mckenzie group

A Bureau Veritas Group Company

Regulatory Compliance Report

Redfern Place
600-660 Elizabeth St, Redfern

Prepared for: **Bridge Housing**
Date: **21 June 2024**
Revision: **F**

Table of Contents

Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
22.05.24	A	55	SSDA Submission - Draft for Stakeholder Review	Patrick Hazzouri	Tse Min Chang	24.05.24
5.06.24	B	52	SSDA Submission – Updated Draft for Stakeholder Review	Tse Min Chang	-	-
12.06.24	C	57	SSDA Submission – Final incorporating Stakeholder Comments	Tse Min Chang	Paul Curjak	12.06.24
17.06.24	D	62	SSDA Submission – Updated Final	Tse Min Chang	Paul Curjak	17.06.24
20.06.24	E	62	SSDA Submission – Final (updated drawing revision)	Tse Min Chang	Paul Curjak	20.06.24
21.06.24	F	62	SSDA Submission – Final (minor update)	Tse Min Chang	Paul Curjak	21.06.24

1. Executive Summary

Development Overview

This report accompanies a detailed State Significant Development Application that seeks approval for a mixed-use development at 600-660 Elizabeth Street, Redfern (Redfern Place). The development proposes four buildings comprising community facilities, commercial/office, affordable/social/specialist disability housing apartments and new public links and landscaping.

The project site comprises Lot 1 in DP 1249145. It has an area of approximately 10850m^2. Part of the site currently accommodates the existing Police Citizens Youth Club (PCYC) (to be demolished and replaced). The remaining portion of the site is vacant with remnant vegetation.

The SSDA seeks approval for redevelopment of the site, including:

- Demolition of existing buildings.
- Tree removal.
- Bulk earthworks including excavation.
- Construction of a community facility building known as Building S1.
- Construction of two residential flat buildings (known as Buildings S2 and S3) up to 14 and 10 storeys respectively, for social and affordable housing.
- Construction of a five-storey mixed use building (known as Building S4) comprising commercial uses on the ground level and social and specialist disability housing above.
- Construction of one basement level below Buildings S2, S3 and part of S4 with vehicle access from Kettle Street.
- Site-wide landscaping and public domain works including north-south and east-west pedestrian through-site link.

For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

There are four buildings located on the site. Buildings S2, S3 and S4 are considered as a single united building due to the shared basement carpark below. Building S1 is considered as a separate building located on the same allotment.

Compliance Summary

As Registered Certifiers we have reviewed the concept architectural design documents prepared by Architecture AND, Silvester Fuller and Hayball (refer appendix A) for compliance with the building assessment provisions currently outlined in Building Code of Australia (BCA) 2022, as current project timeframes indicate that BCA 2022 will be that which applies to the development.

The design documentation reviewed nominates both a prescriptive and performance-based method of achieving compliance with the BCA. This report has been prepared in response to SEARs 4 requirements, to provide a high-level summary of the BCA provisions applicable to the project and will assist in the further development of design as the project progress through design phases.

Extract with regards to SEARs 4 requirements is as follow

4. Built Form and Urban Design • Explain and illustrate the proposed built form, including a detailed site and context analysis to justify the proposed site planning and design approach. • Demonstrate how the proposed built form (layout, height, bulk, scale, separation, setbacks, interface and articulation) addresses and responds to the context, site characteristics, streetscape and existing and future character of the locality. • Demonstrate how the building design will deliver a high-quality development, including consideration of façade design, articulation, activation, roof design, materials, finishes, colours, any signage and integration of services. • Assess how the development complies with the relevant accessibility requirements.	• Architectural drawings • Design Report • Survey Plan • Building Code of Australia Compliance Report • Accessibility Report

The current design is generally considered to be capable of complying with BCA. Further assessment of the design will be required as the design develops to ensure compliance as part of the application for construction certificate/ complying development certificate.

Deviations from the Deemed-to-Satisfy Provisions

The assessment of the schematic design documentation has revealed that the following areas deviate from the deemed-to-satisfy provisions of the BCA. These items are to be addressed to ensure compliance is achieved, either through design amendment to achieve compliance with the deemed-to-satisfy provisions, or through a performance solution demonstrating compliance with the Performance Requirements of the BCA:

No.	Description	DTS Clause	Performance Requirements
Fire Safety Items			
1	**Fire Resistant Construction - S2/S3/S4** • The storage usage within the Basement level exceeds 10% of the storey floor area (up to 23%), where FRL 240 mins apply. • Reduced slab thickness within residential apartments wet areas (reducing the FRL achieved)	C2D5, Spec 5	C1P1, C1P2, C1P8
2	**Residential Corridor Bounding Construction – S2/S3/S4** Non fire rated/ glazed constructions are proposed to public corridors within the residential levels. • S2 – Level 10 to 13 • S3 – Levels 5 to 9 • S4 – Levels 1 to 4	C3D9, Spec 5, C4D12	C1P1, C1P2, C1P8
3	**Travel via Fire-isolated Exits – S1/S2/S3** • The path of travel from the point of discharge at the fire isolated exit necessitates passing within 6m of the external wall of the building. ○ S1 – east elevation ○ S2 – south elevation ○ S3 – north and south elevations facing internal courtyard • Fire stairs at S2 (scissor stair) discharges internally in lieu of directly to outside	D2D12	C1P2, D1P4, D1P5, E2P2,
4	**Combustible Material – S1/S2/S3/S4** Use of combustible materials (such as timber noggin) within external wall (TBC)	C2D2, Spec 5, C2D10	C1P2
5	**Travel via Non-Fire Isolated Exits – S1** The travel distance from the furthest point (ie. Level 2 boxing/ gymnasium) to exit at Ground is 85m (in lieu of 80m)	D2D14	D1P4, E2P2,
6	**Smoke Control System – S1**	E2D20, Spec 21	E2P2

No.	Description	DTS Clause	Performance Requirements
	Based on single fire compartment for the building, the fire compartment size exceeds 2000m^2, which require provision of smoke exhaust as the building is a multi-use building, incorporating hall and sports venue.		

7	**Travel Distance to Exits – S1/S2/S3/S4**
	
	The following extended travel distances are noted:
	• Basement – 29m to a point of choice in lieu of 20m, 45m to exit in lieu of 40m
	• Ground
	  ○ S2 (SOU) – 8m to a point of choice in lieu of 6m
	• Ground to Levels 4, 7 to 9
	  ○ S3 (SOU) – 9m to a point of choice in lieu of 6m
	• Level 1 to 4
	  ○ S4 (SOU) – 10m to a point of choice in lieu of 6m
	• Level 2
	  ○ S1 – 30m to a point of choice in lieu of 20m
	• Level 4
	  ○ S3 – 25m to a point of choice in lieu of 20m
	  ○ S4 – 24m to a point of choice in lieu of 20m
	• Level 5 & 6
	  ○ S3 (SOU) – 15m to a point of choice in lieu of 6m
	• Level 10-13
	  ○ S2 (SOU) – 10m to a point of choice in lieu of 6m
		D2D5, D2D6	D1P4, E2P2,

8	**Travel Distances between Exits – S2/S3**
	
	The following travel distances between exits are noted:
	• Level 1 to 10 – S2 (scissor stair) 5m in lieu of minimum 9m
	• All Levels - S3 (scissor stair) 5m in lieu of minimum 9m
	• Ground to Level 9
	  ○ S2 - 54m in lieu of 45m
	• Level 10
	  ○ S2 – 57m in lieu of 45m
		D2D6	D1P4, E2P2

9	**Rising and Descending Stair - S2** The rising and descending stair parts within S2 is not provided with smoke separation.	D3D5	D1P4, E2P2,
10	**Openings in Fire-Isolated Exits – S3** The Fire Isolated stairways are proposed to have open façade/ window, within proximity from the residential corridor.	C4D5, C4D9,	C1P2, C1P8
11	**Fire Isolated Stairs – S4**	D2D4	D1P4, D1P5, E2P2

No.	Description	DTS Clause	Performance Requirements
	The stairs serving S4 connect up to 5 storeys (in lieu of 3 storeys) and are not proposed to be located within fire rated enclosure.		
12	**Fire Hydrant System – S1/S2/S3/S4** The following variation is proposed to the fire hydrant system: • Booster assembly location (TBC) • Hydrant location (TBC) • Hydrant coverage shortfall (TBC)	E1D2	E1P3
13	**Stair Pressurisation System – S2/S3** Omission of stair pressurisation system to the following fire stairs: • S2 – South stair only (1x) • S3 – Scissor stairs only (2x)	E2D4	E2P2
14	**Sprinkler System – S1/S2/S3/S4** Variation to sprinkler system (such as location of sprinkler booster assembly, location of sprinkler control valve) (TBC)	E1D4 to E1D13	E1P4
Miscellaneous Items			
15	**Stair Construction – S1** The central open stair has 36 risers in consecutive flight without a change in direction.	NSW D3D14(1)(g)	D1P2
16	**Weatherproofing of External Walls – S1/S2/S3/S4** As the external walls are proposed to be constructed of a material not nominated in F3D5, a performance solution is to be provided by the façade engineer/registered architect demonstrating that the external walls comply with the requirements of Performance Requirement F3P1 (previously FP1.4).	F3D5	F3P1 (previously FP1.4).
17	**Special Hazards – S1/S2/S3** Fire engineering assessment to include consideration/ assessment due to provision of electric vehicle charging within and solar panels at roof	E1D17, E2D12	E2P2

Performance solutions will need to be prepared by a suitably qualified/accredited professional, including but not limited to fire engineer (for matter relating to fire safety), accessibility consultant (for matters relating to accessibility), architect (for matters relating to architectural design) and/ or façade engineers (for matters relating to building façade).

The feasibility and any additional requirements that may apply as part of the performance solution assessment will need to be confirmed by the professional preparing the performance solution, as part of the design development phase. Subject to further assessment by the relevant professionals, it is not anticipated that any additional requirements as result of the performance solution will give rise to any inconsistencies with the Development Approval. Refer to Appendix C for statement prepared by E-Lab and David Caple and Associates for further clarification.

Fire Safety Services

The following key fire safety services are required to meet the minimum DTS requirements.

1.	Sprinklers system throughout all buildings
2.	Fire hydrant system throughout all buildings
3.	Fire hose reels throughout all buildings (including residential amenities) excluding residential apartments and office areas
4.	Fire precautions during construction
5.	Air-pressurization throughout the fire isolated stairs (S2/S3)
6.	Automatic smoke detection and alarm system throughout the building (S2/S3/S4)
7.	Automatic smoke exhaust to S1
8.	EWIS System throughout all buildings
9.	Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated (S2/S3/S4)

Refer to parts 9 and 10 of this report for further details regarding the required services.

Any fire engineered solution relating to fire safety provisions will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

Further Assessment

The assessment of the design documentation has also revealed that the following additional information is required in order to complete the assessment, and/or the following areas need to be further reviewed, for the detailed design phase:

No.	Further Information / Review Required	Report Section
1.	S4 – Confirmation of building population is required. There are shortfalls with regards to the sanitary provisions and exit width based on the BCA D2D18 density.	5.1, 8.6, 10.6
2.	Confirm whether there is proposed future subdivision within the allotment, especially between S1 and S2/S3/S4 and between S2, S3 and S4. Where the buildings are proposed to be located within separate title allotments, additional performance solution assessment may be required (such as sharing of building services, lack of fire separation at title allotments etc).	5.1
3.	S1 – Details of proposed building signage (due to combustibility issue)	7.3
4.	S1 – It is to be confirmed if the chamber substations (Class 8) are Electricity Network Substations per the definition in BCA. This would require an FRL of 240/240/240 as required by Specification 5. Any proposal to reduce this FRL will require assessment in a Fire Engineered Solution.	5.1
5.	S1/S2/S3/S4 – For future subdivision, where the buildings will be subdivided into separate allotments, the sharing of building services/ infrastructure will require performance solution assessment.	5.1
6.	S3/S4 – Numerous exit and stair doors currently swing against egress direction	8.1

7.	S4 – Access to minimum 2 exits is required from the multipurpose/ lounge area at Ground Floor. Currently the alternative exit is via the office tenancy/ lobby, which is not permitted as it passes through another sole occupancy unit.	8.1
8.	S1/S2/S3/S4 – Details of fire services, such as location of booster assembly, fire hydrants, fire hose reels, fire control centre etc are required for further assessment.	9.1, 9.9
9.	S2 – Further consideration is required for location of fire extinguisher Ground floor apartments facing Walker Street, as they do not have access to common corridor.	9.3
10.	S2/S3/S4 - Confirm if impulse fans will the utilised within the basement carpark.	10.8

Documentation to enable assessment and demonstrate compliance will be required to address the above items prior to construction certificate approval.

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 (Development Certification and Fire Safety) Regulation 2021.

2. Introduction

The project is seeking approval for a State Significant Development Application (SSDA) for the design and construction of the mixed use development at 600-660 Elizabeth Street, Redfern.

This report accompanies a detailed State Significant Development Application that seeks approval for a mixed-use development at 600-660 Elizabeth Street, Redfern (Redfern Place). The development proposes four buildings comprising community facilities, commercial/office, affordable/social/specialist disability housing apartments and new public links and landscaping.

The project site comprises Lot 1 in DP 1249145. It has an area of approximately 10850m^2. Part of the site currently accommodates the existing Police Citizens Youth Club (PCYC) (to be demolished and replaced). The remaining portion of the site is vacant with remnant vegetation.

The SSDA seeks approval for redevelopment of the site, including:

- Demolition of existing buildings.
- Tree removal.
- Bulk earthworks including excavation.
- Construction of a community facility building known as Building S1.
- Construction of two residential flat buildings (known as Buildings S2 and S3) up to 14 and 10 storeys respectively, for social and affordable housing.
- Construction of a five-storey mixed use building (known as Building S4) comprising commercial uses on the ground level and social and specialist disability housing above.
- Construction of one basement level below Buildings S2, S3 and part of S4 with vehicle access from Kettle Street.
- Site-wide landscaping and public domain works including north-south and east-west pedestrian through-site link.

For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

There are four buildings located on the site. Buildings S2, S3 and S4 are considered as a single united building due to the shared basement carpark below. Building S1 is considered as a separate building located on the same allotment.

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 final design is developed.

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 Registered Certifier for the Construction Certificate. For the purposes of this Report, BCA 2022 has been utilised as it is anticipated that BCA 2022 will apply to the project based on project timeframes.

3. Compliance with the Building Code of Australia

The Building Code of Australia is a performance based document, whereby compliance is achieved by complying with the Governing Requirements and the Performance Requirements.

Performance Requirements are satisfied by one of the following:

1) A Performance Solution

2) A Deemed-to-Satisfy Solution
3) A combination of (1) and (2)

4. Documentation of Performance Solutions

A Performance Solution must demonstrate compliance with all relevant Performance Requirements, or the solution must be at least equivalent to the Deemed-to-Satisfy provisions.

Compliance with the Performance Requirements is to be demonstrated through one or a combination of the following:

a) Evidence of suitability in accordance with Part A5 of the BCA that shows the use of a material, product, plumbing and drainage product, form of construction or design meets the relevant Performance Requirements.
b) A Verification Method including the following:
    i. The Verification Methods provided in the NCC.
    ii. Other Verification Methods, accepted by the appropriate authority that show compliance with the relevant Performance Requirements
c) Expert Judgement
d) Comparison with the Deemed-to-Satisfy Provisions

Where a Performance Solution is proposed as the method to achieve compliance, the following steps must be undertaken:

a) Prepare a performance-based design brief in consultation with relevant stakeholders
b) Carry out analysis, using one or more of the assessment methods nominated above, as proposed by the performance-based design brief.
c) Evaluate results from (b) against the acceptance criteria in the performance-based design brief
d) Prepare a final report that includes:
    i. All Performance Requirements and/or Deemed-to-Satisfy Provisions identified as applicable
    ii. Identification of all assessment methods used
    iii. Details of required steps above
    iv. Confirmation that the Performance Requirement has been met; and
    v. Details of conditions or limitations, if an exist, regarding the Performance Solution.

5. Preliminaries

5.1. Building Assessment Data

Summary of Construction Determination:

Part of Project	S1	S2	S3	S4
Classification	8, 9b	2, 7a, 7b	2, 7a, 7b,	2, 5, 7a, 7b, 9b
Number of Storeys	4	16	16 (13 for the S3 portion only)	16 (6 for the S4 portion only)
Rise In Storeys	3	15	15 (12 for the S3 portion only)	15 (5 for the S4 portion only)
Type of Construction	A	A	A	A

Part of Project	S1	S2	S3	S4
Effective Height (m)	9.5m	45.77m	45.77m (32.61m for the S3 portion only)	45.77m (16.85m for the S4 portion only)

Note:

- *The effective height of the project includes all stories included in the rise in stories of the project (S1 – RL 31.500 to RL 41.000; S2 - RL 29.000 to RL 74.770; S3 – RL 29.000 to RL61.610; S4 – RL 29.000 to RL 45.850).*
- *Basement level has been considered as a rise in storey due to the basement level at Phillip Street and Walker Street is partially located above the adjacent finished ground (minimum 1m in height for more than 12m long)*
- *The fire pump room and tanks below Ground level at S4 is considered a storey.*
- *Roof/ Plant levels for S2, S3 and S4 are considered a storey due to enclosed plantrooms at roof level*

Confirmation of the classification for the chamber substations is required, in particular whether they are considered as Class 8 Electricity Network Substations.

Confirm whether there is proposed future subdivision within the allotment, especially between S1 and S2/S3/S4 and between S2, S3 and S4. Where the buildings are proposed to be located within separate title allotments, additional performance solution assessment may be required (such as sharing of building services, lack of fire separation at title allotments etc). This will be reviewed further during design development phase. This report has considered that the buildings are located on a single allotment.

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
S1	8, 9b	3863	24934	217 (staff, patrons & participants) *Ground – 72* *Level 1 – 61* *Level 2 - 84*
Ground *Indoor Sports Court*	*9b*	*740*	*6697*	*20 participants* *10 patrons*
Ground *Foyer, Youth Hub, Meeting Rooms etc*	*9b*	*500*	*3957*	*10 (youth hub)* *10 (foyer)* *5 (admin staff)* *2 (police)* *5 (gym trainer)* *15 (meeting room)*
Level 1 *Gymnastics/ Parkour*	*9b*	*508*	*5499*	*15 (gymnastics participants)* *2 (staff trainer)* *20 (gymnastics patrons)*
Level 1 *Multipurpose 01*	*9b*	*100*	*1990*	*24 patrons*
Level 2	*9b*	*398*	*2159*	*10 (boxing participants)*

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Gymnasium/ Boxing				*5 (boxing participants)* *3 (staff trainer)* *30 (gym participants)*
Level 2 *Multipurpose 02 & 03*	*9b*	*297*	*1611*	*36 patrons*

Notes:

- The above populations have been determined based on advice received from Architecture AND (Aconex BURNSARC-GCOR-000059 by Jordan Silver dated 29 May 2024)

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Basement (shared between S2, S3, S4)	7a, 7b	4509	16683	0*
S2				
Ground to Level 13 (excl Level 10)	2	14529	N/A	2 person per bedroom
Level 10	2	148	533	148 residents (indoor) 100 residents (outdoor occupied space)
S3 Ground to Level 9	2	7679	N/A	2 person per bedroom
S4	2, 5	1353	6562	87 staff 198 residents
Ground *Office*	*5*	*878*		*87*
Ground *Multipurpose/ Lounge*	*2 (Ancillary)*	*198*		*198*
Level 1	2	1339	4244	2 person per bedroom
Level 2	2	1300	4121	2 person per bedroom
Level 3	2	1300	4535	2 person per bedroom
Level 4	2	933	3088	2 person per bedroom

Notes:

- The above populations have been based on floor areas and calculations in accordance with Table D2D18 (prev. Table D1.13) of the BCA. The Architect/Owner/Operator is to verify the floor areas, volumes and to also determine the density calculation per D2D18(c) or confirm acceptance for using Table D2D18.
- The floor areas to retail portions have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
- The carpark areas have been considered ancillary to the use for the purposes of population numbers

Occupiable Outdoor Areas

BCA 2019 introduced specific provisions regarding occupiable outdoor areas. These provisions outline requirements with regards to fire ratings, egress provisions and coverage from essential services and are contained in this report.

An occupiable outdoor area is defined in the BCA as follows:

'a space on a roof, balcony or similar part of a building:
a) That is open to the sky; and
b) To which access is provided, other than access only for maintenance; and
c) That is not open space or directly connected with open space'

For the purposes of this report, S2/S3/S4 are considered as a single united building. Where future subdivision is proposed to separate the buildings into separate Torrens allotment, performance solution assessment will be required to allow sharing of building services/ infrastructure. Similarly, S1 is considered as separate building, but located within the same allotment, where services will be shared.

5.2. Council Development Approval

A Development Consent will be required from the relevant planning approval authority for the development. A copy of the Development Consent conditions and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

6. Structure

6.1. Structural Provisions (BCA B1):

New structural works are to comply with the applicable requirements of BCA Part B1, including AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS 1170.2-2021 and AS 1170.4-2007.

Based on email correspondence received from BG&E (email from Nathan Kalavritinos dated 2 May 2024), the proposed building importance levels are as follows:

- S1 – Importance Level 3 (unlikely for more than 300 person congregate in one area generally, however there will be infrequent instances where there will be more than 300 person)
- S2 – Importance Level 2 (unlikely for more than 300 person congregate in one area)
- S3 – Importance Level 2 (low rise residential)
- S4 – Importance Level 2 (low rise residential)

Further advice received from Capella Capital (Aconex from Phoebe George Ref Capella-GCOR-000356 dated 21.6.24), advising that there will be infrequent instances where there will be likely more than 300 persons within one area in the basketball course during special events.

Depending on the importance level of the building as determined by AS/NZS 1170.0-2002, the non structural elements of the building, including partitions (and non-structural fire walls), ceilings, services and racking/shelving may be required to comply with the seismic restraint requirements of AS 1170.4-2007. Where this is required,

certification will be required confirming that the design of the seismic restraints comply with AS 1170.4-2002. This may be provided by a specialist seismic consultant or by the architect and services design engineers.

It is noted that BCA 2019 introduced a new Verification Method, B1V2 (previously BV2), which is a pathway available to verify compliance with BCA Performance Requirement B1P1 (1)(c) (previously BP1.1(a)(iii)).

Glazing is to comply with AS1288-2021, and AS2047-2014.

Prior to the issue of the Construction Certificate structural certification is required to be provided by a Professional Engineer registered on the National Engineering Register.

7. Fire Protection

7.1. Fire Compartmentation (BCA C2D2 (previously 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 C3D3 (previously C2.2).

Based upon the rise in storeys and use of the buildings, they are required to be constructed in accordance with the requirements of Type A Construction, in accordance with Tables S5C11a-g of Specification 5 (previously Table 3 & 3.9 of Specification C1.1) of the Building Code of Australia 2022.

The building has been assessed on the basis of the following fire separation / compartmentation within the development:

- Bounding construction to the residential sole occupancy units of 90 minutes, 60 minutes if non-loadbearing (applicable for S2, S3 and S4),
- Separation between the carpark levels and the residential floor of 120 minutes (applicable for S2)
- Fire compartmentation of the building at each floor level for S2, S3 and S4
- Single fire compartment for S1 (due to open stair/ void connecting all storeys)

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		**Type of Construction**		
		A	**B**	**C**
5, 9b or 9c aged care building	max floor area—	8 000 m^2	5 500 m^2	3 000 m^2
	max volume—	48 000 m^3	33 000 m^3	18 000 m^3
6, 7, 8 or 9a (except for patient care areas)	max floor area—	5 000 m^2	3 500 m^2	2 000 m^2
	max volume—	30 000 m^3	21 000 m^3	12 000 m^3

Based on the above fire compartmentation strategy, the maximum fire compartment size is within the DTS limit for all buildings.

7.2. Fire Resistance (BCA C2D2 (previously C1.1))

The building should be constructed generally in accordance with the relevant provisions of Specification 5 (previously Specification C1.1) of the BCA applicable to Type A Construction, Please refer to Appendix C which outlines the required fire rating to be achieved by the development.

Where a fire wall is proposed, it is noted that the wall is to achieve a structural rating regardless of whether it is loadbearing or not. Refer to Appendix C for required FRLs.

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- Lift Motor Rooms;
- Emergency Power Supply;
- Emergency Generators;
- Electricity Supply;
- Boilers or Batteries;
- Hydrant Pump Rooms;
- Sprinkler Pump Rooms;

The above areas are to be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

Please note that with regards to fire separation, the provisions and required FRL's that apply to the building also apply to an occupiable outdoor space associated with the building.

The storage usage within the Basement level exceeds 10% of the storey floor area (999m^2, approx 23%), whereby FRL 240 minutes will be appliable to the basement part (including Ground floor slab). Performance solution assessment will be required for any proposed variation to the DTS provisions.

As per email correspondence BG&E (Aconex BGE-GCOR-000106 from Nathan Kalavritinos dated 16 May 2024) there is proposal for reduction in slab thickness within wet areas to allow for slab setdown. This will be further developed in the detail design phase. If proposed, performance solution assessment by fire engineer will be required.

7.3. Fire Hazard Properties (BCA C2D10 and C2D11 (previously C1.10 and BCA C1.9))

External Wall Cladding

Since the building is of Type A construction, the following components are required to be completely non-combustible:

- External walls and common walls, including façade coverings, framing, insulation;
- Flooring and floor framing of lift pits;
- Non-loadbearing internal walls required to have an FRL;
- All non-loadbearing shafts;
- All loadbearing internal walls and loadbearing fire walls, including those that are part of loadbearing shafts.

Please provide product specifications and test reports to AS 1530.1-1994 for all materials to demonstrate compliance

For materials and assemblies that are required to be non-combustible, the material or system must be not deemed combustible when tested in accordance with AS 1530.1-1994.

Combustible Materials

The following materials, though combustible or containing combustible fibres, may be used wherever a non-combustible material is required:

a) Plasterboard.
b) Perforated gypsum lath with a normal paper finish.
c) Fibrous-plaster sheet.
d) Fibre-reinforced cement sheeting.

e) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
f) Sarking type materials that do not exceed 1mm in thickness and have a Flammability Index not greater than 5.
g) Bonded laminated materials where -
   (i) each laminate is non-combustible; and
   (ii) each adhesive layer does not exceed 1 mm in thickness; and
   (iii) the total thickness of the adhesive layers does not exceed 2 mm; and
   (iv) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval, as part of construction certificate submission.

Any Aluminium Composite Panels must be labelled in accordance with SA TS 5344.

The BCA 2022 has included additional items that are not required to comply with the above, including glazing, fixings, packers, paints, sealants to joints, adhesives and the like.

Furthermore, the BCA now considers the following items as non-combustible, therefore non-combustibility does not need to be demonstrated to achieve compliance. These items are concrete, steel, masonry, aluminium, autoclaved aerated concrete, iron, terracotta, porcelain, ceramic, natural stone, copper, zinc, lead, bronze, brass.

The BCA does nominate that ancillary elements may not be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

a) An ancillary element that is non-combustible.
b) A gutter, downpipe or other plumbing fixture or fitting.
c) A flashing.
d) A grate or grille not more than 2 m^2 in area associated with a building service.
e) An electrical switch, socket-outlet, cover plate or the like.
f) A light fitting.
g) A required sign.
h) A sign other than one provided under (a) or (g) that—
   i) achieves a group number of 1 or 2; and
   ii) does not extend beyond one storey; and
   iii) does not extend beyond one fire compartment; and
   iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.
i) An awning, sunshade, canopy, blind or shading hood other than one provided under (a) that—
   i) meets the relevant requirements of Table S7C7 as for an internal element; and
   ii) serves a storey—
      A. at ground level; or
      B. immediately above a storey at ground level; and
   iii) does not serve an exit, where it would render the exit unusable in a fire.
j) A part of a security, intercom or announcement system.
k) Wiring.
l) Waterproofing material installed in accordance with AS 4654.2 and applied to an adjacent floor surface, including vertical upturn, or a roof surface.
m) Collars, sleeves and insulation associated with service installations.
n) Screens applied to vents, weepholes and gaps complying with AS 3959.
o) Wiper and brush seals associated with doors, windows or other openings.

p) A gasket, caulking, sealant or adhesive directly associated with (a) to (o)

Please provide fire hazard properties reports for any proposed signs and confirm their extent i.e. not spanning more than one storey or fire compartment (eg. S1 building) as part of construction certificate approval.

Confirm whether combustible materials (such as timber noggin) are proposed within external wall. Details to be provided for review as part of construction certificate approval. Performance solution assessment will be required, if proposed.

Interior Linings

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 7 (previously Specification C1.10) of the Building Code of Australia. The following requirements apply:

Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 2.2 kW/m^2
b) Wall and Ceiling Linings – Material Group No. 1,2,3
c) Other Materials – Spread of Flame Index not exceeding 8 and Smoke Developed Index not exceeding 9

Rigid and flexible air handling ductwork must comply with AS4254 Parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

Further detail to be provided for review as design develops, as part of construction certificate approval.

7.4. Separation of equipment (C3D13 (previously C2.12))

Equipment listed below must be separated from the remainder of the building providing a FRL as required by Specification 5 (previously Spec C1.1) but not less than 120/120/120 with a self-closing fire door with an FRL or not less than -/120/30. When separating a lift shaft and life motor room, an FRL of not less than 120/-/- is required.

a) Lift motors and lift control panels; or
b) Emergency generators used to sustain emergency equipment operating in the emergency mode; or
c) Central smoke control plant; or
d) Boilers; or
e) A battery system installed in that building that has total voltage of 12 volts or more and a storage capacity of 200kWh or more.

Further detail to be provided for review as design develops, as part of construction certificate approval.

7.5. Vertical Separation of openings in external walls (BCA C3D7 (previously C2.6))

A building of Type A construction must be provided with spandrel separation between openings on different storeys unless the building is protected with a sprinkler system (other than a FPAA101D or FPAA101H system) throughout in accordance with Specification 17 (previously Specification E1.5).

For the purposes of C3D7 (previously C2.6), window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

Spandrels are required in accordance with BCA Clause C3D7 (previously C2.6), which stipulates a 900mm high spandrel; with 600mm of this spandrel being above the finished floor level. Alternatively, an 1100mm horizontal slab may be utilized. The spandrel material is required to be non-combustible and to achieve an FRL of 60/60/60.

It is noted that any penetrations in the spandrel construction e.g. for drainage, overflow etc. are to be protected.

Detailed elevations will be required to enable a full check and assessment to be undertaken of the spandrels proposed.

Sprinkler protection is proposed to all buildings, including S1. Spandrel protection is not applicable.

7.6. Public Corridors: Class 2 and 3 Buildings (BCA C3D15 (previously C2.14))

Public corridors exceeding 40m in length to be divided into intervals of not more than 40m by smoke proof walls complying with Clause 2 of BCA Specification 11 (previously Specification C2.5)

Majority of the residential corridors at S2, S3 and S4 are considered as open balcony, except for S2 Levels 11 to 13. The corridor at these levels do not exceed 40m in length.

7.7. Protection of Openings in External Walls (BCA C4D3, C4D4, C4D5 (previously C3.2 / C3.3 / C3.4))

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the boundary, within 6m of the far boundary of a road, river, lake or the like that adjoins the allotment, or within 6m of another building on the allotment requires protection by -/60/- fire rated construction, or externally located wall wetting sprinklers.

Where a building is separated into fire compartments, the distance between parts of external walls and openings within them must be not less than the table below unless those parts of each external wall has an FRL not less than 60/60/60 and openings are protected.

Angle Between Walls	Minimum Distance
0º (walls opposite)	6m
More than 0º to 45º	5m
More than 45º to 90º	4m
More than 90º to 135º	3m
More than 135º to 180º	2m
More than 180º	Nil

The allotment is bounded by road on all 4 sides, and minimum 6m separation is provided between S1 and remainder of S2/S3/S4. No protection required.

Fire source feature is defined as;

a) The far boundary of a road, river, lake or the like adjoining an allotment,
b) The side or rear boundary of the allotment,
c) The external wall of another building on the allotment which is not a class 10 building.

7.8. Protection of Openings fire rated building elements (BCA C4D6, C4D11 (previously C3.5 and BCA C3.10))

The prescriptive provisions of the BCA stipulate that openings within building elements required to have an FRL shall be protected as follows:

a) Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL the same as the FRL of the floor it is passing through;

b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL the same as the FRL of the floor it is passing through; (or 120/120/120 where it is a room such as a substation);

c) Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).

Note that where fire dampers, fire collars, etc are utilised, allowance needs to be made for access hatches to be provided within the walls / ceilings to ensure that maintenance access is provided.

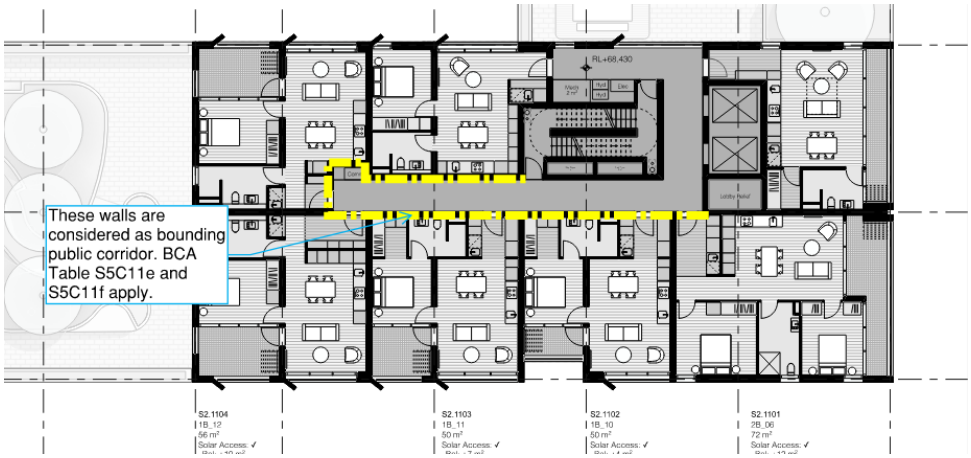
As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts, as part of construction certificate approval.

7.9. Bounding Construction: Class 2 and 3 buildings (BCA C4D12 (previously C3.11))

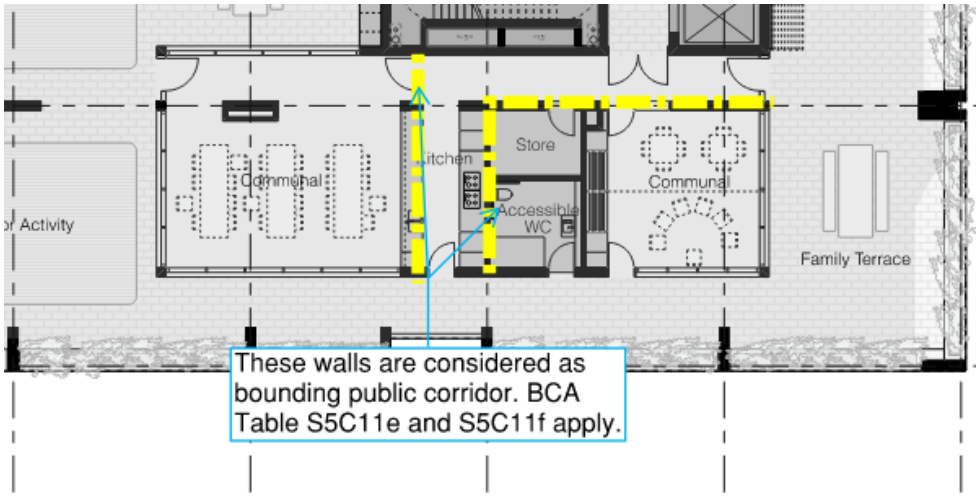
Walls and doorways bounding public corridors, public lobby or the like within Class 2 or 3 building must be fire rated in accordance with Table S5C11e and S5C11f for walls, and achieve FRL -/60/30 for doorways.

However, requirements of C4D12(9) apply where the path of travel to an exit does not provide a person seeking egress with a choice of travel in different directions to alternative exit, and the path of travel is located along an open balcony, landing or the like.

The residential corridors at S2 are generally considered to be open balcony, with the exception at Levels 11 to 13, where the south apartments are not located along an open balcony/ landing.

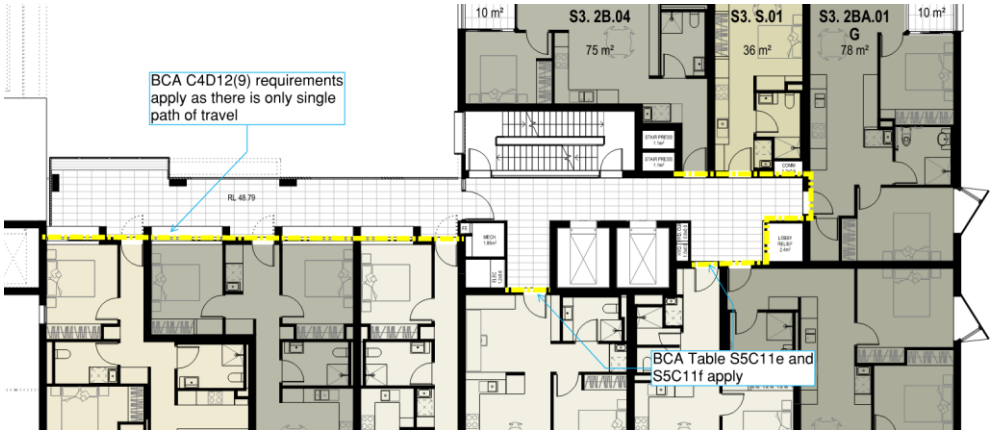


Residential amenities at S2 Level 10 is considered public corridor based on Class 2 classification, for use by occupants only. Requirements of Table S5C11e and S5C11f apply.

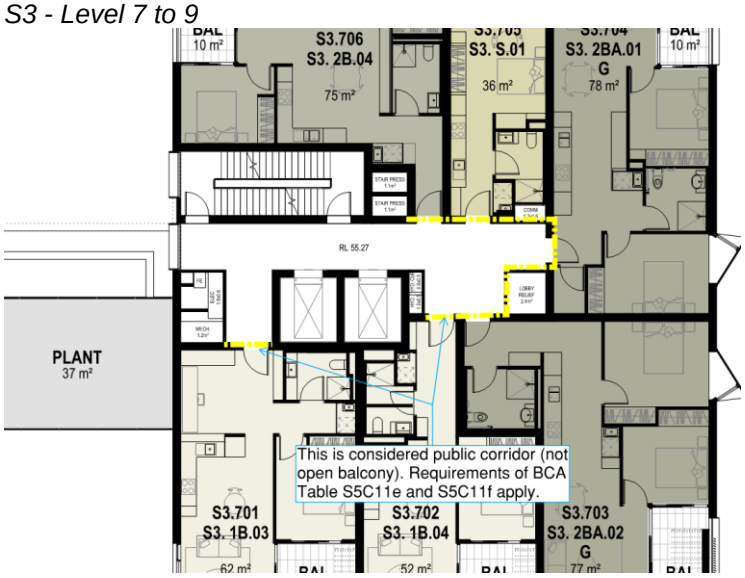


Similarly at S3, the residential corridors are generally considered to be open balcony between Ground to Level 4. However, at Level 5 to 6, requirements of C4D12(9) as the south apartments are provided with single path of travel only. At Levels 7 to 9, the corridor not considered as open balcony, and requirements of Table S5C11e and S5C11f apply.

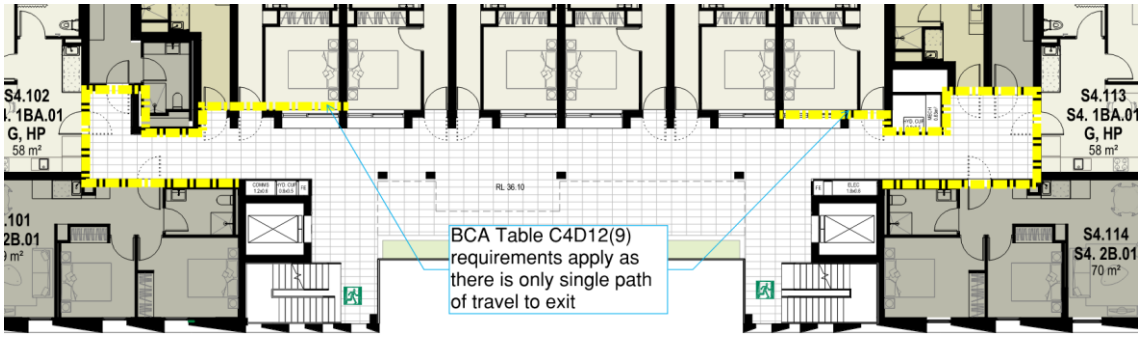
S3 - Level 5 & 6



S3 - Level 7 to 9



As for S4, the residential corridors are generally considered to be open balcony between Levels 1 to 4. However, some of the apartments where located at the north and south ends of the corridors are provided with single path of travel only (eg. Apartments 101, 102, 103, 104, 105, 110, 111, 112, 113 and 114). The requirements of C4D12(9) applies.



8. Access and Egress

8.1. Provision for Escape (BCA D2 (previously D1))

The egress provisions for the proposed building are provided by the following:

- Fire isolated stairways
- Required non-fire isolated stairways
- External Doors

The egress provisions that apply to the building also apply to any occupiable outdoor areas.

Detailing issues that will need to be addressed as the design develops include:

- Door Hardware
- Exit Door Operation
- Stair Construction
- Handrail and Balustrade construction
- Details of Separation of Rising and Descending Stairs
- Discharge from Fire Isolated Exits
- Details of the egress provisions to the Road.
- Door swings

The following design departures are observed, updated design is required to comply:

- Exit/ stair doors swing against egress direction (especially S3 and S4)
- Rising and descending stairs in S2 without smoke separation
- The central stair in S1 has 36 risers in consecutive flight without a change in direction
- Access to minimum 2 exits is required from S4 multipurpose/ lounge area. Currently the alternative exit is via the office tenancy/ lobby, which is not permitted as it passes through another sole occupancy unit

Further review/ discussion is required at detailed design phase. Alternatively, where compliance with DTS cannot be achieved, performance solution assessment will be required.

8.2. Required Fire Isolation of Exits (BCA Clause D2D5 (previously D1.3))

Class 2 or 3

Stairs are required to be fire isolated unless they connect, pass through or pass by not more than 3 storeys in a Class 2 building or 2 storeys in a Class 3 building.

An additional storey of any classification may be added if:

i) It is only for the accommodation of motor vehicles or for other ancillary purposes; or
ii) the building has a sprinkler system (other than a FPAA101D system) complying with Specification 17 installed throughout; or
iii) the required exit does not provide access to or egress for, and is separated from, the extra storey by construction having—
   A. an FRL of –/60/60, if non-loadbearing; and
   B. an FRL of 90/90/90, if loadbearing; and
   C. no opening that could permit the passage of fire or smoke.

The S4 building proposes non-fire isolated stairways that connect >3 storeys in a Class 2 building. This will need to be assessed via a performance solution.

S2 and S3 buildings will be served by fire isolated stairs, however some will be provided with openings on the façade. Refer to section below for fire stair construction requirements.

Class 5 to 9

Stairs utilised as required exits must be fire isolated where they connect, pass through or pass by more than 2 consecutive storeys and, an extra storey may be added if the building has a sprinkler system (other than a FPAA101D system) installed throughout.

Alternatively, where the stair does not provide access to or egress from the third storey, and is separated from that storey by construction achieving and FRL of 60 minutes or, in a Type A building where the construction is loadbearing, 90 minutes, the exit is also not required to be fire isolated.

S1 is served by two stairs. One will be fire isolated, while the other will be open stair

The office tenancy at S4 is located at ground floor, where there is direct access to road.

8.3. Travel via Fire Isolated Exits (BCA D2D12 (previously D1.7))

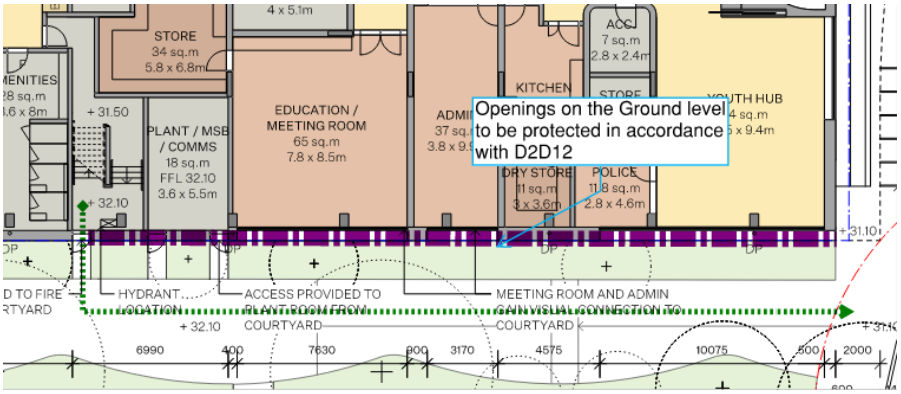
The BCA requires each fire isolated stairway to provide independent egress from each storey served and discharge directly, or by way of its own fire isolated passageway to:

- A road or open space; or
- To a point in a storey within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter, and an unimpeded path of travel not more than 20m to a road or open space; or
- A covered area that adjoins a road or open space, is open for at least 1/3 of its perimeter, has an unobstructed clear height throughout of not less than 3m, and provides an unimpeded path of travel to a road or open space of not less than 6m.

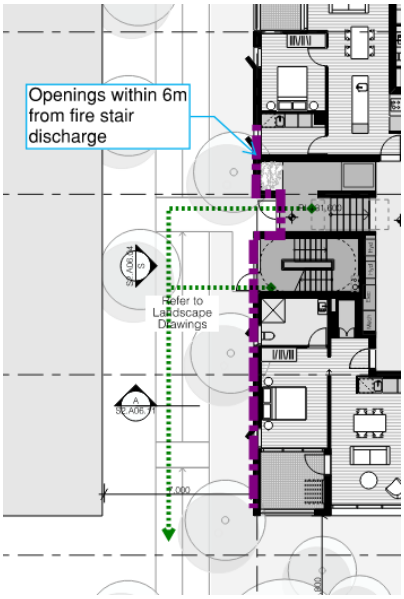
Additionally, where the path of travel from the point of discharge requires occupants to pass within 6m of any part of the external wall of the same building (measured horizontally), that external wall must have a 60/60/60 FRL and have any openings protected internally for a distance of 3m above or below the path of travel.

The following fire stairs discharge require passing through within 6m from the building:

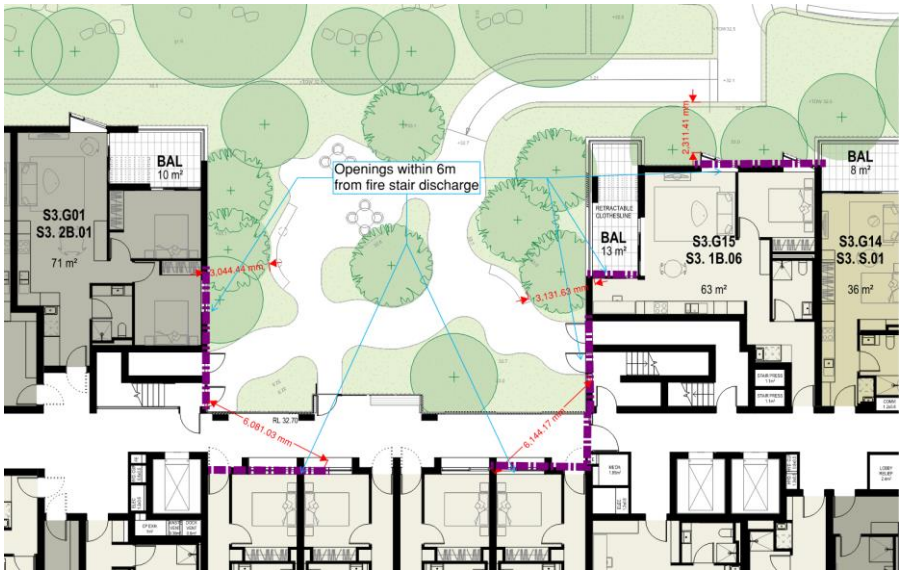
- S1 east elevation



- S2 south fire stair at south elevation



- S3 north and south fire stairs at north and south elevations facing the internal courtyard



Further review/ discussion is required at detailed design phase. Alternatively, where compliance with DTS provisions cannot be achieved, performance solution assessment is required.

8.4. Fire Stair Re-Entry (BCA D3D27 (previously D2.22))

The doors of a fire isolated exit must not be locked from the inside so as to allow provision for fire stair re-entry within fire isolated exits serving any storey above any effective height of 25m.

The requirement for doors to remain unlocked do not apply to a door fitted with a fail-safe device that automatically unlocks the door upon activation of a fire alarm and –

a) On at least every fourth storey the doors are not able to be locked and a sign is fixed on such doors stating that re-entry is available; or
b) An intercommunication system, or an audible or visual alarm system operated from within the enclosure is provided, and a sign is fixed adjacent to such doors explaining its purpose and method of operation.

(b) above is not required in an early childhood centre where the door is fitted with a fail-safe device that automatically unlocks on activation of the fire alarm,

Further information to be submitted as design develops for construction certificate approval.

8.5. Exit Travel Distances (BCA D2D5, D2D6 (previously D1.4, D1.5))

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would be satisfied.

The travel distances to exits should not exceed:

Class 5 to 9

- no point on the floor must be more than 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

Class 2 & 3

- 6m from an exit or from a point of choice from the entrance doorway of a sole occupancy unit

- 20m from a single exit at the level of egress to a road or open space
- Alternate exits not more than 45m apart

The locations of the proposed exits indicate that the travel distances within the building are as follows:

Area	BCA Provisions (Distance to Point of Choice/ Travel Distance/Distance Between	Assessed Distances			Comments
		To a Point of Choice	Overall Travel Distance	Between Alternate Exits	
Basement	20m/40m/60m	29m	45m	<60m	Extended travel distance at bike storage cage (south east)
S1	20m/40m/60m	30m	<40m	<60m	Extended travel distance from Level 2 Boxing and Gymnasium
S2 (SOU) Ground to Level 9	6m/-/45m	8m	-	5m & 54m	Distance between the scissor stairs is less than 9m
S2 Level 10	20m/-/45m	<20m	-	57m	
S2 (SOU) Level 10 to 13	6m/-/45m	10m	-	<45m	
S3 (SOU) Ground to Levels 4, 7 to 9	6m/-/45m	9m	-	5m	Distance between the scissor stairs is less than 9m
S3 Level 4	20m/-/45m	25m	-	5m	Distance between the scissor stairs is less than 9m Extended travel distance to point of choice from communal terrace
S3 (SOU) Level 5 & 6	6m/-/45m	15m	-	5m	Distance between the scissor stairs is less than 9m
S4 Ground	20m/40m/60m	<20m	<40m	<60m	
S4 (SOU) Level 1 to 4	6m/-/45m	10m	-	<45m	
S4 Level 4	20m/-/45m	24m	-	<45m	Extended travel distance from communal terrace

The extended travel distances and distance between the exit stairs will need to be addressed to comply with the requirements of the deemed to satisfy provisions noted above, or be assessed as performance solutions by the Fire Safety Engineer using BCA Performance Requirements D1P4 and E2P2 (previously DP4 & EP2.2)

8.6. Dimensions of Exits (BCA D2D7, D2D8, D2D9, D2D10, D2D11 (previously 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 AS1657-2018 in which case a 600mm clear width is required).

The following table summarises the exit widths required by BCA Clause D2D7, D2D8, D2D9, D2D10, D2D11 (previously D1.6):

Storey	Number of people	Exit Width Required	Exit Width Provided
S1 – Ground	72	1m	Ample
S1 – Level 1	61	1m	3m
S1 – Level 2	84	1m	3m
S2 – Level 10	248	2.5m	3m
S4 – Ground (office)	87	1m	Ample
S4 – Ground (Multipurpose/ Lounge)	198	2m	Ample

**Table Relates to S1 (all levels) and S4(ground floor only); as the remainder of the development is Class 2, where the population will not exceed the exit width provided.*

Confirmation of assumed population in Section 5.1 is required, especially for S2, S3 and S4 resident amenities and office areas. Based on the assumed populations, there are sufficient exits.

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).

8.7. Travel via Required Non-Fire Isolated Stairs (BCA D2D14 (previously D1.9)

A required non-fire isolated stair must provide direct egress, via its own flights from every storey served to the level of road or open space.

The following additional travel distance parameters apply where a required non-fire isolated stair is utilised for egress:

- In a Class 2, 3 or 4 building, the distance between a doorway of a room or a sole occupancy unit to road or open space must not exceed 30m in a building of Type C Construction, or 60m in all other cases
- In Class 5-9 buildings, the distance from any point of a floor to road or open space is not to exceed 80m
- In a Class 2, 3 or 9a building, the required non-fire isolated stair must discharge at a point not more than:
  - 15m from a doorway providing egress to a road or open space or from a fire-isolated passageway leading to road or open space; or
  - 30m from one of 2 such doorways or passageways if travel to each of them from the non-fire-isolated stairway or non-fire-isolated ramp is in opposite or approximately opposite directions.
- In a Class 5 to 8 or 9b building, a required non-fire-isolated stairway or non-fire-isolated ramp must discharge at a point not more than:
  - 20 m from a doorway providing egress to a road or open space or from a fire-isolated passageway leading to a road or open space; or
  - 40 m from one of 2 such doorways or passageways if travel to each of them from the non-fire-isolated stairway or non-fire isolated ramp is in opposite or approximately opposite directions

S1 and S4 require travel via non fire isolated stairs in lieu of fire isolated stairs. The travel distance from S1 Level 2 (Boxing) to road via the open stair is up to 85m in lieu of 80m. As for S4, the travel distance to open space via the non fire isolated stairs do not exceed 80m.

Where compliance with DTS provisions cannot be achieved, performance solution assessment is required.

8.8. Balustrades and Handrails (BCA D3D17, D3D18, D3D19, D3D20, D3D22, D3D29 (previously D2.16 / BCA D2.17 / D2.24))

Generally

Balustrading to a minimum height of 1000mm with a maximum opening of 124mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm, or where it is possible to fall through an openable window located more than 4m above the surface beneath.

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. It is noted that these provisions also apply to any building elements, including AC covers and the like, that are within 1m of the required balustrade.

Where a required barrier is fixed to the vertical face forming an edge of a landing, balcony, deck, stairway or the like, the opening formed between the barrier and the face must not exceed 40 mm.

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.

In addition to the above, handrails are required to both sides of all stairs with a width of 2m or more.

Fire Isolated Stairways

Balustrades in the fire isolated stairways (excluding those serving a Class 9b early childhood centre) and Class 7b or 8 parts of buildings are permitted to contain a 3 rail system, with a bottom rail situated at not more than 150mm above the nosings. The distance between the rails shall not exceed 460mm.

Handrails are required on both sides of all stairways except for fire isolated stairways used only for emergency egress purposes.

Note: in a required exit serving an area required to be accessible, handrails must be designed and constructed to comply with Clause 12 of AS1428.1-2009

Openable Windows in Bedrooms

In bedrooms of Class 2 and 3 buildings, where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D2.24.

Where the lowest part of the window opening is less than 1.7m above a floor, the window opening must be:

a) Fitted with a device to restrict the opening; or
b) Fitted with a screen with secure fittings

The device or screen required must –

a) Not permit a 125mm sphere to pass through it; and
b) Resist an outward horizontal action of 250N; and
c) Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden

Further review will be undertaken to ensure compliance as the design develops as part of construction certificate approval.

8.9. Slip Resistance (BCA D3D15 (previously D2.14))

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D3D15 (prev. Table D2.14) SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but 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

Further review will be undertaken to ensure compliance as the design develops as part of construction certificate approval.

9. 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.

It is noted that the provisions below also apply to occupiable outdoor areas.

9.1. Fire Hydrants (BCA E1D2 (previously E1.3))

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1D2 (prev. E1.3) and AS2419.1-2021.

Pressure and flow information will be required to confirm the required pressures and flow to the system, depending on the type of hydrant to be utilized;

The fire services/hydraulic engineer is to confirm the required flow rates for the development.

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 or with sight of the main entry of the building within 20m of a hardstand area.

A fire ring main is required serving the single united building S2/S3/S4 parts.

Location of booster assembly has yet to be nominated. Further assessment is required as design develops.

The fire tank and fire pump rooms are located below Ground floor of S4. The location is satisfactory.

Where compliance with DTS provisions cannot be achieved, performance solution assessment along with concurrence from fire brigade will be required as part of construction certificate approval.

9.2. Fire Hose Reels (BCA E1D3 (previously E1.4))

A Fire Hose Reel System is required to BCA Clause E1D3 (previously E1.4) and AS2441-2005.

The system is required to provide coverage throughout (including residential amenities area), except residential apartments and office areas.

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

Fire hose reel cupboards must not contain any other services such as water meters, etc., and doors to fire hose reel cupboards are not to impede the path of egress unless a performance solution is developed under BCA Performance Requirement E1P1 (previously EP1.1).

Fire Hose reel are not to extend through Fire and Smoke Walls.

Further assessment is required as design develops.

Where compliance with DTS provisions cannot be achieved, performance solution assessment along with concurrence from fire brigade will be required as part of construction certificate approval.

9.3. Fire Extinguishers (BCA E1D14 (previously E1.6))

The provision of portable fire extinguishers is required to BCA Clause E1D14 (previously E1.6) and AS2444 - 2001 to provide coverage to the throughout the development.

Table below 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 building or class 4 part of building.

In addition, extinguishers are to be provided to the class 2/3 portions of the building in accordance with the below:

- an ABE type fire extinguisher is to be installed with a minimum size of 2.5 kg; and
- extinguishers are to be distributed outside a sole-occupancy unit:
  a) to serve only the storey at which they are located; and
  b) so that the travel distance from the entrance doorway of any sole-occupancy unit to the nearest fire extinguisher is not more than 10 m.

Fire extinguishers are to be located in accordance with AS 2444 - 2001. Further consideration is required for the S2 Ground floor apartments facing Walker Street, as they do not have access to common corridor.

Where compliance with DTS provisions cannot be achieved, performance solution assessment along with concurrence from fire brigade will be required as part of construction certificate approval.

9.4. Automatic Sprinkler Protection (BCA E1D4 – E1D13 (previously E1.5))

Automatic sprinkler protection is required to Specification 17 (previously Spec. E1.5) and AS2118.1-2017 to the following areas:

- Throughout the entire building where the effective height exceeds 25m;
- Throughout any Class 7a car park (other than open deck car parks) containing accommodation for more than 40 vehicles;
- Throughout any fire compartment that exceeds 2,000m^2 in floor area or 12,000m^3 in volume where occupancies of excessive hazard are proposed

A sprinkler system is required to be provided throughout the whole building in a Class 2 or 3 building (excluding a residential care building) or a building containing a Class 2 or 3 part where any part of the building has a rise in storeys of 4 or more. This system to the residential portions is to comply with Specification 17 (previously Spec E1.5) and the relevant parts of Specification 18 (previously Spec. E1.5a).

The sprinkler system shall be connected to and activate an occupant warning system complying with BCA Specification 17 and 20 (prev. Spec E1.5 and Spec E2.2a).

Details of the proposed sprinkler system design will need to be reviewed as the design develops as part of construction certificate approval.

Where compliance with DTS provisions cannot be achieved, performance solution assessment along with concurrence from fire brigade will be required as part of construction certificate approval.

9.5. Smoke Hazard Management (BCA E2D3 – E2D20 (previously E2.2)

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

- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1;
- Automatic Smoke Exhaust System to BCA Specification 21 (previously Spec E2.2b) activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec 20 (previously E2.2a) and AS1670.1-2018
- Automatic Smoke Detection System complying with BCA Specification 20 Clause 4 (previously E2.2a) and AS 1670.1-2018
- Automatic Smoke Detection System to activate the smoke hazard management systems to BCA Spec 20 (previously E2.2b), AS 1670.1-2018and AS/NZS1668.1-2015 Amendment 1;
- Building Occupant Warning System activated by the smoke alarm/detection in accordance with BCA Specification 20 Clause 7 (previously Spec E2.2a) and Clause 3.22 of AS 1670.1-2018
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1. It is noted that this is to be provided to the entire exit.
- Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 Amendment 1

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

Smoke exhaust system requirements apply to S1 building due to Class 9b usage (containing combination of sport halls and multipurpose/ hall usage) where the fire compartment exceeds 2000m^2.

Stair pressurisation system applies to fire stairs serving S2 (applicable to all fire stairs) and S3 (applicable to scissor stairs only). S2 south stair and S3 scissor stairs are proposed to be provided with open façade in lieu of stair pressurisation system. Performance solution assessment is required.

Automatic sprinkler system and smoke detection system applies to S2/S3/S4 as a single united building exceeding 25m in effective height.

Zone smoke control requirements of E2D6 does not apply to S4 as the Ground floor office is the only Class 5 part fire compartment in an otherwise Class 2 building.

.

9.6. Lift Services (BCA E3D3, E3D4, E3D5, E3D9, E3D10, E3D11E3.4 and BCA E3.6)

The passenger lifts to be installed are to be:-

- Fitted with warning signs, fire service controls in accordance with Clauses E3D4, Figure E3D4, E3D9, E3D11, andE3D12 (previously E3.3, Figure E3.3, E3.7, E3.9 and E3.10) of the BCA.
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600m wide, 2000mm long and 1400mm high;
- At least two emergency lifts with stretcher facilities in accordance with Clause E3D5 (previously Part E3.4) of the BCA. The two emergency lifts shall be located in separate shafts. These lifts are to serve all storeys that are served by passenger lifts.
- Be provided with the following in order to satisfy accessibility requirements:
  - A handrail in accordance with AS1735.12-1999,
  - Minimum internal floor dimensions of 1400 x 1600mm for lifts which travel more than 12m, or 1100 x 1400mm for lifts which travel not more than 12m,
  - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
  - Have a set of buttons for operating the lift located at heights above level complying with AS1735.12 - 1999
  - For lifts serving more than 2 levels, automatic audible information within the lift car identifying the level each time the car stops, and audible and visual indication at each lift landing to indicate the arrival of a car

Further information to be provide for assessment as design develops as part of construction certificate approval.

9.7. Exit Signs and Emergency Lighting (BCA E4D2, E4D4, E4D5, E4D6 and E4D8 (previously E4.2 E4.5, E4.6, E4.8))

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with BCA Part E4 and AS/NZS 2293.1-2018, including the potential use of photo luminescent exit signs.

Where exit signs are proposed to be above 2.7m, this will need to be documented as a performance solution by an accredited fire safety engineer. This would need to be assessed to BCA Performance Requirement E4P2 (previously EP4.2).

Details are required to be provided for review as part of construction certificate approval.

9.8. Sound Systems and Intercom Systems for Emergency Purposes (BCA E4D9 (previously E4.9))

A Sound System and Intercom System (EWIS) is required in accordance with AS1670.4-2018 and BCA Clause E4D9 (previously E4.9).

Details are to be provided for review as design develops as part of construction certificate approval.

9.9. Fire Control Centre (BCA E1D15 (previously E1.8))

As the building is a Class 6, 7, 8 or 9 building that contains a floor area of greater than 18,000m^2, a fire control centre is required in accordance with BCA Specification 19 (previously Spec E1.8).

As the building has an effective height of greater than 25m, a fire control centre is required. Where the effective height of the building exceeds 50m, the fire control centre must be located within a dedicated, fire rated room in accordance with the requirements of BCA Specification 19 (previously Spec E1.8)

Further review/ discussion is required at detailed design phase. Details are to be provided demonstrating that the Fire Control Centre does not have a floor level that is -/+300mm from the road/open space.

9.10. Fire Precautions During Construction (BCA E1D16 (previously E1.9))

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels on every storey covered by the roof/floor structure (except the 2 uppermost storeys); and
- Booster connections installed.

Due to the height of the building this will need to be considered and implemented during construction.

10. Health and Amenity

10.1. Stormwater Drainage (BCA Clause F1D3 (previously Clause F1.1)

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2018.

10.2. Surface Water Management (BCA Part F1)

Exposed Joints

Exposed joints in the drainage surface on a roof, balcony, podium or similar horizontal surface part of a building must not be located beneath or run through a planter box, water feature or similar part of the building.

Joints are to be protected in accordance with Section 2.9 of AS 4654.2.

External Waterproofing Membranes

All external above ground areas (roof slabs, balconies etc.) shall be protected by a waterproofing system in accordance with AS4654 Parts 1 and 2 – 2012.

10.3. Floor Wastes (BCA Clause F2D4 (previously F1.11)

Floor wastes to be provided within bathrooms and laundries where located above another sole occupancy unit. The floor shall be sloped towards these wastes.

Floor wastes are required to be provided where wall hung urinals are provided and the floor shall be sloped towards these wastes.

Floor wastes are not indicated. Further information to be provided for assessment as design develops as part of the construction certificate process.

10.4. Roof & Wall Cladding (BCA Part F3 (previously Part F1))

BCA 2022 has introduced some deemed to satisfy provisions that relate to the waterproofing of external walls. These provisions apply as follows:

- Masonry, including masonry veneer, unreinforced and reinforced masonry is to comply with AS 3700
- Autoclaved aerated concrete is to comply with AS 5146.3
- Metal wall cladding is to comply with AS 1562.1

Where the installation is not proposed to comply with the above, or a different material is proposed to be used, a performance solution can be utilised to demonstrate compliance.

Performance Requirement F3P1 (previously FP1.4) which relates to the prevention of the penetration of water through external walls, must be complied with. Where a performance solution is proposed, it is to be prepared by a suitably qualified professional (façade engineer with NER for structural engineering) that demonstrates that the external walls of the proposed building comply with Performance Requirement F3P1 (previously 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.

Further information to be provided for assessment as design develops as part of the construction certificate process.

10.5. Wet Areas & Overflow Protection (BCA Part F2 (previously Part F1)

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2010 requirements.

Further review will be undertaken as the design develops with respect to the specification of waterproofing membrane, provision of water-stops at doorways etc as part of construction certificate approval.

10.6. Sanitary Facilities (BCA F4D2, F4D3, F4D4, F4D5, F4D6 (previously F2.2 and F2.3)

Apartments

Each apartment is required to be provided with the following:

- A kitchen sink and facilities for the preparation and cooking of food; and
- A bath or shower; and
- A closet pan and wash basin; and
- Clothes washing facilities comprising at least one wash tub and space for a washing machine; and
- Clothes line of at least 7.5m, or space for one heat operated drying device within the same space as the clothes washing.

The design submitted indicates that each apartment should satisfy the above requirements.

The following table summarises the sanitary facilities provided for the community facility in S1, and ground floor of S4:

Sanitary Facilities Required				
	WC	Urinals	Basins	Shower
S1 – Sports Venue Participants				

Sanitary Facilities Required				
Male (38 person)	2	4	4	4
Female (38 person)	4	-	4	4
Accessible	1	-	1	1
S1 – Sports Venue Patrons				
Male (18 person)	1	1	1	-
Female (18 person)	2	-	1	-
Accessible	1	-	1	-
S1 – Multipurpose & Others (Hall)				
Male (48 person)	1	1	1	-
Female (48 person)	2	-	1	-
Accessible	1	-	1	-
S1 – Staff				
Male (6 person)	1	0	1	-
Female (6 person)	1	-	1	-
Accessible	1	-	1	-
S4 - Office				
Male (43 person)	3	2	2	-
Female (43 person)	3	-	2	-
Accessible	1	-	1	-

The above table nominates the required facilities based on assumed population in Section 5.1 of this report. The sanitary facilities (including accessible facility) can be shared between different occupants profile (eg. shared between patrons, participants and staff).

Below is the assessment summary of the current sanitary facilities nominated within S1:

	Male				Female			Accessible	
	WC	U	B	Shower	WC	B	Shower	WC + Basin	Shower
Provided	6	TBC	3	4	8	2	4	3	2
Required	5	6	7	4	9	7	4	3	1
Excess/ Deficit	+1	TBC	-4	0	-1	-5	0	0	+1

Based on the sanitary facilities nominated on the drawings, the current sanitary facilities are sufficient, taking into consideration the concession available for accessible facility that can be counted once towards each sex.

The residential amenities at S2 Level 10 and S4 Ground Level are considered as ancillary to the Class 2 usage. As there are sanitary facilities provided within each SOUs, the facilities nominated within the amenities areas are considered complimentary to the space/ usage.

Detailed designs will need to be developed as to the layout, dimensions, etc of the sanitary facilities as part of construction certificate approval.

Note: The Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2009.

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.

10.7. Light and Ventilation (BCA Part F6 (previously Part F4)

Class 2, 3 & 4

Natural light and ventilation is to be provided to all habitable rooms at a rate of 10% and 5% of the floor area of the rooms respectively.

A required window that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must not be less than a horizontal distance from that boundary or wall that is the greater of:

(i) generally — 1 m; and
(ii) 50% of the square root of the exterior height of the wall in which the window is located, measured in metres from its sill.

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.

These provisions also apply to areas considered as occupiable outdoor areas.

Detailed schedule/ assessment demonstrating compliance will be required as part of construction certificate approval.

10.8. Carparks (BCA F6D11 (previously F4.11)

Every storey of a carpark must have a system of mechanical ventilation complying with AS1668.2 or natural ventilation complying with AS1668.4.

Where impulse fan are utilised within basement carpark, performance solution assessment will be required.

10.9. Sound Transmission and Insulation (BCA Part F7 (previously Part F5))

Building elements within Class 2/3 buildings should provide the following sound insulation levels.

Location	Notes	Sound Insulation Requirement
Walls separating habitable rooms		$R_w + C_{tr} \geq 50$
Walls separating habitable room and kitchen or bathroom	Wall must be of Discontinuous Construction	$R_w + C_{tr} \geq 50$
Floor separating habitable rooms	Impact isolation required	$R_w + C_{tr} \geq 50$

Location	Notes	Sound Insulation Requirement
		$L_{n,w} + C_I \leq 62$
Duct, soil, waste or water supply pipe, including pipes that is located in a floor or wall cavity, serves or passes through more than one room	Adjacent habitable room or Adjacent non-habitable room	$R_w + C_{tr} \geq 40$ or $R_w + C_{tr} \geq 25$
Door to habitable room		$R_w \geq 30$

Please note for walls requiring impact resistance an air gap between leafs of the wall construction is required to be provided.

Please provide a report from the acoustic engineer verifying design compliance with the provisions of Part F7 (previously Part F5) of the BCA as part of construction certificate approval.

10.10. Condensation management (BCA Part F8 (previously Part F6)

External Wall Construction

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 located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single skin concrete be separated from water sensitive materials.

Where a pliable building membrane, sarking-type material or insulation layer is installed on the exterior sode of he primary insulation layer, it must have a vapour permeance of not less than: 0.143µg/N.s in climate zones 4 and 5, and not less than 1.14µg/N.s in climate zones 6,7 and 8.

Exhaust Systems

Exhaust systems must achieve a minimum flow rate of 25L/s for bathrooms and sanitary compartments and 40L/s for kitchens and laundries. These exhaust systems must all discharge directly or via a shaft/duct to outdoor air.

An exhaust system that is not run continuously and is serving a bathroom or sanitary compartment that is not ventilated in accordance with F6D7 is to be:

- Interlocked with the rooms light switch; and
- Include a run on timer so that the exhaust system continues to operate for 10 minutes after the light switch is turned off.

Ventilation of Roof Spaces

A roof in climate zones 6, 7 and 8 must have a roof space that:

a) Is located
   i. Immediately above the primary insulation layer; or
   ii. Immediately above sarking with a vapour permeance of not less than 1.14µg/N.s, which is immediately above the primary insulation layer; or
   iii. Immediately above ceiling insulation which meets the requirements of J3D7 (3) and (4)
h) Has a height of not less than 20mm; and
i) Is either
   i. Ventilated to outdoor air through evenly distributed openings in accordance with Table F8D5; or
   ii. Located immediately underneath roof tiles of an unsarked tiled roof

11. Energy Efficiency

The residential (Class 2) portions of the building are subject to BASIX, and a BASIX Certificate will be required prior to the issuance of the Construction Certificate for the works. It is noted that some provisions outlined in the BCA still apply in addition to BASIX.

11.1. SECTION J (JP1 Energy Efficiency)

This is applicable to S1 building as it will not be subject to BASIX assessment, being a separate building.

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, JV4 and JV5 verification methods have been introduced as options available to achieve compliance.

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

The proposed site will be located in a climate zone 5.

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:

J1V1 (previously JV1) NABERS Energy for Offices

- To achieve compliance with J1P1 (previously JP1) a class 5 building must achieve a minimum of 5.5 NABERS Energy for Offices Base Building Commitment Agreement.
- The energy model demonstrates 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
  - 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% of annual hours of operation.
- The building also need to comply with additional requirements of Spec 33 (previously JVa).

The calculation method must comply with ANSI/ASHRAE Standard 140

J1V2 (previously JV3) Green Star

To achieve compliance with J1P1 (previously 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 140, Specification 34 (previously Spec JVb) and when:

- The building complies with simulation requirements and is registered 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

J1V3 (previously 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 34 (previously Spec 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 33 (previously Spec 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.

J1V4 (previously JV4) Building Envelope Sealing

Compliance with J1P1(e) (previously JP1) and J1P2 (previously JP2) is verified for building envelope sealing 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, 10m³hr.m² 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 m³/hr.m² 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 5m³/hr.m² 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.

In a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, where an air permeability rate of not more than 5 m3/hr.m2 at 50 Pa reference pressure is achieved—

a) a mechanical ventilation system must be provided that—
   i. can be manually overridden; and
   ii. provides outdoor air, either—
      A. continuously; or
      B. intermittently, where the system has controls that enable operation for not less than 25 per cent of each 4 hour segment; and
   iii. provides a flow rate not less than that achieved with the following formula:
   Q = (0.05 x A + 3.5 x (N + 1)) / p (refer J1V4 for full articulation of equation.
b) any space with a solid-fuel burning combustion appliance must be ventilated with permanent openings directly to outside with a free area of not less than half of the cross-sectional area of the appliance's flue; and
c) any space with a gas-fueled combustion appliance must be ventilated in accordance with—
   i. clause 6.4 of AS/NZS 5601.1; and
   ii. clause 6.4.5 of AS/NZS 5601.1.

   The volume of the space is considered to be 1 m3 for determining ventilation requirements.

11.2. Building Fabric (Part J4 (previously Part J1))

Roof and Ceiling Construction (Part J4D4 (previously J1.3))

For a deemed-to-satisfy solution roofs and or ceilings are to be constructed to provide a total R-Value greater than or equal to-

(i) in climate zones 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow; and
(ii) in climate zone 6, R3.2 for a downward direction of heat floor; and
(iii) in climate zone 7, R3.7 for an upward direction of heat flow; and
(iv) in climate zone 8, R4.8 for an upward direction of heat flow;

In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.

Where the layer of insulation is penetrated by the percentages as tabled below, additional upgrading of the remainder of the insulation level is required.

To achieve compliance with J0.2 (c) a roof that has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens and does not have a celling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens must have a thermal break. The thermal break to be consisting of a material with a R-Value of 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.

Roof lights (Part J4D5 (previously J1.4))

Where roof lights are installed they must have :-

(a) a total area of not more than 5% of the floor area of the room or space served; and
(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of:-
  (i) for Total system SHGC, in accordance with the below table; and
  (ii) for Total system U-value, not more than U3.9;

Roof light shaft index (see Note 1)	Total area of roof lights up to 3.5% of the floor area of the room or space	Total area of roof lights more than 3.5% and up to 5% of the floor area of the room or space
Less than 1.0	Not more than 0.45	Not more than 0.29
1.0 to less than 2.5	Not more or equal to than 0.51	Not more than 0.33
Greater than 2.5	Not more than or equal to 0.76	Not more than 0.49

External Walls and Glazing (Part J4D6 (previously J1.5))

For walls and glazing construction the total system U-value must not be greater than-

(i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building other than a ward area, U2.0; and
(ii) for a Class 3 or 9c building or a Class 9a ward area –
  (a) in climate zones 1, 3, 4, 6 or 7, U1.1; or
  (b) in climate zones 2 or 5, U2.0; or
  (c) in climate zones 8, U0.9;

The total system U-value of wall-glazing construction should be calculated in accordance with Specification 37 (previously J1.5a).

Wall components of the wall-glazing construction must achieve a minimum total R-Value of R1.0 where the wall is less 80% if the area and reflect the value specified in Table J4D6a (previously J1.5a) where the wall is *0% or more of the area.

There are further design parameters for display glazing and solar admittances for wall-glazing construction, both of which should comply with the relevant provisions of J4D6 (previously J1.5).

Floors (Part J4D7 (previously J1.6))

Floors are to achieve an R rating of 2.0.

11.3. Building sealing (Part J5 (previously J3))

Windows and Doors (Part J5D5 (previously J3.4))

a) A door, openable window or the alike must be sealed –
   (i) When forming part of the envelope; or
   (ii) In climate zones 4,5,6,7 or 8
b) The requirements of (a) do not apply to –
   (i) A window complying with AS2047; or
   (ii) A fire door or smoke door; or
   (iii) A roller shutter door, roller shutter grille or other security door or device installed only for out of house security
c) A seal to restrict air infiltration –
   (i) For the bottom edge of a door, must be draft protection device; and
   (ii) For the other edged of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.
d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than –
   (i) When the conditioned space has a floor area of not more than 50m²; or
   (ii) Where a café, restaurant, open front shop or the like has –
      (A) A 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
      (B) At all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
   (iii) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like

Exhaust fans (Part J5D6 (previously J3.5))

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

Construction of ceilings, walls and floors (Part J5D7 (previously J3.6))

A seal to restrict air infiltration must be fitted to each edge of the external doors and openable windows. The seals may be foam or compressible strip, fibrous seal or the like. The main entry doors must have either an airlock, or self-closing doors, or a revolving door.

Ceilings, walls, floors and any openings such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with the below when forming part of –

(i) The envelope; or
(ii) In climate zones 4, 5, 6, 7 or 8

Construction required by above must be –

(iii) Enclosed by internal lining systems that are close fittings at ceiling, wall and floor junctions; or

(iv) Sealed at junctions and penetrations with –
  (A) Close fitting architrave, skirting or cornice; or
  (B) Expanding foam, rubber compressible strip, caulking or the like

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

Evaporative coolers (Part J5D8 (previously J3.7))

An evaporative cooler must be fitted with a self-closing damper or the like –

(a) When serving a heated space; or
(b) In climate zones 4,5,6,7 or 8.

11.4. Air Conditioning and Ventilation systems (Part J6 (previously J5))

Air conditioning and ventilation systems must be designed to comply with the following provisions:

- Be capable of being deactivated when the building or part of a building being served by that system is not occupied;
- Where motorised dampers are in place, they should close when the system is deactivated
- Where serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute;
- Time switches should be provided to control an air-conditioning system of more than 2kWr and a heater of more than 1kW $_{heating}$ used for air-conditioning, and be capable of switching electric power on and off at variable pre-programmed times on variable pre-programmed days.
- Ductwork and fittings in an air-conditioning system should have insulation complying with AS/NZS 4859.1 and have an insulation R-Value greater than or equal to:-
  - for flexible ductwork R1.0; or
  - for cushion boxes, that of the connecting ductwork; or
  - That specified in Table J6D6 (previously J5.5)

Table J6D6 (previously Table J5.5)

Location of ductwork and fittings	Climate zone 1, 2, 3, 4, 5, 6 or 7	Climate zone 8
Within a conditioned space	1, 2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

Mechanical:

- Be capable of being deactivated where the building or part of the building served by that system is not occupied
- Time switches must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s, capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days;

Heaters

A heater used for air-conditioning or as part of an air-conditioning system must be a either a solar heater, gas heater, heat pump heaters, a heater using reclaimed heat or an electric heater.

A gas water heater, that is used as part of an air-conditioning system must:-

(i) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86% ; or

(ii) If rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%

Refrigerant chillers

An air-conditioning system refrigerant chiller must comply with MEPS and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio laid out under clause J5.10 of the BCA when determined in accordance with AHRI 551/591

Unitary air-conditioning equipment

Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr –

(a) Where water cooled, have a minimum energy efficiency ratio of 4.0 W_r/ $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or

(b) Where air cooled, have a minimum energy efficiency ratio of 2.9 W_r / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

11.5. Artificial Lighting and Power (Part J6)

Interior Artificial Lighting and Power Control (Part J6.2 & 6.3)

In a sole-occupancy unit of a Class 2 building or Class 4 part the lamp power density/illumination power density of artificial lighting must not exceed the allowance of 5 W/m^2 within a sole-occupancy unit and 4 W/m^2 on a verandah, balcony or the like attached to a sole-occupancy unit.

In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 building for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density below:-

The maximum illumination power density;

Common rooms, spaces and corridors in a Class 2 building	4.5W/m^2
Stairways, including fire-isolated stairways	2W/m^2
Toilet, locker room, staff room, rest room or the like	3W/m^2
Lift cars	3W/m^2
Service area, cleaner's room and the like	3W/m^2
Control room, switch room or the like	
(A) intermittent monitoring	3W/m^2
(B) Constant monitoring	4.5W/m^2
Plant room:	
(A) Where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	4W/m^2
(B) With a horizontal illuminance target of 80 lx	2W/m^2
Library:	
(A) Stack & shelving area	2.5W/m^2
(B) Reading room & general areas	4.5W/m^2
Office:	
(A) Artificially lit to an ambient level of 200 lx or more	4.5W/m^2

(B) Artificially lit to an ambient level of less than 200 lx	2.5W/m^2
Museum & gallery	2.5W/m^2
Retail:	14W/m^2
Corridors:	5W/m^2
Common rooms, spaces & corridors in a Class 2 building	4.5W/m^2
Lounge area for communal use in a Class 3 or 9c building	4.5W/m^2
Dormitory of Class 3 building:	
(A) Used for sleeping only	3W/m^2
(B) Used for sleeping & study	4W/m^2
Storage	1.5W/m^2
School:	4.5W/m^2
Health Care:	
(A) Infants & children's wards & ED	4W/m^2
(B) Exam room	4.5W/m^2
(C) Exam room in intensive care & high dependency ward	6W/m^2
(D) All other patient care areas inc wards & corridors	2.5W/m^2
Kitchen and food preparation area:	4W/m^2
Car parks:	
(A) General	2W/m^2
(B) Entry zone (first 15m of travel during the daytime	11.5W/m^2
(C) Entry zone (next 4m of travel) during the day	2.5W/m^2
(D) Entry zone (first 20m of travel) during nighttime	2.5W/m^2
Auditoriums, church and public hall :	8W/m^2
Restaurant, café, bar:	14W/m^2

Artificial Lighting must be controlled by a time switch, other control device or a combination of both.

Each light control in a building must not operate lights within an area of more than;

- 250m^2 if in a Class 6 building or Class 8 laboratory
- Not operate lighting for an area more than -
  a) 250m^2 for a space of not more than 2000m^2;
  b) 1000m^2 for a space of more than 2000m^2
  if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building;
- 1000m^2 for a space of more than 2000m^2

<u>Interior decorative and display lighting</u>

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

- Separately from other artificial lighting; and
- By a manual switch for each area other than when operating times of the displays are the same in a number of areas (e.g. where in a museum) in which case they may be combined; and
- By a time switch in accordance with Specification 40 (previously J6) where the display lighting exceeds 1 kW

Window display must be controlled separately from other display lighting exceeds 1kW.

Exterior artificial lighting

Artificial lighting attached to or directed at the façade of the building if it exceeds a total of 100W must;

- Use LED luminaires for 90% of the total lighting load; or
- Be controlled by a motion detector in accordance with Specification J6 of the BCA;
- When used for decorative purposes, such as façade lighting or signage lighting, have a separate switch in accordance with Specification J6.

Lifts (Part J7D8 (previously J6.7))

Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes and achieve the idle and standby energy performance level required, and the energy efficiency class under J7D8 (previously J6.7) of the BCA.

11.6. Heated Water Supply and Swimming Pool and Spa Pool Plant (Part J8 (previously J7))

Heated water supply (Part J8D2 (previously J7.2))

A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

11.7. Energy Monitoring and On-Site Distributed Energy Resources (Part J9 (previously Part J8))

Facilities for Energy Monitoring (J9D3 (previously J8.3))

A building or sole-occupancy unit with a floor area of more than 500 m2 must have energy meters configured to record the time-of-use consumption of gas and electricity.

A building with a floor area of more than 2 500 m2 must have energy meters configured to enable individual time-of-use energy data recording, in accordance with the below, of—

a) artificial lighting; and
b) appliance power; and
c) central hot water supply; and
d) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
e) on-site renewable energy equipment; and
f) on-site electric vehicle charging equipment; and
g) on-site battery systems; and
h) other ancillary plant.

Energy meters required by the above must be interlinked by a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed and reviewed.

These provisions do not apply to energy meters serving—

a) a Class 2 building where the total floor area of the common areas is less than 500 m2; or
b) individual sole-occupancy units with a floor area of less than 2 500 m

Facilities for Electric Vehicle Charging Equipment (Clause J9D4)

A carpark associated with a Class 2, 3, 5, 6, 7b, 8 or 9 building must be provided with electrical distribution boards dedicated to electric vehicle charging in accordance with Table J9D4 in each storey of the carpark, and labelled to indicate use for electric vehicle charging equipment.

Electrical distribution boards dedicated to serving electric vehicle charging in a carpark must—

a) be fitted with a charging control system with the ability to manage and schedule charging of electric vehicles in response to total building demand; and
b) when associated with a Class 2 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 11:00 pm to 7:00 am daily; and
c) when associated with a Class 5 to 9 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 9:00 am to 5:00 pm daily; and
d) when associated with a Class 3 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 48 kWh from 11:00 pm to 7:00 am daily; and
e) be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in—
    i. 100% of the car parking spaces associated with a Class 2 building; or
    ii. 10% of car parking spaces associated with a Class 5 or 6 building; or
    iii. 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and
f) contain space of at least 36 mm width of DIN rail per outgoing circuit for individual sub-circuit electricity metering to record electricity use of electric vehicle charging equipment; and
g) be labelled to indicate the use of the space required by (f) is for the future installation of metering equipment.

These provisions do not apply to a stand-alone Class 7a building.

Facilities for Solar Photovoltaic and Battery Systems

The main electrical switchboard of a building must—
a) contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for—
    i. a solar photovoltaic system; and
    ii. a battery system; and
b) be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.

At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings—

a) with installed solar photovoltaic panels on—
    i. at least 20% of the roof area; or
    ii. an equivalent generation capacity elsewhere on-site; or
b) where 100% of the roof area is shaded for more than 70% of daylight hours; or
c) with a roof area of not more than 55 m2; or
d) where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like.

The requirements do not apply to a building with solar photovoltaic panels installed on at least 20% of the roof area or to a building with battery systems installed.

12. Access for People with Disabilities

The development is required to comply with the accessibility provisions contained within:

- The Building Code of Australia 2022;
- Disability (Access to Premises – Buildings) Standards 2010;
- 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

Note: With the introduction of the Commonwealth *Disability Discrimination Act (DDA)* in 1992 (enacted in 1993), all organisations have a responsibility to provide equitable and dignified access to goods, services and premises used by occupants. Organisations and individuals since its introduction, are required to work to the objects of the Act which are to eliminate, as far as possible, discrimination against persons on the ground of disability in the **areas of work, accommodation, education, access to premises, clubs and sports, and the provision of goods, facilities, services and land, existing laws and the administration of Commonwealth laws and programs.**

Refer separate report prepared by MGAC (Report No 00714) for further information.

13. Appendix A - Reference Documentation

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

Drawing No.	Title	Revision	Date	Prepared By
S1.A02.00	Cover Page	A	19/06/24	Architecture AND
S1.A02.01	Ground Floor Plan/ Level 1 Plan	A	19/06/24	Architecture AND
S1.A02.02	Level 2 Floor Plan / Roof Plan	A	19/06/24	Architecture AND
S1.A02.03	Sections	A	19/06/24	Architecture AND
S1.A02.04	Elevations	A	19/06/24	Architecture AND
S2.A02.01	Ground	A	19/06/24	Silvester Fuller
S2.A02.02	Level 1	A	19/06/24	Silvester Fuller
S2.A02.03	Level 2	A	19/06/24	Silvester Fuller
S2.A02.04	Level 3	A	19/06/24	Silvester Fuller
S2.A02.05	Level 4	A	19/06/24	Silvester Fuller
S2.A02.06	Level 5	A	19/06/24	Silvester Fuller
S2.A02.07	Level 6	A	19/06/24	Silvester Fuller
S2.A02.08	Level 7	A	19/06/24	Silvester Fuller
S2.A02.09	Level 8	A	19/06/24	Silvester Fuller
S2.A02.010	Level 9	A	19/06/24	Silvester Fuller
S2.A02.011	Level 10	A	19/06/24	Silvester Fuller
S2.A02.012	Level 11	A	19/06/24	Silvester Fuller
S2.A02.013	Level 12	A	19/06/24	Silvester Fuller
S2.A02.014	Level 13	A	19/06/24	Silvester Fuller
S2.A02.016	Roof	A	19/06/24	Silvester Fuller
S2.A06.01	East Elevation	A	19/06/24	Silvester Fuller
S2.A06.02	North Elevation	A	19/06/24	Silvester Fuller
S2.A06.03	West Elevation	A	19/06/24	Silvester Fuller
S2.A06.04	South Elevation	A	19/06/24	Silvester Fuller
S2.A06.11	Section A	A	19/06/24	Silvester Fuller
S2.A06.12	Section B	A	19/06/24	Silvester Fuller
S2.A06.13	Section C	A	19/06/24	Silvester Fuller
A02.00	BASEMENT PLAN	A	19/06/24	Hayball
S3.A02.00	S3 PLAN - GROUND FLOOR	A	19/06/24	Hayball
S3.A02.01	S3 PLAN - LEVEL 1	A	19/06/24	Hayball
S3.A02.04	S3 PLAN - LEVEL 4	A	19/06/24	Hayball

Drawing No.	Title	Revision	Date	Prepared By
S3.A02.05	S3 PLAN - LEVEL 5	A	19/06/24	Hayball
S3.A02.07	S3 PLAN - LEVEL 7	A	19/06/24	Hayball
S3.A02.10	S3 PLAN - ROOF	A	19/06/24	Hayball
S3.A06.01	BUILDING ELEVATIONS	A	19/06/24	Hayball
S3.A06.02	BUILDING SECTIONS	A	19/06/24	Hayball
S3.A06.03	BUILDING SECTIONS	A	19/06/24	Hayball
S4.A02.00	S4 PLAN - GROUND FLOOR	A	19/06/24	Hayball
S4.A02.01	S4 PLAN - LEVEL 1	A	19/06/24	Hayball
S4.A02.02	S4 PLAN - LEVEL 2	A	19/06/24	Hayball
S4.A02.04	S4 PLAN - LEVEL 4	A	19/06/24	Hayball
S4.A02.05	S4 PLAN - ROOF	A	19/06/24	Hayball
S4.A06.01	BUILDING ELEVATIONS	A	19/06/24	Hayball

14. Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA 2022 Clause C4D14
2.	Automatic Fail Safe Devices	BCA 2022 Clause D3D24 & D3D26
3.	Automatic Smoke Detection and Alarm System	BCA 2022 Clause E2D3, E2D5, E2D7, E2D8, E2D9, E2D10, E2D11, E2D13, E2D14, E2D15, E2D16, E2D17, E2D19, E2D20, Spec 20 Clause S20C3/S20C4/S20C5, AS 1670.1 – 2018, AS/NZS 1668.1 – 2015, AS 3786-2014
4.	Automatic Fire Suppression System	BCA 2022 Clause C3D4, E1D5, E1D6, E1D7, E1D8, E1D9, E1D10, E1D11, E1D13, E2D8, E2D9, E2D10, E2D11, E2D13, E2D14, E2D15, E2D16, E2D17, E2D19, E2D20, G3D8, Spec 17, Spec 31 & AS 2118.1 – 2017 Amdt 1 & 2, AS 2118.6 – 2012 (Combined sprinkler & hydrant)
5.	Emergency Lifts	BCA 2022 Clause E3D5 & AS 1735.2 - 2001
6.	Emergency Lighting	BCA 2022 Clause E4D2, E4D4 & AS/NZS 2293.1 – 2018
7.	EWIS	BCA 2022 Clause E4D9 & AS 1670.4 - 2018
8.	Emergency Evacuation Plan	Fire Engineering Report XXXX Revision XX prepared by XXXX dated XXXX and AS 3745 – 2002
9.	Exit Signs	BCA 2022 Clauses E4D5, E4D6 & E4D8 and AS/NZS 2293.1 – 2018
10.	Fire Control Centres	BCA 2022 Spec. 19
11.	Fire Dampers	BCA 2022 Clause C3D13, C4D15, Spec 11, D2D12, E2D3, E2.3, F4.12, Spec E2.2, E2D21, Spec 21, Spec 31 & AS 1668.1 – 2015
12.	Fire Doors	BCA 2022 Clause C4D3, C4D5, C4D6, C4D7, C4D8 & C4D9 and AS 1905.1 – 2015
13.	Fire Hose Reels	BCA 2022 Clause E1D3 & AS 2441 – 2005 Amdt 1
14.	Fire Hydrant System	BCA 2022 Clause C3D13, E1D2, Spec 18, I3D9 & AS 2419.1 – 2021
15.	Fire Seals	BCA 2022 Clause C4D15, C4D16, Spec 13, Spec 14, & AS 1530.4 –2014
16.	Lightweight Construction	BCA 2022 Clause C2D9, Spec 6
17.	Mechanical Air Handling System	BCA 2022 Clause E2D3, E2D4, E2D6, E2D7, E2D8, E2D9, E2D10, E2D11, E2D12, E2D13, E2D14, E2D15, E2D16, E2D17, E2D18, E2D19, E2D20, G3D8, Spec 21, AS/NZS 1668.1 – 2015 & AS 1668.2 – 2012
18.	Portable Fire Extinguishers	BCA 2022 Clause E1D14 & I3D11, AS 2444 – 2001
19.	Pressurising Systems	BCA 2022 Clause E2D3, E2D4, E2D6, E2D7, E2D9, E2D11, E2D12 & AS/NZS 1668.1 – 2015
20.	Required Exit Doors (power operated)	BCA 2022 Clause E3D24 (3)
21.	Self-Closing Fire Hoppers	BCA 2022 Clause C4D14 & AS 1530.4 – 2014

	Essential Fire Safety Measures	Standard of Performance
22.	Smoke Alarms	BCA 2022 Spec 20 & AS 3786 - 2014
23.	Smoke Hazard Management System	BCA 2022 Clause E2D3, E2D4, E2D6, E2D7, E2D8, E2D9, E2D10, E2D11, E2D12, E2D13, E2D14, E2D15, E2D16, E2D17, E2D18, E2D19, E2D20, G3D8, Spec 21, AS/NZS 1668.1 – 2015
24.	Smoke Dampers	BCA 2022 Clause E2D3, E2D21, Spec 21, Spec 31 & AS/NZS 1668.1 – 2015
25.	Smoke Doors	BCA 2022 Spec 11
26.	Warning and Operational Signs	BCA 2022 Clause C4D7, D2.23, E3D4, AS 1905.1 –2015

15. Appendix C - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2022:

Type A Construction

Table S5C11a: Type A Construction: FRL of loadbearing parts of external walls

Distance from a fire source feature	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	90/90/90	120/120/120	180/180/180	240/240/240
1.5 to less than 3m	90/60/30	120/90/90	180/180/120	240/240/180
3m or more	90/60/30	120/60/30	180/120/90	240/180/90

Table S5C11b: Type A Construction: FRL of non-loadbearing parts of external walls

Distance from a fire source feature	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	-/90/90	-/120/120	-/180/180	-/240/240
1.5 to less than 3m	-/60/60	-/90/90	-/180/120	-/240/180
3m or more	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C11c: Type A Construction: FRL of external columns non incorporated in an external wall

Column tyle	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Loadbearing	90/-/-	120/-/-	180/-/-	240/-/-
Non-loadbearing	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C11d: Type A Construction: FRL of common walls and fire walls

Wall type	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Loadbearing or non-loadbearing	90/90/90	120/120/120	180/180/180	240/240/240

Table S5C11e: Type A Construction: FRL of loadbearing internal walls

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Fire-resisting lift and stair shafts	90/90/90	120/120/120	180/120/120	240/120/120

Bounding public corridors, public lobbies and the like	90/90/90	120/-/-	180/-/-	240/-/-
Between or bounding sole-occupancy units	90/90/90	120/-/-	180/-/-	240/-/-
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion	90/90/90	120/90/90	180/120/120	240/120/120

Table S5C11f: Type A Construction: FRL of non-loadbearing internal walls

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Fire-resisting lift and stair shafts	-/90/90	-/120/120	-/120/120	-/120/120
Bounding public corridors, public lobbies and the like	-/60/60	-/-/-	-/-/-	-/-/-
Between or bounding sole-occupancy units	-/60/60	-/-/-	-/-/-	-/-/-
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion	-/90/90	-/90/90	-/120/120	-/120/120

Table S5C11g: Type A Construction: FRL of other building elements not covered by Tables S5C11a to S5C11f

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Other loadbearing internal walls, internal beams, trusses and columns	90/-/-	120/-/-	180/-/-	240/-/-
Floors	90/90/90	120/120/120	180/180/180	240/240/240
Roofs	90/60/30	120/60/30	180/60/30	240/90/60

(3) Carparks

For building elements in a carpark as described in (1) and (2), the following minimum FRLs are applicable:

a) External wall:
   i. Less than 3 m from a fire-source feature to which it is exposed:
      A. Loadbearing: 60/60/60.
      B. Non-loadbearing: –/60/60.
   ii. 3 m or more from a fire-source feature to which it is exposed: –/–/–.

b) Internal wall:
   i. Loadbearing, other than one supporting only the roof (not used for carparking): 60/–/–.
   ii. Supporting only the roof (not used for carparking): –/–/–.
   iii. Non-loadbearing: –/–/–.

c) Fire wall:
   i. From the direction used as a carpark: 60/60/60.
   ii. From the direction not used as a carpark: as required by Tables S5C11a to S5C11g.

d) Columns:
   i. Supporting only the roof (not used for carparking) and 3 m or more from a fire-source feature to which it is exposed: –/–/–.
   ii. Steel column, other than one covered by (i) and one that does not support a part of a building that is not used as a carpark—
      A. 60/–/–; or
      B. an ESA/M of not greater than 26m2/tonne.
   iii. Any other column not covered by (i) or (ii): 60/–/–.

e) Beams:
   i. Steel floor beam in continuous contact with a concrete floor slab
      A. 60/–/–; or
      B. an ESA/M of not greater than 30m2/tonne.
   ii. Any other beam: 60/–/–.

f) Fire-resisting lift and stair shaft (within the carpark only): 60/60/60.

g) Floor slab and vehicle ramp: 60/60/60.

h) Roof (not used for carparking): –/–/–.

(4) For the purposes of subclause (3):

   a) ESA/M means the ratio of exposed surface area to mass per unit length.
   b) Refer to Specification 17 for special requirements for a sprinkler system in a carpark complying with (3) and (b) located within a multi-classified building.

16. Appendix D – Fire Engineer Letter

20/06/2024

Project No. P01069

Hickory,
Level 5
68 Clarke St
Southbank VIC 3006

24 John St,
Leichardt
Sydney
NSW 2040

Dear Lia,

RE: 600-660 Elizabeth Street, Redfern – DA Letter

Introduction

This letter relates to the fire safety design of the proposed Hickory Redfern development which consists of four buildings located at the same allotment, containing community facilities, commercial/office, and housing apartments. Residencial buildings S2, S3 and S4 are considered as a single connected building due to the shared basement carpark beneath. Community centre building S1 is considered as a separate building located on the same allotment at 600-660 Elizabeth Street, Redfern. Specifically, this letter considers fire safety design aspects that impact planning and Development Approval issues.

A review of the preliminary design has been undertaken by E-LAB Consulting based on the following received documentation:

- Architectural Drawings: S1.A02 - A, 19/06/2024 prepared by Architecture AND.
- Architectural Drawings: S2.A02– A, 19/06/2024 prepared by Silvester Fuller.
- Architectural Drawings: S3.A02– A, 19/06/2024 prepared by Hayball.
- Architectural Drawings: S4.A02 – A, 19/06/2024 prepared by Hayball.
- Architectural Drawings: Basement Plan A02.00 – A, 19/06/2024 prepared by Hayball.
- BCA Report: BCA Compliance Report – E, 20/06/2024 prepared by Mckenzie Group.

The fire safety design will generally satisfy the Performance Requirements of the Building Code of Australia by complying with the Deemed-to-Satisfy provisions. However, there are some aspects of the design that require further refinement through performance-based fire engineering to satisfy the Performance Requirements of the Building Code of Australia. A table summarising these key items and their impact, that are proposed to be addressed by a Performance Solution, are covered in appendix A.

Conclusion

Based on our review of the project drawings the proposed development would be able to comply with the Performance Requirements of the Building Codes of Australia without significant redesign to the current plans.

Yours Faithfully,

Ettienne Jordaan | Technical Director

E-LAB Consulting | Fire Engineering

C-10 Accredited Certifier BDC3185 (NSW Fire Safety)

Design Practitioner – Fire Safety Engineering (DEP0001595)

Professional Engineer – Fire Safety (PRE0001129)

ettienne.jordaan@e-lab.com.au **0402 070 205**

Appendix A) Performance Solution List

Table 1: Performance Solution List

ITEM	BCA CLAUSE	NON-COMPLIANCE/ISSUE	DESIGN IMPACT
1	E1D4, Spec 17	Omission of sprinklers from low voltage rooms.	Solution to omit sprinklers from low voltage electrical rooms. Rooms without sprinklers will require fire separating construction (120-minute FRL).
2	E1D4, E2D6	Jet fan solution	Performance solution to allow for use of jet fans in basement carpark in lieu of mechanical ventilation. Likely to require CFD modelling.
3	E1D17, E2D21, J9D4	EV Charging solution	Basement EV charging will be considered for its impact on the buildings fire performance.
4	D2D5	Extended travel distances (Carpark)	Extended travel distances within the carpark (10m increase above the DtS maximums). To be rationalised via increased sprinkler sensitivity in carpark.
5	D2D5	Extended travel distances (Residential)	Extended travel distances within residential levels. To be rationalised via decreased detection spacing.
6	D2D5	Extended travel distances (Non-Residential)	Extended travel distances within non-residential areas. To be rationalised via decreased detection spacing.
7	D2D5	Extended travel distances from SOU	Extended travel distances from SOU to an exit. Likely rationalised by reduction of detector spacing within SOU corridors or smoke seals provided to doors depending on increase above DtS.
8	C2D2, C3D8, C3D9, C3D10, Spec. 5	Rationalisation of FRL's	Rationalisation of reduced fire-resistance levels throughout the development. • 120 minutes in lieu of 240 minutes in storage areas.
9	C2D2, S5C11	Permit slab setdowns to Wet areas	Permit a reduction of the Fire Resistance Levels from 90/90/90 to 60/60/60 in the wet areas of the development.
10	D2D8	Omission of Fire Hose Reel (FHR)	Solution to omit FHR to small fire isolated rooms. Portable fire extinguishers to be provided throughout.
11	E1D2, E1D4	Booster location	Solution to permit non-compliant location of boosters due to multiple entrances of the site. Plans to be provided at FIP detailing booster location.
12	D2D12, C4D5	Discharge past unprotected openings & discharge separation	Discharge from buildings require traveling past unprotected openings from the same, or other buildings on the allotment. Openings in Building 2 & 3, likely to require drenchers. Development also contains 2 exits discharging within same area.

13	E2D19	Omission of smoke exhaust system to S1	Solution to omit the smoke exhaust system to S1 building.
14	E1D4, Spec 17	Omission of sprinklers to sport courts	Solution to omit the requirement of a suppression system to double height court spaces.
15	D3D5	Separation of rising and descending stairs.	Solution to omit the need for rising and descending stair separation. Likely to require additional signage or smoke lobbies.
16	D2D6	Distances between alternate exits	Solution to allow reduced distances between alternate exits of 5m in lieu of 9m.
17	D2D4, E2D4	Omission of stair pressurisation system	Solution to omit stair pressurisation and permit external opening within stair of S2 building.
18	D2D4	Permit stair to be non-fire isolated.	Solution to permit non-fire isolated stair to connect 5 stories in lieu of 2.
19	D3D25	Door swing	Solution to permit door to swing against direction of egress, relying on low population of ground floor spaces.
20	C4D9, C4D5	Protection of openings within a Fire stair	The Fire Isolated stairways are proposed to have open façade/ window, within proximity from the residential corridor in building S3.
21	D2D14	Travel via Non-Fire Isolated Exits	The travel distance from the furthest point (ie. S2 - Level 2 boxing/ gymnasium) to exit at Ground is 85m (in lieu of 80m)

17. Appendix E – S1 Stair Risers Letter of Support

DAVID CAPLE & ASSOCIATES PTY. LTD.
A.B.N. 14 006 231 509 A.C.N. 006 231 509
Management Consultants – Health Safety & Environment

4th April 2024

Bridge Housing
Attention: Lindsey Grey
Level 9
59 Goldbourne Street
SYDNEY NSW 2000
Anna.Ewald-Rice@architecture-and.au

Dear Lindsey,

RE: HUMAN MOVEMENT PERFORMANCE SOLUTION – PCYC PROJECT, SYDNEY

Thank you for the invitation to provide a performance solution based on ergonomic requirements considering human movement for the PCYC building currently under design by Architecture-AND to be located at Redfern in Sydney.

1. Credentials of the Author

David Caple is a Certified Professional Ergonomist (CPE) registered in Australia, USA and UK. He has had over 40 years' experience in providing independent human factors and ergonomics advice to government and industry. This includes the issue of human movement which is specifically requested in this performance solution. These services have been provided across Australia, as well as other countries in the world. A brief overview CV is provided as an Appendix to this report.

In relation to the stair design issue, David has been involved in undertaking independent risk assessments in relation to similar design issues on a range of projects across Australia. This includes The Sydney Opera House, La Trobe Performing Arts Centre, and the Victorian Arts Centre.

This assessment has been based on a methodology which is consistent with the NSW Work Health and Safety (WHS) legislation.

David has been an independent advisor to government in relation to the development of WHS policies in Victoria through WorkSafe Victoria as well as for Safe Work Australia. This includes the development of Regulations, Codes of Practice, and Guidance materials.

2. Scope of the Project

The scope of this project was to risk assess the stair design provided within the bleacher section of the PCYC building at Redfern. It is noted that the 36 treads provided with these stairs do not comply as a Class 9b building. This requires no more than 18 stairs in each flight as required by Clause D3D14 of the National Construction Code 2022.

David Caple & Associates Pty Ltd
PO Box 2135
East Ivanhoe,
Victoria 3079, Australia
2024.docx

Tel: +61 419 339 268
Email: david@caple.com.au

3. Stakeholders

The stakeholders who provided information in relation to this risk assessment were Anna Ewald-Rice, Architect from Architecture-AND.

This included technical information in relation to the stairs and the anticipated activities in the bleacher area of this building.

4. Methodology and Risk Assessment Methods

4.1 The National Construction Code, the NCC Volume 1 – 2022 amendment one, Clause A2G2 outlines four alternative assessment methods. In this project, the assessment method is consistent with the NCC Clause A2G2(2)(c) "Expert Judgement".

4.2 The methodology used for this risk assessment is a combination of qualitative and quantitative data. The quantitative data provided relates to the dimensions for these stairs as well as the landings between sections of the stairs on the bleachers.

4.3 The risk assessment was undertaken consistent with ergonomics methodology. This takes into consideration:

- Physical movement including gait analysis of people ascending and descending the stairs.
- Cognitive risks associated with lighting and kinaesthetic cues.
- Psychosocial risk factors.

4.4 Physical – the physical assessment takes into consideration how the people within the PCYC will traverse up and down the stairs on the bleacher complex. The gait analysis looks at where their feet would contact the treads and the landings.

4.5 Cognitive – the cognitive risk factors relate to the ability to see the transition between the treads and the landings. This takes into consideration the lighting in the area, as well as shadowing over the treads. It also takes into consideration other tactile indicators on the floor including the nosing of the treads to provide kinaesthetic feedback to the person on their body motion.

4.6 Psychosocial – this relates to the potential distraction from other stair users. It is foreseeable in these facilities that multiple people will be using the stairs at the same time and, whilst in conversation, would not be specifically focussed on their gait as they are ascending or descending the stairs.

5. Assumptions Made

5.1 Each stair riser height is 170mm and the bleacher riser height is 340mm.

5.2 The bleacher design would not be used as access stairs into this space. The only stairs that are part of this performance solution as those specifically designed for access towards the left hand side of the bleachers. These are those with the 170mm high tread which is compliant.

5.3 A handrail would be provided down the entire length of the stairs. This handrail would be compliant with the NCC2022 and AS1657-2018 in relation to its location and dimensions.

5.4 The construction of the stair treads and landings would have slip resistant materials that would also be compliant with the NCC2022 and AS1657-2018.

5.5 The stairs would be used in a range of lighting situations. Consequently, the design of the lighting would ensure that compliance with AS/NZS1680-2006 (Interior and workplace lighting).

6. Risk Assessment Outcomes and Recommendations

The following risks are identified in this desktop review, together with associated recommendations.

Number	Risk Factor / Scenario	Risk Rating	Proposed Recommendation	Risk Rating
1.	Potential trip hazard and fatigue of the user ascending multiple sections of stairs without a change of direction and an opportunity to rest.	Medium	1.1 Provide tactiles on the landings to provide the visual and the kinaesthetic feedback to the user that they are about to ascend or descend another section of stairs. 1.2 A user of the stairs can step to one side at each of the small landings towards the bleachers if fatigue is identified.	Low
2.	Trip hazard resulting from a lack of visual indication that there are multiple sections of this stair with landings in between.	Medium	2.1 Incorporate strip lighting or similar underneath the handrail. This would enable the user approaching the stairs to have a strong visual indication that there are a series of small landings between each section of stairs.	Low
3.	Trip hazard resulting from the minimal differentiation in seeing the stair treads from the small landings when ascending or descending the stairs.	Medium	3.1 Utilise the riser sections of treads to highlight the first and last tread of each section of stair. This will provide an additional cognitive cue that a potential change in gait is required.	Low

4.	Potential slip and fall on the treads when descending the stairs.	Medium	4.1	Incorporate a compliant nosing treatment to each tread to reduce the potential for slip and fall is minimised.	Low

Conclusion

This risk assessment concludes that the 36 risers on consecutive flights of stairs at the PCYC building at Redfern would be constructed with a series of enhancements to minimise fatigue and potential for trip and fall incidents on the stairs.

With the implementation of these recommendations, this performance solution would enable compliance.

Please feel free to contact our office if any clarifications are required.

Yours sincerely,

David C Caple

David C Caple AM
Director
David Caple & Associates Pty Ltd
B.Sc.(Hons), Dip. Ed., M.Sc.(Erg.).UK
Past President – International Ergonomics Association (IEA)
Fellow of IEA and Fellow of HFESA, Australia
Fellow and Chartered Member, Institute of Ergonomics and Human Factors, UK
Fellow, Ergonomics Society, Sweden
M. Human Factors Society, USA
Certified Ergonomist, Australia
Certified Professional Ergonomist USA
Senior OHS Auditor, Australia
Member of the Order of Australia
www.davidcaple.com.au

Enc. Brief CV – David C Caple

CONSULTANT PROFILE

David Caple AM
Director
David Caple & Associates Pty Ltd
Melbourne, Australia

www.davidcaple.com.au

Mobile: 0419 339 268
david@caple.com.au

Summary
David has been an independent OHS consultant with 40 years in private consulting plus 15 years in corporate and research employment.
His technical experience includes OHS and ergonomics / Human Factors research projects in Sweden, Hong Kong, USA, Singapore, Papua New Guinea, New Zealand and the UK, as well as OHS management projects in Australian funded by the Australian and state governments as well as the private sector. Activities primarily involve industry-level research and consulting as well as training, strategy development and legal briefings for a range of large and small companies. These projects involve collaborations with government, employers and trade unions.
David is a Member of the Order of Australia.

Technical qualifications
BSc (Hons), DipEd, MSc (Erg) UK
Past President, International Ergonomics Association (IEA)
Fellow, IEA
Fellow, HFESA Australia
Fellow and Chartered Member, Institute of Ergonomics and Human Factors, UK
Fellow, Ergonomics Society Sweden
Member, Human Factors Society USA
Certified Ergonomist, Australia
Certified Professional Ergonomist, USA
Senior OHS Auditor, Australia
Past Adjunct Professor, La Trobe University, Melbourne, Australia since 2004-2023
Past Senior Research Fellow, Federation University, Ballarat, Australia

Experience
- Past President, International Ergonomics Association (IEA) 2006–2009; executive member 2006–2012.
- Conducted industry based OHS consulting in petrochemical, meat, automotive, retail, mining, health, banking, aged care, manufacturing, hospitality, communications, prisons, airlines and public-sector industries.
- Researched Australian OHS issues for Safe Work Australia and state governments.
- Evaluated OHS legislation, including cost benefit studies for state governments.
- Trained OHS managers, supervisors, OHS representatives and employees in several industry sectors.
- Provided expert witness advice in court cases and with Fair Work Australia.
- Developed OHS strategy plans for major employers and government departments.
- Provided technical OHS advice to European Union and US Congress hearings.
- Liaison Officer on ergonomics development with the International Labour Organization, International Organisation for Standards and World Health Organization.
- Independent member of Victorian Government WorkSafe OHS Advisory committee for 15 years appointed by the Minister and judge of OHS Awards for WorkSafe Victoria.
- Author and reviewer of peer-reviewed journals and presenter at more than 30 international conferences.
- Facilitator of public consultation for the Australian Work Health and Safety Strategy – 2012 to 2022 and the ACCC review on quad bike fatalities 2018.
- Host of the online TV series for Safe Work Australia in 2014 and 2015 on emerging WHS issues in Australia
- Independent investigator on OHS Leadership for Singapore Government with top 20 CEOs.
- Project leader for the Australian Government on OHS impacts of introduction and subsequent removal of the equivalent carbon price for SGGs and also on the OHS implications from the recycling of e-waste.
- Conducted industry based OHS risk assessments on emerging issues including bullying, family violence, manual handling, workload management, stress, working at heights, occupational violence, plant design, supply chains and development of OHS management systems.
- Independent ergonomics advisor for Activity Based Work projects involving Green Star accreditation for Government and private companies across Australia and developer of workplace design standards.
- Independent review of occupational violence in school education for the ACT government.