National Construction Code
Building Code of Australia (2022)

BCA Assessment Report - Section J

Proposed refurbishment of an existing community building -
70 Gaskill Street, Canowindra NSW

Prepared for Cabonne Shire Council

Report No: 24019
Version: A
Date prepared: 29/03/2024
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Building Code of Australia - Section J - BASIX & NatHERS

Register

Issue No	Remarks	Date
A		29/03/2024

Introduction

This Section J – Energy Efficiency report has been prepared for Cabonne Shire Council and refers to the refurbishment of an existing community building at 70 Gaskill Street, Canowindra NSW.

The report is based on, and limited to, the information shown on the following documentation:

- Drg. no. 341608-1 sheets DA01-DA14 (rev 2)

Exclusions

This report does not include:
- Assumptions regarding the design intention or the like (except as noted in the report).
- An assessment of sections A through to H of the Building Code of Australia (2022).

Report Format

The report identifies the parts of Section J of the Building Code of Australia (2022) relevant to the project as summarised in the following table (see below).

The prescriptive BCA requirements and status of each of the relevant parts is discussed in the following body of the report.

Building description

- Proposed refurbishment of an existing community building at 70 Gaskill Street, Canowindra NSW.

- BCA Building Classification – 9b

- Floor area (approximate) – 340m2 (internal areas) & 27m2 (services room / store room / packaging room)

- BCA climate zone - 4

- The community building use meets the criteria for a conditioned space and as such the refurbishment of the building will require compliance with Section J (Parts J4 - J9).

- The external storage areas meet the definition of an unconditioned space and as such will not require compliance with the thermal construction requirements of Section J (Parts J4 - J6).

- Note – Section J does not apply to the proposed cool room building.

The above is addressed in the following Section J analysis and summary table located at the end of the report.

Section J – Energy Efficiency

BCA Section J – parts	Referenced	Comment
J2D2 – Application of Section J	Y	compliance readily achievable
J3D3 – Heating and Cooling Loads Class 2 & 4	N	not applicable
J3D4 – Ceiling Fans Class 2 & 4	N	not applicable
J3D5 – Roof Thermal Breaks Class 2 & 4	N	not applicable
J3D6 – Wall Thermal Breaks Class 2 & 4	N	not applicable
J4D3 – Thermal Construction General	Y	compliance readily achievable
J4D4 – Roof and Ceiling Construction	Y	compliance readily achievable
J4D5 – Roof Lights	Y	compliance readily achievable
J4D6 – Walls and Glazing	Y	compliance readily achievable
J4D7 – Floors	Y	compliance readily achievable
J5D3 – Chimneys and Flues	N	n/a – not present
J5D4 – Roof Lights	Y	compliance readily achievable
J5D5 – Windows and Doors	Y	compliance readily achievable
J5D6 – Exhaust Fans	Y	compliance readily achievable
J5D7 – Construction of roofs, walls and floors	Y	compliance readily achievable
J5D8 – Evaporative coolers	N	n/a – not present
J6D3 – Air-conditioning system control	Y	compliance readily achievable
J6D4 – Mechanical ventilation system control	N	n/a – not present
J6D5 – Fans and duct systems	N	n/a – not present
J6D6 – Ductwork insulation	Y	compliance readily achievable
J6D7 – Ductwork sealing	N	n/a – not present
J6D8 – Pump systems	N	n/a – not present
J6D9 – Pipework insulation	N	n/a – not present
J6D10 – Space heating	Y	compliance readily achievable
J6D11 – Refrigerant chillers	N	n/a – not present
J6D12 – Unitary air-conditioning equipment	Y	compliance readily achievable
J6D13 – Heat rejection equipment	N	n/a – not present
J7D3 – Artificial lighting	Y	compliance readily achievable
J7D4 – Interior artificial lighting and power control	Y	compliance readily achievable
J7D5 – Interior decorative and display lighting	N	n/a – not present
J7D6 – Exterior artificial lighting	Y	compliance readily achievable
J7D7 – Boiling water and chilled water storage units	Y	compliance readily achievable
J7D8 – Lifts	N	n/a – not present
J7D9 – Escalators and moving walkways	N	n/a – not present
J8D2 – Heated water supply	Y	compliance readily achievable
J8D3 – Swimming pool heating & pumping	N	n/a – not present
J8D4 – Spa pool heating and pumping	N	n/a – not present
J9D3 – Facilities for energy monitoring	Y	compliance readily achievable
J9D4 – Facilities for electric vehicle charging	N	n/a – not present
J9D5 – Facilities for solar PV and battery systems	Y	compliance readily achievable

Section J – Energy Efficiency Assessment – Analysis

The parts identified in the previous table are further analysed and comments regarding the project are included in italics and bold.

A summary sheet is included which should be attached to the drawings and read in conjunction with this report.

BCA Reference	**Prescriptive BCA requirements / comments**
J2D2 Application of Section J	Performance requirement J1P1 is satisfied by complying with Parts J4, J5, J6, J7, J8 and J9.
J4D3 Thermal Construction general	Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it abuts or overlaps adjoining insulation and forms a continuous barrier with ceilings, walls, bulkheads, floors or the like. **Compliance to be certified during construction.**
J4D4 Roof and Ceiling Construction	The ceiling must achieve a *Total R-Value* greater than or equal to R3.7 for a downward direction of heat flow; And; The solar absorptance (SA) of the upper surface of the roof sheeting must be not more than 0.45. Compliance with J4D4 can be achieved by the following combination: • Installation of R3.5 bulk insulation above the ceiling; and • R1.3 anticon blanket under light colour roof sheeting (SA<0.45) Note: recessed lighting will reduce the effectiveness of ceiling insulation. Contact author of report for advice if recessed lighting is proposed. **Compliance to be certified during construction.**
J4D5 Roof Lights	The roof lights are to comply with the following maximum areas and thermal properties: • *A maximum of no more than 5% of the floor area of the room being served; and* • *U=3.9 (or lesser value) & SHGC=0.29 (or lesser value)* **Compliance to be certified during construction.**

J4D6 Walls & glazing	The Total System U-Value of the internal and external wall-glazing construction must not be greater than U2.0; and the Total System U-Value of wall-glazing construction must be calculated in accordance with Specification 37. And; The solar admittance of externally facing wall-glazing construction must not be greater than the values specified in Table J4D6b; and the solar admittance of a wall-glazing construction must be calculated in accordance with Specification 37. Compliance with J4D6 can be achieved by the following insulation and glazing combination(s): <u>External walls</u> Existing masonry walls : • Installation of R2.5 bulk insulation within a minimum 90mm framed wall with an air gap to the external brickwork. Note: external wall insulation on the west façade is to extend to the underside of the roof sheeting. <u>Windows / glass doors:</u> East façade: Total U value (NFRC) = 3.5 (U values less than this value are satisfactory) Total SHGC value (NFRC) = 0.40 (SHGC values less than this value are satisfactory) West façade (new glazing only): Total U value (NFRC) = 5.8 (U values less than this value are satisfactory) Total SHGC value (NFRC) = 0.60 (SHGC values less than this value are satisfactory) Note: the existing shop front glazing on the western facade is assumed to have thermal values typical for standard single glazed clear glass (U=5.8 & SHGC=0.60) Note: Any variation to the shading indicated on the plans will require a reassessment of the glass type specified in J4D6. **Compliance to be certified during construction.**
J4D7 Floors	The proposed floor construction consists of a concrete slab on ground (no in-slab heating) to replace the existing suspended timber floor. The new floor slab requires a minimum total construction R-value of R2.0 for a downward direction of heat flow. Compliance with J4D7 is achieved by the R-value of soil in contact with the underside of the slab (R>2.0). No additional insulation is required.

J5D4 Roof Lights	The following draught sealing is required for the skylight: • *Fully sealed or capable of being sealed; or* • *An imperforate ceiling diffuser.* **Compliance to be certified during construction.**
J5D5 Windows and Doors	The following draught sealing is required: • A foam seal around the perimeter of the frame and a draught stopper along the bottom edge of external doors. • External doors to be fitted with a self-closer. • Windows to be fitted with weather seals. **Compliance to be certified during construction.**
J5D6 Exhaust fans	Any exhaust fans in the bathrooms must be fitted with a self-closing damper or the like. **Compliance to be certified during construction.**
J5D7 Construction of roof, walls and floors	Construction of the conditioned spaces using plasterboard lined walls and ceilings with cornices, skirting and architraves will achieve draught sealing compliance.
J6D3 Air-conditioning system control	The following controls apply to air-conditioning systems installed in the building: • An air-conditioning system must be capable of being deactivated when the building or part of a building served by that system is not occupied; and comply with J6D3 (1) as applicable. • Single conditioned zone OR when serving more than 1 zone, thermostatically control the temperature of each zone in accordance with J6D3 (1)(b) and (2). • A time switch must be provided to control — o an air-conditioning system of more than 2 kWr; and o a heater of more than 1 $kW_{heating}$ used for air-conditioning. The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days. **Compliance to be certified during construction.**
J6D6 Ductwork insulation	Ductwork and fittings in an air-conditioning system must be provided with insulation complying with AS/NZS 4859.1; and the requirements of J6D6 (1-4) as applicable. • All supply and return ductwork insulated to R1.0 and sealed. **Compliance to be certified during construction.**

J6D10 Space heating	Space heating forming part of an air-conditioning system must comply with the requirements of J6D10 (1)(a), (b), (c), and (d) as applicable. Compliance with J6D10 can be achieved using the following space heating system: • heat pump heater (package AC system complying with MEPS).
J6D12 Unitary air-conditioning equipment	Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS. **Compliance to be certified during construction.**
J7D3 Artificial Lighting	The aggregate maximum illumination power density must not exceed the following (except as allowed by adjustment factors from table J6.2a where motion detectors, dimming, daylight sensors or room size allows). See author of report for upgrade calculations if limits noted below are unachievable - • Library / office / meeting areas: 4.5W / sq.m. (1,070W maximum) • Staff / toilet areas: 3W / sq.m. (150W maximum) • Foyer areas: 9W / sq.m. (450W maximum) • Storage areas: 1.5W / sq.m. (40W maximum) The above wattage allowances generally limit all fixed lighting to low wattage fluorescent or LED sources. The following is exempt from the above: • Emergency lighting required by part E4; • A heater where the heater also emits light, such as in a bathroom; • Lighting of a specialist process nature. **Compliance to be certified during construction.**
J7D4 Interior artificial lighting and power control	Artificial lighting and power within the building must incorporate the following controls: • All 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 or other control device must (if an artificial lighting switch) be located: o in a visible and easily accessed 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. (cont. over)

	(cont.)
	
	• 95% of the light fittings must be controlled by:
	  ○ a time switch in accordance with Specification 40; or
	  ○ an occupant sensing device such as a security key card reader that registers a person entering and leaving the building; or a motion detector in accordance with Specification 40.
	
	• Artificial lighting in a foyer, corridor and other circulation spaces of more than 250W within a single zone; and adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification 40.
	
	The above requirements do not apply to the following:
	• Emergency lighting in accordance with Part E4; and
	• Where artificial lighting is needed for 24-hour occupancy; and
	• Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation,
	• plant room or lift motor room, workshops where power tools are used; and
	• A heater where the heater also emits light, such as in bathrooms.
	
	Compliance to be certified during construction.

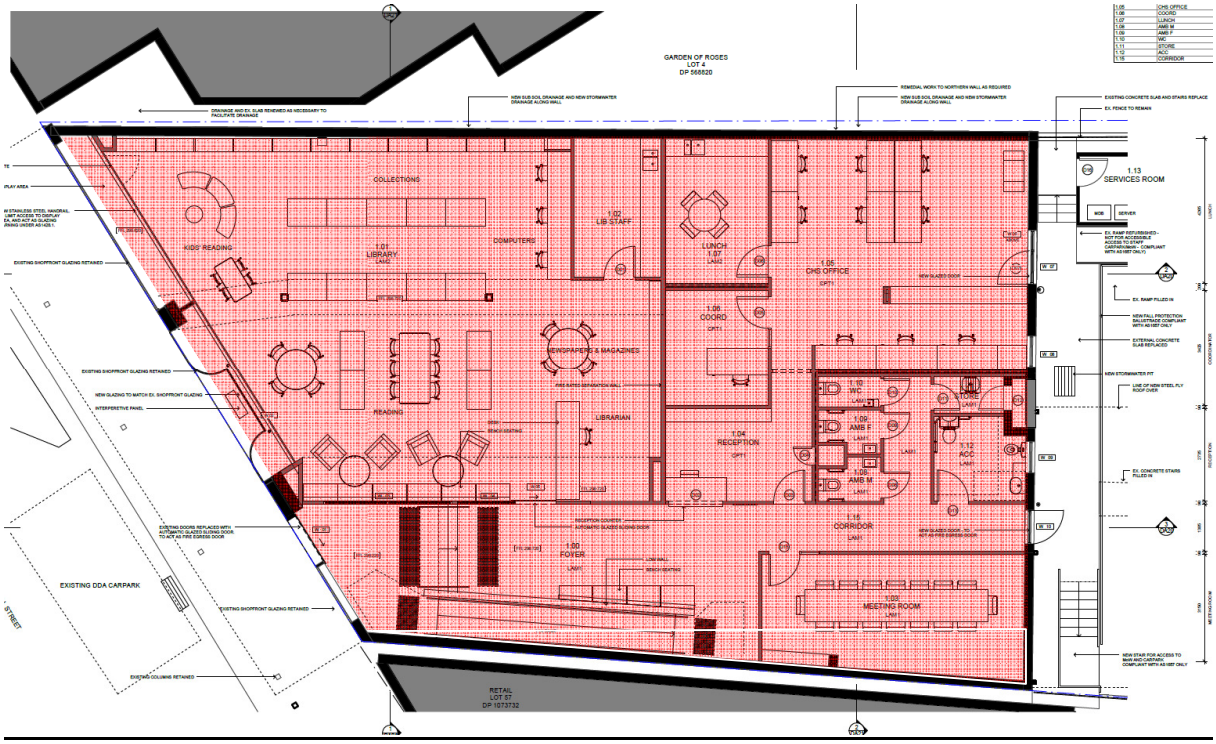
J7D6 Exterior artificial lighting	Artificial lighting around the perimeter of the building must:
	
	• Be controlled by a daylight sensor or time switch (complying with spec 40), and
	• When the total perimeter lighting load exceeds 100W –
	  ○ Must use LEDs for 90% of the total lighting load; or
	  ○ Be controlled by a motion sensor
	• When used for façade or signage lighting have a separate time switch in accordance with Specification 40.
	
	Emergency lighting required by part E4 is exempt from the above.
	
	Compliance to be certified during construction.

J7D7 Boiling water and chilled water storage units	Power supply to any boiling water or chilled water storage units (if installed) must be controlled by a time switch in accordance with Specification 40. **Compliance to be certified during construction**.
J8D2 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).

J9D3 Facilities for energy monitoring	The following facilities for energy monitoring are required: • Gas and/or electricity meters (existing meters assumed to comply with energy retailers' requirements).
J9D5 – Facilities for solar PV and battery systems	The following facilities for solar PV and battery systems are required: • The main electrical switchboard is designed to accommodate a future solar PV and battery system in accordance with J9D5(1)(a); and • At least 20% of the roof area is left clear for the installation of solar panels. **Compliance to be certified during construction**.

Attachments

1/ Conditioned floor areas shown **red** below



2/ Façade report (compliance achieved with method 2).

Façade

Report

Calculator

Project Summary

Date
7/04/2024

Name
Marc Kiho

Company
Kiho Building Consulting

Position
Section J / NatHERS Assessor

Building Name / Address
79 Gaskill Street
Canowindra

Building State
NSW

Climate Zone
Climate Zone 4 - Hot dry summer, cool winter

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
1

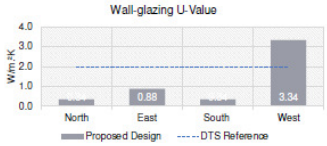
Tool Version
1.2 (June 2020)

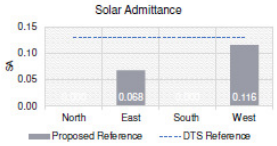
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

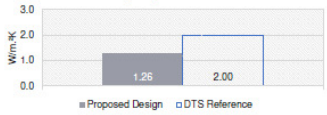
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	0.34	0.88	0.34	3.34	1.26
Solar Admittance		0.07		0.12	
AC Energy Value					14

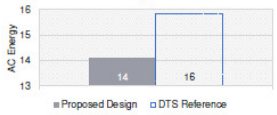
Method 1





Method 2

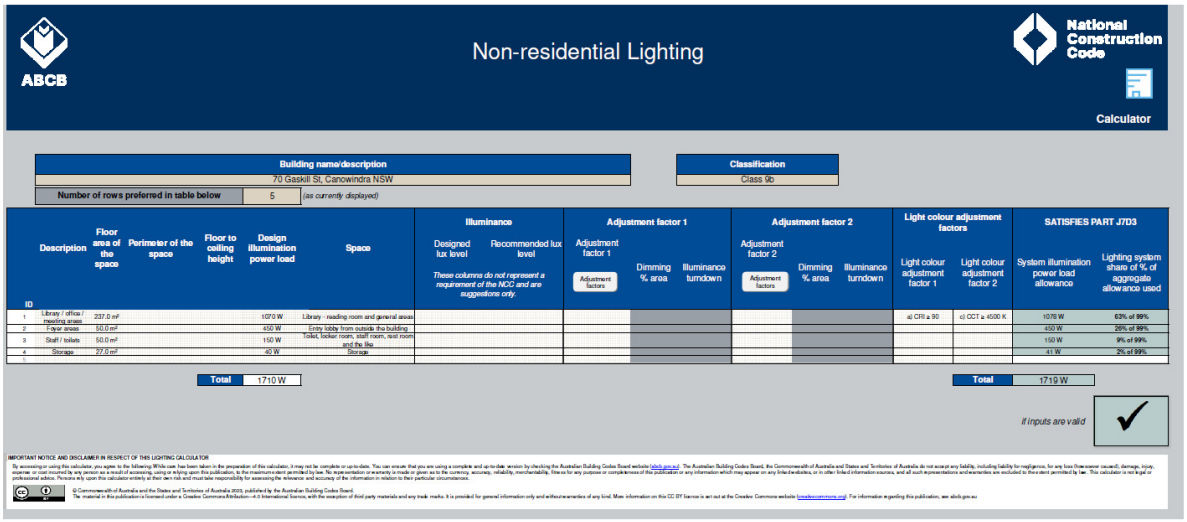




Project Details

	North	East	South	West
Glazing Area (m²)	0	8.2	0	39.5
Glazing to Façade Ratio	0%	17%	0%	55%
Glazing References		W03		W01
Glazing System Types		DEFAULTS (GENERIC)		DEFAULTS (GENERIC)
Glass Types		Double Glazed Unit - no low-E coating		Single glazing
Frame Types		Aluminium		
Average Glazing U-Value (W/m².K)		3.50		5.80
Average Glazing SHGC	0.00	0.40	0.00	0.60
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	86	39.8	57	32.5
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Masonry & R2.5	Masonry & R2.5	Masonry & R2.5	Masonry & R2.5
Wall Thickness	300	300	300	300
Average Wall R-value (m².K/W)	2.92	2.92	2.92	2.92
Solar Absorptance	0.5	0.5	0.5	0.5

3/ Lighting Calculations.



ABCB

Non-residential Lighting

National Construction Code

Calculator

Building name/description	Classification
70 Gaskill St, Canowindra NSW	Class 9b

Number of rows preferred in table below: 5 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance: Designed lux level	Illuminance: Recommended lux level	Adjustment factor 1	Adjustment factor 1: Dimming % area	Adjustment factor 1: Illuminance turndown	Adjustment factor 2	Adjustment factor 2: Dimming % area	Adjustment factor 2: Illuminance turndown	Light colour adjustment factors: Light colour adjustment factor 1	Light colour adjustment factors: Light colour adjustment factor 2	SATISFIES PART J7D3: System illumination power load allowance	SATISFIES PART J7D3: Lighting system share of % of aggregate allowance used
							These columns do not represent a requirement of the NCC and are suggestions only.		Adjustment factors			Adjustment factors						
1	Library / office / meeting areas	237.0 m²			1070 W	Library - reading room and general areas									≥ CRI ≥ 90	≥ CCT ≥ 4500 K	1076 W	63% of 99%
2	Foyer areas	50.0 m²			450 W	Entry lobby from outside the building											450 W	26% of 99%
3	Staff / toilets	50.0 m²			150 W	Toilet, locker room, staff room, rest room and the like											150 W	9% of 99%
4	Storage	27.0 m²			40 W	Storage											41 W	2% of 99%
5																		

Total: 1710 W

Total: 1719 W

If inputs are valid ✓

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THIS LIGHTING CALCULATOR

By accessing or using this calculator, you agree to the following While care has been taken in the preparation of this calculator, it may not be complete or up-to-date. You can ensure that you are using a complete and up-to-date version by checking the Australian Building Codes Board website (abcb.gov.au). The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, to the maximum extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this publication or any information which may appear on any linked websites, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law. This calculator is not legal or professional advice. Persons rely upon this calculator entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.