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NCC SECTION J

Energy Efficiency Report

Version: 1 (Final)
Date: 23 Sep 2022
Prepared: Bruce Carr
Approved:

Bruce Carr

(Signature required)

Project: Mixed use co-living development + Commercial Space
175-177 Cleveland St & 6-8 Woodburn St
REDFERN NSW 2016

Job No. 1380

CONTENTS

Report Revision History:

Date	Issue	Status	Prepared By
15 August 2022	Draft 1 Version 1	Issued to client	Bruce Carr
23 August 2022	Draft 2 Version 1	Issued to client	Bruce Carr
23 September 2022	Version 1 (FINAL)	Issued to client	Bruce Carr

1 INTRODUCTION

This report assesses the proposed development for its compliance with Section J energy efficiency provisions of the National Construction Code (NCC) 2019 Volume 1 (Amendment 1). These provisions will apply or all new (and altered) construction work.

This report will detail the measures required to achieve compliance and will be required as part of the submission to the council or the consent authority for a SSD (State Significant Development).

2 APPLICATION

Section J Deemed-to-Satisfy (DTS) provisions of the NCC 2019 (Volume One – Amndt 1) have been applied for the assessment of this project and this report will outline what measures are required for this building to comply.

The DTS provisions consist of 5 Parts.

This report is concerned with the following parts:

- Part J1: Building Fabric
- Part J3: Building Sealing
- Part J6: Artificial Lighting and Power
- Part J7: Heated Water Supply and Swimming Pool and Spa Pool Plant
- Part J8: Facilities for Energy Monitoring

The following section will not form part of this report, as they will require the expertise of specialist service consultants:

- Part J5: Air-conditioning and Ventilations Systems

Note:

Part J4 has been removed from the NCC since 2010

Part J2 has been removed from the NCC since 2019 which existed in the NCC 2016. Glazing provisions are now included in Part J1.

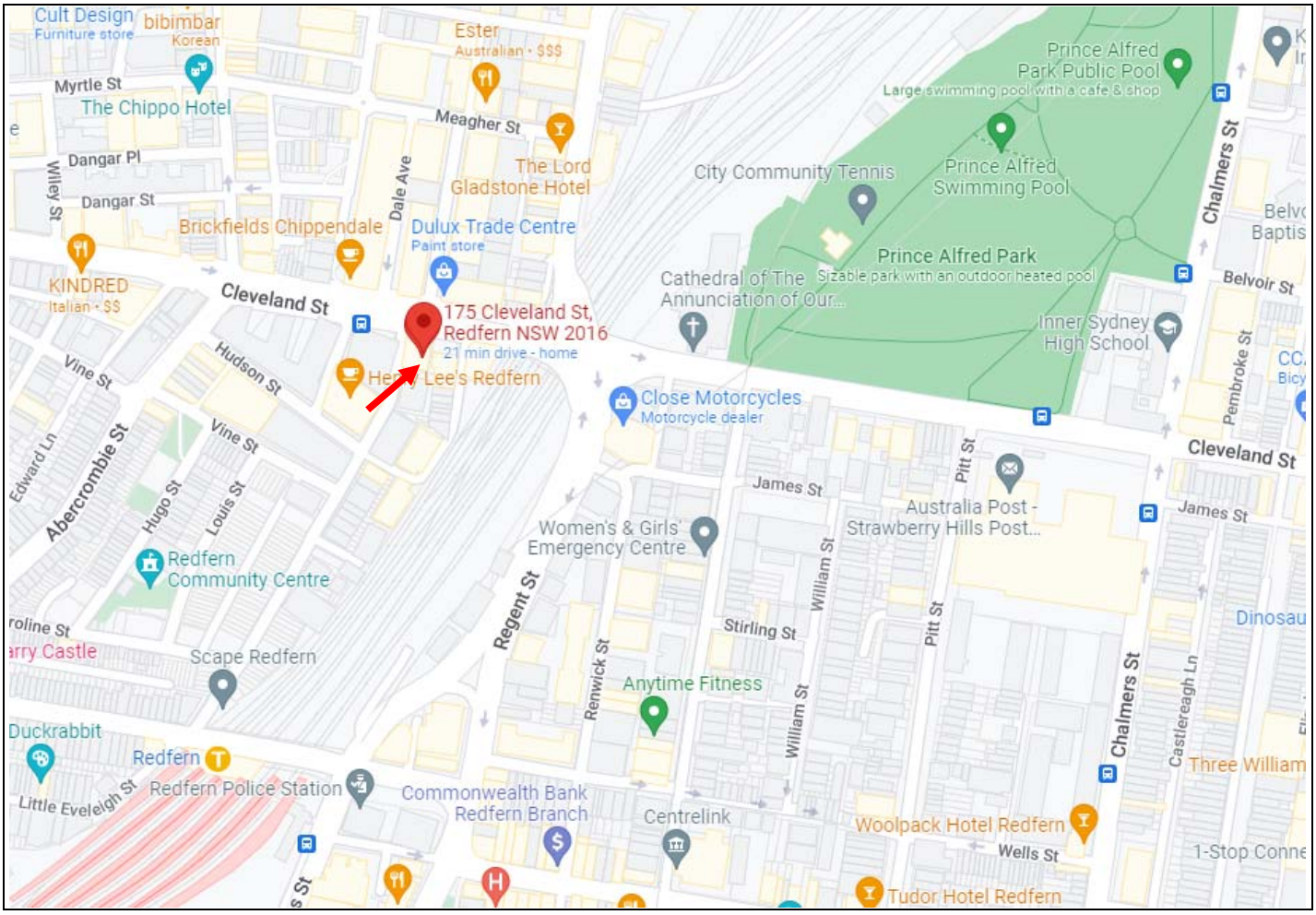
3 BUILDING DETAILS

The title, address and location details for the project are as follows:

Project: Mixed use co-living development + Commercial Space

Address: 175-177 Cleveland St & 6-8 Woodburn St REDFERN NSW 2016

Authority: Council of the City of Sydney



Climate zone: **5** (*Warm Temperate*)

- This climate zone is characterised by low diurnal temperatures near the coast to high diurnal ranges inland.
- Four distinct seasons: Summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort
- Mild winters with low humidity, hot to very hot summers with moderate humidity

Description:

A new 7 storey mixed-use development is planned. This will consist of:

- 216 Sole occupancy units (SOUs) (Class 3) - levels 1 to 5
- 2 x Class 6 retail units on the ground floor
- 4 x Class 5 units (ground floor)
- 'Multi-purpose' common room (Class 3)
- 1 x Class 5 unit (level 1)
- Single level basement car park (Class 7a)
- Common garden, laundry and communal area at the ground level
- Common lounge and kitchen on level 6

All SOUs and commercial units will be conditioned. There will be glazing on all facades.

The following construction materials are being proposed in the building design in accordance to the plans and design documentation referenced below:

- External Walls: Cavity brick lined internally with plasterboard
- Roof and Ceiling: Concrete lined internally with plasterboard
- Internal Walls: Plasterboard on studs
- Floors: Suspended concrete
- Windows: Single glazed
- Skylights: N/A
- Lighting: LED or compact fluorescent

Building classes:

Class 3: "*a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons including a boarding house, guest house…"*

Class 5: "*an office building used for professional or commercial purposes, excluding buildings of a Class 6, 7, 8 or 9"*

Class 6: *"A shop or other building for the sale of goods by retail or the supply of services direct to the public eg. Café, restaurant, kiosk, hairdressers, showroom or service station".*

Class 7a: *"A building which is a carpark".*

References:

a) Plans:

Mark Shapiro Architects. Received by STS on 9th Sep 2022
Project Number: 21022 (Revision P11)
Date: 8/09/2022
Drawing Numbers: SSD0001, SSD1000-1001, SSD1200, SSD2000–2009, SSD2011-2016, SSD2300, SSD2302–2304, SSD2400–2405, SSD9000, SSD9001

b) National Construction Code 2019 Vol. 1 (Amendment 1)

4 SUMMARY AND CERTIFIER CHECK:

Below is a summary of the energy efficiency actions required to meet the requirements of the NCC. Details are available in each relevant section.

Element	Insulation Requirements	Action	Certifier Check
Ceiling/Roof	Insulation is required in the concrete ceiling/roof of the following rooms: • Level 5: All rooms • Level 4: Rooms 4.45-4.48, 4.01-4.10, 4.34-4.44 4.25-4.33	Add minimum insulation of **R3.05** (or **3.27** if the insulation fills the airspace)	
External Walls	Insulation is required in the external cavity brick walls: Commercial & Retail: Sole Occupancy Rooms:	 Add min. insulation of **R1.5** Add min. insulation of **R1.0**	
Walls other than External: (dividing conditioned & non-conditioned space)	Insulation is required in the cavity brick party walls between the conditioned rooms and the fire stairs and lifts.	Add minimum insulation of **R1.0**	
Floor	Insulation is required in the following concrete floors: i) Ground floor commercial & retail units. These are above the basement carpark (which is unenclosed and mechanically ventilated by more than 1.5 air changes per hour) ii) Level 1 Sole Occupancy Rooms. The following rooms contain a suspended concrete slab above 'open air': 1.05, 1.20, 1.21, 1.26, 1.27, 1.28 iii) Commercial/Retail floor slab on ground. This is located on the southern side and a portion of the floor is slab on ground	 Add minimum insulation of **R1.66** Add minimum insulation of **R1.66** Add minimum insulation of **R0.54**	
External Glazing	**Class 3 Sole Occupancy Units + Multi-Purpose Rm:** Single glazed clear: U-Value=5.8/SHGC=0.70 **Class 5 & 6 Commercial Units:** Single glazed low-e: U-Value=4.7/SHGC=0.43	Ensure that a certificate of compliance is supplied with the windows.	

J3: Building Sealing

Sealing of new doors and windows is required. Refer to the relevant sections below for details.

J5: Air Conditioning and Ventilation Systems:

Refer to the design and installation requirements of the Mechanical Engineer or trade contractor's specifications.

J6: Artificial Lighting and Power:

See Section 10 further requirements on interior lighting and control.

J7: Heated Water Supply & Swimming Pool & Spa Pool Plant:

Hot water system to be installed in accordance with Part B2 of NCC Volume 3 – Plumbing Code of Australia.

J8: Facilities for Energy monitoring:

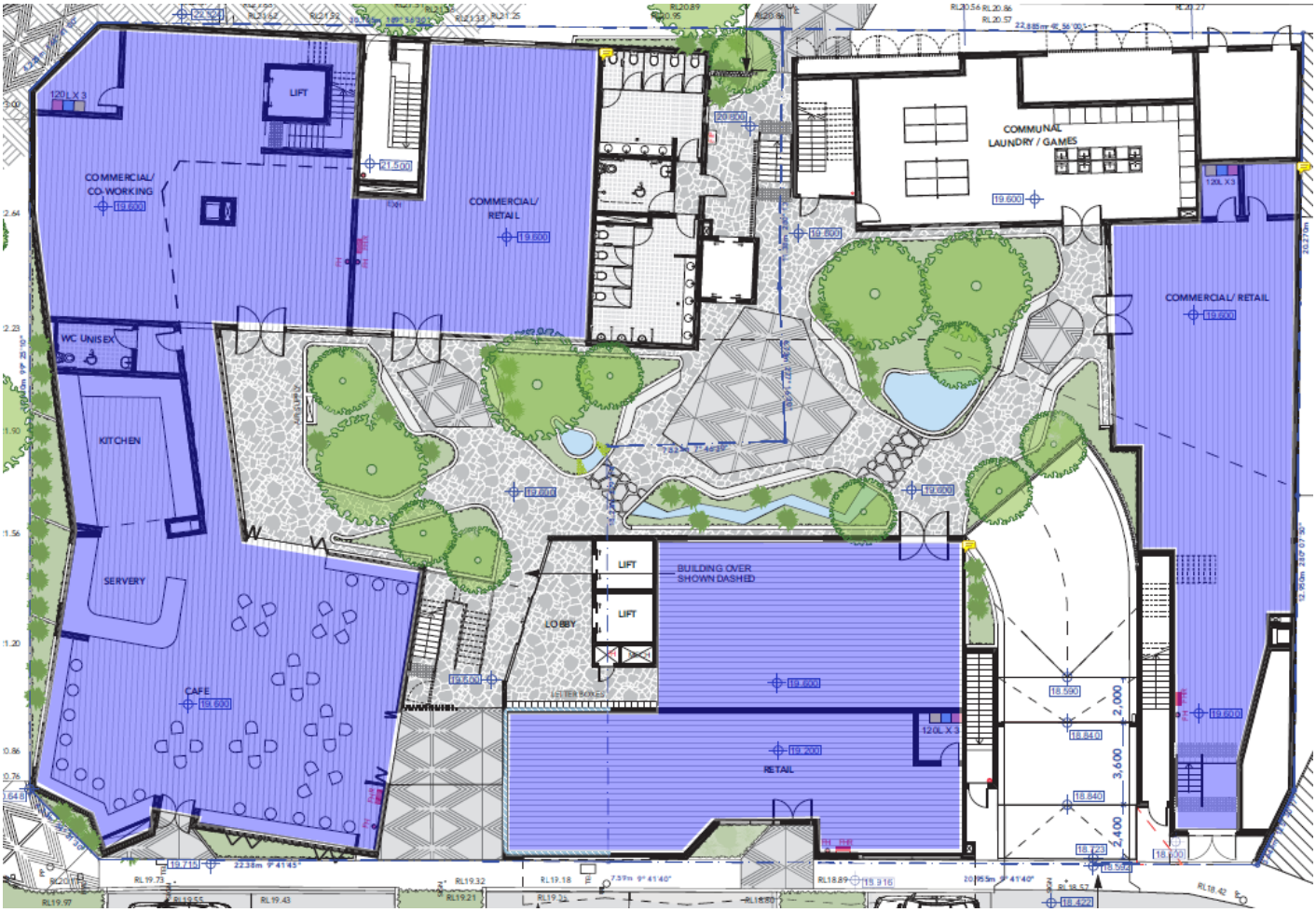
A building or sole occupancy unit with a floor area of more than 500 m^2 must have an energy metre configured to record the time-of-use consumption of gas and electricity. A building with a floor area of more than 2,500 m2 must have energy meters configured to enable individual time-of-use energy consumption data recording.

Figure 5.1 (Floor Plans):

Site Plan:

True
North

Ground:



Level 1:

Level 2:

Level 3:

Level 4:

Level 5:

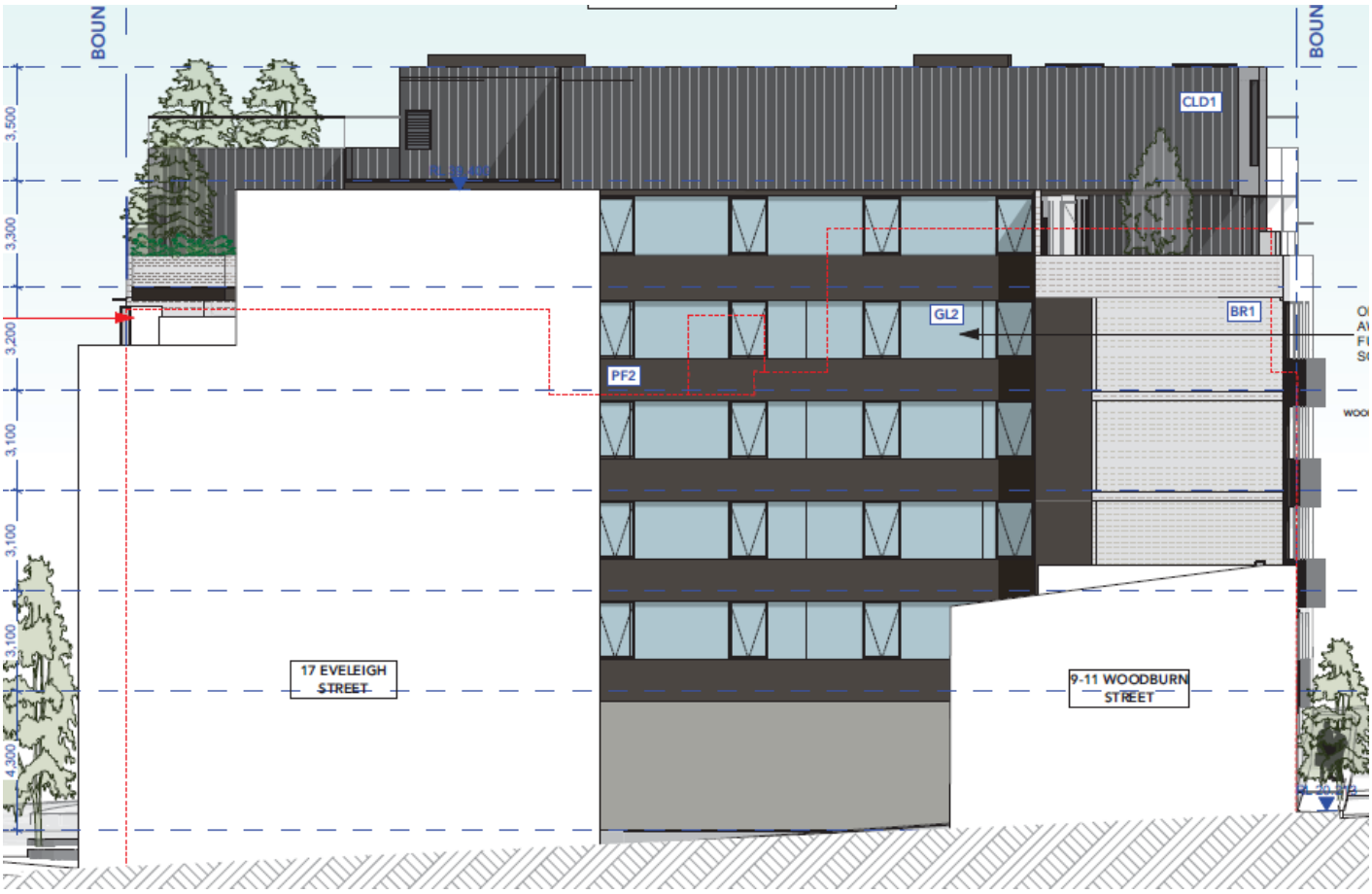
Legend: Conditioned Areas

Figure 5.2 (Elevations):

North:

West:

South:


BOUN
BOUN
CLD1
GL2
BR1
PF2
17 EVELEIGH STREET
9-11 WOODBURN STREET

East:


CLD1
CLD1
BR1
BAL1
OPS
OPS

Following is the detail of each part of Section J of the NCC:

Part J1 is applicable only to NEW or ALTERED building works forming part of the external envelope around conditioned areas and the envelope separating the conditioned space from non-conditioned space.

5 PART J1: BUILDING FABRIC

The NCC Part J1 is concerned with the following 4 provisions:

- J1.3 – Roof and ceiling construction
- J1.4 – Roof lights
- J1.5 – Walls
- J1.6 – Floors

The provisions in Part J1 apply to the conditioned spaces in the proposed development. The NCC uses the term 'envelope' to demarcate the conditioned space from non-conditioned space and the exterior of the building. A space is deemed to be conditioned if the air contained will be actively heated or cooled by an air-conditioning service (see definitions at the end of this report).

The diagram above shows the building envelope (Figure 5.1). This is the boundary between the conditioned and non-conditioned zones (or outdoor space).

5.1 J1.2: THERMAL CONSTRUCTION GENERAL

All insulation that is part of the 'envelope' will be installed in accordance with Clause J1.2, the manufacturer's Specifications and AS/NZS 4859.1

5.2 J1.3: ROOF AND CEILING CONSTRUCTION

5.2.1 Roof and ceiling insulation requirement

As per Part J1.3(a), a building's roof & ceiling in climate zone 5 that is part of the 'envelope' is required to achieve a total R-Value of **R3.7** in a downwards direction.

In climate zone 5, the solar absorptance of the upper surface of a roof must not be more than **0.45**.

The sole occupancy units contain a concrete ceiling/roof to 5 degrees with a suspended plasterboard ceiling under. Those SOUs with a ceiling below a concrete walking surface above are required to be insulated. The following SOUs contain all or a portion of a ceiling below a concrete walking surface:

- Level 5: All rooms
- Level 4: Rooms:
    - 4.45-4.48
    - 4.01-4.10
    - 4.34-4.44
    - 4.25-4.33

This ceiling and roof achieve the following R-Values:

	Roof Type: Solid concrete roof to 5°, suspended plaster ceiling	***R-Value (heat flow direction: downwards)***
1	Outdoor air film (7m/s)	0.04
2	Waterproof membrane, rubber synthetic (4mm, 961 kg/m^3)	0.03
3	*Solid Concrete (200mm, 2400 kg/m^3)	0.14
4	Ceiling Air Space (100mm to 300mm, non-reflective)	0.22
5	Plasterboard (10mm)	0.06
6	Indoor air film (still air)	0.16
	Total *R-Value*	**0.65#**

NB:

*This is calculated from table J1.5(d) NCC 2016 where 100mm of solid concrete provides an R-Value of 0.07. For 200mm solid concrete, this equates to an R-Value of 0.14.

#This R-Value calculation has assumed there will be no thermal bridging between the concrete and plasterboard ceiling as there will be no studs.

Table 5.2a:

R-Value for Roof & Ceiling Construction	Insulation R-Value Requirements	Action to Achieve Compliance
0.65	**3.7** required: Additional insulation needed is: 3.7 – 0.65 = **3.05**	Add minimum insulation of **R3.05** to the ceiling below the concrete tiled walking surface above
Assuming the insulation fills the air space between the concrete and plasterboard (air space = 0.22). 0.65 - 0.22 = 0.43	**3.7** Required. Additional R-Value is 3.7 - 0.43 = **3.27**	Addition minimum insulation of **R3.27** to the ceiling below the concrete tiled walking surface above

5.3 J1.4: ROOF LIGHTS

5.1.1 Roof light performance requirement

Not applicable

5.4 J1.5: WALLS AND GLAZING

5.4.1 Requirement

An external wall that is part of the envelope must achieve the minimum total R-Value or, satisfy one of the options as specified in Table J1.5a.

The total system U-Value of wall-glazing construction must not be greater than:

- 2.0 for a Class 5 (commercial) building in climate zone 5
- 2.0 for a Class 6 (retail) building in climate zone 5
- 2.0 for a Class 3 (room) building in climate zone 5

The walls surrounding this 'conditioned' space along with the walls separating conditioned and non-conditioned space (lifts, fire stairs, common ground floor WCs and laundry) are the building 'envelope'. These walls therefore need to comply with the NCC.

The following option in table 5.4a below will achieve compliance:

Table 5.4a:

External Wall Insulation:

The following option in table 5.4a below will achieve compliance:

Description	**Required Total Wall Construction R-Value**	**Typical Construction Specifications**	**Required Added Insulation**
Class 5 Offices	North, East & West: R1.0 South: R1.4	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.5**
Class 6 Retail	North, East & West: R1.0 South: R1.4	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.5**
Class 3 Sole Occupancy Rooms	All orientations: R1.0	*Cavity Brick, plasterboard lined internally	Add minimum insulation of **R1.0**

NB: * This R-Value calculation has assumed there will be no thermal bridging due to absence of frames.

Table 5.4b: Glazing Requirements:

		*Minimum Requirements (incl. frame)		Additional Shading Devices Required	
Level/Description	**Orientation**	**U-Value (≤)**	**SHGC (±10%)**		**#Typical Glazing**
Class 3 SOUs	All	5.8	0.70	None	Single glazed clear
Class 5 Office Space	All	4.7	0.43	None	Single glazed low-e
Class 6 Retail & Cafe	All	4.7	0.43	None	Single glazed low-e

See **Appendix 1** at the end of this report for a façade report summary generated by the ABCB Façade Calculator for confirmation of compliance of the U-Value and solar admittance for each façade. Compliance was met as follows:

- Class 3: Method 2
- Class 5: Method 2
- Class 6: Method 2

The performance figures & specifications are indicative only and may vary depending on the chosen manufacturer & supplier.

***The glazing manufacturer must provide performance data to show that the selected glazing complies with the values in the table through the WERS certification.**

NB: The following links to the WERS website provides information on the window manufacturers which are certified under WERS and the energy rating of each of their glazing products: http://www.wers.net/

5.5 J1.6: FLOORS

5.5.1 Floor insulation requirement

A floor that is part of the 'envelope' must achieve the minimum Total R-Value in a downwards and upwards direction or satisfy one of the options as specified in Table J1.6.

The following floors are required to comply:

iv) Ground floor commercial units. These are above the basement carpark (which is unenclosed and mechanically ventilated by more than 1.5 air changes per hour) &

v) Level 1 Sole Occupancy Rooms & Multi-Purpose Room. The following rooms contain a suspended concrete slab above 'open air': 1.05, 1.20, 1.21, 1.26, 1.27, 1.28

vi) 'Commercial/Retail' unit on the ground floor. This is located on the southern and contains a concrete slab on ground

As per table J1.6, a floor must achieve a minimum R-Value of R2.0 in the downwards direction in climate zone 5.

i) & ii) Suspended concrete slab for ground floor commercial units & level 1 SOUs:

	Floor type: Concrete suspended floor	***R-Value***
1	Indoor air film	0.16
2	Concrete Floor (200mm)	0.14
3	Outdoor Air	0.04
	Total *R-Value*	**0.34**

The following options in table 5.3a below will achieve compliance:

Table 5.5a:

Insulation Provided by Construction	**Required R-Value**	**Required Action to Achieve Compliance**
0.34	**R2.0** Required. Additional R-Value is 2.0 - 0.34 = **1.66**	Addition minimum insulation of **R1.66**.

iii) Slab on ground for Retail unit:

	Floor type: Concrete slab on ground	***R-Value***
1	Indoor air film	0.16
2	Concrete Floor (200mm)	0.14
3	R-Value of soil	1.16*
	Total *R-Value*	**1.46**

NB: * Calculated from table 2a in Specification J1.6 based on the ratio of the floor area to floor perimeter.

The following options in table 5.3a below will achieve compliance:

Table 5.5a:

Insulation Provided by Construction	**Required R-Value**	**Required Action to Achieve Compliance**
1.46	**R2.0** Required. Additional R-Value is 2.0 – 1.46 = **0.54**	Addition minimum insulation of **R0.54**.

6 PART J2: GLAZING

This part is blank as it was removed by the NCC in the 2019 version and integrated into Part J1 (Building Fabric).

7 PART J3: BUILDING SEALING

7.1 J3.2: CHIMNEYS AND FLUES

Not applicable

7.2 J3.3: ROOF LIGHTS

A roof light must be sealed, or capable of being sealed, when serving a conditioned space or a habitable room in climate zones 4, 5, 6, 7 or 8. The seal must be constructed with:

- An imperforate ceiling diffuser or the like installed at the ceiling or internal lining level, or
- A weatherproof seal, or
- A shutter system readily operated either manually, mechanically or electronically by the occupant

7.3 J3.4: WINDOWS AND DOORS

A seal to restrict air infiltration must be fitted to each edge of a new door, openable window or the like forming part of the envelope of a conditioned space in climate zones 4, 5, 6, 7 or 8.

Above requirements do not apply to:

a) Windows complying with AS2047 (Windows in Buildings – Selection and Installation) or
b) A fire door or smoke door or
c) A roller shutter door, roller shutter grill or other security or device installed only for out-of-hours security

The seal on the bottom of an external swing door must be a draft protection device and for the other edges of an external door or edges of an openable window or other such opening, may be foam or rubber compression strip, fibrous seal or the like.

As per Clause J3.4d, an entrance to a building, if leading to a conditioned space must have an air lock, 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 50m2; or
ii) where a front shop or the like has-
    a. a 3m 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.
iii) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like

7.4 J3.5: EXHAUST FANS

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

7.5 J3.6: CONSTRUCTION OF ROOFS, WALLS AND FLOORS

Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope or in climate zones 4, 5, 6, 7 or 8. This must be constructed by:

- enclosing by internal lining systems that are close fitting at ceiling, wall and floor junctions or,
- sealed by caulking, skirting, architraves, cornices, expanding foam, rubber strips or the like.

The above requirements do not apply to openings, grilles or the like required for smoke hazard management.

7.6 J3.7: EVAPORATING COOLERS

Not applicable.

8 PART J4

This part is blank as it was removed by the NCC in a previous version.

9 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

Refer to the Mechanical Engineer's documentation for compliance requirements for air-conditioning.

10 PART J6: ARTIFICIAL LIGHTING AND POWER

10.1 J6.2 ARTIFICIAL LIGHTING

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 adjusted 'illumination power density' (IPD) – see last column below for the total maximum Watts allowable for each room. This excludes any emergency lighting, signage or display cabinet lighting or a heater where the heater also emits light.

The aggregate design illumination power load is the sum of the design illumination power loads in each of the spaces served. In determining this design illumination power load, where there are multiple lighting systems serving the same space;

i) The total illumination power load of all systems must be used; or

ii) For a control system that permits only one system to operate at a time, the design illumination power load is:

a. Based on the highest illumination power load; or

b. 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.

Table A:

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
Car Park	Basement	2	1122.60	2.0	0.7	**3207**
NBN & MSB	Basement	3	15.70	5.1	1.0	**80**
Res Garbage Room (No. 1)	Basement	1.5	91.60	1.9	1.0	**174**
Res Garbage Room (No. 2)	Basement	1.5	52.40	2.0	1.0	**106**
Comm Garbage Room	Basement	1.5	31.30	2.3	1.0	**73**
Pump Room	Basement	1.5	40.00	2.1	1.0	**84**
Communal Laundry/games	Ground	4.5	83.20	5.8	1.0	**483**
Sub-station	Ground	1.5	19.70	2.3	1.0	**45**
Services/Metres	Ground	3	14.80	4.9	1.0	**73**
Female WC	Ground	3	15.80	4.7	1.0	**75**
Male WC	Ground	3	14.60	4.8	1.0	**70**
Accessible WC	Ground	3	7.20	5.1	1.0	**37**
Multi-Purpose Room	Ground	2.5	96.60	3.6	1.0	**348**
Commercial/Co-Working	Ground	2.5	170.00	3.2	1.0	**544**
Café	Ground	14	253.00	17.9	1.0	**4524**
Retail	Ground	14	114.20	21.2	1.0	**2422**
Commercial/Retail	Ground	2.5	154.00	3.6	1.0	**558**
Commercial	L1	2.5	151.40	3.7	1.0	**558**

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
101-104	L1	5	17.20	8.1	1.0	**139**
105-107	L1	5	17.68	8.0	1.0	**142**
108-112, 115	L1	5	20.51	7.9	1.0	**162**
113, 114	L1	5	20.06	7.9	1.0	**159**
116-118	L1	5	18.03	8.0	1.0	**145**
119	L1	5	20.51	7.9	1.0	**162**
120	L1	5	25.51	7.9	1.0	**201**
121-124	L1	5	20.51	7.9	1.0	**162**
125	L1	5	30.86	7.5	1.0	**232**
126-133	L1	5	21.22	7.9	1.0	**168**
134-137	L1	5	20.51	7.9	1.0	**162**
138	L1	5	20.86	8.0	1.0	**167**
139-140	L1	5	20.06	7.9	1.0	**159**
01-03	L2, L3, L4	5	17.20	8.1	1.0	**139**
04-07	L2, L3, L4	5	17.68	8.0	1.0	**142**
08-12	L2, L3, L4	5	20.51	7.9	1.0	**162**
13-14	L2, L3, L4	5	20.06	7.9	1.0	**159**
15	L2, L3, L4	5	20.51	7.9	1.0	**162**
16-18	L2, L3, L4	5	18.03	8.0	1.0	**145**
19	L2, L3, L4	5	20.51	7.9	1.0	**162**
20	L2, L3, L4	5	25.51	7.9	1.0	**201**
21-24	L2, L3, L4	5	20.51	7.9	1.0	**162**
25	L2, L3, L4	5	30.86	7.5	1.0	**232**
26-33	L2, L3, L4	5	21.22	7.9	1.0	**168**
34-37	L2, L3, L4	5	20.51	7.9	1.0	**162**
38	L2, L3, L4	5	20.86	8.0	1.0	**167**
39-40	L2, L3, L4	5	20.06	7.9	1.0	**159**
41-44	L2, L3, L4	5	17.68	8.0	1.0	**142**
45	L2, L3, L4	5	20.66	8.0	1.0	**165**
46-47	L2, L3, L4	5	17.68	8.0	1.0	**142**
48	L2, L3, L4	5	17.20	8.1	1.0	**139**
501	L5	5	22.76	7.8	1.0	**178**
502	L5	5	21.62	7.9	1.0	**171**
503	L5	5	21.62	7.9	1.0	**171**
504	L5	5	22.76	7.8	1.0	**178**
505	L5	5	31.62	7.6	1.0	**242**
506-508	L5	5	22.76	7.8	1.0	**178**
509-511	L5	5	18.03	8.0	1.0	**145**
512	L5	5	20.51	7.9	1.0	**162**
513	L5	5	25.51	7.9	1.0	**201**
514-524	L5	5	20.51	7.9	1.0	**162**
525	L5	5	21.92	7.8	1.0	**172**
526	L5	5	22.76	7.8	1.0	**178**
527	L5	5	23.27	7.8	1.0	**181**
528	L5	5	20.51	7.9	1.0	**162**
529	L5	5	20.51	7.9	1.0	**162**
530	L5	5	20.06	7.9	1.0	**159**
531	L5	5	20.06	7.9	1.0	**159**
532	L5	5	20.51	7.9	1.0	**162**

Description	Levels	Unadjusted IPD	Area	Adjusted IPD	*Control Factor	#Max Power (W) Per Space
Common Kitchen/Lounge	L6	4.5	206.50	5.9	1.0	**1211**
Common Meeting Room	L6	4.5	56.00	6.5	1.0	**364**
WCs	L6	3	20.00	4.6	1.0	**93**
Lobby	Ground	9	26.10	15.4	0.6	**671**
Corridor	L1	5	259.00	5	0.6	**2158**
Corridor	L2	5	259.00	5	0.6	**2158**
Corridor	L3	5	259.00	5	0.6	**2158**
Corridor	L4	5	259.00	5	0.6	**2158**
Corridor	L5	5	222.40	5	0.6	**1853**

NB: *Any control devices such as lighting timers, motion detectors, daylight sensors or dynamic lighting control devices used for any zones listed in the table above must comply with Specification J6 of the NCC Volume 1 2019.

10.2 J 6.3 INTERIOR ARTIFICIAL LIGHTING AND CONTROL

Artificial lighting of a room or space must be individually operated by a switch or other control device or a combination of both. An artificial lighting switch must be located in a visible and easily accessible position in the room or space being switched or in an adjacent room or space from where 90% of the lighting being switched is visible.

An artificial lighting switch or other control device must, for other than a single functional space such as an auditorium, theatre, swimming pool, sporting stadium or warehouse:

- Not operate lighting for an area of more than 250 m^2 if in a Class 5 or 8 building, or
- Not operate lighting for an area of more than 250 m^2 for a space of not more than 2000 m^2

95% of the light fittings in a building or storey of a building, other than a Class 2 or 3 of more than 250 m^2 must be controlled by a time switch in accordance with Specification J6 or, an occupant sensing device such:

- as a security key card reader that registers a person entering and leaving a building; or
- a motion detector in accordance with Specification J6.

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.

In a Class 5, 6 or 8 building of more than 250m^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:

- the room containing the natural lighting zone is less than 20m^2, or
- the room's natural lighting zone contains less than 4 luminaires, or
- 70% or more of the luminaires in the room are in the natural lighting zone

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

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 sole occupancy units of Class 3, other than where the accommodation is for people with a disability or the aged, in order to cut power of the artificial lighting, air conditioning, local exhaust fans and bathroom heaters when the sole occupancy unit is unoccupied.

10.3 J 6.4 INTERIOR DECORATIVE AND DISPLAY LIGHTING

Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled-

a) Separately from other artificial lighting; and

b) By a manual switch for each area other than when the operating times of the displays are the same in an area, in which case they may be combined.

c) By a time switch in accordance with Specification J6 where the display exceeds 1Kw.

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

10.4 J6.5 ARTIFICIAL LIGHTING AROUND THE PERIMETER OF A BUILDING

Exterior artificial lighting attached to or directed at the façade 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 perimeter lighting loads exceeds 100W:

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 with J6.

The requirements in ii) above do not apply to emergency lighting in accordance with Part E4.

10.5 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.

10.6 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 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

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

10.7 J6.8 ESCALATORS AND MOVING WALKWAYS

Not applicable

11 PART J7: HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT

11.1 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.

11.2 J7.3: SWIMMING POOL HEATING AND PUMPING

Not applicable

11.3 J7.4: SPA POOL HEATING AND PUMPING

Not applicable

12 PART J8: FACILITIES FOR ENERGY MONITORING

12.1 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 the facility to record the consumption of gas and electricity.

b) A building with a floor area of more than 2,500 m2 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
- (iv) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
- (v) 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.

13 DEFINITIONS

The following definitions from the 2019 NCC (Volume 1) are relevant to this Section J Report:

Envelope

Parts of a building's fabric that separate a conditioned space or habitable room from -

(a) the exterior of the building; or

(b) a non-conditioned space including -

(i) the floor of a rooftop plant room, lift-machine room or the like; and

(ii) the floor above a carpark or warehouse; and

(iii) the common wall with a carpark, warehouse or the like.

Habitable room

Means a room used for normal domestic activities, and:

(a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but

(b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Conditioned space

Means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning, but does not include:

Air-conditioning

A service that actively cools or heats the air within a space, but does not include a service that directly cools or heats cold or hot rooms or; maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

Bulk Insulation

Has a high resistance to the flow of heat by conduction. It includes Fibreglass, Rockwool, Glass Wool, Polyester, expanded or extruded polystyrene or other similar materials.

R-Value (m^2. K/W)

Means the thermal resistance of a component calculated by dividing its thickness by its thermal conductivity.

U-Value (m^2. K/W)

Means the thermal transmittance of the composite elements allowing for the effect of any airspaces, thermal bridging and associated surface resistances.

End of report

APPENDIX 1