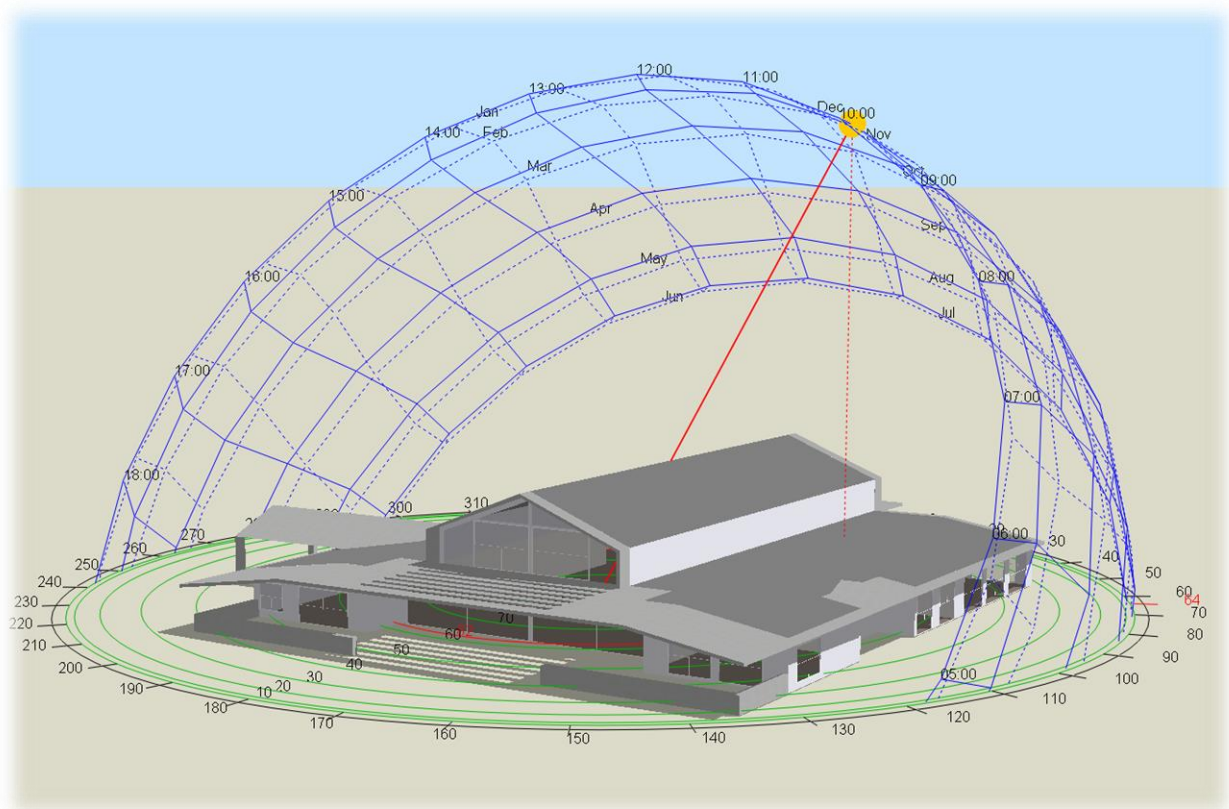


NCC Section J Compliance Report

JIV3 Performance Solution Method

Proposed Morpeth Gardens Country Club

39 Metford Road, Tenambit NSW 2323



Prepared for:

URBANDWELL
modular construction

Date: 15 April 2024
Revision: 00
Project Number: 23192

Quality Management

Revision: 00
Remarks: For Information
Date: 15 April 2024
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Executive Summary Of Building Fabric Compliance Requirements

Part J4 – The recommendations for the **Building Fabric Thermal Performance** are summarised below. This section is a summary only, refer to [Section 3.3](#) for details and [Appendix C](#) for building envelope schematics.

Table 1 – Summary of Building Fabric Insulation Minimum Requirements

Recommendations for Compliance		
J4D4 – Roof & Ceiling		
Roof Types	<i>Recommendation for Compliance</i>	
<i>Flat Ceiling with Pitched Roof</i>		
<i>Racked Ceiling with Pitched Roof</i>		
J4D5 – Roof Lights		
<i>Recommendation for Compliance</i>	Maximum U-Value	Maximum SHGC
	Not applicable to project.	Not applicable to project.
J4D6 – Walls & Glazing		
Wall Types	<i>Recommendation for Compliance</i>	
External Colorbond Wall	R2.0 Insulation Batts (Approximately 75mm).	
Internal Wall	R2.0 Insulation Batts (Approximately 75mm).	
Note that if metal stud is used, an R0.2 thermal break is required on all frames. <i>Insulation types have not considered requirements such as fire compliance or acoustic requirements.</i>		
Glazing System		
All Glazing		
<i>Maximum Values for Compliance</i>	Maximum U-Value	Maximum SHGC
	4.70	0.48
J4D7 – Floors		
Slab On Ground		
<i>Recommendation for Compliance</i>	No Insulation Required as per J4D7(2).	

Part J4 – The recommendations for the **Building Glazing Thermal Performance** are summarised above. Refer to Section 3.3.5 for details.

Part J5 – The deemed to satisfy (DTS) provisions for **Building Sealing** shall be applied. Refer to Section 3.4 for details.

Part J6 – The DTS provisions for all **Air Conditioning & Ventilation Systems** shall be applied and shall be the responsibility of the Mechanical Consultant / Contractor. Refer to Section 3.5 for details.

Part J7 – The DTS provisions for all **Artificial Lighting & Power** shall be applied and shall be the responsibility of the Electrical Consultant / Contractor. Refer to Section 3.6 for details.

Part J8 – The DTS provisions for any **Heated Water Supply & Swimming Pool & Spa Plant** shall be applied and shall be the responsibility of the Hydraulic Consultant / Contractor. Refer to Section 3.7 for details.

Part J9 – The DTS provisions for **Energy Monitoring** shall be applied and shall be the responsibility of the Hydraulic Consultant. Refer to [Section 3.8](#) for details.

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1.0 Introduction and Methodology







Purpose of Report

EVC has carried out a Section JIV3 Energy Efficiency analysis for the new Propose country club to be located at 39 Metford Road, Tenambit NSW 2323.

The purpose of this report is to provide the building envelope performance requirements necessary to comply with the provisions of Section J of Volume One of the National Construction Code (NCC) 2022 using the JIV3 performance solution method.

Assessment Method

The compliance assessment method applied was as follows:

-  Part **J4** requires the definition of the **building fabric thermal performance** requirements in line with the JIV3 performance solution method undertaken.
-  Part **J5** requires the definition of additional requirements to provide adequate **building sealing** in line with the DTS provisions.
-  Part **J6** requires the definition of requirements pertaining to the performance of **air conditioning and ventilation** equipment in line with the DTS provisions.
-  Part **J7** requires the definition of requirements pertaining to the performance of **artificial lighting and power** equipment in line with the DTS provisions.
-  Part **J8** requires the definition of requirements pertaining to the performance of **hot water supply, and swimming pool and spa pool plant** in line with the DTS provisions.
-  Part **J9** requires the definition of requirements pertaining to **facilities and energy monitoring** in line with the DTS provisions.

Building Classification

Under *Clause A6* of the Building Code of Australia, the proposed building assessed is recognised as a Class 9B building.

The building is in Tenambit, NSW. It falls within Climate Zone 5 (See Figure 1).

Sources of Information

The following sources of information were used to undertake the Section J analysis:





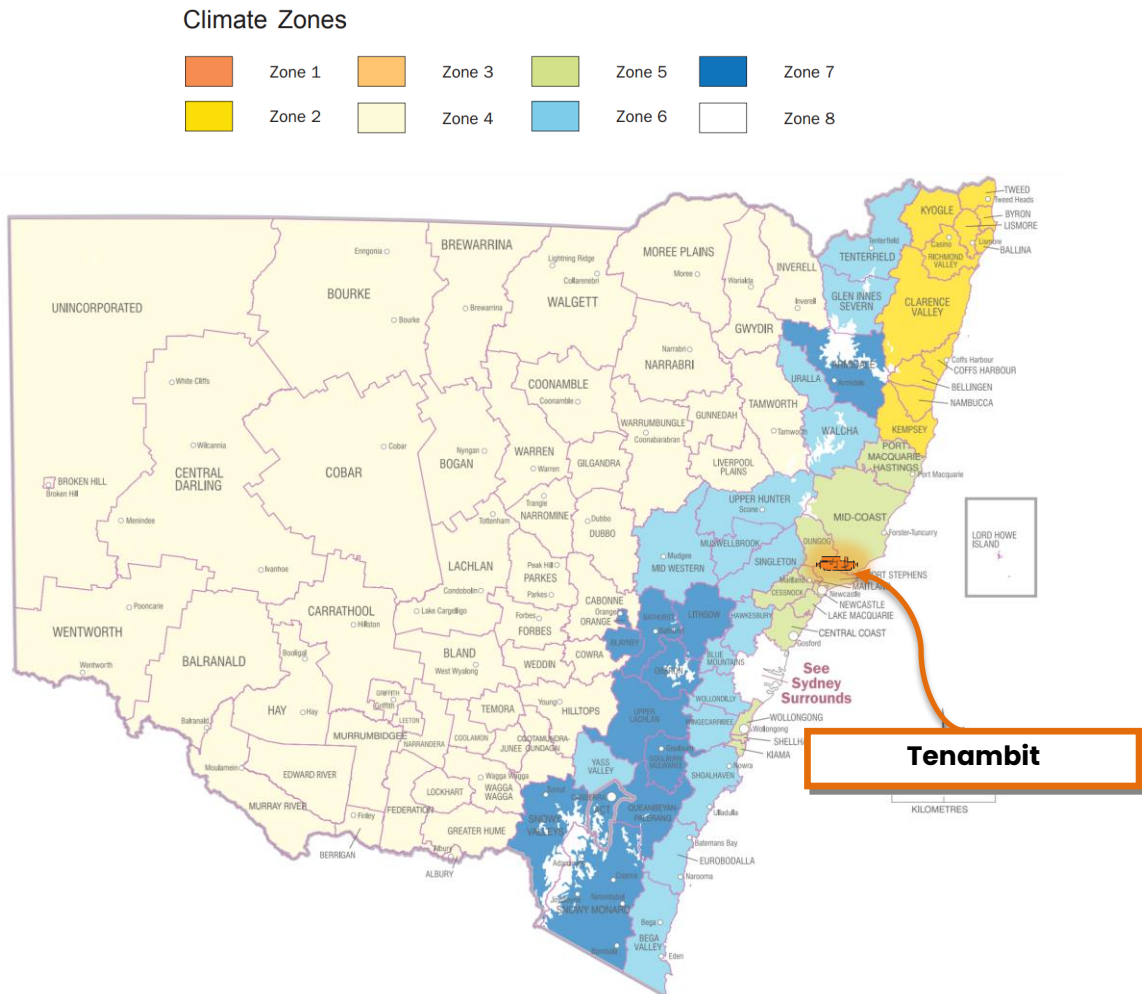
-  Architectural drawings:
-  Section J of the Building Code of Australia (2022)
-  Australian Building Codes Board (ABCB) J1.5 facade calculator 2019
-  [ABCB \(Australian Building Codes Board\) website](https://www.abcb.gov.au/)

Figure 1 – Location of Project on ABCB Climate Zone Map



2.0 Section J Compliance Provisions

Where no details of compliance with Section J are specified within this report it is the responsibility of the individual and relevant disciplines to provide separate Section J Certification e.g. mechanical, electrical, hot water, architectural.

Receiving and reviewing of these certificates by EVC does not relieve the relevant discipline from designing, specifying, and installing (where relevant) complying NCC Section J materials / systems.

Each project stakeholder / design discipline (architect, builder, mechanical, electrical, hydraulic, etc) is responsible to design / specify and install a solution which complies with the National Construction Code relevant to this project and no review undertaken by EVC removes such responsibility of other parties to comply.

Parts J4, J5, J6, J7, J8 and J9 compliance requirements apply to the *Building Envelope* as outlined within this document.

This report makes no comment on any vapour sealing or waterproofing.

All recommended insulations should be verified for their suitability against the compliance requirements within the National Construction Code relevant to this project; in particular but not limited to the compliance requirements of AS 1530.1 for Non-Combustibility.

Extra thickness insulation may be required for fire protection reasons specified by others.

Important Exclusion -

This report does not provide any advice or make any considerations for the compliance with NCC 2022 Specification 43 Bushfire protection for certain Class 9 buildings, in particular S43C9 Internal Tenability (b).

The building structure designer such as the architect should select appropriate construction materials & design the building structure in such a way to comply with NCC 2022 S43C9 Internal Tenability (b).




3.0 Details of Compliance Requirements

3.1 Part J4 – Building Fabric

Application of Part – **Elements identified as forming the building envelope need to comply.** The building envelope is defined as the parts of a building's fabric that separate a conditioned space or habitable room from a non-conditioned space. All R-Values have been adjusted to account for thermal bridging of the associated building fabric – i.e., purlins, wall framing, etc.

The builder is to ensure that all insulation must comply with AS 4859.1 and be installed in accordance with Section J4D3 of the NCC. Insulation installation must be in accordance with AS3999.

Notes:

-  Insulation layer must be continuous and fully envelope the conditioned spaces;
-  It is important to allow insulation to maintain its thickness and not be compressed;
-  Abuts or overlaps adjoining insulation other than at supporting structural members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member.

3.2 Extent of Thermal Envelope

Refer to [Appendix C](#) for thermal envelope mark-ups.

3.3 Details of Building Fabric Element R-Values

The building fabric elements were modelled as outlined below.

3.3.1 Roof Insulation

Part J4D4 of the NCC indicates that a DTS roof and ceiling must have a solar absorptance of no more than **0.45** and achieve a minimum total thermal resistance of **R3.7** downwards for climate zone 5. If a steel frame is to be used, then an R0.2 thermal break is to be applied to the frame.

Metal Roof – Raked Ceiling

Item	DTS Building R-Value	Proposed Building R-Value
Outdoor Air Film	0.03	0.03
Metal Roof	0.00	0.00
DTS Insulation	3.25	-
R1.8 (80mm) Foil Faced Blanket	-	1.21
Plasterboard	0.05	0.05
Indoor air film	0.16	0.16
Total R-Value	3.70	1.45

Metal Roof – Flat Ceiling

Item	DTS Building R-Value	Proposed Building R-Value
Outdoor Air Film	0.03	0.03
Metal Roof	0.00	0.00
DTS Insulation	3.25	-
R1.8 (80mm) Foil Faced Blanket with R2.5 (100mm) Ceiling Batts	-	2.82
Plasterboard	0.05	0.05
Indoor air film	0.16	0.16
Total R-Value	3.70	3.06




3.3.2 Walls

Section J4D6 of the NCC indicates that the total system U-value of wall-glazing construction must not be greater than 2. The ABCB façade (Appendix B) calculator was used for the new walls which make up the building envelope. Table 3 below is a summary of data from the façade calculator that was used in the reference building.

Table 2 – Reference Building Façade Data

Glazing System	DTS Building Average Wall R-value	DTS Glazing U Value (W/m ² K)	DTS SHGC
All Glazing	1.40	2.1	0.18

Notes:

-  The wall constructions below were used to achieve the average wall R-values in Table 3.
-  The model has allowed for either timber or steel stud frames to be used. If a steel frame is to be used, then an R0.2 thermal break is to be applied to the frame.
-  An air gap is normally recommended in external lightweight walls to assist with condensation removal.

External Lightweight Wall

Item	DTS Building R-Value	Proposed Building R-Value
Outdoor Air Film	0.03	0.03
Lightweight Cladding	0.00	0.00
R2.0 (75mm) Insulation	1.18	1.34
Plasterboard	0.07	0.07
Indoor air film	0.12	0.12
Total R-Value	1.40	1.56

3.3.3 Floors

Table J4D7 of the NCC indicates that the total R-value for a DTS slab-on-ground / Suspended Slab in climate zone 5 must be a minimum of R2.0 calculated with a soil R-Value in accordance with Specification of J4D7. The floor constructions below were used to achieve the floor R-values in the models.

Slab on Ground

All slab on ground for this project is deemed to meet the minimum R2.0 requirement as per J4D7(2). No insulation is required.

3.3.4 Details of Glazing Element Performance


The minimum glazing thermal performance has been determined using the J1V3 performance solution compliance method.

Table 4 – Building Glazing Thermal Performance Requirements

Glazing System Type	Proposed Building Glazing Thermal Performance	
All Glazing	Maximum U-Value	Maximum SHGC
	3.8	0.39

Note: Glass U-value & shading co-efficient performance values in this table should be met by the total glazing systems selected. i.e., the combined glass and frame WERS rating must meet these maximum U and SHGC values. The glazing manufacturer should supply a glazing system to equal or better the performance values nominated in this table.

Notes:

 The proposed maximum glazing products & system values nominated above are for information only. These nominations demonstrate that the glazing performance requirements detailed in this report area achievable using commercially available glazing products (refer <https://www.wers.net/werscontent/certified-products-commercial>). It is the responsibility of the architect, contractor, and/or builder to select glazing products which meet the stated U-Value and SHGC performance requirements and raise any concerns in meeting these values if required.

The above glazing was modelled based on VFloat Green & EnergyTech Clear with a 10mm air gap as a guide only.

3.4 Part J5 – Building Sealing

Application of Part – **Elements forming the building envelope need to comply.**

Below is a summary of the recommendations made. For more information refer to Part J5 of Volume One of the National Construction Code.

J5D3 – Chimneys and Flues	
Section J Requirement	Recommendations for Compliance
<i>The chimney or flue of open solid fuel burning appliances must be fitted with a damper or flaps that can be closed to seal the chimney or flue.</i>	Not Applicable to Project.

J5D4 – Roof Lights	
Section J Requirement	Recommendations for Compliance
<i>Roof lights serving conditioned / habitable spaces must be sealed or be capable of being sealed.</i>	Not Applicable to Project.

J5D5 – Windows & Doors	
Section J Requirement	Recommendations for Compliance
<i>A door, openable window or the like must be fitted with seals to limit air infiltration. This does not apply to windows complying with AS2047, a fire or smoke door, or security doors installed only for out-of-hours security.</i>	Door and window seals fitted as required. The seals may be a foam or rubber compressible strip, fibrous seal or the like. The seal for the bottom edge of an external swinging door to be a draft protection device.

J5D5 – Building Entrances	
Section J Requirement	Recommendations for Compliance
<i>An entrance to a conditioned space greater than 50m² must have an airlock, self-closing door, rapid roller door, revolving door or the like. Special conditions apply to cafes, restaurants, open front shops, or the like (see J5D5.4).</i>	All entry doors to the main dining / dancefloor space that are <i>not</i> automatic doors are to be complete with reed switches as nominated by the mechanical services consultant.

J5D5 – Loading Dock Entrance	
Section J Requirement	Recommendations for Compliance
<i>If leading to a conditioned space, a loading dock entrance must be fitted with a rapid roller door or the like.</i>	Not Applicable to Project.

J5D6 – Exhaust Fans	
Section J Requirement	Recommendations for Compliance
<i>Must be fitted with self-closing dampers when serving a conditioned space or habitable room.</i>	All new exhaust fans fitted with self-closing dampers (to be nominated by mechanical services consultant).











J5D7 – Construction of Ceilings, Walls, & Floors	
Section J Requirement	Recommendations for Compliance
<i>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.</i>	Constructed with close fitting lining systems at all junctions.

J5D8 – Evaporative Coolers	
Section J Requirement	Recommendations for Compliance
<i>Must be fitted with self-closing dampers or the like.</i>	Not Applicable to Project.

3.5 Part J6 – Air Conditioning and Ventilation

Air conditioning and ventilation systems for the building need to be designed and certified for compliance with NCC Section J by the **mechanical services consultant**.







This part of Section J includes requirements for:

-  Air-conditioning and mechanical ventilation systems control;
-  Fan systems minimum requirements;
-  Ductwork Insulation;
-  Ductwork sealing;
-  Pump systems;
-  Pipework insulation;
-  Space heating;
-  Refrigerant chillers;
-  Unitary air-conditioning equipment; and
-  Heat rejection equipment.

3.6 Part J7 – Artificial Lighting and Power

Artificial lighting and power systems for this development need to be designed and certified for compliance with NCC Section J by the **electrical services consultant**.

This includes requirements for:

-  Artificial lighting;
-  Interior artificial lighting and power control;
-  Interior decorative and display lighting;
-  Boiling water and chilled water storage units;
-  Lifts; and
-  Escalators and moving walkways.

3.7 Part J8 – Heated Water Supply and Swimming Pool and Spa Pool Plant

Part J7 compliance is the responsibility of the **hydraulic services consultant / contractor**. For additional information refer to Part J7 of Volume One of the National Construction Code.

3.8 Part J9 – Energy monitoring and On-site Distributed Energy Resources

The table below is an indicative guide only. **Part J9 compliance is the responsibility of the hydraulic, electrical and mechanical services consultant / contractor.** For additional information refer to Part J9 of Volume One of the National Construction Code.

Table 6 – Summary of Energy Monitoring & On-site Distributed Energy Resources Requirements

J9D3 – Facilities for Energy Monitoring
Section J Requirements
A building with a floor area of more than 500 m ² must have energy meters configured to record the time-of-use consumption of gas and electricity.
J9D4 – Facilities for Electric Vehicle Charging Equipment
Section J Requirements
Not applicable to project.
J9D5 – Facilities for Solar Photovoltaic and Battery Systems
Section J Requirements
<p>The main electrical switchboard of a building must –</p> <ul style="list-style-type: none"> • Contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for: <ul style="list-style-type: none"> - a solar photovoltaic system; and - a battery system. • Be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area. <p>At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, unless the building:</p> <ul style="list-style-type: none"> - Has installed solar photovoltaic panels on at least 20% of the roof area; or - Has an equivalent generation capacity elsewhere on-site.

4.0 JIV3 Assessment Details

The simulations for the JIV3 verification were carried out using Design Builder EnergyPlus simulation software. This is a simulation software which has been BESTTEST approved. The simulation was carried out and supervised by suitably qualified and experienced simulators.

4.1 Simulation Inputs

The inputs outlined below are in accordance with verification method JIV3 specified in Section J of the NCC & Specification 34 Modelling Parameters for JIV3.


4.1.1 Building Envelope Fabric

The building envelope fabric was input into the model as outlined in Section 4.

The solar absorptance factors were modelled as 0.6 for walls and 0.45 for roofs for the reference building and proposed building.

4.1.2 Occupancy & Operating Schedules

The operation and occupancy schedules were modelled in accordance with the following tables from the NCC specification S35C2:

 Table S35C2e Occupancy and operation profiles of a Class 9B.

4.1.3 Lighting Power Densities

Lighting power densities were modelling as per Table J7D3a “Maximum illumination power density”.

4.1.4 Appliances and Equipment Loads

Equipment loads were included for all areas using the operating schedule identified above as specified in Table S35C2e “Internal heat gains for appliances and equipment”.

People loads were applied to the model as specified in Table S35C2n “Internal heat gains for occupants and hot meals” of the NCC.

4.1.5 HVAC Systems

The same air conditioning systems have been used in both the reference and proposed building model. The air conditioning zone set point temperatures used in both models were 24°C in cooling and 21°C in heating.

4.1.6 Hot Water Systems & Lifts

The annual energy consumption of hot water services & lifts has been omitted as per clause S34C4 (h) of the NCC.

4.1.7 Temperature Data

The Newcastle Airport data included within the modelling software was used in the model.

4.2 Simulation Outputs

The summarised data in Table 8 below demonstrates the proposed building meets the requirements of specification JIV3 (1)(a)(ii) and the predicted GHG emissions of the proposed building is less than that of the reference building.

For a minimum of 98% of the plant operation time, both models space temperatures were modelled between 18 and 25°C CDB for condition spaces with transitory occupancy and 21 and 24°C CDB in all other conditioned spaces.



The proposed building achieves a thermal comfort level of between a Predicted Mean Vote (PMV) of -1 to +1 across not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation as required by JIV3.

Hours of operation are defined as the hours when the occupancy of the zone is greater than 20% of its peak occupancy.

Table 8 – Simulated GHG Emissions Summary

Simulated GHG Emissions Summary	
DTS Building Electricity [kgCO ₂ -e]	26,355
Proposed Building Electricity [kgCO ₂ -e]	23,106

Notes:

-  The totals outlined are not predicted total energy usage for the building. These totals have been prepared for the purpose of comparing different building components and the for the purpose of showing compliance with Section J of the NCC.
-  The proposed building energy has not been offset by any renewable energy generated and used on site. The calculation method used complies with JIV3 (3) (a) & (b).

Appendix A – NCC Section J Compliance Certificate

This certificate is issued as 'evidence of suitability' under Clause A2G2 (2)(b)(i) of the Building Code of Australia. This certificate allows for the certification of both design and completed (built) energy efficiency building components and services as prescribed in Section J of the Building Code of Australia (NCC 2022).

Project Details:	Morperth Gardens – Proposed Country Club
Address:	39 Metford Road, Tenambit NSW 2323
Project No:	23192
Building Class:	Class 9B – Assembly Building.
Climate Zone:	5
Report Date:	15 April 2024
Documentation Drawings:	Architectural drawings: Proposed Country Club Morpeth Gardens – Final Revised Concept, Revision 7, Issued 10/11/2023

NCC Section J Compliance

Design:

- ✓ I certify that the energy efficiency systems and elements as identified below and as detailed in the nominated drawings / specification and Designer statements, indicate compliance with the specified part of Section J of the NCC; or

Installation / Construction:

- ✓ **Section J – Energy Efficiency.** This indicates that the building or part identified complies fully with **Parts J1 to J8** (see below) of the Building Code of Australia;
OR

The following nominated energy efficiency elements / systems are certified

- ✓ **Part J4 – Building Fabric**
- Part J5 – Building Sealing**
- Part J6 – Air Conditioning and Ventilation**
- Part J7 – Artificial Lighting and Power**
- Part J8 – Hot Water Supply and Swimming Pool and Spa Pool Plant**
- Part J9 – Facilities for Energy Monitoring**

This certificate is issued as 'evidence of suitability' under Clause A2G2 (2)(b)(i) of the Building Code of Australia. This certificate allows for the certification of both design and completed (built) energy efficiency building components and services as prescribed in Section J of the Building Code of Australia (NCC 2022).

Compliance

The proposed development will comply with Section J of the NCC 2022 if built in accordance with the referenced plans and the details and recommendations contained within this report. The success of the suggested compliance initiatives will depend on the details being integrated into the drawings and specifications and these initiatives then being built in the final works. Where details are not clear or need to be confirmed, please consult with the report author.

Certifier Details

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Signature:



Date:

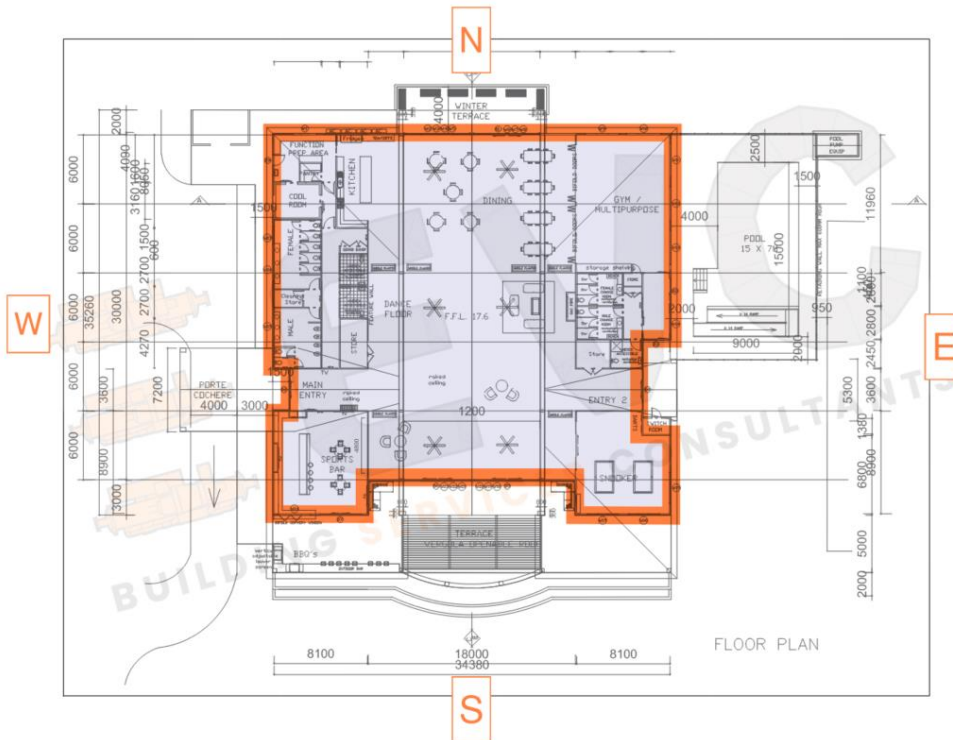
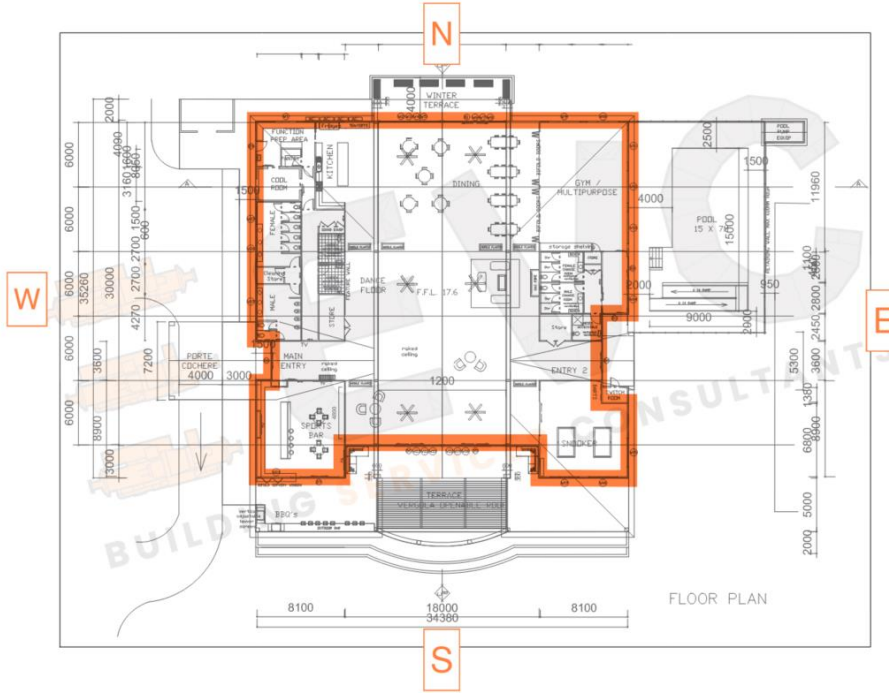
15/04/2024

Appendix B – Building Envelope Markups

Please note markups are not to scale

Legend

- 
Extent of Building Envelope
- 
Metal Roof
- 
Slab on Ground
- 
Suspended Slab



Appendix C – COLORBOND® Colour Reference Tables

Table 1 – Classification of COLORBOND® steel Colours for NCC and BASIX for the COLORBOND® steel Standard 22 Colours

Colour	Solar Absorbance	BCA Classification	BASIX Classification
Cove™	0.54	M	M
Mangrove®	0.64	D	M
Gully™	0.63	D	M
Wallaby®	0.64	D	M
Terrain®	0.69	D	M
Basalt®	0.69	D	M
Nightsky®	0.96	D	D
Classic Cream™	0.32	L	L
Surfmist®	0.32	L	L
Paperbark®	0.42	M	L
Evening Haze®	0.43	M	L
Shale Grey™	0.43	M	L
Dune®	0.47	M	L
Windspray®	0.58	M	M
Pale Eucalypt®	0.60	M	M
Jasper®	0.68	D	M
Manor Red®	0.69	D	M
Woodland Grey®	0.71	D	D
Monument®	0.73	D	D
Ironstone®	0.74	D	D
Cottage Green®	0.75	D	D
Deep Ocean®	0.75	D	D

Table 2 – Classification of COLORBOND® Metallic steel for NCC and BASIX

Colour	Solar Absorptance	BCA Classification	BASIX Classification
Galactic™	0.34	L	L
Cosmic™	0.39	L	L
Rhea™	0.49	M	M
Astro®	0.62	D	M
Aries™	0.70	D	M
Celestian™	0.93	D	D

Table 3 – Classification of COLORBOND® Coolmax steel for NCC and BASIX

Colour	Solar Absorptance	BCA Classification	BASIX Classification
Whitehaven®	0.23	L	L