



## **BUILDING CODE OF AUSTRALIA REPORT (SSDA6)**

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**Sydney International Convention,  
Exhibition and Entertainment Precinct  
(SICEEP) – ICC Hotel  
Darling Harbour, Sydney**

**Prepared for Lend Lease**

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## Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design (refer appendix A) for compliance with the Building Code of Australia 2013.

It is anticipated that due to the size and nature of the building, there will be alternate solutions that address non-compliances with the deemed-to-satisfy provisions of the BCA. The alternate solutions will be addressed against the relevant Performance Requirements of the BCA by a suitably qualified Fire Engineer.

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 Construction Certificate will need to include verification from a suitably accredited fire engineer: -

DTS Clause	Description of Non-Compliance	Performance Requirement
E1.3	Fire Hydrant Booster Assembly  Fire Hydrant Booster Assembly is not located within sight of the main entrance of the building	EP1.3
D1.7(b)	Travel via Fire-Isolated Exits  Each fire-isolated stairway must provide independent egress from each storey served and discharge directly, or by way of its own fire-isolated passageway, to road or open space.  It is proposed fire-isolated stairways serving the basement & upper levels will converge and discharge at a single point	DP4
D.4	Extended Travel Distances  Travel distances will exceed the following DtS provisions of the BCA <ul style="list-style-type: none"><li>Basement – 30m to reach exit. Exit is reached before a point of choice becomes available (in lieu of 20m to a point of choice at which travel in different directions to 2 exits is available)</li><li>Ground Floor Entrance Lobby – extended travel to an exit up to 50m, in lieu of 40m.</li><li>Podium Level 2 (Bar) – up to 40m to reach exit. Exit is reached before a point of choice becomes available (in lieu of 20m to a point of choice at which travel in different directions to 2 exits is available)</li><li>Podium Level 3 (Executive Office) - up to 35m to reach exit. Exit is reached before a point of choice becomes available (in lieu of 20m to a point of choice at which travel in different directions to 2 exits is available)</li></ul>	DP4, EP2.2
E2.2	Rationalisation of the smoke hazard management system	EP2.2

Other matters to be addressed in conjunction with the Fire Safety Engineer

<b>DTS Clause</b>	<b>Description of Non-Compliance</b>	<b>Performance Requirement</b>
C2.14	Smoke separation of residential corridors	CP3
	Proposal to delete smoke-proof walls required in public corridors more than 40m in length	
C2.3	Separation of classification in different storeys	CP2, CP3
	Installation of the escalator/travelator, providing access to the Ballroom/Function Area from the entrance lobby, results in the FRL required between floors not being achieved	
C1.1 Spec C1.1	Rationalisation of FRL's	CP1, CP2
E4.5	Exit signs higher than the 2.7m above the ground allowed for in AS 2293.1-2005	EP4.2

Where items for which an alternate solution is prepared relate to Category 2 Fire Safety items under the Environmental Planning & Assessment Regulation 2000, approval will be required by Fire & Rescue NSW as part of the Construction Certificate process.

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

Assessed By

Eric Bailey  
Director

## 1.0 Introduction

This report supports a State Significant Development Application (SSDA) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application (referred to as SSDA6) seeks approval for construction of the International Convention Centre (ICC) Hotel component of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) at Darling Harbour.

This SSDA follows SSDA1, which seeks approval for the core convention, exhibition and entertainment facilities of the SICEEP Project; SSDA2, a staged application that sets out a Concept Proposal for a new mixed use neighbourhood at Darling Harbour known as 'The Haymarket'; and a number of detailed proposals (SSDA3, SSDA4, and SSDA5) for use of development plots within The Haymarket. SSDAs 1 and 2 were submitted to the Department of Planning and Infrastructure (DoPI) in March 2013, and the SSDAs 3-5 were submitted in May 2013.

The ICC Hotel forms part of the SICEEP Project, which will deliver Australia's global city with new world class convention, exhibition and entertainment facilities and support the NSW Government's goal to "make NSW number one again".

### Overview of Proposed Development

The proposal relates to a SSDA for the ICC Hotel component of the SICEEP Project. The hotel is located at the northern end of the precinct and comprises a single building with up to 656 rooms. The hotel is being developed by Lend Lease and is consistent with Darling Harbour Live's Preferred Precinct Plan.

More specifically, this SSDA seeks approval for the following components of the development:

- Demolition of existing site improvements;
- Associated tree removal and replanting;
- Construction and use of a single hotel tower providing for up to 656 rooms and including guest facilities, restaurant and ballroom;
- Public domain improvements including integration with existing / proposed works; and
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

### Background

The NSW Government considers that a precinct-wide renewal and expansion of the existing convention, exhibition and entertainment centre facilities at Darling Harbour is required, and is committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of the Sydney International Convention, Exhibition and Entertainment Precinct.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create SICEEP.

Key features of the Preferred Precinct Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
  - Up to 40,000m<sup>2</sup> exhibition space;
  - Over 8,000m<sup>2</sup> of meeting rooms space, across 40 rooms;
  - Overall convention space capacity for more than 12,000 people;
  - A ballroom capable of accommodating 2,000 people; and
  - A premium, red-carpet entertainment facility with a capacity of 8,000 persons.
- Providing a hotel complex at the northern end of the precinct, immediately adjacent to the new International Convention Centre.
- A vibrant and authentic new neighbourhood at the southern end of the precinct, called 'The Haymarket', including apartments, student accommodation, community facilities, shops, cafes and restaurants.
- Renewed and upgraded public domain that has been increased by a hectare, including an outdoor event space for up to 27,000 people at an expanded Tumbalong Park.
- Improved pedestrian connections linking to the proposed Goods Line (formerly Ultimo Pedestrian Network) drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pymont and the City.

## Site Description

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south. The SICEEP Site has been divided into three redevelopment areas – Bayside, Darling Central and The Haymarket.

The ICC Hotel Site (refer to Figure 1):

- is located within the northern end of the Bayside precinct;
- is bound by Harbourside Shopping Centre to the north and east, the International Convention Centre to the south and Darling Drive to the west; and
- occupies an area of approximately 3,730m<sup>2</sup>.





Figure 1 – Aerial Photograph of the SICEEP Site and Redevelopment Areas

### Planning Approvals Strategy

The SICEEP Project will result in the lodgement of numerous SSDAs for the various components of the redevelopment project. SSDAs have already been lodged for the PPP component of the SICEEP Project (comprising the convention centre, exhibition centre, entertainment facility and ancillary commercial premises and associated public domain upgrades), the Stage 1 Concept Proposal for The Haymarket, and the Stage 2 detailed proposals for three of the development plots within The Haymarket. Future applications will be lodged for the remaining development plots within The Haymarket Site.

This Application relates to a SSDA6 for the ICC Hotel component of the SICEEP Project and is consistent with Darling Harbour Live's Preferred Precinct Plan.

## 1.1 Current Legislation

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

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate.

## 2.0 Building Assessment Data

Summary of Construction Determination: -

SICEEP Hotel	
Classification	3, 5, 6, 9b
Number of Storeys Contained	38
Rise In Storeys	36
Type of Construction	A
Effective Height (m)	>50m

Notes:

1. The effective height of the building may alter as the design progresses, depending on the number of storeys chosen to be incorporated into the design.



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

Part of Project	Classification	Use	Floor area (Approx.) m <sup>2</sup>
Ground Floor	3	Entrance Lobby & Bar	1560
Podium Level 1	9b	Ballroom/Meeting Centre	2150
Podium Level 2	5, 6	Bar/Housekeeping/Employee Facilities	2150
Podium Level 3	5, 6	Restaurant/Executive Office	1940
Podium Level 4	3	Recreational Area	800
Typical floor	3	Hotel	1170

### 3.0 Structural Provisions

Any new structural works are to be designed to the applicable requirements of Part B of the BCA.

### 4.0 Fire Resistance

The building will be designed be constructed generally in accordance with the relevant performance provisions 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;

- Fire compartmentation of the building at each floor level as appropriate.
- Separation between retail levels and commercial/hotel portions of the building.
- Separation of each hotel sole-occupancy unit.

Fire resistance levels for building structural members are as follows:

- Retail Portions (Restaurant/Bar) 120 minutes  
(To be determined by Fire Safety Engineer)
- Commercial portion 120 minutes
- Hotel portion (including ancillary use areas of the hotel) 90 minutes

**Note; see comments in executive summary pertaining to alternate solutions to be addressed by Fire Safety Engineer.**

#### **4.1 Protection of Openings**

The building is to be setback greater than 6m from any fire source feature. As such, no external openings require protection.

During the detailed design phase, openings in internal walls and/or other elements such as floors, which are required to have an FRL (i.e. bounding public corridors, public lobbies, between or bounding sole-occupancy units, or the like) with respect to integrity and insulation, will be designed to be constructed so as to not reduce the fire-resisting performance of the element.

#### **4.2 Vertical Separation of openings in external walls:**

The SICEEP ICC Hotel is to be provided with Sprinkler protection throughout and consequently fire rated spandrels are not required.

#### **4.3 Public Corridors: Class 2 and 3 Buildings**

Public corridors exceeding 40m in length to be divided into intervals of not more than 40m by smoke proof walls, however, this will be reviewed against the relevant performance provisions of the BCA.

**Note; see comments in the executive summary relating to fire engineering analysis.**

#### **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.

BCA requires Fire Control Room, Main Switch Room & Hydrant/Sprinkler Pumproom to be separated from the remainder of the building by construction achieving an FRL not less than 120/120/120.

Please note; in relation to the Substation located on Ground Floor, the supply authority will require the Substation to be separated from the remainder of the building by construction achieving an FRL of not less than 180/180/180.

#### **4.4 Fire Hazard Properties**

The fire hazard properties of fixed surface linings and mechanical ductwork will be designed to comply with specification C1.10 Building Code of Australia.

## **5.0 Egress**

The egress provisions from the proposed building are provided in fire-isolated stairways and external perimeter doorways.

Other detailing issues will be addressed during design development.

### **5.1 Exit Travel Distances**

Egress provisions will be considered pursuant to the relevant performance provisions through fire safety engineering analysis during detailed design phase.

### **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).

Currently Level 1 Ballroom/Function Area is provided with 3m of aggregate egress width. The available aggregate egress width is capable of accommodating a total population of 320 for this floor.

### **5.3 Fire Isolated Exits**

Discharge of the fire-isolated stairways within the proposed ICC Hotel satisfy the prescriptive requirements of the BCA.

### **5.4 Balustrading and Handrail**

During detailed design phase, balustrading and handrails will be developed to show compliance with the prescriptive provisions of the BCA.

In addition, the main public stairs and ramps should be designed in accordance with the requirements of AS1428.1 for persons with disabilities.

### **5.5 Access for Persons with a Disability**

Access for people with disabilities will be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2011. 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 will be developed during detailed design phase.

In addition accessible sole occupancy units, at the rate of 19 for the first 500 rooms and 1 per 50 rooms thereafter, are required to be provided.

## General

Access will be provided to and within the building pursuant to AS1428.1-2009 during detailed design phase 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.

## 6.0 Fire Services & Equipment

The following fire services are required 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 2118.6-2012 throughout the building
- 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,
- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-1998 required to the Class 9b Ballroom/Function Room & Class 6 Restaurant & Bar;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2b
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-1998
- Sound System & Intercom System for Emergency Purposes in accordance with AS 1670.4-2004.
- Emergency Lifts to BCA Clause E3.4 & AS 1735.2 – 2001.
- 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

**Please note; Building specific smoke hazard management will be considered through fire safety engineering analysis during detailed design phase.**

A Fire Control Room will be provided in accordance the relevant performance provisions of the BCA, as the building exceeds an effective height of greater than 50m.

## 6.1 Fire Hydrants

A system of Fire Hydrants is required to be provided to BCA Clause E1.3 and AS 2419.1-2005.

The Fire Hydrant Booster Assembly must be:

- Operable by fire brigade pumping appliances located within 8m, and
- Within sight of the main entrance of the building, and
- Separated from the remainder of the building by construction achieving an FRL of not less than 90/90/90 for a distance of 2m each side & 3m above the upper hose connection.

**Currently the fire hydrant booster assembly is not located within sight of the main entrance of the building. This is to be assessed as part of the fire engineering strategy for the building.**

Fire hydrants are to be provided within fire isolated stairs.

## 6.2 Fire Hose Reels

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

To be located within 4m of exits and provide coverage within the building based on a 36m hose length.

## 6.3 Automatic Sprinkler Protection

An Automatic Fire Suppression System will be provided to comply with Specification E1.5 and AS2118 part 6 throughout the building.

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 Light & Ventilation and Smoke Hazard Management

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

- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-1998 required to the Class 9b Ballroom/Function Room & Class 6 Restaurant & Bar;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2b
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-1998

**Discussions will be held with Fire Safety Engineer concerning rationalisation of the smoke hazard management system in the building to address Performance Requirement EP2.2 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. This will be developed in detailed design.

Natural Lighting must be provided to all bedrooms in accordance with BCA Clause F4.1 and F4.2.

## 8.0 Sound Transmission and Insulation

Sound transmission and insulation to be provided in accordance with Part F5 of the BCA.

## 9.0 Lift Services

The passenger lifts to be installed will be designed to comply with BCA Part E3.

Where two or more passenger lifts are installed and serve the same storey, at least two emergency lifts must be provided to serve those storeys and, if located within different shafts, at least one emergency lift must be provided in each shaft.

An emergency lift must be contained within a fire-resisting shaft in accordance with the requirements of Part C of the BCA.

## 10.0 Sanitary Facilities

Sanitary facilities will be provided to the project as per the requirements of Part F2 of the BCA.

Please note the Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2001.



## 11.0 Energy Efficiency

The proposed development shall comply with Part J of the BCA. It is understood that the ESD assessment shall incorporate the relevant Part J provisions of the BCA as part of the construction certificate process, verifying compliance with the performance provisions pursuant to JV3 of the BCA

### 11.1 Access for Maintenance

Detailed design documentation will be developed to show the necessary details for access 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
- Plant that receives a concession under verification method JV3(b) for the use of energy obtained from a source that is renewable on-site such as solar, geothermal or wind; or
- Another process as reclaimed energy.

## Appendix A - Design Documentation

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

Drawing No.	Title	Drawn By	Revision
DA000	Title Sheet	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA001	Location Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA002	Site Context Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA003	Building Works Boundary Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA004	Ground Plan With Immediate Context	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA090	Basement Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA100	Ground Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA101	Mezzanine Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA102	Podium Level 1 Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA103	Podium Level 1B Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA104	Podium Level 2 Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C

DA105	Podium Level 3 Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA106	Podium Level 3B Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA107	Podium Level 4 Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA110	Tower Levels 5-25 Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA111	Tower Levels 26 & 27 Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA112	Tower Level 28 Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA113	Tower Levels 29-34 Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA114	Tower Levels 35 Floor Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA120	Lower Roof Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA125	Upper Roof Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA130	Roof Plan	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA200	Section AA	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA201	Section BB	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C

DA300	North East Elevation, Tower	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA301	South East Elevation, Tower	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA302	South West Elevation, Tower	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA303	North West Elevation, Tower	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA304	Western Elevation, Podium	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA305	Southern Elevation, Podium	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA306	Eastern Elevation, Podium	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C
DA307	Northern Elevation, Podium	Francis-Jones Morehen Thorp (FJMT) in collaboration with Lend Lease Design	C

## Appendix B - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2011:

**Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS**

Building element	Class of building — FRL: (in minutes)			
	<i>Structural adequacy/Integrity/Insulation</i>			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
<b>EXTERNAL WALL</b> (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 <i>non-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	–/–/–	–/–/–	–/–/–	–/–/–
<b>EXTERNAL COLUMN</b> 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	–/–/–	–/–/–	–/–/–	–/–/–
<b>COMMON WALLS and FIRE WALLS—</b>	90/ 90/ 90	120/120/120	180/180/180	240/240/240
<b>INTERNAL WALLS—</b>				
<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
Bounding <i>public corridors</i> , public lobbies and the like—				
<i>Loadbearing</i>	90/ 90/ 90	120/–/–	180/–/–	240/–/–
<i>Non-loadbearing</i>	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding <i>sole-occupancy units—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/–/–	180/–/–	240/–/–
<i>Non-loadbearing</i>	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Ventilating, pipe, garbage, and like <i>shafts</i> not used for the discharge of hot products of combustion—				
<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
<b>OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS—</b>				
	90/–/–	120/–/–	180/–/–	240/–/–
<b>FLOORS</b>	90/ 90/ 90	120/120/120	180/180/180	240/240/240
<b>ROOFS</b>	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)
<b>Wall</b>		
(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
<b>Column</b>		
(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 <sup>2</sup> /tonne
(c)	any other column not covered by (a) or (b)	60/–/–
<b>Beam</b>		
(a)	steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m <sup>2</sup> /tonne
(b)	any other beam	60/–/–
<b>Fire-resisting lift and stair shaft</b> (within the <i>carpark</i> only)		60/60/60
<b>Floor slab and vehicle ramp</b>		60/60/60
<b>Roof</b> (not used for carparking)		–/–/–
Notes:	<ol style="list-style-type: none"> <li>1. ESA/M means the ratio of exposed surface area to mass per unit length.</li> <li>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.</li> </ol>	