



NCC SECTION J DTS REPORT

# Log Cabin Pub Penrith

LOTS 20-22 Memorial Avenue, Penrith NSW 2750

**PREPARED FOR**

FDC  
22-24 Junction Street  
Forest Lodge NSW 2037  
Tel: 02 8117 5000

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# NCC Section J DTS Report

## Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
26.03.2020	1	Issued for DA	B. Park	E. Chan

**Northrop Consulting Engineers Pty Ltd**

ACN 064 775 088 | ABN 81 094 433 100

Level 11, 345 George Street, Sydney NSW 2000

02 9241 4188 | [sydney@northrop.com.au](mailto:sydney@northrop.com.au) | [www.northrop.com.au](http://www.northrop.com.au)

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## Table of Contents

1. Summary.....	4
2. Report Limitations .....	5
3. DTS Assessment .....	6
3.1 Referenced Drawings.....	6
3.2 Building Description .....	6
3.3 J1 Building Fabric.....	7
Appendix A – Glazing Calculator(s) .....	8
Appendix B – Building Thermal Boundary Markup .....	10
Ground Floor .....	10
First Floor .....	11
Appendix C – Ground Floor Area and Perimeter Markup.....	12

# 1. Summary

Northrop Consulting Engineers have been engaged to conduct a Deemed-to-Satisfy (DTS) assessment of the building fabric in accordance with Section J of the National Construction Code (NCC) 2019. This summary report provides minimum compliance requirements for the building fabric as outlined in Part J1 of the code.

The table below outlines compliance requirements for J1.0 to J1.6:

**Table 1: Insulation and Glazing System requirements for the building fabric**

Building Fabrics	Required Minimum Thermal Performance
Roof and Ceiling	R3.2; Solar Absorptance (SA) < 0.45
External Walls	R1.5
Partition Walls to Non-Conditioned Space	R1.5
Floors (Slab-on-ground, exposed & semi-exposed)	R2.0
All External Windows	U-value: 5.9 SHGC: 0.48
All Internal Windows	U-value: 5.9 SHGC: 0.77

Should the requirements listed above be deemed unfeasible, it is recommended that the project team should proceed with a JV3 performance-based solution. This approach is more flexible as it offers a holistic assessment of the building performance, rather than individual components.



## 2. Report Limitations

Due care and skill have been exercised in the preparation of this report.

This report is intended as a guide to illustrate the potential NCC section J compliance methods to be considered in the development. It should be read in conjunction with the other design documentation and specific applications may vary during the development of the project.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Northrop for detailed advice, which will take into account that party's particular requirements.

### 3. DTS Assessment

#### 3.1 Referenced Drawings

Drawing No.	Rev	Date	Title
DA010	8	18.03.2020	Site Plan
DA050	5	16.03.2020	Roof Plan
DA100	7	18.03.2020	Proposed Ground Floor Plan
DA101	7	18.03.2020	Proposed First Floor Plan
DA201	2	16.03.2020	Elevations 01
DA202	2	16.03.2020	Elevations 02
DA301	3	16.03.2020	Sections

#### 3.2 Building Description

The Log Cabin Pub Penrith is classified as Class 6 and 9b – retail and assembly building as stipulated in Blackett Maguire and Goldsmith’s preliminary BCA assessment of the proposed development. For the purposes of Section J – Part J1 Class 6 and 9b was considered for the assessment of the building fabric encapsulating conditioned spaces throughout the development. This proposed development is located in LOTS 20-22 Memorial Avenue, Penrith NSW 2750 which belongs to climate zone 6 as shown in Figure 1 below.

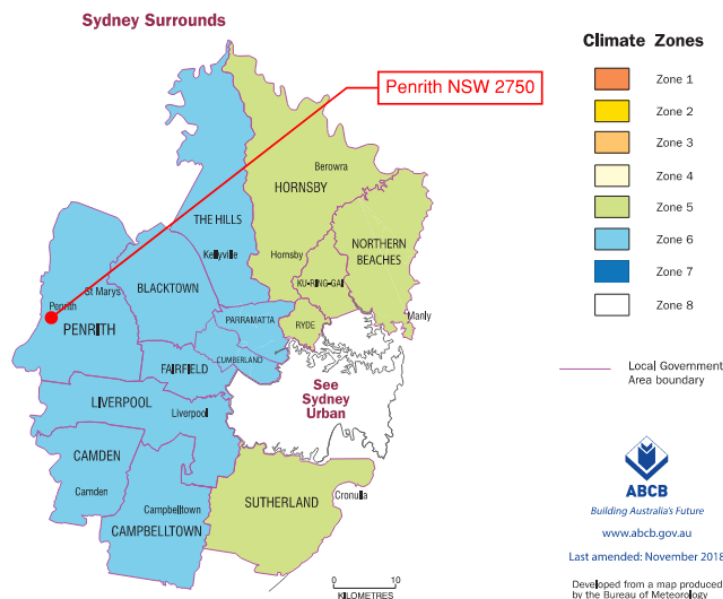


Figure 1 - Climate Zone Map of Sydney Surrounds

### 3.3 J1 Building Fabric

Building fabric thermal insulation requirements apply to the building fabric enclosing habitable and conditioned spaces forming part of the thermal boundary of the site (building envelope). This is demonstrated in the thermal boundary markup attached in Appendix B of this report.

Below entails the thermal performance requirements of each components of the building fabric applicable to Log Cabin Pub Penrith development, which are assessed against Parts J1.3 to J1.6.

#### J1.3 Roof and Ceiling Construction

Roof and ceiling construction must achieve a total system R-Value of R3.2 with solar absorptance value of no more than 0.45.

#### J1.5 Walls and Glazing

The total system U-Value the wall-glazing construction\* of Log Cabin Pub Penrith must not be greater than U2.0 as per J1.5 clause (a)(i).

The table below outlines the thermal performance requirements of the external walls, partition walls and the glazing system required to achieve the specified maximum of U2.0.

**Table 1 - Required Code Compliant Thermal Performance of the Wall-Glazing System**

Wall-Glazing Component	Required Thermal Performance
External Wall	R1.5 (See Note Below)
Partition Wall	R1.5 (See Note Below)
External Glazing	U-Value: 5.9 SHGC: 0.48
Internal Glazing	U-Value: 5.9 SHGC: 0.77

**Note:** The total system R-Value of the external and partition walls reflect thermal performances inclusive of the thermal bridging effect caused by building support structures. As such the build up must achieve the stipulated R-Values with the effects of thermal bridging taken into account.

#### J1.6 Floors

All ground floors\* and floors to non-conditioned space such as floors exposed to the outside air and semi-exposed floors must achieve a total system R-Value of 2.0 (See Appendix B for Thermal Boundary Markup).

\*The required total system R-Value of the slab-on-ground is met through the inclusion of the layer of soil in contact with the ground floor. See Appendix C for the R-Value calculation of the soil layer.

# Appendix A – Glazing Calculator

NCC 2019 Wall-Glazing Calculator v3.0										Building Check-Values						
Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019										Area (m <sup>2</sup> )						
Building name and description			Classification		Climate Zone		Walls		Glazing		Sub-total	Display	Glazing Percentage (non display)			
Log Cabin Pub Penrith			Other		6		76.5		43.2		119.7	0.0	36%			
Calculated Area-Weighted U-Value			2.00		Calculated Representative Air-Conditioning Energy Value		207.1		238.3		61.7	299.5	0.0	20%		
Allowable Area-Weighted U-Value			2.00		Allowable Representative Air-Conditioning Energy Value		208.6		214.7		95.3	310.0	0.0	31%		
Building total U-Value allowance met			100%		Building total SHGC allowance met		100%		169.4		163.3	332.7	0.0	49%		
Check Values			Wall Element Requirements		Display Glazing Element Requirements		-		421.8		4.4	426.4	0.0	1%		
Visible			Met		-		-		1120.8		367.4	1488.3	0.0	25%		
Use of this calculator does not guarantee compliance with the NCC. The disclaimer and a version update check are available at the bottom of the page										Element Limits						
										Wall U-Value*		1.00				
										Display Glazing U-Value		5.8				
										Display Glazing Solar Admittance		0.81				
										*The wall u-value limit will update based on building class and glazing %						
Element Description			U-Value			SHGC and Shading				Element Check-Values						
ID	Description (optional)	Element Type	Facing Sector	Area (m <sup>2</sup> )	U-Value	U-Value Element share of allowance used	SHGC	Glazing Height (m)	Shading Height (m)	Shading Projection (m)	SHGC Element share of allowance used	Rounded G/H	Rounded P/H	Shading Factor	Solar Admittance	AC Energy Value
1	North	Wall	North	76.55	0.71	2% of building total					Not counted	0	0	1	0	0
2	East	Wall	East	238.27	0.71	6% of building total					Not counted	0	0	1	0	0
3	South	Wall	South	214.69	0.71	5% of building total					Not counted	0	0	1	0	0
4	West	Wall	West	169.44	0.71	4% of building total					Not counted	0	0	1	0	0
5	Partition Walls	Wall	Internal	421.81	0.71	10% of building total					Not counted	0	0	1	0	0
6						Not counted					Not counted	0	0	1	0	0
7	G_N1	Glazing	North	12.24	5.90	2% of building total	0.48	2.6	1.7	1.87	6% of building total	-0.6	1.1	1	0.48	12.455424
8	G_N2	Glazing	North	6.38	5.90	1% of building total	0.48	2.9	2.9	0.3	3% of building total	0	0.1	0.9	0.432	5.8430592
9	FF_N1	Glazing	North	19.17	5.90	4% of building total	0.48				9% of building total	0	0	1	0.48	19.507392
10	FF_N2	Glazing	North	5.40	5.90	1% of building total	0.48	2.7	4	8.5	2% of building total	0.4	2.1	0.68	0.3264	3.7366272
11						Not counted					Not counted	0	0	1	0	0
12	G_E1	Glazing	East	4.68	5.90	1% of building total	0.48	1.7	1.7	0.5	1% of building total	0	0.2	0.8	0.384	2.908224
13	G_E2	Glazing	East	11.52	5.90	2% of building total	0.48	3.2	3.2	2.75	2% of building total	0	0.8	0.41	0.1968	3.67276032
14	G_E3 & E4	Glazing	East	8.41	5.90	2% of building total	0.48	2.9	2.9	0.3	3% of building total	0	0.1	0.9	0.432	5.8856564
15	FF_E1	Glazing	East	8.41	5.90	2% of building total	0.48	2.85	4	0.4	3% of building total	0.3	0.1	1	0.48	6.537672
16	FF_E2 & E3	Glazing	East	1.35	5.90	0% of building total	0.48	2.25	2.25	0.2	1% of building total	0	0	1	0.48	1.04976
17	FF_E4	Glazing	East	26.85	5.90	5% of building total	0.48				10% of building total	0	0	1	0.48	20.874672
18						Not counted					Not counted	0	0	1	0	0
19	G_S1 & S2	Glazing	South	14.08	5.90	3% of building total	0.48				3% of building total	0	0	1	0.48	6.7584
20	G_S3 & S4	Glazing	South	2.41	5.90	0% of building total	0.48	1.85	1.85	0.3	1% of building total	0	0.1	0.93	0.4664	1.073592
21	G_S5 & S6	Glazing	South	5.70	5.90	1% of building total	0.48	2.85	2.85	0.3	1% of building total	0	0.1	0.93	0.4664	2.54448
22	G_S7 & S8	Glazing	South	17.10	5.90	3% of building total	0.48	2.85	2.85	0.55	4% of building total	0	0.1	0.93	0.4664	7.63344
23	G_S9 & S10	Glazing	South	12.48	5.90	2% of building total	0.48				3% of building total	0	0	1	0.48	5.9904
24	FF_S1 & S2	Glazing	South	15.40	5.90	3% of building total	0.48	3.5	3.7	1.07	3% of building total	0.1	0.2	0.93	0.4664	6.87456
25	FF_S3 & S4	Glazing	South	16.72	5.90	3% of building total	0.48	3.8	4	1.07	4% of building total	0.1	0.2	0.93	0.4664	7.463808
26	FF_S5 & S6	Glazing	South	11.40	5.90	2% of building total	0.48	2.85	4	1.07	3% of building total	0.3	0.2	0.98	0.4704	5.36256
27						Not counted					Not counted	0	0	1	0	0
28	G_W1	Glazing	West	19.98	5.90	4% of building total	0.48	2.7	2.7	1.8	4% of building total	0	0.6	0.51	0.2448	8.16814368
29	G_W2 & W3	Glazing	West	25.65	5.90	5% of building total	0.48	2.7	2.7	4.2	3% of building total	0	1.5	0.35	0.168	7.196364
30	G_W4 & W5	Glazing	West	29.70	5.90	6% of building total	0.48	2.7	2.7	5.5	4% of building total	0	2	0.35	0.168	8.332632
31	G_W6	Glazing	West	0.74	5.90	0% of building total	0.48				0% of building total	0	0	1	0.48	0.593184
32	FF_W1	Glazing	West	20.93	5.90	4% of building total	0.48				8% of building total	0	0	1	0.48	16.77348
33	FF_W2	Glazing	West	21.74	5.90	4% of building total	0.48	2.7	4	8.5	6% of building total	0.4	2.1	0.68	0.3264	11.8474877
34	FF_W3	Glazing	West	14.85	5.90	3% of building total	0.48	2.7	4	1.15	6% of building total	0.4	0.2	0.99	0.4752	11.7847224
35	FF_W4 & W5	Glazing	West	29.70	5.90	6% of building total	0.48	2.7	4	5.7	3% of building total	0.4	1.4	0.68	0.3264	16.1891136
36						Not counted					Not counted	0	0	1	0	0
37	Internal Glazing	Glazing	Internal	4.62	5.90	1% of building total	0.77				Not counted	0	0	1	0.77	0
38						Not counted					Not counted	0	0	1	0	0
39						Not counted					Not counted	0	0	1	0	0
40						Not counted					Not counted	0	0	1	0	0
41						Not counted					Not counted	0	0	1	0	0

42			Not counted	Not counted	0	0	1	0	0
43			Not counted	Not counted	0	0	1	0	0
44			Not counted	Not counted	0	0	1	0	0
45			Not counted	Not counted	0	0	1	0	0
46			Not counted	Not counted	0	0	1	0	0
47			Not counted	Not counted	0	0	1	0	0
48			Not counted	Not counted	0	0	1	0	0
49			Not counted	Not counted	0	0	1	0	0
50			Not counted	Not counted	0	0	1	0	0

**Disclaimer:**

This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to 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 this calculator is entirely at your own risk and the author accepts no liability of any kind.

Made by Alex Zeller

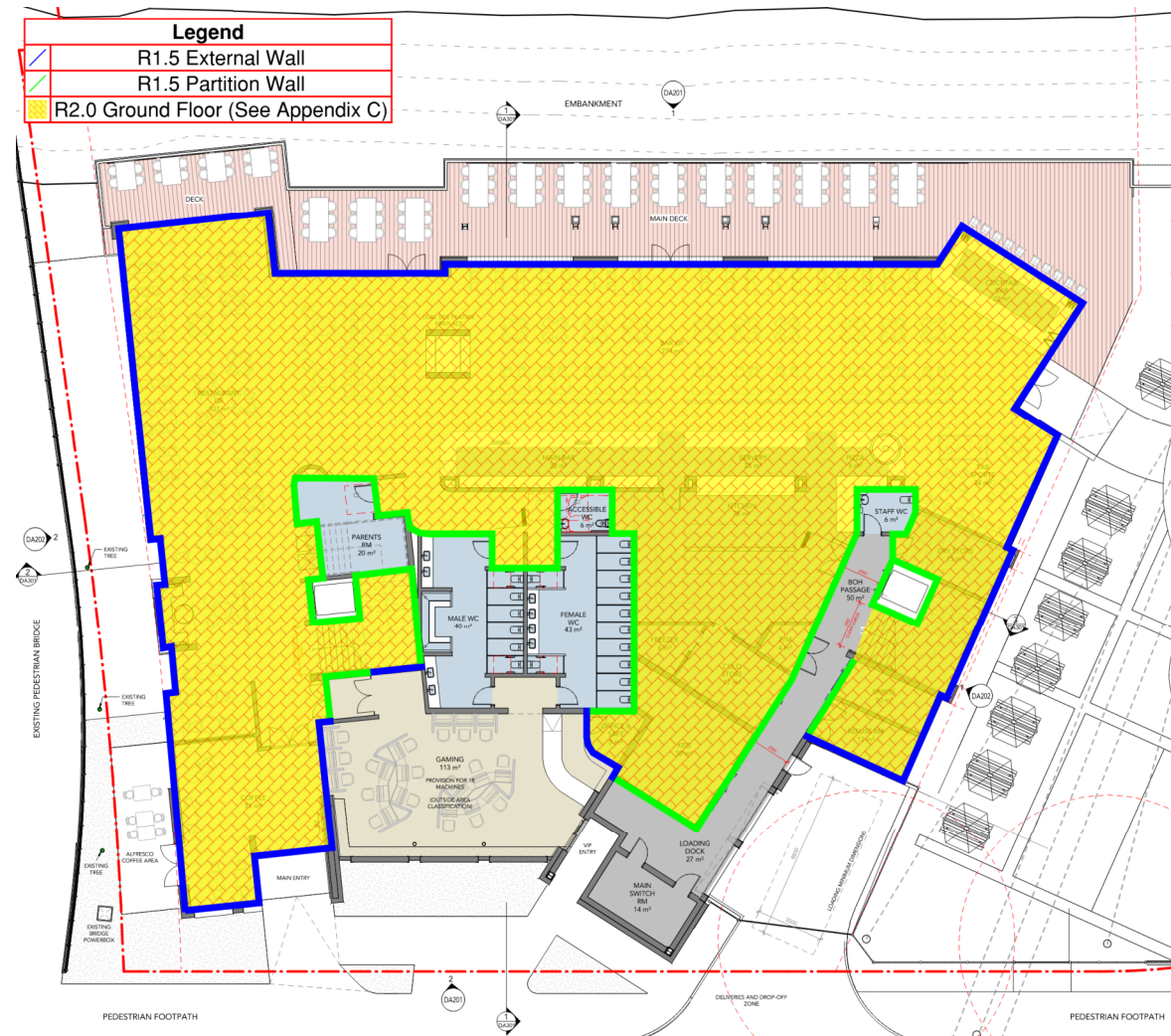
[alex.zeller@northrop.com](mailto:alex.zeller@northrop.com) with any suggestions for improvement

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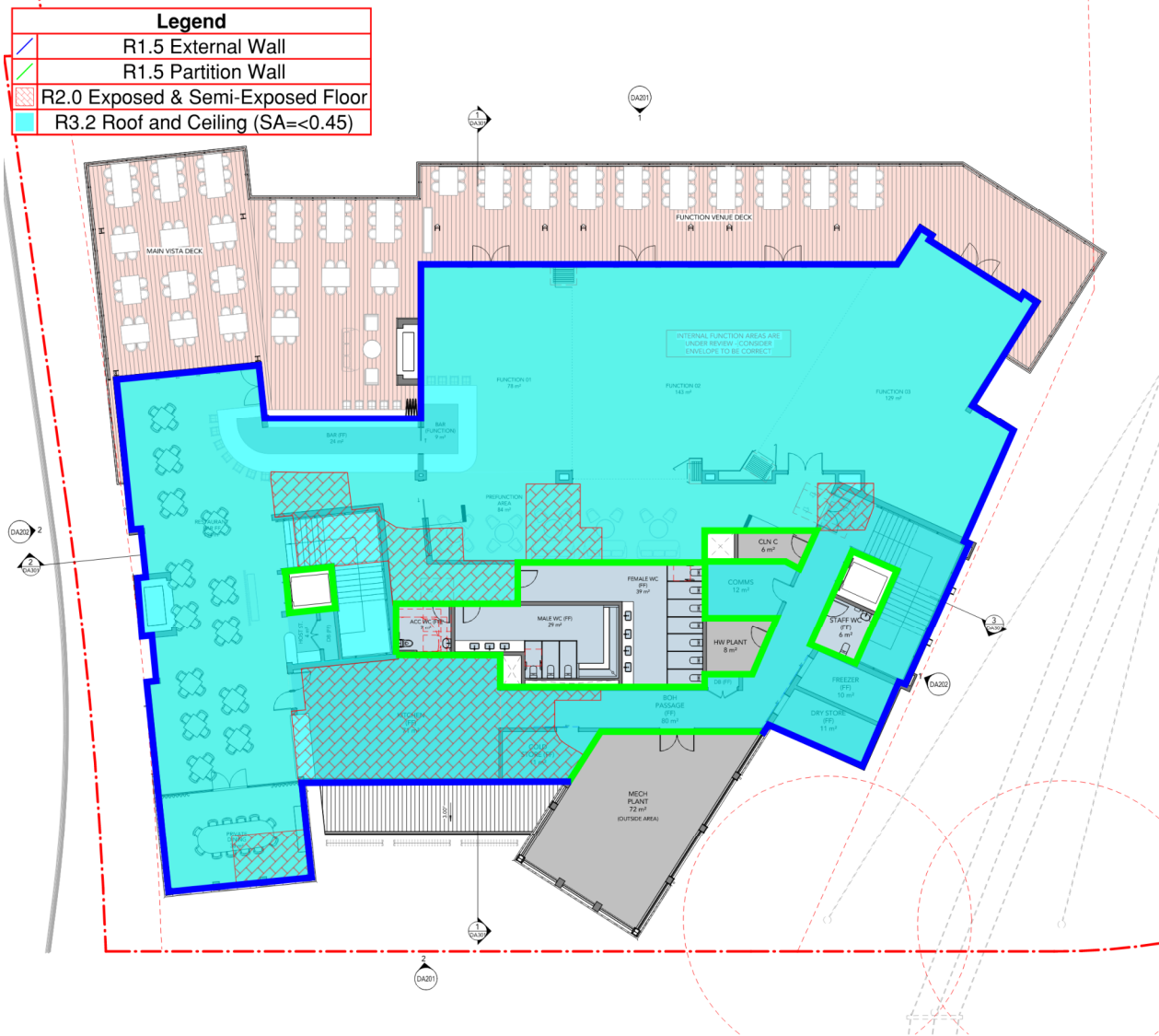


# Appendix B – Building Thermal Boundary Markup

## Ground Floor



First Floor



## Appendix C – Ground Floor Soil R-Value Calculation

Table 2 - Calculation of the R-Value of the soil layer in contact with the ground floor in accordance with Specification J1.6a Sub-floor thermal performance

Ground Floor R-Value Calculation	Floor Perimeter
Ground Floor Area	988.5 m <sup>2</sup>
Ground Floor Perimeter	272.47 m
Floor Area to Floor Perimeter Ratio (FA/FP)	3.6
External Wall Thickness (mm)	300 mm
Equivalent R-Value of the Soil in Contact with Ground	R1.91
Ground Floor Slab (Concrete floor assumed)	R0.09
Indoor Air Film	R0.11
<b>Total System R-Value of Ground Floor</b>	<b>R2.01</b>