REF: 201467-01BCA-Final.docx

BUILDING CODE OF AUSTRALIA REPORT

Revision: A 2020

Bringelly Road Business Hub - Warehouse / Industrial Facility, Bringelly Road, NSW

Prepared for: ESR Australia

Document Disclaimer

This document has been prepared solely for the use of our client in accordance with our current professional standards and as per our agreement for providing compliance consulting services. Although all due care has been taken in the preparation of this document, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

This document represents the opinions of McKenzie Group Consulting based on the facts and matters known at the time of preparation of this document. Opinions, judgments and recommendations detailed in this document, which are based on our understanding and interpretation of current statutory and regulatory obligations and standards, should not be construed as legal opinions.

Table of Contents

Executive Summary 4
1.0 Introduction 6
2.0 PRELIMINARIES 6
3.0 FIRE PROTECTION 7
4.0 EGRESS PROVISIONS 8
5.0 ACCESS FOR PEOPLE WITH DISABILITIES 10
6.0 FIRE SERVICES AND EQUIPMENT 13
7.0 HEALTH AND AMENITY 15
8.0 ENERGY EFFICIENCY 17
Appendix A - Design Documentation 19
Appendix B - Draft Fire Safety Schedule 20
Appendix C- Fire Resistance Levels 21

Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
31.07.20	A	21	Preliminary BCA report	Alison Domenici	Vanessa Hinge	31.07.20
17.08.20	B	21	Final BCA report	Alison Domenici	Vanessa Hinge	17.08.20

Executive Summary

Development Overview

The proposed development comprises the construction of a warehouse facility with on-ground parking and associated office, located at Bringelly Road Business Hub, Bringelly Road, NSW.

Compliance Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by ESR (refer appendix A) for compliance with the Building Code of Australia 2019 (amendment 1).

In this regard the following areas in particular require further review:

No.	Items for review	Responsibility
1.	Please advise if there are any proposed alternative building solutions with regard to design of the building services for the project.	Services Consultants
2.	Access and facilities for people with disabilities	Architect
3.	Sanitary provisions for the occupants of the building to be clarified for the warehouse.	Architect

The assessment of the design documentation has revealed that the following areas may be considered to be assessed against the relevant performance requirements of the BCA, where design amendments are not able to be provided. The submission for Construction certificate will need to include verification from a suitably accredited fire engineer: -

No.	Alternative Solution Description	DTS Clause	Performance Requirement
Fire Safety Items			
1.	Continuous unobstructed perimeter vehicle access is not proposed due to: ○ Awnings located over the driveway to East and West; ○ Boom gate and sliding gate is proposed to South driveway entry/exit ○ Staff outdoor area restricts location of vehicular path within 18m of the building. The use and make up of this part also to be further identified in design development; ○ Generators/stormwater tanks and ancillary equipment to the building is located on the West elevation affecting perimeter vehicular access as this	C2.3 & C2.4	CP9
2.	External fire hydrants are likely to be installed under awnings to the East and West utilising two (2) lengths of 30m fire hose for the purposes of achieving fire hydrant coverage.	E1.3	EP1.3

3.	Smoke exhaust is likely to be rationalised to reduce smoke exhaust quantity.	E2.2	EP2.2
4.	Directional and non-directional exit signs are likely to be required to be mounted more than 2.7m from the FFL which does not comply with AS2293.1-2018.	E4.5	EP4.2
5.	The following travel distance may require design alteration or a performance solution to justify compliance is achieved: (a) Greater than 40m to the exit (180m) to the warehouse: (b) Greater than 60m between exits (180m) to the warehouse (c) Less than 9m between exits (8.4m) to the office	D1.4, D1.5	DP4, DP5, EP2.2
Accessibility items			
6.	Door circulation spaces in accordance with AS1428.1 not provided to: • Access to the kitchenette to the dock office to the South at ground; • Access to the corridor for accessible WC to the office at level 1	D3.3	DP1
7.	Lift access not provided to dock offices.	D3.2	DP1

The Performance Solutions relating to CP9 and EP2.2 of the BCA will be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

1.0 Introduction

The proposed development comprises the construction of a warehouse with ancillary office with on-ground parking, located at Bringelly Road Business Hub, Bringelly Road, NSW.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the design is developed.

1.1 Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate. For the purposes of this Report, BCA 2019 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

2.0 PRELIMINARIES

2.1 Building Assessment Data

Summary of Construction Determination: -

Part of Project	
Classification	5, 7b, 8
Number of Storeys	2
Rise In Storeys	2
Type of Construction	C
Effective Height (m)	<12m

Summary of the floor areas and relevant populations where applicable: -

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Warehouse / Industrial	7b, 8	34,744 m^2	TBA	1158*
Office	5	1225 m^2	TBA	123*

Notes:

- Population numbers for the warehouse have been determined based upon either workshop or storage facility under D1.13 of the BCA as the use is unknown (i.e. 30m^2 per person) therefore these tend to be conservative

2.2 Structural Provisions (BCA B1)

Any new structural works are to comply with the applicable requirements of AS/NZS 1170.1.

Glazing is to comply with AS1288, and AS2047.

Prior to the issue of the Construction Certificate structural certification is required to be provided, including determination of the importance level of the development.

2.3 Development Approval

A Development Approval will be required from Council for the development. A copy of the Development Approval conditions and approved drawings will be required prior to the issuing of the Construction Certificate for the relevant component of works.

3.0 FIRE PROTECTION

3.1 Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the Building, the building is required to be **Type C Construction** in accordance with Table 5 & 5.9 of Specification C1.1 of the Building Code of Australia 2019 Amendment 1.

The subject development has been considered as a Large Isolated Building and the following provisions will apply:

- Automatic sprinkler protection to AS2118.1 and BCA Specifications E1.5 throughout the development / smoke detection and alarm system in accordance with AS1670,

- Perimeter emergency vehicular access must:

  (a) be 6m wide located within 18m of the entire building perimeter, with no part of the 6m width to be built upon or used for any purpose other than vehicular or pedestrian movement;
  (b) be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and
  (c) have a loadbearing capacity and unobstructed height to permit the operation and passage of fire brigade vehicles;
  (d) be wholly within the allotment except that a public road may serve as the vehicular access or part thereof subject to meeting the requirements under C2.4 (b)

Continuous unobstructed perimeter vehicle access is not proposed due to:

- Awnings located over the driveway to East and West;
- Boom gate and sliding gate is proposed to South driveway entry/exit
- Staff outdoor area restricts location of vehicular path within 18m of the building. The use and make up of this part also to be further identified in design development;
- Generators/stormwater tanks and ancillary equipment to the building is located on the West elevation affecting perimeter vehicular access as this

Central verges/islands are also indicated on the vehicular driveway. It should be clarified that this these are for no other purpose than vehicular or pedestrian movement.

Perimeter vehicle access therefore is not currently complying with prescriptive approach and subject to a design team review may be assessed under a Performance Solution in accordance with Performance Requirement CP9 of the BCA.

Smoke exhaust is required throughout the development. It is likely that the performance of the Smoke Exhaust system may require to be rationalised via a Performance Solution for the site in accordance with Performance Requirement EP2.2 of the BCA.

3.2 Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type C Construction, Please refer to Appendix C of this report which outlines the required fire rating to be achieved by the development.

3.3 Fire Hazard Properties (BCA C1.10 and Specification C1.10)

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 Building Code of Australia. The following requirements apply:

Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than (1.2) kW/m2

b) Wall and Ceiling Linings – Material Group No.1, 2 or 3.

4.0 EGRESS PROVISIONS

4.1 Provisions for Escape (BCA D1)

The egress provisions from the proposed building will be provided by:

- Required non-fire isolated stairways; and
- Single swing exit doors direct to open space

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Stair construction
- Handrail and balustrade construction

4.2 Exit Travel Distances (BCA D1.4)

The travel distances to exits should not exceed:

Class 5-9

- 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and

- exits shall be located to not be more than 60m apart and not closer than 9m

The review of the building indicates that the deemed to satisfy requirements in terms of travel distances would be satisfied, with the exception of the following areas:

(a) Greater than 40m to the exit to the warehouse
(b) Greater than 60m between exits to the warehouse
(c) Less than 9m apart to the office (8.4m)

Where redesign alteration is not provided to comply with the prescriptive provisions of the BCA these areas would need to be assessed under a fire engineered solution as appropriate to ensure that the performance provisions of the BCA are met.

Further detailing will also be required to show the stair arrangements compliance with part D2.

4.3 Dimensions of Exits (BCA D1.6)

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657 in which case a 600mm clear width is required).

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e. minimum 920 mm doors).

The exit doors and stairs appear to be able to comply with this provision.

4.4 Balustrading and Handrails (BCA D2.16 and BCA D2.17)

Generally

Balustrading to a height of 1000mm with a maximum opening of 125mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm.

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs.

The public stairs and ramps located along an accessible path of travel should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

4.5 Swinging Doors (BCA D2.20)

All proposed exit doors should swing outwards in the direction of egress as required by Clause D2.20. the exit doors to the office are not indicated in the direction of egress and should be altered to comply prescriptively or a performance solution may be provided to justify the direction of opening meeting the performance provisions of the BCA.

4.6 Slip Resistance

The following requirements apply for slip resistance of stairway treads and ramp surfaces:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

5.0 ACCESS FOR PEOPLE WITH DISABILITIES

5.1 General Building Access Requirements (BCA D3.1)

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2019 Amendment 1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work
- AS1428.4.1-2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Warehouse and production/Manufacturing facilities/Storage

To and within all areas normally used by the occupants, but as the uses of these areas could be deemed inappropriate, confirmation is required as the appropriateness of the areas in question by the owner or tenant.

5.2 Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle public entry and at least 50% of all other entrances
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the public.

In buildings over 500m^2 in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

And where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the door leaves must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the door leaves must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

It is noted that the both dock offices do not have lift access. Access is required to be provided to all areas normally used by the occupants. Lift access to be provided in accordance with D3.2 and facilities in accordance with E3.6 of the BCA.

5.3 Provisions for Access within Buildings (BCA D3.3)

A building required to be accessible is required to be equipped with either an AS1428.1 compliant lift or AS1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3;
- Doorways must have a clear opening of 850mm;
- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface
- Any glazed capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS1288 requirements)

The design does not indicate all details for this assessment. Further details to be provided to determine compliance.

However, the following areas were noted as not complying with prescriptive approach to compliance. Door circulation spaces were not provided to the doors in the following areas:

- Access to the kitchenette to the dock office to the South at ground;
- Access to the corridor for accessible WC to the office at level 1

The use of these areas to be further detailed and resolved through an Access Consultant where redesign can not occur.

5.4 Car parking (BCA D3.5)

Accessible car parking spaces are required to comply with AS 2890.6-2009 at the rate of 1 space for every 100 carparking spaces.

The development is proposed to contain 231 car parking spaces which requires a minimum of 3 accessible spaces. Three spaces have been indicated on the plan provided.

A ‘shared zone’ of minimum 5400mm x 2400mm is required adjacent to accessible car parking spaces, protected with a bollard.

5.5 Tactile Indicators (BCA D3.8)

Tactile indicators are required to be provided to warn occupants of all stairs and ramps regardless of public nature or private environment and where an overhead obstruction occurs less than 2.0m above the finished floor level.

5.6 Stairs (BCA D3.3 inter Alia AS1428.1)

Stairs shall be constructed as follows:

a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail TGSIs do not protrude into the transverse path of travel.
b) Where the intersection is at an internal corridor, the stair shall be set back in 300mm, so the handrails do not protrude into transverse path of travel.
c) Stairs shall have opaque risers.
d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
e) Stair nosing profiles shall-
    - Have a sharp intersection;
    - Be rounded up to 5mm radius; or
    - Be chamfered up to 5mm x 5mm
f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

5.7 Provisions for Accessible Sanitary Facilities (BCA F2.4)

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary towels and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Office and industrial/warehouse buildings	a) 1 on every storey containing sanitary compartments; and b) Where a storey has more than 1 bank of sanitary compartments containing male and female sanitary compartments, at not less than 50% of those banks.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS1428.1-2009.

Accessible WC and ambulant facilities have been indicated on plans. Detailing of the accessible and ambulant sanitary facilities to be provided as part of detailed design documentation.

5.8 Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating 'EXIT' and 'Level" number

Details to be provided in Construction Certificate documentation.

5.9 Glazing on an accessway (BCA D3.12)

On an accessway, where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or opening, must be clearly marked in accordance with AS1428.1

5.10 Passenger lifts (BCA E3.6)

Lifts provided to the building for accessibility must be a type identified in Table E3.6a, have accessible features in accordance with Table E3.6b and not rely on a constant pressure device for its operation if the lift is fully enclosed.

Details to be provided in detailed design documentation. Please also note comments in D3.2 above in respect of no access to dock offices.

6.0 FIRE SERVICES AND EQUIPMENT

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

6.1 Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005, please provide pressure and flow calculations for review.

The building is required to be provided with a booster assembly as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, the booster is to be located at the main vehicle entry and within sight of the main entry of the building within 20m of a hardstand area.

External fire hydrants are likely to be located beneath the covered awnings whilst utilising two (2) lengths of 30m fire hose for the purposes of achieving fire hydrant coverage. If this prescriptive non-compliance occurs it would be required to be addressed via Performance Solution in accordance with Performance Requirement EP1.3.

6.2 Fire Hose Reels (BCA E1.4)

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005 to all parts of the warehouse building. Fire hose reels are not needed however to the office component, and therefore portable fire extinguishers are required to be provided in these areas in accordance with BCA E1.6.

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length. Where required, additional fire hose reels shall be located internally as required to provide coverage.

6.3 Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444-2001 to be provided as per the below.

Table E1.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
General provisions – Class 2 to 9 buildings (except within sole-occupancy units of a Class 9c building)	(a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) (b) To cover Class F fire risks involving cooking oils and fats in kitchens. (c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles). (d) To cover Class A fire risks in normally occupied fire compartments less than 500m^2 not provided with fire hose reels (excluding open deck carparks). (e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels. (f) To cover Class A fire risks associated with Class 2 or 3 or 5 building or class 4 part of building.

Fire extinguishers are to be located in accordance with AS 2444, often collocated with fire hydrants and/or fire hose reels.

6.4 Automatic Sprinkler Protection (BCA E1.5)

As the building is considered a Large Isolated Building, an Automatic sprinkler protection is required to serve the entire building in accordance with Specification E1.5 and AS2118.1-2017.

Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review.

An occupant warning system should be provided in accordance with BCA Specification E1.5.

6.5 Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with AS/NZS2293.1-2018

Where directional and non-directional exit signs are proposed to be mounted more than 2.7m from the FFL this will not comply with AS/NZS2293.1-2018.This prescriptive non-compliance would be required to be addressed via Performance Solution in accordance with Performance Requirement EP4.2 of the BCA.

6.6 Smoke Hazard Management (BCA E2.2)

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Automatic Smoke Exhaust System in accordance with the requirements of BCA Spec E2.2b and activated by smoke detectors complying with Specification E2.2b

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry.

Any variation to the prescriptive provisions will require the consent of the fire brigade and should form part of the fire safety engineering report to verify the performance requirements of the BCA.

6.7 Fire Control Centres (BCA E1.8)

A fire control centre facility in accordance with Specification E1.8 must be provided for the building as it has a total floor are of more than 18,000m^2.

Details to be provided in Construction Certificate documentation.

7.0 HEALTH AND AMENITY

7.1 Sanitary Facilities (BCA F2.2 and BCA F2.3)

Bathroom Construction

Where bathrooms or rooms containing water closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

Offices/ Warehouses

Separate sanitary facilities are required to be provided for male & female employees at a rate at the following.

The following table summarises the sanitary facilities required:

Sanitary Facilities required for offices			
	WC	Urinals	Basins
Male	4	3	3
Female	5	0	3
Accessible	1	0	1
The Above Facilities are adequate for 62 males & 62 females			
Sanitary Facilities required for offices			
	WC	Urinals	Basins
Male	29	13	29
Female	39	0	29
Accessible	1	0	1
The Above Facilities are adequate for 579 males & 579 females			

There are adequate facilities indicated for the offices.

However as indicated above due to the high levels of employees determined under D1.13 of the BCA the numbers of sanitary facilities required for the warehouse are large and are not yet indicated as complying. It is anticipated that there numbers will be rationalised post development consent.

7.2 Light and Ventilation (BCA Part F4)

Class 5, 6, 7, 8 & 9

Natural Ventilation is required to be provided to rooms at a rate of 5% of the floor area in openings. Alternatively, mechanical ventilation is required in accordance with AS1668.2-2012.

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

7.3 Condensation management (BCA Part F6)

Pliable building membranes installed to an external wall must:

- achieve compliance with AS 4200.1, and
- be installed in accordance with AS4200.2, and
- be a vapour permeable membrane (applicable as the development is in climate zone 7); and
- be located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single sin concrete be separated from water sensitive materials.

Exhaust systems must achieve a minimum flow rate of 25L/s for bathrooms and sanitary compartments must discharge directly or via a duct to outdoor air or to a roof space that is ventilated.

Kitchens and laundries to achieve a minimum flow rate 40L/s and discharge directly or via a shaft or duct to outdoor air.

Exhaust systems discharging directly or via a shaft or a duct to a roof space must be through evenly distributed systems. Openings for minimum flow requirements must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is greater than 22º. 30% of the total unobstructed area required for exhaust being discharged directly or via a shaft or duct to outdoor air must be located not more than 900 mm below the ridge or highest point of the roof space.

7.4 Weatherproofing of External Walls (BCA FP1.4)

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with for the Class 5 office portion of the building. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building complies with Performance Requirement FP1.4 which reads as follows:

> *A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—*
>
> *a) unhealthy or dangerous conditions, or loss of amenity for occupants; and*
> *b) undue dampness or deterioration of building elements.*

8.0 ENERGY EFFICIENCY

Efficient energy use must be achieved appropriate to the function and use of the building, level of human comfort, solar radiation, energy source of the services and sealing of the building envelope. To achieve this JV1, JV2, JV3 and JV4 verification methods have been introduced as options available to achieve compliance.

It is noted that a deemed to satisfy pathway is still available.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved.

Verification Methods

The Verification Methods available to demonstrate compliance with the BCA on a performance basis are as follows:

<u>JV1 NABERS Energy for Offices</u>

- To achieve compliance with JP1 a class 5 building must achieve a minimum of 5.5 NABERS Energy for Offices Base Building Commitment Agreement and comply with ANSI/ASHRAI Standard 140.
- To achieve the energy model for (JP1 (i)) solar radiation the base buildings greenhouse gas emissions are not more than 67% of the 5.5 star level when excluding:
  - Tenant supplementary heating; and
  - Cooling systems; and
  - External lighting; and
  - Car park services.
  - A thermal comfort level between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% f annual hours of operation.
- The building also need to comply with additional requirements of Spec JVa.

<u>JV2 Green Star</u>

- To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings Green Star can be used as a verification method when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:

- The building complies with simulation requirements and is registers for a Green Star – Design & As-Built rating; and
- The annual greenhouse gas emissions of the proposed building are less than 90% of the annual greenhouse gas emissions of the reference building; and
- In the proposed building, a thermal comfort level of between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation of the building; and
- The building complies with the additional requirements of Specification JVa.

JV3 Verification Using a Reference Building

- To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings verification using a reference building can be used when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:
  - It is determined that the annual greenhouse gas emissions of the proposed building are not more than the annual greenhouse gas emissions of a reference building when the proposed building is modelled with the proposed services and the proposed building is modelled with the same services as the reference building. The proposed building thermal comfort level is to be between predicted mean vote 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; and
  - The building achieves the additional requirements in Specification JVa; and
  - The greenhouse gas emissions of the proposed building may be offset by renewable energy generated and use on site and another process such as reclaimed energy used on site.

JV4 Building Envelope Sealing

- Compliance with sealing of the building against air leakage is verified when the envelope is sealed at an air permeability rate tested in accordance with Method 1 of AS/NZS ISO 9972, of not more than –
  - For a class 2 building or a class 4 part of a building, 10m^3hr.m^2 at 50 Pa reference pressure; or
  - For a class 5, 6, 8, 9a or 9b building other than a ward area in climate zones 1, 7 and 8, 5 m^3/hr.m^2 at 50 Pa reference pressure; or
  - For class 3 or 9c building, or a class 9a ward area in climate zones 1, 3, 4, 6, 7 and 8 5m^3/hr.m^2 at 50 Pa reference pressure.
- Part J3 and performance solution that uses on of the other NCC assessment Methods which verifies that compliance with JP1 (e) will be achieve can also be used as verification methods.

Appendix A - Design Documentation

The following documentation was used in the assessment and preparation of this report: -

Drawing No.	Title	Date	Drawn By	Rev
DA101	Site Plan	14.08.20	ESR	A
DA900	Area Plans	14.08.20	ESR	A
FS14-200	Section & North & South Elevation	1.06.20	ESR	B

Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
2.	Automatic Smoke Detection and Alarm System	BCA Spec. E2.2a, AS 1670.1 – 2018, AS/NZS 1668.1 – 2015,
3.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 2017 Amdt 1,
4.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & Specification E2.2a Clause 7
5.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2018
6.	Exit Signs	BCA Clauses E4.5 & E4.8 and AS/NZS 2293.1 – 2018
7.	Fire Control Centres and Rooms	BCA Spec. E1.8
8.	Fire Blankets	BCA Clause E1.6 and AS 2444 – 2001
9.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
10.	Fire Hydrant System	Clause C2.12, E1.3 & AS 2419.1 – 2005 Amdt 1
11.	Mechanical Air Handling System – smoke exhaust	Specification E2.2b, AS/NZS 1668.1 – 2015
12.	Paths of Travel	EP&A Reg 2000 Clause 186
13.	Perimeter Vehicular Access	BCA Clause C2.4
14.	Portable Fire Extinguishers	BCA Clause E1.6 &, AS 2444 – 2001
15.	Required Exit Doors (power operated)	BCA Clause D2.19 (b)(iv)
16.	Warning and Operational Signs	BCA Clause E3.3

Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2019 Amendment 1:

Table 5 TYPE C CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is—				
Less than 1.5 m	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
1.5 to less than 3 m	–/–/–	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
INTERNAL WALLS-				
Bounding *public corridors*, public lobbies and the like—	60 / 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—	60/ 60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated—	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–