirements for insulation mark-ups.

3 Part J2 Glazing

3.1 Overview

Glass impacts significantly on the energy performance of the building. This method of glazing analysis considers the area of the glass and orientation on a level by level basis. Buildings that are 2 storeys or greater in height require each level to comply with the NCC requirements in Part J2.

3.2 Responsible Designer

The responsible designers for this part of the NCC are the architect and the facade engineer (where applicable).

3.3 Summary of Requirements

Part J2 requires established minimum glazing system performance requirements, which vary depending on the climate zone, orientation, area and shading of the glazing.

The glazing conductance (U-value), solar heat gain coefficient (SHGC) and shading devices are assessed together and calculated for each façade orientation. These are then added together to give an air conditioning energy value. To comply this must be less than the energy index target.

The calculation involves numerous factors and is typically undertaken using the glazing calculator developed by the Australian Building Codes Board (ABCB). Refer to Appendix B for the NCC Volume One Glazing Calculator.

3.4 Application of Part J2

This part is applicable to all external glazing and internal glazing separating a conditioned space from a non-conditioned space.

3.5 Glazing Performance

We have reviewed the development to assess the performance characteristics required to meet the deemed to satisfy provisions for external glazing.

3.6 Results

Based on the current design the glazing requirements are summarised in the following tables.

Teaching, Administration, Library & Canteen Building

Part J2 glazing DTS calculator results for Ground Floor of Building B (Teaching, Administration, Library & Canteen) are summarised in the table below:

Table 4: Building B, Ground Floor deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building B (Teaching, Admin, Library, Canteen) Ground Floor	North	≥ 4.0	≤ 0.26
	East	≤ 2.4	≤ 0.24
	South West	≤ 2.9	≥ 0.45
	North East	≥ 4.0	≤ 0.16
	South East	≤ 1.6	≥ 0.45
	South	≤ 3.4	≥ 0.45
	West	≤ 2.2	≤ 0.22

Part J2 glazing DTS calculator results for Level 1 of Building B (Teaching, Administration, Library & Canteen) are summarised in the table below:

Table 5: Building B, Level 1 deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building B (Teaching, Admin, Library, Canteen) Level 1	North	≥ 4.0	≤ 0.40
	East	≤ 3.4	≤ 0.34
	South West	≤ 2.1	≥ 0.45
	North East	≥ 2.0	≤ 0.80
	South East	≤ 1.9	≥ 0.45
	South	≤ 2.7	≥ 0.45
	West	≤ 1.9	≤ 0.20
	North West	≥ 4.0	≤ 0.32

Hall Building

Part J2 glazing DTS calculator results for Building A (Hall) are summarised in the table below:

Table 6: Building A, Ground Floor deemed-to-satisfy window thermal performance requirements:

Level	Window Orientation	Window U-Value (U_w)	Window SHGC ($SHGC_w$)
Building A (Hall) Ground Floor	North	≥ 4.0	≤ 0.38
	East	≤ 4.0	≤ 0.29
	South	≤ 2.4	≥ 0.45
	West	≤ 1.7	≤ 0.18

Note: All glazing properties are based on AFRC figures and are values for the total glazing system.

The above values indicate extremely high-performance glazing may be required to meet the requirements of Section J2: DTS Glazing calculator. It is therefore recommended that some design changes are made to improve thermal performance of the fabric such as improved shading or reduced extent of glazing. Alternative compliance via the JV3 modelling pathway could be considered.

4 Part J3 Building Sealing

4.1 Overview

Air leakage accounts for 15–25% of winter heat loss in buildings and can contribute to a significant loss of coolness in climates where air conditioners are used. Gaps in insulation and thermal bridging are also a substantial source of heat loss and can cause both draughts and condensation.

4.2 Responsible Designer

The responsible designers for this part of the NCC are the architect and the facade engineer (where applicable). The NCC minimum requirements for insulation are required to be incorporated in order to assist with improving thermal performance.

4.3 Summary of Requirements

All buildings in all NCC 2016 climate zones must achieve compliance with the DTS parameters as set out in Part J3. The requirements are summarized in the following sections.

Part J3.2 Chimneys and Flues

There are no chimneys or flues present for this project.

Part J3.3 Roof Lights

There are no roof lights present for this project.

Part J3.4 Windows and Doors

- a) A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of –
 - i. the envelope of a conditioned space; or
 - ii. the external fabric of a habitable room or public area in climate zones 4, 5, 6, 7 and 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 required by (a) -
 - i. for the bottom edge of an external swing door, must be a draft protection device; and
 - ii. for the other edges of an external door or the edges of an openable window or such opening, may be a foam or rubber compression strip, fibrous seal or the like.
- d) An entrance to a building that leads into a conditioned space must have an airlock, self-closing door, revolving door or the like, other than -
 - i. where the conditioned space has a floor area of not more than 50m²; or
 - ii. where a cafe, restaurant, open front shop or the like has –
 - A. a 3m deep un-conditioned zone between the main entrance, including an open front, and conditioned space; and
 - B. at all other entrances to the cafe, restaurant, open front shop or the like, self-closing doors.

Part J3.5 Exhaust Fans

Where exhaust fans are present within conditioned or habitable spaces for this project:

Miscellaneous exhaust fans, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving -

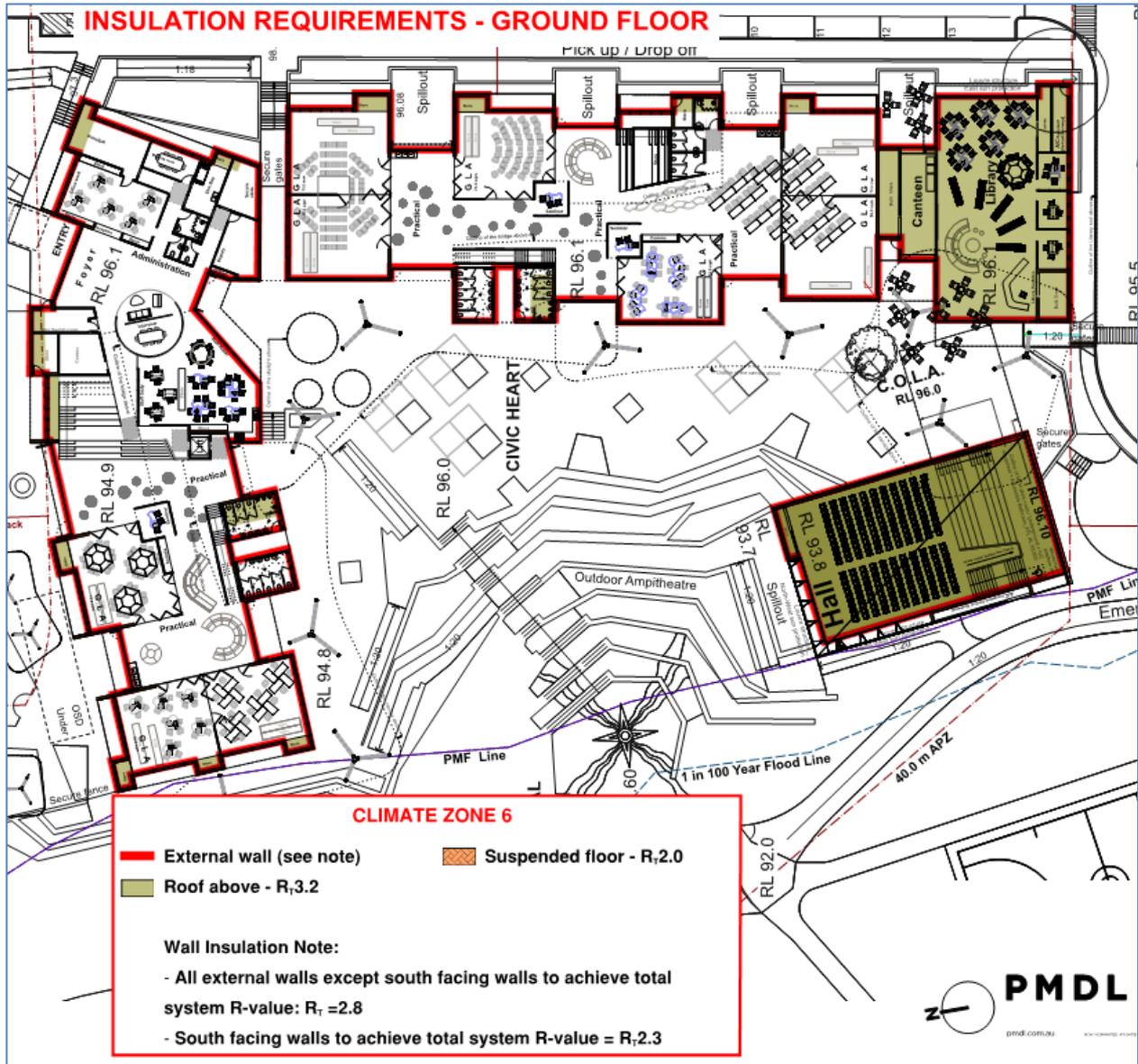
- i. a conditioned space; or
- ii. a habitable room in climate zones 4, 5, 6, 7 and 8.

Part J3.6 Construction of Roofs, Walls and Floors

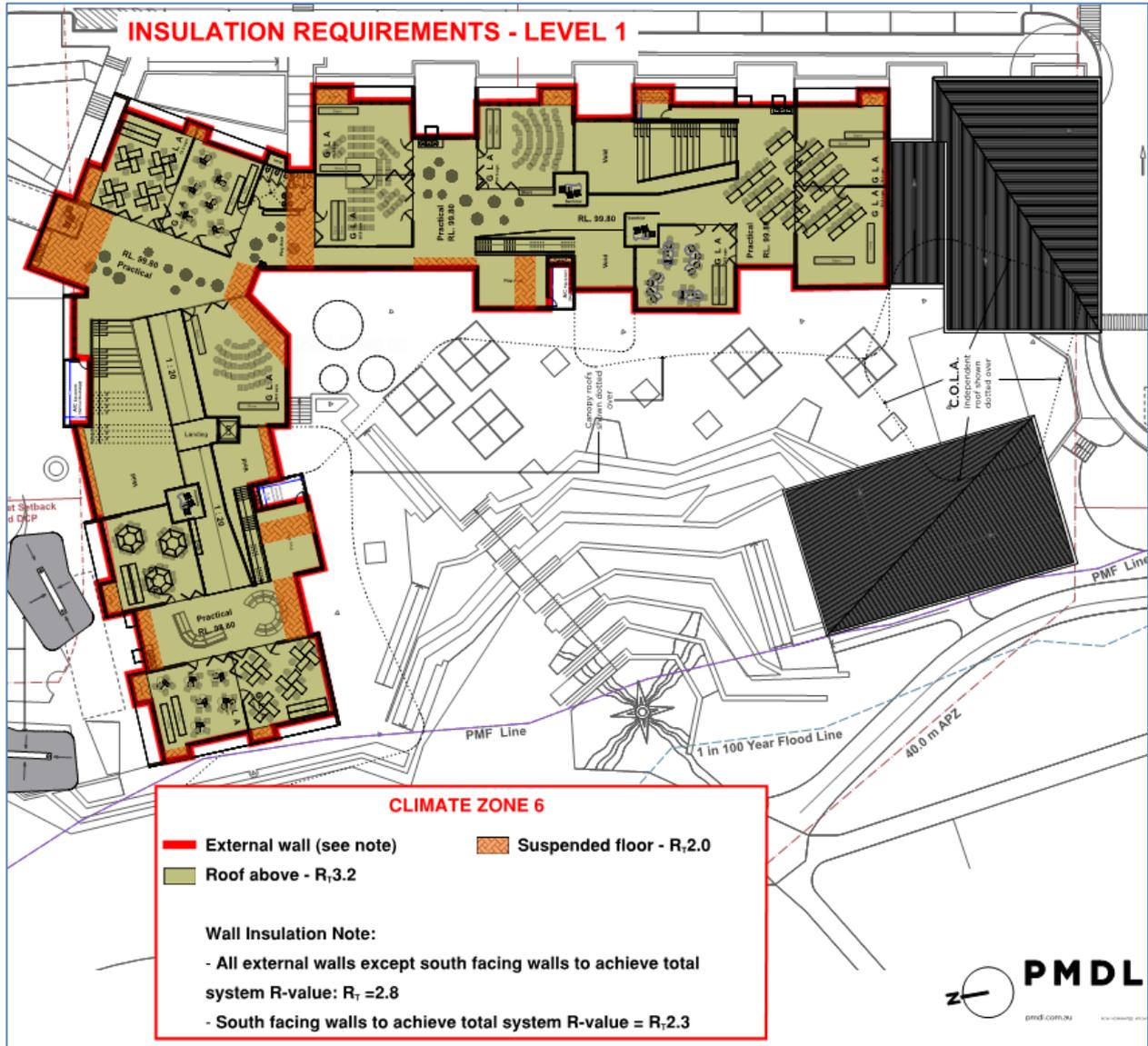
- a) Roof, ceiling, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of -
 - i. the envelope; or
 - ii. the external fabric of a habitable room or a public area in climate zones 4, 5, 6, 7 and 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 by caulking, skirting, architraves, cornices or the like.
- c) The requirements of (a) do not apply to openings, grilles and the like required for smoke hazard management.

Appendix A – Insulation Requirements

Ground Floor:



Level 1:



Appendix B – Glazing Calculators

Building A: Hall Building:

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) HELP

Building name/description: **St. Peter and Paul Primary School - Building A** Application: **other** Climate zone: **6**

Storey: **Ground**

Facade areas		N	NE	E	SE	S	SW	W	NW	internal
Option A		104m ²		126m ²		64.9m ²		178m ²		
Option B										n/a
Glazing area (A)		89.6m ²		40.9m ²		50.5m ²		110m ²		

Number of rows preferred in table below: **10** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS							SHADING		CALCULATED OUTCOMES OK (if inputs are valid)							
ID	Description (optional)	Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
		Option A facades	Option B facades	Height (m)	Width (m)	Area (m ²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S _H)	Cooling (S _C)	Area used (m ²)	Element share of % of allowance used
1	North 8	N		10.30	8.70		4.0	0.38	device		2.00	0.00	0.00	0.30	89.61	100% of 100%
2											ROW SKIPPED (OK if intentional)					
3	East 6	E		4.80	5.30		4.0	0.29				0.00	1.00	1.00	25.44	62% of 99%
4	East 7	E		4.30	3.60		4.0	0.29				0.00	1.00	1.00	15.48	38% of 99%
5											ROW SKIPPED (OK if intentional)					
6	South 10	S		4.90	10.30		2.4	0.45				0.00	1.00	1.00	50.47	100% of 94%
7											ROW SKIPPED (OK if intentional)					
8	West 1	W		1.60	2.30		1.7	0.18	1.200	4.900	0.00	3.30	1.00	1.00	3.68	3% of 100%
9	West 2	W		10.30	10.30		1.7	0.18	device		2.00	0.00	0.05	0.31	#####	97% of 100%
10																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR
 The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

Building B: Teaching and Administration – Ground Level:

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)
[HELP](#)

Building name/description: **St. Peter and Paul Primary School - Building B**

Application: **other** Climate zone: **6**

Storey: **Ground**

Facade areas	N	NE	E	SE	S	SW	W	NW	internal
Option A	385m ²	67.6m ²	261m ²	98.7m ²	303m ²	12.6m ²	412m ²		
Option B									n/a
Glazing area (A)	168m ²	44.5m ²	113m ²	67.9m ²	119m ²	5.4m ²	211m ²		

Number of rows preferred in table below: **48** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS							SHADING		CALCULATED OUTCOMES OK (if inputs are valid)								
ID	Description (optional)	Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes	
		Option A facades	Option B facades	Height (m)	Width (m)	Area (m ²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S _H)	Cooling (S _C)	Area used (m ²)	Element share of % of allowance used	
1	North 1	N		3.50	6.00		4.0	0.26				0.00	1.00	1.00	21.00	12% of 99%	
2	North 2	N		3.50	6.00		4.0	0.26				0.00	1.00	1.00	21.00	12% of 99%	
3	North 3	N		3.50	6.10		4.0	0.26				0.00	1.00	1.00	21.35	13% of 99%	
4	North 4	N		3.00	8.90		4.0	0.26				0.00	1.00	1.00	26.70	16% of 99%	
5	North 5	N		3.50	5.90		4.0	0.26				0.00	1.00	1.00	20.65	12% of 99%	
6	North 6	N		2.70	12.00		4.0	0.26				0.00	1.00	1.00	32.40	19% of 99%	
7	North 7	N		4.30	5.80		4.0	0.26				0.00	1.00	1.00	24.94	15% of 99%	
8																	
9	East 1	E		3.50	9.50		2.4	0.24				0.00	1.00	1.00	33.25	29% of 99%	
10	East 2	E		3.50	5.90		2.4	0.24				0.00	1.00	1.00	20.65	18% of 99%	
11	East 3	E		3.50	4.90		2.4	0.24				0.00	1.00	1.00	17.15	15% of 99%	
12	East 4	E		3.50	6.00		2.4	0.24				0.00	1.00	1.00	21.00	19% of 99%	
13	East 5	E		3.50	6.00		2.4	0.24				0.00	1.00	1.00	21.00	19% of 99%	
14																	
15	Southwest 1	SW		1.50	3.60		2.9	0.45	20.700	7.400		0.00	5.90	1.00	1.00	5.40	100% of 100%
16																	
17	North-East 1	NE		3.20	7.90		4.0	0.16				0.00	1.00	1.00	25.28	57% of 94%	
18	North-East 2	NE		3.20	6.00		4.0	0.16				0.00	1.00	1.00	19.20	43% of 94%	
19																	
20	South East 1	SE		2.70	9.60		1.6	0.45	15.300	7.400		0.00	4.70	1.00	1.00	25.92	38% of 100%
21	South East 2	SE		3.50	12.00		1.6	0.45				0.00	1.00	1.00	42.00	62% of 100%	
22																	
23	South 1	S		3.50	5.90		3.4	0.45	6.800	7.400		0.00	3.90	1.00	1.00	20.65	17% of 98%
24	South 2	S		3.00	5.90		3.4	0.45	8.600	7.400		0.00	4.40	1.00	1.00	17.70	15% of 98%
25	South 3	S		3.00	1.50		3.4	0.45	3.500	7.400		0.00	4.40	1.00	1.00	4.50	4% of 98%
26	South 4	S		3.00	1.50		3.4	0.45	4.200	7.400		0.00	4.40	1.00	1.00	4.50	4% of 98%
27	South 5	S		3.00	2.00		3.4	0.45	9.300	7.400		0.00	4.40	1.00	1.00	6.00	5% of 98%
28	South 6	S		3.00	4.70		3.4	0.45	7.500	7.400		0.00	4.40	1.00	1.00	14.10	12% of 98%
29	South 7	S		2.70	5.60		3.4	0.45	7.100	7.400		0.00	4.70	1.00	1.00	15.12	13% of 98%
30	South 8	S		2.70	2.90		3.4	0.45				0.00	1.00	1.00	7.83	7% of 98%	
31	South 9	S		3.50	8.10		3.4	0.45				0.00	1.00	1.00	28.35	24% of 98%	
32																	
33	West 3	W		3.50	6.00		2.2	0.22	6.000	7.400		0.00	3.90	1.00	1.00	21.00	10% of 100%
34	West 4	W		3.50	6.00		2.2	0.22				0.00	1.00	1.00	21.00	10% of 100%	
35	West 5	W		2.70	2.70		2.2	0.22	5.200	7.400		0.00	4.70	1.00	1.00	7.29	3% of 100%
36	West 6	W		1.50	1.80		2.2	0.22	device			2.00	0.00	0.05	0.31	2.70	1% of 100%
37	West 7	W		2.70	5.90		2.2	0.22	15.100	7.400		0.00	4.70	1.00	1.00	15.93	8% of 100%
38	West 8	W		2.70	5.80		2.2	0.22	8.100	7.400		0.00	4.70	1.00	1.00	15.66	7% of 100%
39	West 9	W		2.70	1.50		2.2	0.22	3.300	7.400		0.00	4.70	1.00	1.00	4.05	2% of 100%
40	West 10	W		2.70	1.50		2.2	0.22	3.600	7.400		0.00	4.70	1.00	1.00	4.05	2% of 100%
41	West 11	W		2.70	5.90		2.2	0.22	6.000	7.400		0.00	4.70	1.00	1.00	15.93	8% of 100%
42	West 12	W		2.70	5.90		2.2	0.22	4.200	7.400		0.00	4.70	1.00	1.00	15.93	8% of 100%
43	West 13	W		2.70	5.70		2.2	0.22	8.500	7.400		0.00	4.70	1.00	1.00	15.39	7% of 100%
44	West 14	W		2.70	5.90		2.2	0.22	6.800	7.400		0.00	4.70	1.00	1.00	15.93	8% of 100%
45	West 15	W		2.70	1.90		2.2	0.22				0.00	1.00	1.00	5.13	2% of 100%	
46	West 16	W		2.70	3.40		2.2	0.22				0.00	1.00	1.00	9.18	4% of 100%	
47	West 17	W		4.30	9.70		2.2	0.22				0.00	1.00	1.00	41.71	20% of 100%	
48																	

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.

Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

Revision: A

Revision Date: 05/09/2018

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Building B: Teaching and Administration –Level 1:

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) HELP

Building name/description: **St. Peter and Paul Primary School - Building B** Application: **other** Climate zone: **6**

Storey: **Level 1**

Facade areas	N	NE	E	SE	S	SW	W	NW	internal
Option A	363m ²	310m ²	365m ²	136m ²	421m ²	24.1m ²	438m ²	26.2m ²	
Option B									n/a

Glazing area (A): 99.5m² 21m² 112m² 75.4m² 188m² 16.5m² 253m² 8.55m²

Number of rows preferred in table below: **51** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS							SHADING		CALCULATED OUTCOMES OK (if inputs are valid)							
ID	Description (optional)	Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
		Option A facades	Option B facades	Height (m)	Width (m)	Area (m ²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S _a)	Cooling (S _c)	Area used (m ²)	Element share of % of allowance used
1	North 1	N		3.50	5.90		4.0	0.40				0.00	1.00	1.00	20.65	21% of 98%
2	North 2	N		4.10	1.20		4.0	0.40	1.000	4.100	0.24	0.00	0.92	0.78	4.92	4% of 98%
3	North 3	N		1.40	1.40		4.0	0.40	1.000	1.400	0.71	0.00	0.44	0.44	1.96	1% of 98%
4	North 4	N		3.50	6.00		4.0	0.40				0.00	1.00	1.00	21.00	22% of 98%
5	North 5	N		5.90	1.10		4.0	0.40				0.00	1.00	1.00	6.49	7% of 98%
6	North 6	N		1.60	2.00		4.0	0.40				0.00	1.00	1.00	3.20	3% of 98%
7	North 7	N		3.50	5.90		4.0	0.40				0.00	1.00	1.00	20.65	21% of 98%
8	North 8	N		3.50	5.90		4.0	0.40				0.00	1.00	1.00	20.65	21% of 98%
9																ROW SKIPPED (OK if intentional)
10	West 2	W		3.50	6.00		1.9	0.20	5.600	3.500	1.60	0.00	0.16	0.34	21.00	8% of 100%
11	West 3	W		3.50	6.00		1.9	0.20				0.00	1.00	1.00	21.00	8% of 100%
12	West 4	W		3.50	6.00		1.9	0.20	12.100	3.500	3.46	0.00	0.05	0.31	21.00	9% of 100%
13	West 5	W		3.50	6.00		1.9	0.20	12.100	3.500	3.46	0.00	0.05	0.31	21.00	9% of 100%
14	West 6	W		3.50	6.00		1.9	0.20	12.100	3.500	3.46	0.00	0.05	0.31	21.00	9% of 100%
15	West 7	W		6.10	5.90		1.9	0.20	3.300	3.500	0.94	-2.60	0.43	0.47	35.99	13% of 100%
16	West 8	W		3.50	5.80		1.9	0.20	7.000	3.500	2.00	0.00	0.05	0.31	20.30	8% of 100%
17	West 9	W		6.10	5.90		1.9	0.20	4.300	3.500	1.23	-2.60	0.29	0.40	35.99	13% of 100%
18	West 10	W		3.50	5.60		1.9	0.20	8.500	3.500	2.43	0.00	0.05	0.31	19.60	8% of 100%
19	West 11	W		6.10	5.90		1.9	0.20	6.800	3.500	1.94	-2.60	0.07	0.31	35.99	15% of 100%
20																ROW SKIPPED (OK if intentional)
21	South 1	S		3.50	5.90		2.7	0.45				0.00	1.00	1.00	20.65	8% of 97%
22	South 2	S		3.50	6.80		2.7	0.45				0.00	1.00	1.00	23.80	9% of 97%
23	South 3	S		5.90	5.90		2.7	0.45	9.500	3.500	2.71	-2.40	0.55	0.55	34.81	21% of 97%
24	South 4	S		3.50	5.10		2.7	0.45	7.300	3.500	2.09	0.00	0.55	0.55	17.85	11% of 97%
25	South 5	S		5.90	5.90		2.7	0.45	3.700	3.500	1.06	-2.40	0.69	0.63	34.81	18% of 97%
26	South 6	S		3.50	5.90		2.7	0.45	6.200	3.500	1.77	0.00	0.58	0.56	20.65	12% of 97%
27	South 7	S		5.90	6.00		2.7	0.45	6.500	3.500	1.86	-2.40	0.57	0.56	35.40	21% of 97%
28																ROW SKIPPED (OK if intentional)
29	East 1	E		1.50	2.50		3.4	0.34				0.00	1.00	1.00	3.75	3% of 99%
30	East 2	E		3.50	6.00		3.4	0.34				0.00	1.00	1.00	21.00	19% of 99%
31	East 3	E		4.10	1.20		3.4	0.34				0.00	1.00	1.00	4.92	4% of 99%
32	East 4	E		1.60	1.40		3.4	0.34				0.00	1.00	1.00	2.24	2% of 99%
33	East 5	E		3.50	6.10		3.4	0.34				0.00	1.00	1.00	21.35	19% of 99%
34	East 6	E		1.60	1.90		3.4	0.34				0.00	1.00	1.00	3.04	3% of 99%
35	East 7	E		6.00	1.10		3.4	0.34				0.00	1.00	1.00	6.60	6% of 99%
36	East 8	E		3.50	6.00		3.4	0.34				0.00	1.00	1.00	21.00	19% of 99%
37	East 9	E		1.60	1.40		3.4	0.34				0.00	1.00	1.00	2.24	2% of 99%
38	East 10	E		4.10	1.10		3.4	0.34				0.00	1.00	1.00	4.51	4% of 99%
39	East 11	E		3.50	6.00		3.4	0.34				0.00	1.00	1.00	21.00	19% of 99%
40																ROW SKIPPED (OK if intentional)
41	South East 1	SE		5.90	0.70		1.9	0.45				1.00	1.00	4.13	5% of 99%	
42	South East 2	SE		3.50	6.00		1.9	0.45				1.00	1.00	21.00	27% of 99%	
43	South East 3	SE		3.50	6.10		1.9	0.45				1.00	1.00	21.35	28% of 99%	
44	South East 4	SE		5.90	4.90		1.9	0.45	15.400	3.500	4.40	-2.40	0.37	0.39	28.91	40% of 99%
45																ROW SKIPPED (OK if intentional)
46	Northwest 1	NW		5.70	1.50		4.0	0.32				0.00	1.00	1.00	8.55	100% of 100%
47																ROW SKIPPED (OK if intentional)
48	Northeast 1	NE		3.50	6.00		2.0	0.80				0.00	1.00	1.00	21.00	100% of 59%
49																ROW SKIPPED (OK if intentional)
50	South west	SW		5.90	2.80		2.1	0.45				0.00	1.00	1.00	16.52	100% of 98%
51																

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if inputs are valid