

National Construction Code Building Code of Australia (2019)

BCA Assessment Report - Section J

Proposed community centre – 1164 Coxs Creek Rd, Coxs Creek NSW.

Prepared for Calare Civil

Report No: 23001

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Register

Issue No	Remarks	Date
A		11/01/2023

Introduction

This Section J – Energy Efficiency report has been prepared for Calare Civil and refers to the proposed community centre at 1164 Coxs Creek Rd, Coxs Creek NSW.

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

- Unnumbered site plan, floor plan & elevations

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 (2019).

Report Format

The report identifies the parts of Section J of the Building Code of Australia (2019) 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 community centre at 1164 Coxs Creek Rd, Coxs Creek NSW.
- BCA Building Classification – 9b
- Floor area (approximate) – 310 m²
- BCA climate zone - 6
- The community centre will require compliance with Section J as the building meets the definition of a conditioned space.
- The external storage and battery room are exempt from the thermal construction requirements of Section J (parts J1 to J5) as the space will not be heated or cooled.

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
J0.1 – application of Section J	Y	compliance readily achievable
J0.2 – heating and cooling loads Class 2 & 4	N	n/a – not present
J0.3 – ceiling fans	N	n/a – not present
J0.4 – roof thermal breaks	Y	compliance readily achievable
J0.5 – wall thermal breaks	Y	compliance readily achievable
J1.2 – thermal construction general	Y	compliance readily achievable
J1.3 – roof and ceiling construction	Y	compliance readily achievable
J1.4 – roof lights	N	n/a – not present
J1.5 – walls and glazing	Y	compliance readily achievable
J1.6 – floors	Y	compliance readily achievable
J3.2 – chimneys and flues	N	n/a – not present
J3.3 – roof lights	N	n/a – not present
J3.4 – windows and doors	Y	compliance readily achievable
J3.5 – exhaust fans	Y	compliance readily achievable
J3.6 – construction of roofs, walls and floors	Y	compliance readily achievable
J3.7 – evaporative coolers	N	n/a – not present
J5.2 – air-conditioning system control	Y	compliance readily achievable
J5.3 – mechanical ventilation system control	N	n/a – not present
J5.4 – fan systems	N	n/a – not present
J5.5 – ductwork insulation	N	n/a – not present
J5.6 – ductwork sealing	N	n/a – not present
J5.7 – pump systems	N	n/a – not present
J5.8 – pipework insulation	N	n/a – not present
J5.9 – space heating	Y	compliance readily achievable
J5.10 – refrigerant chillers	N	n/a – not present
J5.11 – unitary air-conditioning equipment	Y	compliance readily achievable
J5.12 – heat rejection equipment	N	n/a – not present
J6.2 – artificial lighting	Y	compliance readily achievable
J6.3 – interior artificial lighting and power control	Y	compliance readily achievable
J6.4 – interior decorative and display lighting	N	n/a – not present
J6.5 – exterior artificial lighting	Y	compliance readily achievable
J6.6 – boiling water and chilled water storage units	N	n/a – not present
J6.7 – lifts	N	n/a – not present
J6.8 – escalators and moving walkways	N	n/a – not present
J7.2 – heated water supply	Y	compliance readily achievable
J7.3 – swimming pool heating & pumping	N	n/a – not present
J7.4 – spa pool heating and pumping	N	n/a – not present
J8.3 – facilities for energy monitoring	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
J0.1 Application of Section J	Performance requirement JP1 is satisfied by complying with Parts J1, J3, J5, J6, J7 and J8.
J0.4 Roof thermal breaks	<p>Steel framed roof / ceiling construction requires a thermal break consisting of a material with an R-value not less than R0.2 installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens where the ceiling lining is not present or is fixed directly to the roof frame.</p> <p>Compliance to be certified during construction.</p>
J0.5 Wall thermal breaks	<p>Steel framed walls construction requires a thermal break consisting of a material with an R-value not less than R0.2 installed at all points of contact between the external cladding and the wall frame where the internal lining is not present or is fixed directly to the wall frame.</p> <p>Compliance to be certified during construction.</p>
J1.2 Thermal Construction general	<p>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.</p> <p>Compliance to be certified during construction.</p>
J1.3 Roof and Ceiling Construction	<p>The roof / ceiling combination must achieve a <i>Total R-Value</i> greater than or equal to R3.2 for a downward direction of heat flow;</p> <p>And;</p> <p>The solar absorptance (SA) of the upper surface of the roof sheeting must be not more than 0.45.</p> <p>Compliance with J1.3 can be achieved by the following combinations:</p> <ul style="list-style-type: none"> • <i>Installation of R3.5 bulk insulation to the ceiling and reflective sarking / anticon blanket under light colour roof sheeting (SA<0.45)</i> <p>Compliance to be certified during construction.</p>

J 1.5 Walls & glazing	<p>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 J1.5a.</p> <p>And;</p> <p>The solar admittance of externally facing wall-glazing construction must not be greater than the values specified in Table J1.5b; and the solar admittance of a wall-glazing construction must be calculated in accordance with Specification J1.5a.</p> <p>Compliance with J1.5 can be achieved by the following insulation and glazing combination(s):</p> <p><u>External walls</u> <i>Lightweight clad framed walls:</i></p> <ul style="list-style-type: none"> • <i>Installation of R2.5 bulk insulation within a 90mm timber framed wall.</i> <p><u>Internal walls shared with battery room / storage area</u> <i>Lightweight clad framed walls:</i></p> <ul style="list-style-type: none"> • <i>Installation of R2.5 bulk insulation within a 90mm timber framed wall.</i> <p>Note: if any internal or external walls are steel framed, an R0.2 thermal break is required beneath the external cladding (AirCell Insulbreak or similar).</p> <p><u>Windows & glass doors - all façades:</u> <i>Total U value (NFRC) = 5.8 (U values less than this value are satisfactory)</i></p> <p><i>Total SHGC value (NFRC) = 0.60 (SHGC values less than this value are satisfactory)</i></p> <p>Note: Any variation to the shading indicated on the plans will require a reassessment of the glass type specified in J1.5.</p> <p>Compliance to be certified during construction.</p>
J1.6 Floors	<p>The proposed floor construction consists of a concrete slab on ground (no in-slab heating). The floor slab requires a minimum total construction R-value of R2.0 for a downward direction of heat flow.</p> <p>Compliance with J1.6 can be achieved by the following insulation:</p> <ul style="list-style-type: none"> • R-value of soil in contact with underside of slab of R1.5; and • Installation of R1.1 polystyrene insulation boards (25mm KingSpan Kooltherm K3) on the underside of the slab (excluding external storage areas). <p>Compliance to be certified during construction.</p>

J3.4 External Windows and Doors	<p>The following draught sealing is required (conditioned spaces only):</p> <ul style="list-style-type: none"> • 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 comply with AS2047. <p>Compliance to be certified during construction.</p>
J 3.5 Exhaust fans	<p>Any exhaust fans in the kitchen or bathrooms must be fitted with a self-closing damper or the like.</p> <p>Compliance to be certified during construction.</p>
J3.6 Construction of roof, walls and floors	<p>Construction of the conditioned spaces using plasterboard lined walls and ceilings with cornices, skirting and architraves will achieve draught sealing compliance.</p>
J 5.2 Air-conditioning system control	<p>(If installed) The following controls apply to air-conditioning systems installed in the building:</p> <ul style="list-style-type: none"> • 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 J5.2 (ii) to (xii) as applicable. • Single conditioned zone OR when serving more than 1 zone, thermostatically control the temperature of each zone in accordance with J5.2(a)(ii). • A time switch must be provided to control — <ul style="list-style-type: none"> ○ an air-conditioning system of more than 2 kW_r; and ○ a heater of more than 1 kW_{heating} used for air-conditioning. <p>The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.</p> <p>Compliance to be certified during construction.</p>
J5.9 Space heating	<p>Space heating forming part of an air-conditioning system must comply with the requirements of J5.9 (a), (b), (c), and (d) as applicable.</p> <p>Compliance with J5.9 can be achieved using the following space heating system:</p> <ul style="list-style-type: none"> • heat pump heater (package AC system).
J5.11 Unitary air-conditioning equipment	<p>(If installed) Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS.</p> <p>Compliance to be certified during construction.</p>

J6.2 Interior Artificial Lighting	<p>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).</p> <p>See author of report for upgrade calculations if limits noted below are unachievable -</p> <ul style="list-style-type: none"> • Main hall / meeting room / corridor areas: 8W / sq.m. (1,650W maximum) • Kitchen area: 4W / sq.m. (100W maximum) • Toilet areas: 3W / sq.m. (75W maximum) • External storage / battery room: 1.5W / sq.m. (24W maximum) <p>The above wattage allowances generally limit all fixed lighting to low wattage fluorescent or LED sources.</p> <p>The following is exempt from the above:</p> <ul style="list-style-type: none"> • 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. <p>Compliance to be certified during construction.</p>
J6.3 Interior artificial lighting and power control	<p>Artificial lighting and power within the building must incorporate the following controls:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ○ 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; & ○ not operate lighting for an area of more than 250 m². • 95% of the light fittings must be controlled by: <ul style="list-style-type: none"> ○ 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 the building; or a motion detector in accordance with Specification J6. <p>(cont. over)</p>

	<p>(cont.)</p> <p>The above requirements do not apply to the following:</p> <ul style="list-style-type: none"> • Emergency lighting in accordance with Part E4; 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. <p>Compliance to be certified during construction.</p>
J6.5 Exterior artificial lighting	<p>Artificial lighting around the perimeter of the building must:</p> <ul style="list-style-type: none"> • Be controlled by a daylight sensor or time switch (complying with spec J6), and • When the total perimeter lighting load exceeds 100W – <ul style="list-style-type: none"> ○ Must use LEDs for 90% of the total lighting load; or ○ Be controlled by a motion sensor. <p>Emergency lighting required by part E4 is exempt from the above.</p> <p>Compliance to be certified during construction.</p>
J7.2 Heated water supply	<p>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).</p>
J8.3 Facilities for energy monitoring	<p>The following facilities for energy monitoring are required:</p> <ul style="list-style-type: none"> • Electricity meter to be installed to record time-of-use consumption (to energy supply authority requirements) • Sub metering of individual building services is not required.

Section J BCA requirements – 1164 Coxs Creek Rd, Coxs Creek NSW

(to be read in conjunction with Section J report)

Insulation

- Roof (light colour with SA<0.45): reflective sarking / R1.3 anticon blanket
- Ceiling: R3.5
- External walls: R2.5
- Internal wall shared with storage / battery room areas: R2.5
- Floor slab: R1.1 insulation (Kingspan K3 boards or equivalent)
- Thermal breaks required for steel framed construction: R0.2 between wall frame and external cladding

External windows & glass doors

- All façades: U = 5.8 & SHGC = 0.60
- Glazing to comply with AS2047

Draught sealing

- External doors to have foam seal around perimeter, draught stopper along bottom edge and self-closer.
- Bathroom / kitchen exhaust fans to be fitted with a self-closing damper.

Air conditioning (if installed)

- To comply with Part J5 as applicable
- Package AC units to comply with MEPS
- Single conditioned zone OR when serving more than 1 zone, thermostatically control the temperature of each zone in accordance with J5.2(a)(ii).
- All AC units with a heating or cooling capacity of more than 2kW_r to have a time switch controller (refer to spec J6 of BCA for details).

Internal lighting & power control

- Main hall / meeting / corridor areas - maximum illumination power density of 8 W/m²
- Kitchen area - maximum illumination power density of 4 W/m²
- Toilet areas - maximum illumination power density of 3 W/m²
- Storage / battery room area - maximum illumination power density of 1.5 W/m²
- 95% of lighting to be controlled by a time switch or occupant sensing device.
- Maximum of 250 sq.m of lighting controlled per light switch.

External lighting

- All external lighting to be controlled by either a daylight sensor or time switch and where total perimeter lighting exceeds 100W have a minimum of 90% of light fittings to be LEDS or be controlled by a motion sensor.

Hot water supply

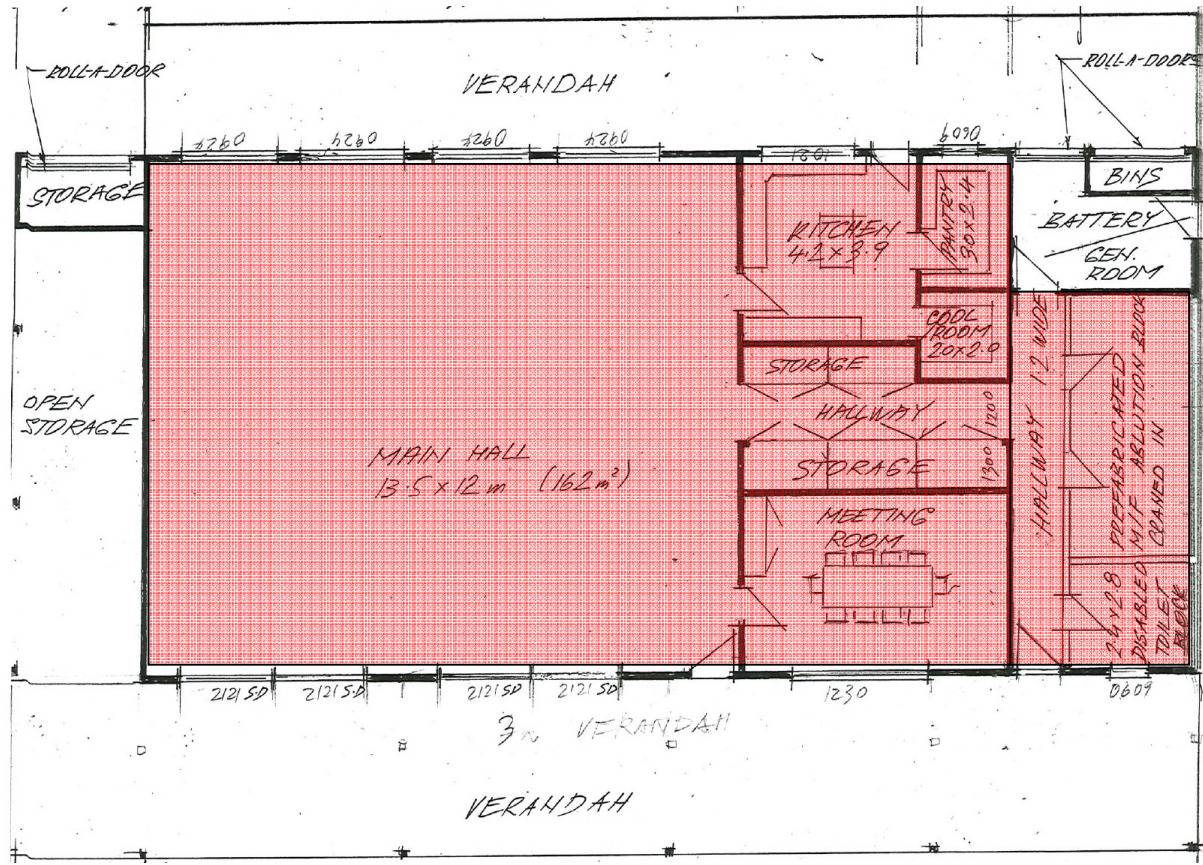
- Heated sanitary water systems to be designed and installed as per part B2 NCC vol. 3

Metering of electricity

- Electricity meter (as required by energy supply authority) to be installed.
- Sub metering is not required

Attachments

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



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



3/ Lighting Calculations.