



BUILDING CODE OF AUSTRALIA REPORT

**University of Sydney
Abercrombie Student Accommodation
Abercrombie Street, Darlington 2006**

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18.09.13	A	15	Report for Section 75W Application	Brigitte Thearle		26.09.13
02.10.13	B	16	Final Report for Section 75W Application	Brigitte Thearle		03.10.13
09.10.13	C	16	Final Report for Section 75W Application	Brigitte Thearle		10.10.13

As Accredited Certifiers, we have reviewed architectural design documents prepared by Nettleton Tribe (refer appendix A) for compliance with the Building Code of Australia 2013.

The assessment of the design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA. The submission for Crown Certificate will need to include verification from a suitably accredited fire engineer: -

DTS Clause	Description of Non-Compliance	Performance Requirement
D1.3	Central required stair is not fire isolated and connects four storeys	CP2, DP5, EP2.2
D1.4	The following areas exceed the maximum allowable travel distance: ▪ Travel distance to a single exit in the bin room/plant is up to 36m in lieu of the required 20m ▪ Distances between alternate exits on levels 1-4 of up to 55m in lieu of 45m	DP4, EP2.2

The fire engineered solution relating to EP2.2 will need to be prepared in consultation with the NSW Fire Brigade as part of the Crown Certificate process.

The documentation will need further detailing such as door hardware, specifications, service design, as outlined in Appendix D of this report.

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

Assessed By

Brigitte Thearle

1.0 Introduction

The proposed development comprises of five storeys of student accommodation, including ancillary areas such as common rooms, laundries, meeting areas and the like. A basement is proposed to provide bicycle facilities and plant.

The site is located on the north side of Abercrombie Street in Darlington, adjacent to the business school which is currently under construction.

1.1 Current Legislation

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

The version of the BCA applicable to the development, is version that in place at the time of the invitation to tender.

2.0 Building Assessment Data

Summary of Construction Determination: -

Student Housing	
Classification	3
Number of Storeys Contained	6
Rise In Storeys	6
Type of Construction	A
Effective Height (m)	17.7m

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

Part of Project	BCA Class	Assumed Population
Basement (Bicycle Facilities & Plant)	3 & 7b	250
Ground Floor (Sole Occupancy Units & Common Facilities)	3	
Level 1 (Sole Occupancy Units & Common Facilities)	3	
Level 2 (Sole Occupancy Units & Common Facilities)	3	
Level 3 (Sole Occupancy Units & Common Facilities)	3	
Level 4 (Sole Occupancy Units & Common Facilities)	3	

Notes:

1. The above populations have been based on one person per sole occupancy unit and one person per 15m² for the common areas in accordance with Table D1.13 of the BCA.
2. The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.

3.0 Structural Provisions

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

Glazing is to comply with AS1288, and AS2047.

Prior to the issue of the Crown Certificate structural certification is required to be provided.

4.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 3 of Specification C1.1 of the Building Code of Australia 2013. The building is required to be Type A Construction.

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

- Bounding construction to each sole occupancy units of 90 minutes,
- Fire compartmentation of the building at each floor level,

Fire resistance levels for building structural members are as follows:

- Residential Portions 90 minutes
- Storage (bicycle) Portions 240 minutes
- Carpark Portions 120 minutes

4.1 Protection of Openings

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

1. Any external opening within 3m of the fire source feature protected by -/60/- fire rated construction, or externally located wall wetting sprinklers, or an alternate solution be provided to verify CP2 of the BCA.
2. Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of 90 minutes to residential, 240 minutes to floor above bicycle storage;
3. Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of 90 minutes to residential, 240 minutes to floor above bicycle storage (or 120/120/120 where it is a room such as a substation);
4. Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).
5. Self-closing -/60/30 fire doors to all sole occupancy unit entry doors

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

Fire source feature is defined as;

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

The proposed building is located more than 3m from the eastern and western side boundaries. The far boundary of Abercrombie Street is more than 6m from the building. The proposed building is less than 3m from the northern boundary. All openings and non-loadbearing portions within 3m of this boundary are to be fire rated and/or protected. Alternatively, an alternate solution may be feasible. This is to be confirmed by the fire safety engineer.

4.2 Vertical Separation of openings in external walls:

The building is proposed to be sprinkler protected, therefore spandrel separation is not required to be provided.

4.3 Public Corridors: Class 2 and 3 Buildings

Public corridors exceeding 40m in length are required to be divided into intervals of not more than 40m by smoke proof walls. Currently, there is no smoke-proof construction proposed, and the length of corridors connected on the ground floor is approximately 110m and 130m on levels 1-4. As part of design development, the corridor will need to be subdivided into portions not exceeding 40m in length by smoke-proof construction, with any doors in that construction being smoke doors that fail safe closed on activation of fire alarm.

4.4 Passive Fire Protection

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

- Lift motor rooms,
- Emergency power supply,
- Emergency generators,
- Electricity supply,
- Boilers or batteries,
- Hydrant Pump rooms,
- Sprinkler Pump Rooms,

To be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

4.4 Fire Hazard Properties

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

5.0 Egress

The egress provisions from the proposed building are provided by:

- Fire isolated stairways
- External perimeter doorways
- Required non fire isolated stairways

The central stair that is not fire isolated is required to ensure the distances between required exits are feasible to be verified as an alternate solution. This stair is required by the deemed to satisfy

provisions to be fire isolated and is therefore to be assessed as part of the alternate solution to BCA Performance Requirement CP2, DP5 and EP2.2.

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Stair construction
- Handrail and balustrade construction
- Details of Separation of rising & descending stairs
- Discharge from the Fire Isolated Exits
- Details of the egress provisions to the Road. Note the exit paths from the discharge point to the road are to be wholly within the allotment on which the building is located

5.1 Exit Travel Distances

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would need to be assessed as part of an alternate solution prepared by a suitably qualified fire engineer.

The entrance doorway from a sole-occupancy unit must not be more than:

- 6m from an exit or from a point of choice
- 20m from a single exit at the level of egress to a road or open space

Portions of the building that are not sole occupancy units are to be not more than 20m from a point where travel in two different directions is available.

Alternate exits are not to be more than 45m apart.

The following areas exceed the maximum allowable travel distance:

- Travel distance to a single exit in the bin room/plant is up to 36m in lieu of the required 20m
- Distances between alternate exits on levels 1-4 of up to 55m in lieu of 45m

5.2 Dimensions of Exits

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

The egress width provided is adequate to cater for the proposed population.

Doorways are permitted to contain a clear opening width of 750mm with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e minimum 870 mm doors).

5.3 Fire Isolated Exits

Each fire-isolated stairway or fire-isolated ramp must provide independent egress from each storey served and discharge directly, or by way of its own fire-isolated passageway to:

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

Where a path of travel from the point of discharge of a fire-isolated exit necessitates passing within 6m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have an FRL of not less than 60/60/60 and any openings protected internally in accordance with C3.4, for a distance of 3 m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

The discharge path from the northern stairs of the western, central and eastern wings require occupants to pass by openings in the student housing building. These openings are to be protected as above, with the walls achieving an FRL of 60/60/60.

Where the discharge of fire stairs does not comply with the above, the discharge will need to be assessed as part of the alternate solution to BCA Performance Requirement DP5.

The discharge location of the northern fire stair is to be confirmed.

5.4 Balustrading and Handrail

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

Where it is possible to fall more than 4m to the finished floor below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing.

Any windows with a sill height of less than 1.7m in bedrooms or 865mm in all other cases with a fall of more than 2m for windows, 4m for all other cases, openings are to be restricted or a protective barrier that does not allow a 125mm sphere to pass through.

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

Handrails are to be provided to each side of the stair, where the stair exceeds a width of 2m. Where an egress stair exceeds 2m in width, an additional handrail is required to ensure that the egress width of 2m is accounted.

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

5.5 Access for Persons with a Disability

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2013. Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2009.

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc. Further details are to be provided or access to these areas is to be assessed by an access consultant.

Where the main public entrance is via a ramp, tactile indicators shall be provided in accordance with AS 1428.4 at the top and bottom. Parking shall be provided for people with disabilities in accordance with Clause D3.5 of the BCA. Facilities services and features of the building accessible to people with disabilities shall be identified by signage complying with Clause D3.6 of the BCA.

General

Access to be provided to and within the building pursuant to AS1428.1-2009 as follows:

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

Note that entrances that are not accessible are to be located within 50m of an entrance that is accessible.

A portion of the sole occupancy units are required to be accessible, and the rooms provided are to be representative of the range of rooms available. Based on there being 200 rooms within the development, 9 sole occupancy units are required to be accessible. Of the sole occupancy units, 10 are proposed to be accessible. The entry door to each of the accessible sole occupancy units is to be adjusted to ensure the minimum latch side clearance requirements outlined in AS 1428.1-2009 are met.

6.0 Fire Services & Equipment

The following fire services will need to be provided throughout the building:

- An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA and AS 2118.1-1999. Sprinklers are not required by the deemed to satisfy provisions, however are proposed to be provided throughout.
- Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
- Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
- Portable Fire Extinguishers in accordance with Clause E1.6 of the BCA and AS 2444-2001,
- Sound System & Intercom System for Emergency Purposes in accordance with AS 1670.4-2004.
- Emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA and AS/NZS 2293.1-2005

A Fire Control Centre is not required, however the fire services will need to be co-ordinated.

6.1 Fire Hydrants

A system of Fire Hydrants is / not required to be provided to BCA Clause E1.3 and AS 2419.1-2005. We will reply upon design certificate from a Hydraulic Consultant.

A booster assembly is required as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, it is to be located

at the main vehicle entry and within sight of the main entry of the building within 20m of a hardstand area.

Fire hydrants are to be provided within fire isolated stairs/within 4.0m of required exits.

Access to the fire hydrant pump room is to be direct from outside or from a fire isolated stair.

6.2 Fire Hose Reels

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441.

Hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length.

Please note that fire hose reel coverage cannot pass through fire or smoke doors.

6.3 Automatic Sprinkler Protection

An Automatic Fire Suppression System is proposed to be provided to Specification E1.5 and AS2118.1-1999

Location of pumps, tanks, FIP, control valves and booster are to be resolved as part of design development.

An occupant warning system that is triggered upon activation of the sprinkler system should be provided in accordance with BCA Specification E1.5.

7.0 Ventilation and Smoke Hazard Management

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

- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a, AS 1670.1-2004 and AS 3786-1993

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry. Any variation to the prescriptive provisions will require the consent of the fire brigade and should form part of the fire safety engineering report to verify the performance requirements of the BCA.

Throughout the development the provision of natural or mechanical ventilation is required to all habitable rooms in accordance with F4.5 Building Code of Australia and AS 1668 and AS/NZS 3666.1.

8.0 Lift Services

The passenger lifts to be installed are to be: -

- fitted with warning signs, fire service controls in accordance with Clauses E3.3, E3.7, E3.9 and E3.10 of the BCA

- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600mm wide, 2000mm long and 1400mm high.
- Be provided with the following: -
 - A handrail in accordance with AS 1735.12
 - Minimum internal floor dimensions as specified in Table E3.6b of the BCA i.e. 1,400mm x 1,600mm,
 - Minimum clear door opening complying with AS 1735.12
 - Passenger protection system complying with AS 1735.12
 - Have a set of buttons for operating the lift located at heights above level complying with AS 1735.12.
 - Lighting in accordance with AS 1735.12
 - Automatic audible information within the lift car to identify the level each time the car stops
 - Audible and visual indication at each lift landing to indicate the arrival of the lift car

9.0 Sanitary Facilities

Each group of sole occupancy units is to be provided with:

- A bath or shower; and
- A closet pan and wash basin; and

It is noted that each sole occupancy unit is provided with a closet pan, wash basin, shower and cooking facilities.

A common laundry is provided on the ground floor for use of all residents.

10.0 Sound Transmission & Insulation

The sound transmission and insulation requirements for the Class 2 portions shall be provided in accordance with Part F5 of the BCA 2013 for the following elements:

- A floor separating sole-occupancy units or a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification:
 - $R_w + C_{tr}$ (airborne) not less than 50
 - $L_n, w+CI$ (impact) not more than 62
- A wall separating sole-occupancy units
 - $R_w + C_{tr}$ (airborne) not less than 50,
- A wall separating a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification
 - R_w (airborne) not less than 50,
- A wall separating a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit; or a sole-occupancy unit from a plant room or lift shaft.
 - R_w (airborne) not less than 50
 - Discontinuous Construction
- A door assembly separating a sole-occupancy unit from a stairway, public corridor, public lobby or the like,
 - R_w not less than 30
- All walls required to have a impact sound insulation rating are of discontinuous construction

10.0 Energy Efficiency

The proposed development shall comply with Part J of the BCA. To achieve compliance, there are two options available:

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
 - Building Fabric
 - Glazing
 - Building Sealing
 - Air Conditioning & Ventilation Systems
 - Artificial Lighting & Power
 - Hot Water Supply
2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

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

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

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

10.8 Access for Maintenance

Access is to be provided to all plant, equipment and components associated with the provision of the above energy requirements i.e.

- Adjustable or monitored shading devices
- Time switches and motion detectors
- Room temperature thermostats
- Plant thermostats such as boilers or refrigeration units
- Motorised air dampers and central valves
- Reflectors, Lenses and Diffusers of light fittings
- Heat transfer equipment

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

Drawing No.	Title	Drawn By	Revision
4001_DA-01	Basement Plan	Nettleton Tribe	B
4001_DA-02	Ground Floor Plan	Nettleton Tribe	B
4001_DA-03	Level 1 & 2 Plan	Nettleton Tribe	B
4001_DA-04	Level 3 & 4 Plan	Nettleton Tribe	B
4001_DA-06	Elevations	Nettleton Tribe	B
4001_DA-07	Sections	Nettleton Tribe	B

Essential Fire Safety Measures		Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670 – 2004
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 1999,
5.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & AS 1670 – 2004
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
7.	EWIS	BCA Clause E4.9 & AS 1670.4 - 2004
8.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
9.	Fire Dampers	BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990
10.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2005
11.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
12.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005
13.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
14.	Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
15.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991
16.	Paths of Travel	EP&A Reg 2000 Clause 186
17.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
18.	Smoke and/or Heat Alarm System	BCA Spec. E2.2a & AS 3786 – 1993
19.	Smoke Dampers	AS/NZS 1668.1 – 1998
20.	Smoke Doors	BCA Spec. C3.4
21.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 – 2005, BCA Clause D2.23

The table below represents the Fire resistance levels required in accordance with BCA 2013:

Table 3 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 <i>loadbearing</i> 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- <i>loadbearing</i> 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 <i>external wall</i> , 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—				
	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 3.9 REQUIREMENTS FOR CARPARKS

Building element	FRL (not less than) Structural adequacy/Integrity/Insulation
	ESA/M (not greater than)
Wall	
(a) <i>external wall</i>	
(i) less than 3 m from a <i>fire-source feature</i> to which it is exposed:	
<i>Loadbearing</i>	60/60/60
<i>Non-loadbearing</i>	–/60/60
(ii) 3 m or more from a <i>fire-source feature</i> to which it is exposed	–/–/–
(b) <i>internal wall</i>	
(i) <i>loadbearing</i> , other than one supporting only the roof (not used for carparking)	60/–/–
(ii) supporting only the roof (not used for carparking)	–/–/–
(iii) <i>non-loadbearing</i>	–/–/–
(c) <i>fire wall</i>	
(i) from the direction used as a <i>carpark</i>	60/60/60
(ii) from the direction not used as a <i>carpark</i>	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 <i>carpark</i>	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 <i>carpark</i> 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 <i>carpark</i> complying with Table 3.9 and located within a multi-classified building.