



DESIGN CONFIDENCE

BCA Design Assessment Report

AUDAA

62 Old Barrenjoey Road
Avalon NSW 2107

CONTENTS

EXECUTIVE SUMMARY	4
1.0 INTRODUCTION	5
1.1 General.....	5
1.2 Purpose of Report	5
1.3 Documentation Provided for Assessment.....	5
1.4 Report Exclusions	5
2.0 DEVELOPMENT DESCRIPTION	6
2.1 General.....	6
2.2 Building Description.....	6
2.3 BCA Interpretation Notes	6
3.0 BCA ASSESSMENT SUMMARY	8
3.1 General.....	8
3.2 Section B: Structure	8
3.3 Section C: Fire Resistance	8
3.4 Section D: Access & Egress	9
3.5 Section E: Services & Equipment	9
3.6 Section F: Health & Amenity.....	10
3.7 Section G – Ancillary Provisions	10
4.0 BCA DETAILED ASSESSMENT	11
4.1 General.....	11
4.2 BCA Section B – Structural Provisions	11
4.3 BCA Section C – Fire Resistance	11
4.4 BCA Section D – Access and Egress.....	16
4.5 BCA Section E – Services & Equipment	20
4.6 BCA Section F – Health & Amenity	21
4.7 BCA Section G – Ancillary Provisions	25
APPENDIX 1	27
APPENDIX 2	28
APPENDIX 3	29

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Revision History:

OUR REFERENCE	REMARKS	ISSUE DATE
P219_269 -1 (BCA) NH	Report issued to accompany Development Application submission	19 July 2019
P219_269 -2 (BCA) NH	Report updated to reflect updated drawings and issued as FINAL	2 July 2020

EXECUTIVE SUMMARY

This BCA Design Assessment report has been prepared by Design Confidence at the request of AUDAA. With respect to the assessment undertaken the following areas in particular need further review as the project develops –

NO.	ITEMS FOR FURTHER CONSIDERATION	RESPONSIBILITY
1.1	<p>The following building elements and their components must be non-combustible –</p> <ul style="list-style-type: none"> 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; iv. Secondary façade screen 	Architect
1.2	<p>Consideration needs to be given to the design of the external walls as vertical separation within them needs to be incorporated therein, compliant vertical separation consists of the following –</p> <ul style="list-style-type: none"> i. A spandrel which is not less than 600mm in height, which extends not less than 600mm above the upper floor surface of an intervening floor and is non-combustible construction achieving an FRL of 60/60/60; or ii. Provide a fire-resistant slab or horizontal projection outwards from the external face of the openings no less than 1.1 m deep and extends at least 450 mm parallel from the openings. <p>For the purpose of this clause, the BCA considers a window or opening means any part of an external wall of a building that does not have an FRL of 60/60/60 or greater.</p> <p>Therefore, irrespective of whether windows are located above one another or not the external wall / façade is to incorporate vertical separation achieving a minimum FRL of 60/60/60 on each floor, excluding the ground floor.</p>	Architect

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.

Table 2 below lists scenarios where we believe the adoption of a performance design may add value to development –

NO.	DESIGN EFFICIENCIES
FIRE SAFETY	
2.1	Justify a reduced FRL of 120/120/120 in lieu of 180/180/80 for the fire walls and intermediate floor, separating the commercial class 6 tenancy from the class 2 & 7a part in the same storey and above.
2.2	Justify the non-protection of opening in external walls on the second floor located within 3m from a fire source feature/side boundary.
2.3	Justify the reduced unobstructed width via the required stairway serving the class 2 units.

1.0 INTRODUCTION

1.1 General

This BCA Design Assessment report has been prepared at the request of AUDAA and relates to the proposed mixed-use development located at 62 Old Barrenjoey Road Avalon Beach.

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.

1.2 Purpose of Report

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

1.3 Documentation Provided for Assessment

This assessment is based upon the architectural documentation prepared by AUDAA 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) Occupational Health & Safety Act and Regulations;
- (ii) WorkCover Authority requirements;
- (iii) Structural and Services Design Documentation;
- (iv) BASIX Requirements;
- (v) The individual requirements of service authorities (i.e. Telecommunication Carriers, Sydney Water, Energy Australia);
- (vi) The Disability Discrimination Act (DDA) 1992;
- (vii) The relevant accessibility provisions of the BCA 2019, as are principally contained in Part D3, E3.6 & F2.4 of the code;
- (viii) The relevant energy efficiency provisions of the BCA 2019, as are principally contained within Section J of the code;
- (ix) The Disability (Access to Premises – Buildings) Standards 2010.

2.0 DEVELOPMENT DESCRIPTION

2.1 General

In accordance with the Building Code of Australia, the assessment undertaken relates to the proposed mixed-use development located at 62 Old Barrenjoey Road, Avalon Beach.

For the purpose of the Building Code of Australia (BCA) the subject building may be described as contained below.

2.2 Building Description

Table 2 – Building Characteristics

DESCRIPTION OR REQUIREMENT		
Building Classification	Residential	2
	Retail	6
	Garage / Carpark	7a
Rise in Storeys	Three (3)	
Construction Type	Type A	
Effective Height	~5.2m	
Floor Area	Residential	~310m ²
	Retail	~140m ²
	Garage / Carpark	~92m ²
Volume	Residential	~744m ³
	Retail	~420m ³
	Garage / Carpark	~220m ³
Climate Zone:	Climate Zone 5	

2.3 BCA Interpretation Notes

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

- (i) Exits have been treated as coinciding with being open to the sky (unroofed);
- (ii) Each unit has been treated as a separate sole-occupancy unit;
- (iii) The building has not been treated as having an air-handling system which recycles air from one fire compartment (i.e. sole-occupancy unit) 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;

- (iv) The garage on the ground floor has been treated as a class 7a carpark on the basis it accommodates more than 3 vehicle spaces;
- (v) The class 7a carpark at the rear of the ground floor has been treated as an area for use in common between the class 2 and 6 part;
- (vi) The entry at the shop front entry serving the class 6 retail tenancy has been treated as the single required exit for the tenancy space;
- (vii) It is understood that 'Innowood Beams' comprising timber will be used above the balcony of the topmost level (i.e. external to the building) that does not form part of the main roof and is also not proposed to be used as an element of the external wall.

3.0 BCA ASSESSMENT SUMMARY

3.1 General

The following table summarises the compliance status of the architectural design in terms of each *applicable* prescriptive provision of the BCA and indicates a capability for compliance with the BCA.

Although, it should be recognised that instances exist where 'Prescriptive non-compliance' occurs, or 'Additional design input' is required.

Such instances should not necessarily be considered BCA deficiencies; but matters which need to be considered by the design team and any assessment authority at relevant stages of design and/or assessment.

For those instances of either 'prescriptive non-compliance' or 'additional design input', a detailed analysis and commentary is provided within Part 4 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 flood hazard areas			✓

3.3 Section C: Fire Resistance

BCA CLAUSE	COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C1.1 fire resisting construction			✓
C1.8 lightweight construction			✓
C1.9 non-combustible building elements			✓
C1.10 fire hazard properties			✓
C1.14 ancillary elements			✓
C2.6 vertical separation of openings in external walls			✓
C2.7 separating by fire walls			✓
C2.8 separation of classifications in the same storey			✓
C2.9 separation of classifications in different storeys			✓
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			✓
C3.10 openings in fire isolated lift shafts			✓
C3.11 bounding construction: Class 2 and 3 buildings and Class 4 parts.			✓

BCA CLAUSE	COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C3.12 openings in floors and ceilings for services			✓
C3.13 openings in shafts			✓
C3.15 openings for service installations			✓
C3.16 construction joints			✓

3.4 Section D: Access & Egress

BCA CLAUSE	COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
D1.2 number of exits required	✓		
D1.3 when fire-isolated stairways and ramps are required	✓		
D1.4 exit travel distances	✓		
D1.5 distance between alternative exits	✓		
D1.6 dimensions of exits and paths of travel to exits			✓
D1.10 discharge of exits			✓
D2.3 non-fire-isolated stairways and ramps			✓
D2.7 installation in exits and paths of travel			✓
D2.8 enclosure of space under stairs and ramps			✓
D2.13 goings and risers			✓
D2.14 landings			✓
D2.15 thresholds			✓
D2.16 balustrades and other barriers			✓
D2.17 handrails			✓
D2.19 doorways and doors	✓		
D2.20 swinging doors	✓		
D2.21 operation of latch			✓
D2.24 protection of openable windows			✓

3.5 Section E: Services & Equipment

BCA CLAUSE	COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E1.3 fire hydrants			✓
E1.6 portable fire extinguishers			✓
E2.2 smoke hazard management			✓
E3.1 lift installations			✓
E3.3 warning against use of lifts in fire			✓
E4.2 emergency lighting			✓
E4.5 exit signs			✓
E4.6 direction signs			✓

3.6 Section F: Health & Amenity

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
F1.0	external weatherproofing			✓
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 waste			✓
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 on location of sanitary compartments			✓
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			✓

3.7 Section G – Ancillary Provisions

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
G5.2	construction in bushfire prone areas			✓
G1.101	provision for cleaning windows			✓

4.0 BCA DETAILED ASSESSMENT

4.1 General

With reference to the 'BCA Assessment Summary' contained within Part 3 of this report, the following detailed 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 BCA Section B – Structural Provisions

Cl. B1.1 The resistance of a building or structure must be greater than the most critical action effect from different combinations of actions determined pursuant to BCA Cl. B1.2 & AS/NZS 1170.0 & BCA Cl. B1.4.

Cl. B1.2 The structural design of the building must be determined in accordance with the individual "actions" considerations contained within this clause (i.e. permanent actions, imposed actions, wind / snow / earthquake and other actions).

Cl. B1.4 The structural resistance of materials and forms of construction must 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)

Cl. B1.6 If the building is located in a flood hazard area, the building must comply with the ABCB Standard for Construction of Buildings in Flood Hazard Areas.

4.3 BCA Section C – Fire Resistance

Cl. C1.1 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 2 the following information details the construction methodology and concessions available to the subject building.

□ General notes

- (i) Internal walls required to have an FRL must extend:
 - To the underside the floor next above;

Cl. C1.1
Cont'd

- To the underside of a roof covering if it is non-combustible and must not be crossed by timber or other combustible building elements, except 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 shafts) 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.
- ❑ 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.

Cl. C1.8 Lightweight construction used in a wall system required to have an FRL or a lift, stair or service shaft (refer to Spec C1.1 above) must comply with BCA Specification C1.8.

Cl. C1.9 The following building elements and their components must be non-combustible –

- (i) External 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.

Cl. C1.10	The fire hazard properties for materials proposed to be provided have been summarised within Table A3.1 as contained within Appendix A3.
C1. 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.
Cl. C2.6	<p>Openings in external walls (including external walls not having an FRL of 60/60/60) are required to contain vertical separation via either of the following means –</p> <ul style="list-style-type: none"> (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 be non-combustible and have an FRL being not less than 60/60/60; or (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 FPAA101D or FPAA101H system) complying with Spec. E1.5 throughout the building.
Cl. C2.7	<p>A fire wall must be constructed in accordance with the following –</p> <ul style="list-style-type: none"> (i) Have the relevant FRL prescribed by Specification C1.1 for each of the adjoining parts, and if these are different, the greater FRL; (ii) Any openings in a fire wall must not reduce the FRL required by Specification C1.1 for the fire wall, except where permitted by the Deemed-to-Satisfy Provisions of Part C3; (iii) Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or sarking-type material, must not pass through or cross the fire wall unless the required fire-resisting performance of the fire wall is maintained. <p>Any part of a building separated from the remainder of the building by a fire wall may be treated as a separate fire compartment if it is constructed in accordance with above and the fire wall extends to the underside of the following –</p> <ul style="list-style-type: none"> (i) a floor, provided its FRL is equal to the fire wall; or (ii) the underside of the roof covering.

Cl. C2.8	<p>The ground floor contains three (3) different classifications which are located alongside one another (being retail, residential and carpark, therefore –</p> <ul style="list-style-type: none"> (i) Option 1 - Fire walls dividing the different classifications into individual compartments are to be provided (refer to Appendix A2); or (ii) Option 2 - In lieu of the provision of fire walls all relevant building elements located within the ground floor are to be constructed to achieve the higher FRL (being 180/180/180) this includes the intervening floor separating the residential part above; or (iii) Option 3 - Pursue a BCA Performance Solution / Fire Engineering Report which would look at rationalising the required FRL for the ground floor building elements to be 120/120/120 throughout in lieu of 180/180/180.
Cl. C2.9	<p>The intermediate floor separating the class 7a carpark and class 2 residential part above must achieve an FRL of not less than 120/120/120.</p> <p>The intermediate floor separating the class 6 retail tenancy from the class 2 residential part above must achieve an FRL of not less than 180/180/180.</p>
Cl. C2.12	<p>Any on-site fire pumps are required to be separated in accordance with AS2419.1-2005.</p>
Cl. C2.13	<ul style="list-style-type: none"> (i) If the main electrical switchboard is to sustain any emergency equipment, then the switchboard is required to be separated with construction achieving an FRL of 120/120/120 and have any access doorway protected with a self-closing fire door having an FRL of -- /120/30; and (ii) All switchboards in the electrical installation, which sustain the electricity supply to the emergency equipment, must be constructed so that emergency equipment switchgear is separated from non-emergency equipment switchgear by metal partitions designed to minimise the spread of a fault from the non-emergency switchgear. <p>For the purposes of the above, emergency equipment includes:</p> <ul style="list-style-type: none"> (i) Fire hydrant booster pumps; (ii) Air handling systems designed to exhaust and control the spread of fire and smoke; and (iii) Control and indicating equipment.

Cl. C3.2 Reference should be made to figures below for openings within the external walls located within 3m of a fire-source feature / boundary, at the first floor and second floor.

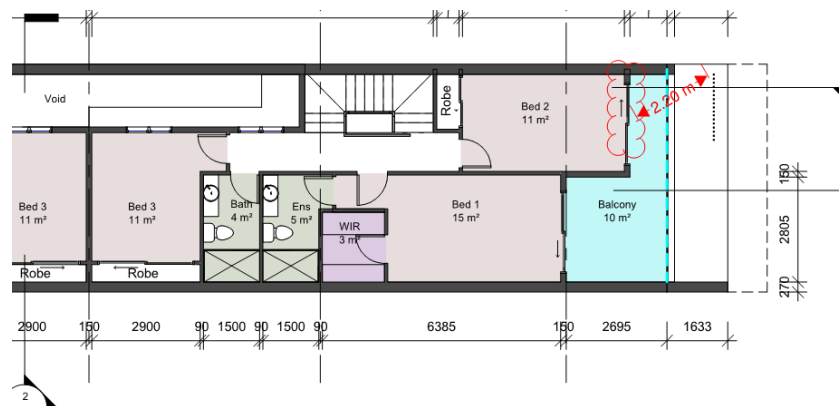


Figure C3.2a – Second floor

With respect to the above openings, one (1) or more of the following resolutions is required –

- (i) Re-design the subject elevation such that the openings are located greater than 3m from the fire-source feature / side boundary;
- (ii) Extend the blade wall to a length of 3m which will act as a method of protection to the exposed window. The subject blade wall will need to achieve an FRL of at least 30/--/--;
- (iii) Provide protection in accordance with Cl. C3.4 of the BCA (see clause below); or
- (iv) Pursue a BCA Performance Solution with respect to this matter, demonstrating compliance with the Performance Requirements of the BCA, the solution being to rely upon a 1m blade wall rather than a wall which is 3m in length.

Cl. C3.4 Where protection is required, doorways, windows and other openings must be protected as follows –

☐ Windows

- (i) External wall-wetting sprinklers with windows that are permanently fixed in the closed position or automatic closing; or
- (ii) Fixed fire windows having an FRL of --/60/--; or
- (iii) Automatic closing fire shutters achieving an FRL of --/60/--.

☐ Doorways

- (i) External wall-wetting sprinklers used with doors that are automatic or self-closing; or
- (ii) Fire doors having an FRL of --/60/30 that are self-closing or automatic closing.

☐ Other openings

Cl. C3.4 Cont'd	<p>(i) Excluding voids – internal or external wall-wetting sprinklers, as appropriate; or</p> <p>(ii) Construction having an FRL not less than --/60/--.</p>
Cl. C3.11	Doorways within the Class 2 part, providing access from the residential sole occupancy units and from rooms not within a residential sole occupancy unit to the public corridors must be protected with self-closing --/60/30 fire doors.
Cl. C3.12	Where a service passes through a floor/ceiling required to achieve an FRL, that service is required to be protected by either a shaft which has been construction in accordance with BCA Spec C1.1 (listed above) or in accordance with C3.15 (see below).
Cl. C3.13	<p>Any opening in a wall providing access to a ventilating, pipe, garbage or other service shaft are required to be protected as follows:</p> <p>(i) Sanitary compartment – Non-combustible door or panel assembly or an FRL of --/30/30;</p> <p>(ii) --/60/30 fire door or hopper that is self-closing;</p> <p>(iii) Access panel with an FRL of --/60/30; or</p> <p>(iv) Garbage shaft – A door or hopper of non-combustible construction.</p>
Cl. C3.15	Any proposed service penetrations (electrical, mechanical, plumbing, etc) that penetrates a building element which is required to be of fire resisting construction is required to be protected.
Cl. C3.16	Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation must be protected in a manner identical with a prototype tested in accordance with AS1530.4 to achieve the required FRL.

4.4 BCA Section D – Access and Egress

Cl. D1.6	<p>It is noted that the common stairway serving unit 1 and unit 2 is provided with a clear unobstructed width of 1m (i.e. between walls), without the provision of handrails.</p> <p>For the reduced width identified, it is considered that compliance is readily achievable via a performance-based solution at the Construction Certificate phase.</p> <p>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 1,980mm) 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 be accessible).</p>
Cl. D1.10	The discharge points of the exits shall have an unobstructed width of 1m and be via a stairway, ramp or other incline having a gradient of no steeper than 1:8 or complying with AS1428.1-2009 (where required to be accessible for people with a disability).

Cl. D2.3 The required non-fire isolated stairways must be constructed in accordance with D2.2, or only of –

- (i) Reinforced or prestressed concrete;
- (ii) Steel in no part less than 6mm thick;
- (iii) Timber that
 - a. has a finished thickness of not less than 44 mm; and
 - b. has an average density of not less than 800 kg/m³ at a moisture content of 12%; and
 - c. has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue.

Cl. D2.7 (i) Services comprising –

- electricity meters, distribution boards or ducts; or
- central telecommunications distribution boards or equipment; or
- electricity motors or other motors serving equipment in the building,

may be installed in a required exit, except for fire isolated exits or in any path of travel leading to a required exit, if the services or equipment are enclosed with by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

(ii) Gas or other fuel services must not be installed in a required exit.

Cl. D2.8 If a space below space the non-fire isolated stairway it must be provided with –

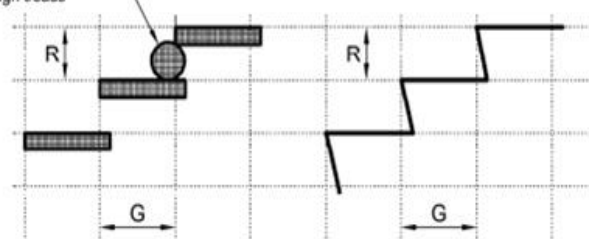
- (i) Enclosing walls and ceilings having an FRL of not less than 60/60/60; and
- (ii) A self-closing --/60/30 fire door.

Based on the updated drawings, no space below is intended to be enclosed to for a room or cupboard.

Cl. D2.13 The going, riser and steepness dimension of the stairways are required to be designed within the following range:

Riser (R)		Going (G)		Slope Relationship (2R+G)	
Max	Min	Max	Min	Max	Min
190	115	355	250	700	550

125 mm sphere must not pass through treads



<p>Cl. D2.13 Cont'd</p>	<ul style="list-style-type: none"> (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 (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).
<p>Cl. D2.14</p>	<p>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.</p> <p>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 (amendment 1).</p>
<p>Cl. D2.15</p>	<p>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.</p> <p>That is unless the doorway opens to a road or open space and:</p> <ul style="list-style-type: none"> (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.
<p>Cl. D2.16</p>	<p>Balustrades are required to be constructed as follows:</p> <ul style="list-style-type: none"> (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; and (iv) For floors more than 4m above the surface beneath, any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing; (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.
<p>Cl. D2.17</p>	<p>Handrails are required along one (1) side of each stairway flight and ramp, unless required to assist people with a disability in accordance with Clause D3.3.</p> <p>The handrails are required to fixed at a height of not less than 865mm measured above the nosing's of the stair treads or ramp and be continuous such that no obstruction on or above them will tend to break a hand hold.</p>

Cl.
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;
 - a. Be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and
 - b. 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
 - c. A single hand pushing action on a single device which is located between 900mm and 1.2m above the floor; or
- (ii) Where the latch operation device referred to in (i) above is not located on the door leaf itself –
 - a. 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
 - b. Braille and tactile signage complying with Clause 2 and 6 of Specification D3.6 must identify the latch operation.
- (iii) Is fitted with a fail-safe device which automatically unlocks the door upon activation of any smoke, or any other detector deemed suitable in accordance with AS1670.1-2018.

Cl.
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:
 - (a) The openable portion of the window must be protected with a device to restrict the window opening or a screen with secure fittings;
 - (b) The device or screen must not permit a sphere greater than 125mm is permitted to pass through;
 - (c) Resist the outward horizontal action of 250N against the window or screen;
 - (d) Have a child resistant release mechanism is able to 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:
 - (a) In addition, to window protection as per (i) above;
 - (b) Where the floor below the window is 4m or more above the floor or if the window is not covered above; and

Cl.
D2.24
Cont'd

- (c) Any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing and have no gaps greater than 125mm.

4.5 BCA Section E – Services & Equipment

Cl. E1.3 A fire hydrant system complying with AS2419.1-2005 is required to serve the building.

All points on a floor shall be within reach of a 10m hose stream issuing from a nozzle at the end of a 30m length of hose laid on floor connected to the fire hydrant outlet.

Cl. E1.6 Portable extinguishers must be provided in accordance with Table E1.6 to cover risk classes within the building and throughout the building, where internal fire hydrants are provided.

Where internal hydrants are provided, portable fire extinguishers complying with AS2444-2001 are required as follows -

- (i) 2.5kg ABE type portable fire extinguishers are required to the residential part of the building where one (1) or more internal hydrants are installed. The travel distance to an extinguisher must not exceed 10m from the entrance doorway of each sole-occupancy unit; and
- (ii) To cover Class B (if more than 50L excluding vehicle fuel tanks is stored); and
- (iii) Class AE or E fire risks associated with emergency service switchboards.

Cl. E2.2 The building must be provided with the following smoke hazard management systems -

- (i) Each sole-occupancy unit is required to be provided with a smoke alarm complying with Clause 3 of Specification E2.2a of the BCA & AS3786-2014 (amendment 2);
- (ii) The smoke alarm(s) are to be located in the hallway serving all bedroom(s), and in egress paths for any storey not containing bedrooms;
- (i) A smoke detection system complying with Clause 4 of Specification E2.2a of the BCA & AS1670.1-2015 is to be provided throughout the areas not within the sole occupancy associated with the class 2 part as well as within the class 6 retail tenancy;
- (ii) The smoke detection system must activate a building occupant warning system in accordance with Clause 7 of Spec. E2.2a and AS1670.1-2015.

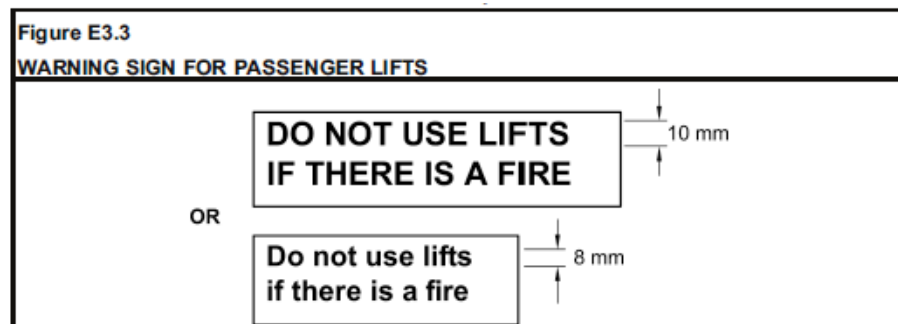
Where the carpark is provided with a mechanical ventilation system in accordance with AS1668.2-2012 (amendment 2) it must comply with Clause 5.5 of AS1668.1-2015, except that -

- (i) Fans with metal blades suitable for operation at normal temperature may be used; and

Cl. E2.2
Cont'd (ii) The electrical power and control cabling need not be fire rated.

Cl. E3.1 The electric passenger lift installation, or an electrohydraulic passenger lift installation are required to comply with Specification E3.1.

Cl. 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.



Cl. E4.2 Emergency lighting complying with AS2293.1-2018 must be installed in the passageway, corridor or the like throughout the class 6 tenancy and from the entrance doorway of the sole occupancy units to the doorway discharging to the road and open space via the garage, at the Edmund Hock Avenue frontage.

Cl. E4.5 Exit signs complying with AS2293.1-2018 are required to be installed above or adjacent to any doorways serving as required exits from the doors serving as or forming part of a required exit in a storey required to be provided with emergency lighting in accordance with E4.2.

Cl. 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 BCA Section F – Health & Amenity

Cl. F1.0 Weatherproofing of external wall(s) are required to comply with Verification Method FV1 (i.e. certificate of conformity).

Cl. F1.1 Stormwater drainage must comply with AS/NZS3500.3-2018.

Cl. F1.4 Waterproofing membranes for above ground use (i.e. balconies above ground) must comply with AS4654-2012.

Cl. F1.5 Where roof cladding is proposed, the 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; or

Cl. F1.5 Cont'd	<p>(iii) cellulose cement corrugated sheeting complying with AS/NZS 2908.1 and installed in accordance with AS/NZS 1562.2; or</p> <p>(iv) metal sheet roofing complying with AS 1562.1; or</p> <p>(v) plastic sheet roofing designed and installed in accordance with AS/NZS 4256 Parts 1, 2, 3 and 5 and AS/NZS 1562.3; or</p> <p>(vi) asphalt shingles complying with ASTM D3018-90, Class A.</p>
Cl. F1.6	Any sarking-type materials used for weatherproofing of roofs and walls are required to comply with AS/NZS 4200.1-2017 and AS 4200.2-2017 incorporating amendment 1.
Cl. F1.7	Building elements in wet areas must be water-resistant or waterproof in accordance with Table F1.7 and AS 3740-2010.
Cl. F1.9	Where a damp-proof course is provided, it must consist of a material that complies with AS/NZS 2904 or impervious sheet material in accordance with AS 3660.1.
Cl. F1.10	A floor laid directly onto ground or fill must be provided with a vapour barrier complying with AS 2870-2011.
Cl. 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.
Cl. F1.13	Glazed assemblies in an external wall must comply with AS 2047-2014 (amendment 1 and 2) requirements for resistance to water penetration.
Cl. F2.1	<p>Each unit requires clothes drying facilities comprising:</p> <ul style="list-style-type: none"> ▪ 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.
Cl. F2.3	<p>The number of employees within the class 6 retail tenancy has been treated as being not more than 10 and accommodating not more than 20 patrons.</p> <p>Hence, it is considered the provision of an accessible WC within the retail tenancy satisfies the required facilities pursuant to Table F2.3 of the BCA.</p>
Cl. F2.5	<p>The door to a fully enclosed sanitary compartment must –</p> <ul style="list-style-type: none"> (i) open outwards; or (ii) slide; or (iii) be readily removable from the outside of the sanitary compartment unless there is a clear space of 1.2m between the closet pan and the doorway (i.e. lift off hinges).

Cl. F3.1	<p>Unobstructed ceiling heights are required as follows:</p> <p>Class 2 part</p> <ul style="list-style-type: none"> (i) Habitable rooms excluding kitchens and the like – 2.4m; (ii) Above a stairway, landing or the like – 2m; and (iii) Public corridors, sanitary facilities, kitchens, laundries, storerooms and the like – 2.1m. <p>Class 6 & 7a parts</p> <ul style="list-style-type: none"> (i) A bathroom, sanitary compartment, store room, garage, carparking area or the like – 2.1m; (ii) A corridor, passageway, above a stairway, landing or the like – 2m; (iii) A commercial kitchen – 2.4m; and (iv) All other areas – 2.4m.
Cl. F4.1	<p>Natural light must be provided to all habitable rooms within the class 2 part.</p> <p>Methods of providing natural light is to be in accordance with Clause F4.2.</p>
Cl. F4.2	<p>All habitable rooms are required to have natural lighting provided by either –</p> <ul style="list-style-type: none"> (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.
Cl. F4.4	<p>Where compliant natural lighting is not provided to non-habitable rooms, artificial lighting complying with AS/NZS1680.0-2009 is required to be installed.</p>
Cl. F4.5	<p>Any habitable room, sanitary compartment, bathroom, laundry and any other room occupied by a person for any purpose must have either;</p> <ul style="list-style-type: none"> (i) Natural ventilation via permanent openings, windows or doors having an openable area of not less than 5% of the floor area of the room (refer F4.6 & F4.6); or (ii) Mechanical ventilation complying with AS1668.2.
Cl. F4.8	<p>The accessible WC within the class 6 retail tenancy is noted as opening directly into the tenancy space, and hence must be protected in accordance with F4.9</p>

Cl. F4.9	<p>The accessible WC must be protected by either of the following -</p> <ul style="list-style-type: none"> (i) Access must be by an airlock, hallway or other room with a floor area of not less than 1.1m² and fitted with self-closing doors at all access doorways; or (ii) The sanitary compartment must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.
Cl. F4.11	<p>The class 7a garage (carpark) must have -</p> <ul style="list-style-type: none"> (i) A system of mechanical ventilation complying with AS1668.2-2012 (amendment 2); or (ii) A system of natural ventilation complying with Section 4 of AS1668.4-2012.
Cl. F5.4	<p>The intermediate floors separating sole occupancy units must have an $R_w + C_{tr}$ (airborne) of not less than 50 and an $L_{n,w} + C_1$ (impact) not more than 62.</p>
Cl. F5.5	<p>Internal walls are required to be constructed as follows:</p> <ul style="list-style-type: none"> (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 and internal non-fire isolated stairways (i.e. stairwells) must have an R_w of not less than 30; and (v) 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; (vi) Doorways providing access to sole-occupancy units from public corridors and internal non-fire isolated stairways (i.e. stairwells) must have an R_w of not less than 30; and (vii) A wall required to have a sound insulation must be constructed such that the wall continues to the underside of: <ul style="list-style-type: none"> ▪ The floor above; ▪ A ceiling having the same sound insulation required for the wall; and ▪ The underside of the roof above. (viii) Services must not be chased into concrete or masonry elements.

- Cl. 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.
- Cl. 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.

4.7 BCA Section G – Ancillary Provisions

- Cl. G5.2 If the building is located in a designated bushfire prone area, the building must comply with AS3959-2018.
- Cl. 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.

Report By

Verified By



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



Luke Sheehy
Principal
For Design Confidence (Sydney) Pty Ltd

APPENDIX 1

The BCA Design Assessment report was based upon the architectural documentation prepared by AUDAA, namely –

DRAWING NUMBER	DESCRIPTION	ISSUE	DATE
A102	SITE ANALYSIS	01	25.03.2019
A105	GROUND	01	25.03.2019
A106	LEVEL 1	01	25.03.2019
A107	LEVEL 2	01	25.03.2019
A108	ROOF	01	25.03.2019
A109	ELEVATIONS	01	25.03.2019
A111	SECTIONS	01	25.03.2019
A111	SOUTH & SECTION C	01	25.03.2019
A115	FINISHES	01	25.03.2019

APPENDIX 2

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 <i>fire-source feature</i> 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 <i>fire-source feature</i> 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—				
<i>Fire-resisting lift and stair shafts—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/120/120	180/120/120	240/120/120
<i>Non-loadbearing</i>	–/ 90/ 90	–/120/120	–/120/120	–/120/120
<i>Bounding public corridors, public lobbies and the like—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/–/–	180/–/–	240/–/–
<i>Non-loadbearing</i>	–/ 60/ 60	–/–/–	–/–/–	–/–/–
<i>Between or bounding sole-occupancy units—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/–/–	180/–/–	240/–/–
<i>Non-loadbearing</i>	–/ 60/ 60	–/–/–	–/–/–	–/–/–
<i>Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
<i>Non-loadbearing</i>	–/ 90/ 90	–/ 90/ 90	–/120/120	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS—				
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) ADEQUACY/INTEGRITY/INSULATION ESA/M (NOT GREATER THAN)	STRUCTURAL
Wall			
(a)	external wall		
	(i) less than 3 m from a <i>fire-source feature</i> to which it is exposed:		
	Loadbearing	60/60/60	
	Non-loadbearing	-/-/60	
	(ii) 3 m or more from a <i>fire-source feature</i> 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 <i>fire-source feature</i> 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

The table below represents the fire hazard properties for building materials applicable to this development.

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 –
	<ul style="list-style-type: none"> ▪ a smoke growth rate index not more than 100; or ▪ an average specific extinction area less than 250m²/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)

Design Confidence (Sydney) Pty Limited

Shop 2, 35 Buckingham Street, Surry Hills

T: (02) 8399 3707
E: sydney@designconfidence.com
W: www.designconfidence.com

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