DESIGN CONFIDENCE

BCA Design Assessment Report

LAHC –
Warwick Farm

11-13 Mannix Parade
Warwick Farm NSW 2170

ACCESSIBILITY | BUILDING REGULATIONS | FIRE ENGINEERING | MANAGEMENT SERVICES

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Revision History —

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EXECUTIVE SUMMARY

This BCA Design Assessment report has been prepared by Design Confidence at the request of Taylor Construction on behalf of Land and Housing and relates to the proposed affordable housing located at 11-13 Mannix Parade, Warwick Farm, NSW, 2170.

With respect to the assessment undertaken the following areas in particular need further review as the project develops —

ITEM	ITEMS FOR FURTHER CONSIDERATION	RESPONSIBILITY
1.	The following building elements and their components must be non-combustible – i. External walls and common walls, including all components incorporated in them, including the façade covering, framing and insulation; ii. The flooring and floor framing of lift pits; iii. Non-loadbearing internal walls where they are required to be fire-resisting.	Project Architect
2.	A test report from a Registered Testing Authority must be provided to certify that the façade / external walls achieve compliance with BCA FP1.4 and FV1.	All

In addition to undertaking a detailed assessment of the design against the perspective requirements of the BCA a preliminary performance-based assessment has also been undertaken. The purpose of the assessment was to look at the incorporation of a performance-based design may add value in-lieu of complying with the prescriptive (DtS) provisions.

The table below lists scenarios where we believe the adoption of a performance design may add value to development –

NO.	DESIGN EFFICIENCIES	DTS CLAUSE	PERFORMANCE REQUIREMENT
FIRE SAFETY			
1.	Rationalise a reduction in FRL's within intermediate floors within wet areas based on slab set downs.	C1.1, Spec. C1.1	CP1, CP2 & EP2.2
2.	Justify a single exit within the carpark area in lieu of two.	D1.2	DP4 & EP2.2
3.	Travel distances of up to 25m to a single exit in lieu of 20m within basement carpark.	D1.4	DP4 & EP2.2
4.	Fire-isolated stairways discharge at ground level within a space that is not open for at least 1/3 of its perimeter and does not afford an unimpeded path of travel of less than 6m to the road.	D1.7	DP5 & EP2.2
5.	Omission of fire hose reels within the basement carpark levels.	E1.4	EP1.1

Be advised that the adoption of performance solutions for fire safety matters may be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

1.0 INTRODUCTION

1.1 General

This BCA Design Assessment Report has been prepared at the request of Taylor on behalf of Land and Housing and relates to the proposed affordable housing development located at at 11-13 Mannix Parade, Warwick Farm, NSW, 2170.

The final proposed development will consist of residential units across a total of seven storeys including single level basement parking.

Figure 1 - 3D render of proposed building

The development site will involve four (4) residential lots being 11-13 Mannix Parade, 2 Hinkler Avenue and 2 McGirr Parade in Warwick Farm. The site will consist of the amalgamation and boundary adjustment of the existing lots as follows:-

- Lot 26 (being No. 11 Mannix Parade) – 607 square metres,
- Lot 27 (being No. 13 Mannix Parade) – 676.6 square metres,
- Part of the rear portion of Lot 8 (being at No. 2 Hinkler Avenue) – 30 square metres (approximately); and
- Part of the rear portion of Lot 9 (being at No. 2 McGirr Parade) – 361.18 square metres (approximately).

The site is relatively irregular in shape and will have a combined total area of approximately of 1,683.49 square metres and is currently occupied by free-standing/single storey dwelling-houses, made of fibrocement material and tile roofing.

1.2 Purpose of Report

The purpose of this report is to identify the extent to which the architectural design documentation complies with the relevant prescriptive provisions of the Building Code of Australia (BCA) Volume 1, edition 2019.

This report is based upon, and limited to, the information depicted in the documentation provided for assessment, and does not make any assumptions regarding 'design intention' or the like.

1.3 Documentation Provided for Assessment

This assessment is based upon the architectural documentation prepared by Turner and listed within **Appendix 1**.

1.4 Report Exclusions

It is conveyed that this report should not be construed to infer that an assessment for compliance with the following has been undertaken—

(i) Work Health & Safety Act and Regulations;

(ii) Work Cover Authority requirements;

(iii) Structural and Services Design Documentation;

(iv) The individual requirements of service authorities (i.e. Telecommunication Carriers, Sydney Water, Energy Australia);

(v) The Disability (Access to Premises - Buildings) Standards 2010;

(vi) The Disability Discrimination Act (DDA) 1992; and

(vii) The relevant Accessibility and Energy Efficiency Provisions as contained within the BCA.

2.0 DEVELOPMENT DESCRIPTION

2.1 General

In accordance with the BCA, the assessment undertaken relates to the proposed affordable housing development located at 48-50 Wellington Road, Chester Hill NSW.

For the purpose of the BCA the subject development may be described as contained below.

2.2 Building Description

Table 2 – Building Characteristics

DESCRIPTION OR REQUIREMENT		
Building Classification	Carpark	7a
	Residential	2
Rise in Storeys	Six (6)	
Construction Type	Type A	
Effective Height	15.85m	(RL GF – 13.15, RL L5– 29.0)
Floor Area	Carpark	~1,032m^2
Volume	Within limitations	
Climate Zone:	Climate Zone 5	

2.3 BCA Assessment – Interpretation Notes

To provide the reader with additional context, the following information regarding assessment methodology used in this assessment is provided below—

(i) Each unit has been treated as a separate sole-occupancy unit;

(ii) Travel to alternative exits from the point of choice have been treated as being ≥45° apart;

(iii) The stairways serving the residential levels and carpark have been assessed as being fire isolated;

3.0 BCA ACCESS DESIGN ASSESSMENT SUMMARY

3.1 General

The following tables summarises the compliance status of the architectural design in terms of each *applicable* prescriptive provision of the BCA and indicates a ***capability for compliance*** ('COMPLIES') with the provisions of the BCA.

A detailed analysis and commentary are provided in **Section 3.0** of this report in the instance that prescriptive non-compliance occurs ('DOES NOT COMPLY') or further 'DESIGN DETAIL' is required.

Such instances should not necessarily be considered BCA deficiencies, but rather matters which need to be considered by the design team, the certifying authority and all other relevant stakeholders as design progresses.

For those instances of either prescriptive non-compliance ('DOES NOT COMPLY') or further 'DESIGN DETAIL' is required, a detailed analysis and commentary is provided within **Section 4.0** of this report.

3.2 Section B – Structure

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
B1.1	resistance to actions			✓
B1.2	determination of individual actions			✓
B1.4	materials and form of construction			✓
B1.6	construction of buildings in floor hazard areas			✓

3.3 Section C – Fire Resistance

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C1.1	fire resisting construction		✓	
C1.8	structural tests for lightweight construction			✓
C1.9	non-combustible building elements			✓
C1.10	fire hazard properties			✓
C1.14	ancillary elements			✓
C2.2	general floor area and volume limitations	✓		
C2.6	vertical separation of openings in external walls	✓		
C2.8	separation of classifications in the same storey			✓
C2.9	separation of classifications in different storeys			✓
C2.10	separation of lift shafts			✓
C2.12	separation of equipment			✓
C2.13	electricity supply system			✓
C2.14	public corridors in Class 2 and 3 buildings	✓		
C3.2	protection of openings in external walls	✓		
C3.4	acceptable methods of protection			✓
C3.8	openings in fire isolated exits			✓

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C3.9	service penetrations in fire-isolated exits			✓
C3.10	openings in fire isolated lift shafts			✓
C3.11	bounding construciton: Class 2 and 3 buildings			✓
C3.12	openings in floors and ceilings for services			✓
C3.15	openings for services installations			✓
C3.16	construction joints			✓
C3.17	columns protected with lightweight construction to achieve an FRL			✓

3.4 Section D – Access and Egress

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
D1.2	number exits required		✓	
D1.4	exit travel distances		✓	
D1.5	distance between alternative exits	✓		
D1.6	dimensions of exits and paths of travel to exits			✓
D1.7	travel via fire-isolated stairway		✓	
D1.10	discharge from exits			✓
D2.3	non-fire-isolated stairways and ramps			✓
D2.7	Installations in exits and paths of travel			✓
D2.13	goings and risers			✓
D2.14	landings			✓
D2.15	thresholds			✓
D2.16	balustrades			✓
D2.17	handrails			✓
D2.19	doorways and doors			✓
D2.20	swinging doors			✓
D2.21	operation of latch			✓
D2.23	signs on doors			✓
D2.24	protection of openable windows			✓

3.5 Section E – Services and Equipment

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E1.3	Fire Hydrants			✓
E1.4	Fire Hose Reels			✓
E1.5	Sprinklers			✓
E1.6	portable fire extinguishers			✓
E2.2	smoke hazard management			✓

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E3.1	lift installations			✓
E3.2	stretcher facilities in lifts			✓
E3.3	warning against use of lifts in fire			✓
E3.7	fire service controls			✓
E3.9	fire service recall switch			✓
E3.10	Lift car fire service control switch			✓
E4.2	emergency lighting requirements			✓
E4.5	exit signs			✓
E4.6	direction signs			✓

3.6 Section F - Health and Amenity

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
F1.0	weatherproofing of external walls			✓
F1.1	stormwater drainage			✓
F1.4	external above ground membranes			✓
F1.5	roof coverings			✓
F1.6	sarking			✓
F1.7	waterproofing of wet areas in buildings			✓
F1.9	damp-proofing			✓
F1.10	damp-proofing of floors on the ground			✓
F1.11	provision of floor wastes			✓
F1.13	glazed assemblies			✓
F2.1	facilities in residential buildings			✓
F2.5	construction of sanitary compartments	✓		
F3.1	heights of rooms and other spaces			✓
F4.1	provision of natural light			✓
F4.2	methods and extent of natural light			✓
F4.4	artificial lighting			✓
F4.5	ventilation of rooms			✓
F4.8	restriction of position of water closets and urinals			✓
F4.9	airlocks			✓
F4.11	carparks			✓
F5.4	sound insulation rating of floors			✓
F5.5	sound insulation rating of walls			✓
F5.6	sound insulation rating of internal services			✓
F5.7	sound isolation of pumps			✓
F6.2	pliable building membrane			✓
F6.3	flow rate and discharge of exhaust systems			✓
F6.4	ventilation of roof spaces			✓

3.7 Section G – Ancillary Provisions

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
G1.101	provision for cleaning windows			✓
G6.1	occupiable outdoor areas			✓

4.0 BCA DETAILED ASSESSMENT – CLASS 2-9 BUILDINGS

4.1 General

With reference to the BCA Design Assessment Summary contained in **Section 3.0** above, the following analysis and commentary is provided.

This commentary is formulated to enable the design documentation to be further progressed, for the purpose of evidencing the attainment of compliance with the relevant provisions of the BCA.

4.2 Section B - Structure

B1.1	The resistance of a building or structure shall be greater than the most critical action effect determined by B1.2 of the BCA, AS/NZS 1170.0-2002 and B1.4 of the BCA.
B1.2	The structural design of the building is required to be determined in accordance with the varying "actions" considerations contained within this clause (i.e. permanent actions, imposed actions, wind / snow / earthquake actions).
B1.4	The structural resistance of materials and forms of construction shall be determined in accordance with the following: (i) Masonry - AS3700-2018 (ii) Concrete construction - AS3600-2018 (iii) Footings and slabs – AS2870-2011 (iv) Steel construction - AS4100-1998 or AS/NZS 4600-2005 (v) Termite Risk Management - AS3660.1-2014 (vi) Piling - AS2159-2009 (vii) Glazed assemblies - AS2047-2014-amendments 1 & 2 (external), and/or AS1288-2006 (internal)
B1.6	A class 2 building in a flood hazard area must comply with the ABCB Standard for Construction of Buildings in Flood Hazard Areas.

4.3 Section C – Fire Resistance

C1.1	Testing certificates are to be provided confirming the proposed cladding material has been tested in accordance with AS1530.1 and AS1530.3. Notwithstanding the above, the building elements are required to achieve the nominated FRLs as nominated within BCA Spec C1.1 as applicable, these FRLs have been summarised within Table A2.1 as contained within Appendix 2. In addition to the FRLs contained within the Appendix A2 the following information details the construction methodology and concessions available to the subject building.

C1.1 *Cont'd*

General Notes

(i) Internal walls required to have an FRL must extend:

- To the underside the floor next above;
- To the underside of a roof covering if it is non-combustible and must not be crossed by timber or other combustible building elements, expect for roof battens with dimensions of 75mm x 50mm or less or sarking-type material; or
- A ceiling that is immediately below the roof and has a resistance to the incipient spread of fire to the roof space between the ceiling and the roof of not less than 60 minutes;

(ii) Any loadbearing internal wall and a loadbearing fire wall (including shafts) is required to be of concrete or masonry or fire-protected timber;

(iii) A non-loadbearing internal wall required to achieve an FRL is required to be of non-combustible construction;

(iv) A shaft which is not for the discharge of hot products of combustion and not load-bearing is required to be of non-combustible construction;

(v) The bottom of any shafts is required to be non-combustible and laid directly on the ground unless otherwise enclosed by construction having an FRL not less than that required for the walls; and

(vi) Building elements are required to achieve an FRL from both sides.

Concessions

(i) In the storey immediately below the roof, the FRL of internal walls (excluding shaft walls) and internal columns may be reduced to 60/60/60;

(ii) A floor need not have an FRL if it is laid directly on the ground;

(iii) The roof need not achieve an FRL if its covering is non-combustible;

(iv) Where the basement levels is protected by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Spec. E1.5 and is separated from the class 2 part above in accordance with C2.9, the basement carpark level may comply with Table A2.2 as contained within Appendix 2.

Method of attachment not to reduce the fire-resistance of building elements

The method of attaching or installing a finish, lining, ancillary element or service installation to a building element must not reduce the fire-resistance of that element to below that required.

C1.8

Any lightweight construction to internal walls required to achieve an FRL or protection to steel columns required achieve an FRL are required to be tested for resistance in accordance with this clause.

C1.9

It is requested that testing certificates be provided confirming all the the proposed materials within the external walls has been tested in accordance with AS1530.1 and AS1530.3 and referenced within the next report update.

The following building elements and their components must be non-combustible

(i) External walls and common walls, including all components in them including the facade covering, framing and insulation;

(ii) The flooring and floor framing of lift pits;

(iii) Non-loadbearing internal walls where they are required to be fire-resisting;

(iv) A shaft, being a lift, ventilating, pipe, garbage, or similar shaft that is not for the discharge of hot products of combustion, that is non-loadbearing;

(v) A loadbearing internal wall and a loadbearing fire wall, including those that are part of a loadbearing shaft.

C1.10

The fire hazard properties for materials proposed to be provided have been summarised within Table A3.1 as contained within Appendix 3.

C1.14

An ancillary element must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is one of the elements permitted under this clause.

C2.6

Windows and other openings within external walls (including externals walls not having an FRL of 60/60/60) are required to contain vertical separation via either of the following means –

(i) The provision of spandrels within the external walls not less than 900mm in height and extend not less than 600mm above the finished floor level. The spandrels are required to non-combustible and have an FRL being not less than 60/60/60;

(ii) The provision of horizontal aprons/projections that project outwards from the external face of the wall not less than 1100mm and extends along the wall not less than 450mm beyond the openings concerned. The horizontal projections are required to be non-combustible and have an FRL being not less than 60/60/60); or

(iii) Provision of a sprinkler system (other than a FPAA101H system) complying with Spec. E1.5 throughout the building.

Our office has been advised by the design team an AS2118.1 system will be installed and therefore vertical separation is not required to be addressed.

C2.8

Each floor within the building contains a single classification, therefore there are no requirements to provide separation of classifications in the same storey.

C2.9

The intermediate floor separating the class 7a carpark from the class 2 part above must be achieve an FRL of not less than 60/60/60 on the basis it is protected with

a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Spec. E1.5 – refer Table A2.2 within Appendix 2 for further concessions.

The intermediate floor separating the class 7b storage from the residential above, must have the higher FRL of 240/240/240.

C2.10

The lift shall be separated from the remainder of the building by shaft walls achieving the required FRLs in accordance with the tables contained in Appendix 2 of this report, appropriate to the class 2, 5 and class 7a parts.

Note, where a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Spec. E1.5 is provided within the carpark, the lfit shaft walls need only acheive an FRL 60/60/60 - – refer Table A2.2 within Appendix 2 for further concessions.

C2.12

(i) Lift Installations

If the lift motor and lift control panel are not contained within the lift shaft, then the equipment is required to be separated with construction achieving an FRL of 120/120/120 or --/120/120 (if nonloadbearing) and any access doorway is required to protected with a self-closing fire door having an FRL of --/120/30.

(ii) Plant Equipment

In the event the plant equipment contains boilers then these boilers and associated equipment are required to be separated with construction achieving an FRL of 120/120/120 or --/120/120 (if nonloadbearing) and any access doorway is required to protected with a self-closing fire door having an FRL of --/120/30.

Note, boilers is a defined term within the BCA, hence it is recommended that the services engineer review the terminology to first determine whether any components of the air-handling system constitute as boilers.

In switch boards that supply the emergency equipment mentioned above the emergency equipment switch gear must be separated by metal partitions designed to minimize the spread of a fault from the non-emergency equipment switch gear.

C2.14

The residential public corridors are noted as being less than 40m, and hence not required to be provided with smoke proof walls.

C3.2

Generally, throughout the development openings are located more than 3m from the side allotment boundaries, therefore no openings are required to be protected under the requirements of this clause.

C3.4	Any openings requiring protection are required to comply with the provisions of this clause and Specification C3.4. Referring to D1.7 below, it has been identified that there are openings on ground floor that are located within 6m of a discharge path that are required to be protected internally. These openings are located on the East elevation (main entrance). Where protection is required, the DTS provisions requires that doorways, windows and other openings must be protected as follows: (i) Doorways: a. External wall-wetting sprinklers used with doors that are self-closing or automatic closing; or b. –/60/30 fire doors that are self-closing or automatic closing. (ii) Windows: a. Wall-wetting sprinklers located externally if windows are automatic closing or permanently fixed in the closed position; or b. --/60/-- fire windows that are automatically closing or permanently fixed in the closed position; or c. --/60/-- automatic closing fire shutters. (iii) Other openings: a. Excluding voids – internal or external wall-wetting sprinklers, as appropriate; b. Construction having an FRL not less than -/60/-. c. Fire doors, fire windows and fire shutters must comply with Specification C3.4.
C3.8	(i) Doorways that open to fire-isolated stairways, fire-isolated passageways, and are not doorways opening to a road or open space, must be protected by –/60/30 fire doors that are self-closing, or automatic-closing in accordance with (i) and (ii); (ii) The automatic-closing operation required by (i) must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located not more than 1.5 m horizontal distance from the approach side of the doorway; (iii) Activation of the sprinkler system must also initiate the automatic-closing operation.

C3.9	Fire isolated exits must not be penetrated by any services other than – (i) electrical wiring permitted by D2.7(e) to be installed within the exit; or (ii) ducting associated with a pressurisation system if it – (iii) is constructed of material having an FRL of not less than –/120/60 where it passes through any other part of the building; and (iv) does not open into any other part of the building; or (v) water supply pipes for fire services.
C3.10	The entrance doorway of the lift shaft must be protected by --/60/-- fire doors that comply with AS1735.11-1986 and are set to remain closed except when discharging or receiving passengers, goods or vehicles. A lift call panel, indicator panel or other panel in the wall of the lift shaft must be backed by construction having an FRL of not less than --/60/60 if it exceeds 35,000mm^2 in area.
C3.11	Doorways providing access from the sole occupancy units and any other rooms not within a sole occupancy unit (i.e. common room) to the public corridor must be protected with self-closing -/60/30 fire doors.
C3.12	Where a service passes through a floor required to have an FRL or a ceiling required to have a resistance to the incipient spread of fire (refer to C1.1), that service is required to protected by either a shaft in accordance with C1.1 or in accordance with C3.15.
C3.13	Any opening in a wall providing access to a ventilating, pipe, garbage or other service shaft are required to be protected as follows: (i) Sanitary compartment – Non-combustible door or panel assembly or an FRL of --/30/30; or (ii) --/60/30 fire door or hopper that is self-closing; or (iii) Access panel with an FRL of --/60/30; or (iv) Garbage shaft – A door or hopper of non-combustible construction.
C3.15	Any openings for service installations (electrical, mechanical, plumbing, etc.) that penetrates a building element which is required to be of fire resisting construction is required to be protected (i.e. fire seals).
C3.16	Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation are required to be protected in a manner identical with a prototype tested in accordance with AS1530.4-2014 to achieve the required FRL.

C3.17	Where a column is protected by lightweight construction to achieve the required FRL defined by C1.1 passes through a building element that is also required to have an FRL it is required to be installed using a method and materials identical with the prototype assembly of the construction which has achieved the required FRL.

4.4 Section D – Access and Egress

D1.2	The residential levels are provided with a single exit at each storey, as required to satisfy the requirements of this clause. Egress from the basement levels is noted as requiring a vertical rise within the building of more than 1.5m and hence the provision of two exits is required. The basement is provided with two doors to access the fire-isolated stair, however the lead to the same stairway, so therefore can only be counted as a single exit. To address the above compliance item the following options are provided: (i) Introduce a second stair or alternative exit within the basement to afford a second exit; or (ii) Justify the current configuration via a performance-based solution, demonstrating compliance with the relevant performance requirements of the BCA.
D1.3	The stairways serving the residential levels and carpark have been provided as fire-isolated stairs.
D1.4	Travel distances within the building have been assessed as being compliant with the provisions of this clause. Notwithstanding the above, the travel distances to exits should not exceed – **Class 7a (carpark)** (i) No point on a floor must be more than 20 from an exit or point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40m. **Class 2 (residential)** (i) Th entrance doorway of any SOU must be not more than 12m from an exit or from a point of choice from which travel in different directions to 2 exits is available; (ii) The entrance doorway of any SOU must be not more than 30m from a single exit serving the storey at the level of egress to a road or open space. (iii) No point of the floor of a room of which is not a SOU must be more than 20m from an exit or from a point at which travel in different directional to 2 exits is available. Note – the distances for the class 2 parts indicated above are provided on the basis the building is protected with a sprinkler system complying with Spec. E1.5 of the BCA.

D1.4 *Cont'd*	It is assessed that within the basement, as only served with a single exit, travel distances extend to up to 25m to an exit in lieu of 20. To address the above compliance item the following options are provided: (i) Introduce a second stair or alternative exit within the basement to afford compliant travel distances; or (ii) Justify the current configuration via a performance-based solution, demonstrating compliance with the relevant performance requirements of the BCA.
D1.6	The path of travel to an exit and any required exit is to have an unobstructed height throughout of not less than 2m (except a doorway, which can be 1980mm) and an unobstructed width not less than 1m (except a doorway, which can be 750mm in an area not required to be accessible and 850mm in an area required to accessible).
D1.7	It is noted that the fire isolated stairs serving residential levels and basement both discharge externally and require occupants to pass by within 6m to parts of the external wall (specifically the lobby) If protection under C3.4 is not achievable, there may be the opportunity justify the existing via a performance-based solution prepared by an accredited C10 Fire Engineer, with all recommendations included within the Fire Safety Engineering Report to be included within construction issue documentation. In addition to the above, both fire stairs discharge into a covered area not open for at least 1/3 of the its perimeter and does not provide an unimpeded path of travel of less than 6m to the road.

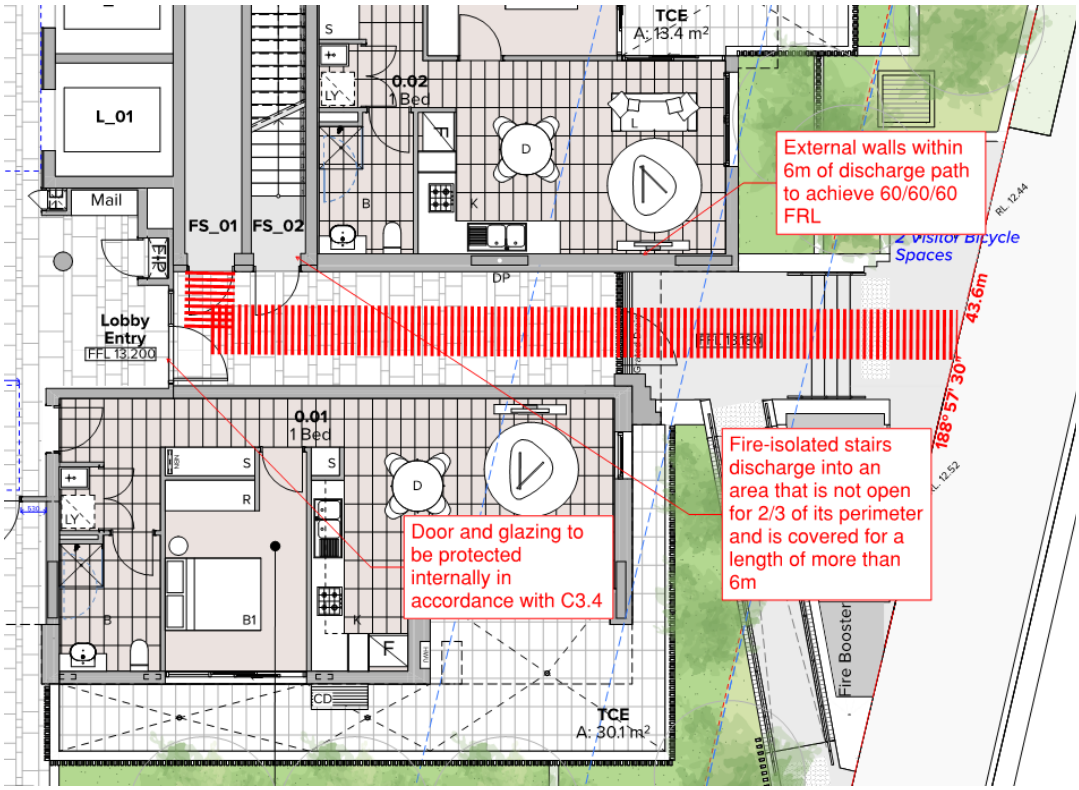


Figure 4– Paths of travel to road from fire isolated exits

D1.7 *Cont'd*

To address the above compliance item the following options are provided:

(i) Re-configure the discharge from both stairs to not be directed within a non-compliant covered area; or

(ii) Justify the current configuration via a performance-based solution, demonstrating compliance with the relevant performance requirements of the BCA.

D1.10

The discharge points of the exits are required to have an unobstructed width of 1m (including gates) and be via a stairway, ramp or other incline having a gradient of no steeper than 1:8 or complying with AS1428.1-2009- amendment 2 (where required to be accessible for people with a disability).

D2.3

The required non-fire isolated stairway (including landings and any supporting building elements) must be constructed in accordance with D2.2, or only of –

(i) Reinforced or prestressed concrete; or

(ii) Steel in no part less than 6mm thick; or

(iii) Timber that –

- Has a finished thickness of not less than 44mm;
- Has an average density of not less than 800 kg/m3 at a moisture content of 12%; and
- Has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue.

D2.7

Gas or other fuel services shall not be installed within the required exits; and

Any services or equipment (being electrical meters, distribution boards or the like) installed within the hallway are required to be enclosed by non-combustible construction or a fire-protective covering (i.e. 1 layer of 13mm fire-protective grade plasterboard) with doorway(s) or opening(s) suitably sealed against smoke spreading from the enclosure.

D2.13

The going, riser and steepness dimension of the stairways are required to be designed within the following range:

STAIRWAY LOCATION	RISER (R)	GOING (G)	QUANTITY (2R + G)
Public	Max: 190mm Min:115mm	Max:355mm Min: 250mm	Max: 700mm Min:550mm
Private	Max:190mm Min: 115mm	Max: 355mm Min: 240mm	Max: 700mm Min: 550mm

(i) The risers and goings are required to be constant throughout the flight except variations of no greater than 5mm are permitted between adjacent risers or goings and no greater than 10mm are permitted between the smallest and largest goings or risers in a flight; and

D2.13

(ii) The stair treads are required to have a surface or nosing strip achieving a slip-resistance classification of P3 or R10 in dry or P4 or R11 in wet tested in accordance with AS4586-2013 (amendment 1).

Cont'd

D2.14 Stair landings are required to be a minimum of 750mm long with a gradient not steeper than 1:50 and have a slip-resistance surface or strip.

The surface or strip is required to achieve a slip-resistance classification of P3 or R10 in dry or P4 or R11 in wet tested in accordance with AS4586-2013 (amend 1).

D2.15 The threshold of a doorway is not permitted to incorporate a step or ramp at any point closer to the doorway than the width of the door leaf.

That is unless the doorway opens to a road or open space and:

(i) In a building required to be accessible, is provided with a threshold or step ramp in accordance with AS1428.1-2009; or

(ii) In all other cases, the door sill is not more than 190mm above the finished surface of the ground.

D2.16 Balustrades are required to be constructed as follows:

(i) To a height not less than 865mm above the nosings of the stair treads or the floor of a ramp;

(ii) 1000mm above the floor of any access path, balcony, landing or the like;

(iii) Any opening does not permit a 125mm sphere to pass through it and for stairs, the space is measured above the nosings;

(iv) For floors more than 4m above the surface beneath, any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing; and

(v) For balustrades in fire-isolated stairways used primarily for emergency purposes openings between balustrades can be up to 300mm or where rails are used, the bottom rail must be a maximum of 150mm above the stair nosings line or from the landing or floor and the opening between rails must not be more than 460mm.

D2.17 Handrails are required along one (1) side of each stairway flight and ramp, unless required to assist people with a disability.

The handrails are required to fixed at a height of not less than 865mm measured above the nosings of the stair treads or ramp and be continuous such that no obstruction on or above them will tend to break a hand hold.

D2.19

A doorway serving as a required exit or forming part of a required exit –

(i) Must not be fitted with a revolving door;

(ii) Must not be fitted with a sliding door unless –

- It leads directly to a road or open space; and
- The door is able to be opened manually under a force of not more than 110N; and

(iii) If fitted with a door which is power-operated –

- It must be able to be opened manually under a force of not more than 110N if there is a malfunction or failure of the power source; and
- If it leads directly to a road or open space it must open automatically if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

D2.20

A swinging door in a required exit or forming part of a required exit must swing in the direction of egress unless –

(i) It serves a building or part of a building with a floor area of not more than 200m^2, it is the only required exit from the building or part and it is fitted with a device for holding it in the open position, or

(ii) It serves a sanitary compartment or airlock (in which case it may swing either direction), and

(iii) Must not impede the path or direction of egress.

D2.21

Any door in a required exit, forming part of a required exit or in the path of travel to a required exit are required to be readily operable without a key from the side that faces a person seeking egress and:

(i) By a single hand pushing or downward action on a single device located between 900mm and 1100mm from the floor;

- Be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and
- Have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35mm nor more than 45mm; or
- A single hand pushing action on a single device which is located between 900mm and 1.2m above the floor.

(ii) Where the latch operation device referred to above is not located on the door leaf itself –

- Manual controls to power-operated doors must be at least 25mm wide, proud of the surrounding surface and located-
- Not less than 500mm from an internal corner; and
- For a hinged door, between 1m and 2m from the door leaf in any position; and
- For a sliding door, within 2m of the doorway and clear of a surface mounted door in the open position
- Braille and tactile signage complying with Clause 2 and 6 of Specification D3.6 must identify the latch operation.

D2.21 *Cont'd*

(iii) Fitted with a fail-safe device which automatically unlocks the door upon the activation of any sprinkler system or detection system deemed suitable in accordance with AS1670.1-2018 installed throughout the building.

D2.23

Signage complying with this clause to alert persons that the operation of certain doors is required to be installed on or adjacent to –

(i) a required fire door providing direct access to a fire isolated exit, except a door providing direct egress from a SOU, on the side of the door that faces a person seeking egress and if the door is fitted with a device for holding it in the open position, on either the wall adjacent to the doorway or both sides of the door; and

(ii) both sides of a door leading from a fire isolated to a road or open space.

Signage referred to above must be in capital letters not less than 20mm high in a colour contrasting with the background and state –

(i) for an automatic door held open by an automatic hold-open device

"FIRE SAFETY DOOR-DO NOT OBSTRUCT"

(i) for a self-closing door –

"FIRE SAFETY DOOR
DO NOT OBSTRUCT
DO NOT KEEP OPEN"

(ii) for a door discharging from a fire isolated exit –

"FIRE SAFETY DOOR-DO NOT OBSTRUCT"

D2.24

Window openings to bedrooms require protection, if the floor below the window is 2m above the surface beneath.

Protection need not be provided where the lowest level of the window is 1.7m or more above the finished floor level.

(i) Protection can be in the form of the following:

- The openable portion of the window must be protected with a device to restrict the window opening or a screen with secure fittings;
- The device or screen must not permit a sphere greater than 125mm is permitted to pass through;
- Resist the outward horizontal action of 250N against the window or screen;
- Have a child resistant release mechanism if the screen or device can be removed, unlocked or over ridden; and

(ii) A barrier with a height of not less than 865mm above the floor is required to an openable window:

- In addition, to window protection as per (i) above;
- Where the floor below the window is 4m or more above the floor or if the window is not covered above; and
- Any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing and have no gaps greater than 125mm.

4.4 Section E – Services and Equipment

E1.3

A fire hydrant system complying with AS2419.1-2005 is required to serve the building, including -

(i) All points on a floor are required to be within reach of a 10 m hose stream issuing from a nozzle at the end of a –

- 30 m length of hose laid on floor, connected to an internal attack fire hydrant outlet
- 60m length of a hose laid on the floor, connected to an external fire hydrant outlet.

(ii) Additional hydrants can be installed in appropriate locations, where additional coverage is required;

(iii) Where a sprinkler system is installed throughout the building in accordance with AS2118.1, AS2118.4, AS2118.6, FPAA101H or FPAA101D, the fire hydrant booster protection requirements of Clause 7.3(c)(ii) and 7.3(d)(iii) of AS2419.1-2005 do not apply;

(iv) If the fire brigade booster assembly is within, or affixed to, the external wall of the building, the booster shall be within sight of the main entrance to the building;

(v) If the fire brigade booster assembly is remote from the building, it is required to be at the boundary of the site, be within sight of the main entrance of the building and adjacent to the principal vehicular access to the site.

E1.4

A hose reel system complying with AS2441-2005 is required to serve the carpark part within the subject development.

A fire hose reel system must be provided in accordance with the following –

(i) Hose reels are required to be located within 4m of an exit; and

(ii) All points on a floor are required to be in reach of a 4m hose stream at the end of a 36m hose length laid on the floor;

(iii) Additional hose reels can be installed along the path of travel where additional coverage is required.

Note - Hose reel coverage is not required in the Class 2 parts of the building.

There may be provision for the removal of the fire hose reels al together from the development and offset with additional portable fire extinguishers. This would need to be assessed and documented as part of the fire engineering.

E1.5

An automatic fire sprinkler system is required to be installed throughout the whole building based on the rise in storeys of more than 4 under 25m effective height.

The required sprinkler system shall be in accordance with Specification E1.5 and Specification E1.5a of the BCA, as applicable.

With respect to the above Specification E1.5a, Clause 3 contains concessions which apply to the requirements of Parts C, D and E of the BCA depending on the sprinkler systems which will be provided.

Preliminary advice from the design team is that an AS2118.1 system will be provided throughout the building.

E1.6

Portable extinguishers must be provided in accordance with Table E1.6 to cover risk classes throughout the whole building.

Portable fire extinguishers complying with AS2444-2001 are required as follows:

(i) To cover Class B (if more than 50L excluding vehicle fuel tanks is stored); and

(ii) To cover Class AE or E fire risks associated with emergency service switchboards; and

(iii) To cover Class F fire risks involving cooking oils and fats in kitchens.

Within the residential parts portable fire extinguishers are to be located within 10m of the entrance to each SOU.

E2.2

The building requires all the following smoke hazard management systems –

Class 2 – Residential Parts

(i) The building must be provided with a smoke alarm system complying with Clause 3 of Specification E2.2a of the BCA & AS3786-2014 (amendment 2); and

(ii) Smoke alarms must be installed in each sole occupancy unit and located on or near the ceiling containing bedrooms and where there is more than one alarm installed within a sole occupancy unit, alarms must be interconnected within that sole occupancy unit;

(iii) Smoke alarms are not required in public corridors and other internal public spaces on the basis the class 2 part will be protected by a sprinkler system complying with Spec. E1.5 (other than a FPAA101D system);

(iv) In a Class 2 building provided with a sprinkler system complying with Specification E1.5 (other than FPAA101D or FPAA101H system), smoke detectors are not required in public corridors and other internal public spaces.

Class 7a – Basement carpark

(i) For the class 7a basement levels, where a mechanical ventilation system is provided in accordance with AS1668.2 it must comply with Clause 5.5 of AS1668.1, except that –

- Fans with metal blades suitable for operation at normal temperature may be used;

E2.2 *Cont'd*

- The electrical power and control cabling need not be fire rated.

In addition to the above, the following applies to any air-handling system provided within the building which does not form part of a smoke hazard management system and which recycles air from one fire compartment to another fire compartment or operates in a manner that may unduly contribute to the spread of smoke from one fire compartment to another fire compartment must:

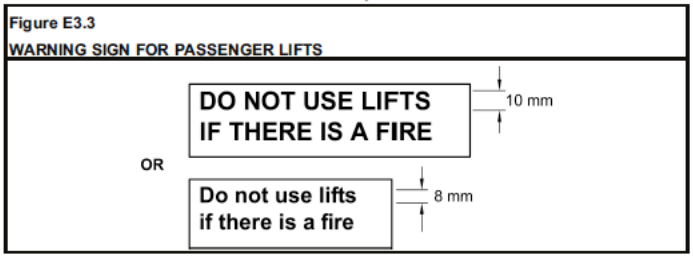
(i) be designed and installed to operate as a smoke control system in accordance with AS/NZS 1668.1-2012 (amendment 2); or

(ii) incorporate smoke dampers where the air-handling ducts penetrate any elements separating the fire compartments served and be arranged such that the air-handling system is shut down and the smoke dampers are activated to close automatically by smoke detectors complying with clause 7.5 of AS 1670.1-2018.

E3.1 An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with Specification E3.1.

E3.3 A warning sign must be displayed where it can be readily seen near every call button for a passenger lift and comply with the details and dimensions of Figure E3.3 of the BCA.

Figure E3.3
WARNING SIGN FOR PASSENGER LIFTS



E3.7 The passenger lift requires:

(i) A fire control switch complying with E3.9 of the BCA; and

(ii) Lift car fire service drive control switch complying with E3.10 of the BCA.

E3.9 The lift must be provided with a fire service recall control switch required by E3.7, which activates the fire service recall operation.

The fire service recall switch must be located and function in accordance with the requirements of this clause.

E3.10 The lift must be provided with a lift car fire service drive control switch required by E3.7, which activates from within the lift car.

The lift car fire service drive control switch must be located and function in accordance with the requirements of this clause.

E4.2 Emergency lighting complying with AS2293.1-2018 is required to be installed throughout.

E4.5	Exit signage complying with AS2293.1-2018 are required installed above or adjacent to any doorways serving as required exits from the building and final doors from stairways.
E4.6	If an exit is not readily apparent to persons occupying or visiting either the building, then exit signs complying with AS2293.1-2018 are required to be installed in appropriate positions in corridors, hallways, lobbies and the like, indicating the direction to a required exit.

4.6 Section F – Health and Amenity

F1.0	Weatherproofing of external wall(s) are required to comply with Verification Method FV1 (i.e. certificate of conformity). There are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls. A test report from a Registered Testing Authority must be provided to certify that the façade / external walls achieve compliance with BCA FP1.4 and FV1.
F1.1	Stormwater drainage must comply with AS/NZS3500.3-2018.
F1.4	Waterproofing membranes for external above ground use (i.e. balconies and roof) are required to comply with AS4654-2012 Parts 1 and 2.
F1.5	A roof must be covered with — (i) Concrete roofing tiles complying with AS 2049 and fixed, except in cyclonic areas, in accordance with AS 2050, as appropriate; or (ii) terracotta roofing tiles complying with AS 2049 and fixed, except in cyclonic areas, in accordance with AS 2050; (iii) cellulose cement corrugated sheeting complying with AS/NZS 2908.1 and installed in accordance with AS/NZS 1562.2; or (iv) metal sheet roofing complying with AS 1562.1; or (v) plastic sheet roofing designed and installed in accordance with AS/NZS 4256.1, AS/NZS 4256.2, AS/NZS 4256.3, AS/NZS 4256.5 and AS/NZS 1562.3; or (vi) Terracotta, fibre-cement and timber slates and shingles designed and installed in accordance with AS 4597, except in cyclonic areas.
F1.6	Any sarking-type materials used for weatherproofing of roofs and walls are required to comply with AS/NZS4200.1-2017 and AS4200.2- 2017 incorporating amendment 1.
F1.7	Building elements in wet areas must be water-resistant or waterproof in accordance with Table F1.7 and comply AS 3740-2010.
F1.9	Where a damp-proof course is provided, it must consist of a material that complies with AS/NZS2904 or impervious sheet material in accordance with AS3660.1.

F1.10	A floor laid directly onto ground or fill must be provided with a vapour barrier complying with AS2870-2011.
F1.11	A bathroom or laundry located at any level above a sole-occupancy unit or public space must have a floor waste and the floor graded to the floor waste to permit drainage of water.
F1.13	The glazed assemblies in an external wall must comply with AS2047-2014 (amendments 1 and 2) for resistance to water penetration.
F2.1	Each sole occupancy unit requires - (i) Clothes washing facilities, comprising at least one washtub and a space for a washing machine; and (ii) Clothes drying facilities comprising clothes line or hoist with no less than 7.5m of line; or space for one (1) heat-operated drying cabinet or appliance in the same room as the clothes washing facilities
F2.5	The door to a full enclosed sanitary compartment is required to: (i) Open outwards; (ii) Slide; or (iii) Be readily removable from the outside of the sanitary compartment (i.e. lift-off hinges). Unless there is a clear space of at least 1.2m between the closest pan within the sanitary compartment and the hinge side edge of the doorway.
F3.1	The required unobstructed ceiling heights throughout the building are as follows- (i) A corridor, passageway or the like – 2.1m; (ii) A bathroom, sanitary compartment, store room, car parking area or the like – 2.1m; (iii) A residential kitchen, laundry or the like – 2.1m; (iv) A habitable room in a residential SOU excluding a kitchen – 2.4m; (v) Above a stairway, ramp, landing or the like – 2m.
F4.1	Natural light must be provided to all habitable rooms. Methods of providing natural right is to be in accordance with Clause F4.2.

F4.2 All habitable rooms are required to have natural lighting provided by either –

(i) Window(s) having a light transmitting area of not less than 10% of the floor area of the room, which are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or

(ii) Roof light(s) having a light transmitting area of not less than 3% of the floor area of the room and open to the sky;

(iii) Natural light might be provided by borrowing light from an adjoining room, in accordance with the requirements of Clause F4.3.

F4.4 Artificial lighting in accordance with AS/NZS1680.0 must be provided —

(i) In required stairways, passageways and ramps; and

(ii) If natural lighting equivalent to the requirements of F4.2 is not available, to —

- Residential part: to sanitary compartments, bathrooms, laundries, common stairways and other communal areas;
- Carpark part: to all rooms frequently occupied, all spaces required to be accessible; corridors, lobbies and similar circulation spaces and paths of egress.

F4.5 Any habitable room, sanitary compartment, bathroom, laundry and any other room occupied by a person for any purpose must have either:

(i) Natural ventilation (i.e. opening(s) having an openable area of 5% of the room being served) complying with F4.6; or

(ii) Mechanical ventilation complying with AS1668.2-2012 (amendment 2).

F4.6 Natural ventilation must consist of openings, windows, doors or other devices which can be opened with a ventilating area not less than 5% of the floor area of the room required to be ventilated.

Natural ventilation may be provided by borrowing ventilation from an adjoining room in accordance with the requirements of Clause F4.7.

F4.8 Generally, throught the development bathrooms are located so as to not open directly into a kitchen area. If a bathroom were to open directly into the kitchen they must be protected in accordance with F4.9.

F4.9 A sanitary compartment opening directly into a kitchen within an SOU must –

(i) Have access provided by an airlock, hallway or other room; or

(ii) Be provided with mechanical exhaust ventilation.

F4.11 The basement level must have –

(i) A system of mechanical ventilation complying with AS1668.2; or

(ii) A system of natural ventilation complying with Section 4 of AS1668.4.

F5.4 A floor must have an Rw + Ctr (airborne) of not less than 50 and an Ln,w+C1 (impact) not more than 62 where it separates:

(i) sole-occupancy units; or

(ii) a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.

F5.5 Internal walls are required to be constructed as follows:

(i) The walls that separate sole-occupancy units must have an $R_w + C_{tr}$ (airborne) of not less than 50;

(ii) The walls that separate sole-occupancy units from public corridors, internal exit stairways, lifts, other rooms or the like and different classifications require an R_w (airborne) of not less than 50;

(iii) Be of discontinuous construction if the wall separates a bathroom, sanitary compartment, laundry or kitchen in a sole-occupancy unit from a habitable room (other than a kitchen in an adjoining unit) or lift shaft;

(iv) Doorways providing access to sole-occupancy units from public corridors must have an R_w of not less than 30; and

(v) A wall required to have a sound insulation must be constructed such that the wall continues to the underside of:

- The floor above;
- A ceiling having the same sound insulation required for the wall; and
- The underside of the roof above.

(vi) Services must not be chased into concrete or masonry elements.

F5.6 Any duct, soil, stormwater, waste or water supply pipe (including a duct or pipe that is located in a wall or floor cavity) serves or passes through more than one (1) sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than:

(i) 40 if the adjacent room is a habitable room (other than a kitchen); or

(ii) 25 if the adjacent room is a kitchen or non-habitable room.

F5.7 A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

F6.2 Where a pliable building membrane is installed in an external wall, it must comply with the requirements of this clause.

Where a pliable membrane is not installed in an external wall, the primary water control layer must be separated from water sensitive materials by a drained cavity

F6.3	An exhaust system installed in a kitchen, bathroom, sanitary compartment or laundry must be installed to comply with the requirements of this clause.
F6.4	Where an exhaust system is installed in a kitchen, bathroom, sanitary compartment or laundry and discharges directly or via a shaft or duct into a roof space, the roof space must be ventilated to outdoor air through evenly distributed openings in accordance with the requirements of this clause.

4.7 Section G – Ancillary Provisions

G1.101	The windows located three (3) or more storeys above the street level shall be able to be cleaned from wholly within the building or by a method complying with Work Health and Safety Act 2011 and Regulations made under the Act.
G5.2	If the building is located in a designated bushfire prone area, the building must comply with AS3959-2018.
G6.1	The balcony areas of units that are open to the sky have been assessed as occupiable outdoor areas. The occupiable outdoor areas within the unit balconies, are to be provided with the following applicable provisions as detailed in Part G6 – (i) The fire hazard properties of linings, materials or assemblies must comply with C1.10 as for an internal element, excluding properties identified in G6.2(b).

5.0 CONCLUSION

5.1 General

Based upon our detailed review of the proposed architectural drawings, it is the opinion of this office that the subject development is capable of complying with the performance provisions of the BCA.

Compliance would be achieved via a mixture of adopting a performance-based approach as well as complying with the relevant deemed-to-satisfy requirements as outlined within the BCA, compliance via the performance-based approach could occur without significant changes to the proposed design.

The details of the proposed performance solutions are subject to the outcome of the fire engineering brief and analysis which will be carried out in accordance with the International Fire Engineering Guidelines.

The performance solutions for the building will be developed as part of the ongoing design and consultation with the design team.

Report By

Lindsay Beard
Associate | Building Regulations
For Design Confidence (Sydney) Pty Ltd

Verified By

Luke Sheehy
Principal
For Design Confidence (Sydney) Pty Ltd

APPENDIX 1 – DOCUMENTATION PROVIDED FOR ASSESSMENT

This accessibility assessment was based upon the architectural documentation prepared by Turner, namely—

DRAWING NO.	TITLE	DATE	REVISION
A-100-101	Location Plan	31.07.2020	K
A-110-007	Basement 1	31.07.2020	K
A-110-008	Ground Level	31.07.2020	K
A-110-010	Level 01-03	31.07.2020	K
A-110-040	Level 04	31.07.2020	K
A-110-050	Level 05	31.07.2020	K
A-110-060	Roof	31.07.2020	K
A-250-010	West Elevation	31.07.2020	K
A-250-020	East Elevation	31.07.2020	K
A-250-030	South Elevation	31.07.2020	K
A-250-040	North Elevation	31.07.2020	K
A-350-010	Section AA	31.07.2020	K
A-350-020	Section BB	31.07.2020	K

APPENDIX 2 – FIRE RESISTANCE LEVELS

The Table below represents the Fire Resistance Levels (FRLs) required in accordance with BCA 2019:

Table A2.1 – Type A construction: FRL of building elements

BUILDING ELEMENT	CLASS OF BUILDING — FRL: (IN MINUTES) *STRUCTURAL ADEQUACY/INTEGRITY/INSULATION*			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120	–/240/180
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion—				
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/ 90/ 90	–/120/120	–/120/120
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

Table A2.2 REQUIREMENTS FOR CARPARKS

BUILDING ELEMENT			FRL (NOT LESS THAN) / ESA/M (NOT GREATER THAN)
Wall			
(a)	*external wall*		
	(i)	less than 3 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		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 Table 3
Column			
(a)	supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark*		60/–/– or 26 m^2/tonne
(c)	any other column not covered by (a) or (b)		60/–/–
Beam			
(a)	steel floor beam in continuous contact with a concrete floor slab		60/–/– or 30 m^2/tonne
(b)	any other beam		60/–/–
Fire-resisting lift and stair shaft (within the *carpark* only)			60/60/60
Floor slab and vehicle ramp			60/60/60
Roof (not used for carparking)			–/–/–
Notes:	1.	ESA/M means the ratio of exposed surface area to mass per unit length.	
	2.	Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.	

APPENDIX 3 – FIRE HAZARD PROPERTIES

The table below represents the required fire hazard properties for building materials applicable to this development in accordance with BCA 2019.

Table A3.1 – Fire hazard properties

FLOOR LININGS AND FLOOR COVERINGS CRITICAL RADIANT FLUX (CRF IN KW/M2	
Non-Sprinkler Protected Areas	2.2
Sprinkler Protected Areas	1.2
Fire-Isolated Exits & Fire Control Rooms	1.2
Lift Cars	2.2
WALL LININGS AND CEILING LININGS TESTED TO AS5637.1	
Fire-Isolated Exits & Fire Control Rooms	Group 1
Public Corridors – Walls	Group 1 or 2
Public Corridors – Ceilings	Group 1 or 2
Specific Areas – Walls	Group 1, 2 or 3
Specific Areas – Ceilings	Group 1, 2 or 3
Other Areas – Walls	Group 1, 2 or 3
Other Areas – Ceilings	Group 1, 2 or 3
Lift Cars	Group 1 or 2
NOTE	In addition to achieving the group number above they too must comply with the following – • a smoke growth rate index not more than 100; or • an average specific extinction area less than 250m^2/kg
OTHER MATERIALS OR ASSEMBLIES	
Fire-Isolated Exits & Fire Control Rooms	Spread-of Flame Index 0 Smoke-Developed Index 2
Non-fire-isolated stairs & escalators and auditorium fixed seating	Spread-of Flame Index 0 Smoke-Developed Index 5
Sarking-type material	Flammability Index 0 (fire control rooms) Flammability Index 5 (other areas)
Other materials	Spread-of Flame Index 9 Smoke-Developed Index 8 (if the Spread-of Flame Index is more than 5)

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