REF: 067032-02BCA

# NATIONAL CONSTRUCTION CODE (BUILDING CODE OF AUSTRALIA) REPORT

## Residential Development for DA Phase of the Tower, Basement which forms part of the Design Competition Works located at Lot 68, Sydney Olympic Park

## Prepared for Ecove Group

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| 19/09/2014 | A | 19 | Preliminary for Development Application | Lindsay Beard | Brigitte Thearle | 19/9/14 |

## Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Bates Smart (refer appendix A) for compliance with the Building Code of Australia 2014. It should be noted that the proposed child care centre does not form part of this report.

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 |
|---|---|---|
| C2.14 | Public corridors exceeding 40m in length are required to be divided into intervals of not more than 40m by smoke proof walls. The proposed corridors are up to 69m in length and are not proposed to be separated into 40m intervals. | CP2, DP4 EP2.2 |
| D1.4 | The following areas exceed the maximum allowable travel distance:<br><br><u>Basement Level 003:</u><br>• 53m to an exit after a POC in the carpark in lieu of 40m<br><u>Basement level 002:</u><br>• 56m to an exit after a POC in the carpark in lieu of 40m<br><u>Basement level 001:</u><br>• 54m to an exit after a POC in the carpark in lieu of 40m | DP4, EP2.2 |
| E1.3 | Location of the fire hydrant booster is not within sight of lobby entrances. | EP1.3 |

The fire engineered solution relating to EP1.3, EP2.2, will need to be approved after consultation with the NSW Fire Brigade as part of the Construction 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 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

Lindsay Beard
Building Surveyor

## 1.0 Introduction

The proposed development comprises of a mixed use tower comprising of residential and commercial/ retail, along with associated parking. The childcare does not form part of this development application.

The development is located at Lot 68, Sydney Olympic Park

### 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 the 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: -

| | **Tower and basement** |
|---|---|
| Classification | 2, 7a, 6, 5 |
| Number of Storeys Contained | 37 |
| Rise In Storeys | 36 |
| Type of Construction | A |
| Effective Height (m) | 114.9m |

1. The effective height calculations are based on the lowest level where direct egress to open space is available is RL3.50

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

| Part of Building | Class | Floor Area (m²) | Occupant No. |
|---|---|---|---|
| **Basement 001** | | | |
| Carpark | 7a | 900 (approx) | 30 |
| **Basement 002** | | | |
| Carpark | 7a | 900 (approx | 30 |
| **Basement 003** | | | |
| Carpark | 7a | 900 (approx) | 30 |
| **Ground Floor (453sqm)** | | | |
| Cafe | 6 | 101 | 101 |
| Office | 5 | 30 | 3 |
| Residential | 2 | 322 | |
| **Residential (7966sqm)** | | | |
| Levels 1-3 | 2 | 808 | |
| Level 4 | 2 | 813 | |
| Levels 05-09 | 2 | 813 | |
| Level 10 | 2 | 809 | |
| Levels 11-15 | 2 | 809 | |
| Level 16 | 2 | 798 | |
| Levels 17-24 | 2 | 798 | |
| Levels 25-26 | 2 | 809 | |
| Levels 27-33 | 2 | 809 | |
| Level 34 Plant | 2 | 700 (approx) | |
| **Total:** | | **11,119** | |

Notes:
1. The above populations have been base on the floor areas and calculations 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. The Carpark areas have been considered ancillary to the use for the purposes of population numbers

## 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 Construction Certificate structural certification is required to be provided.

## 4.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2014. 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 the residential sole occupancy units of 90 minutes,
- Separation between the carpark and the residential/ retails portions of 120 minutes,
- Separation between the retail/commercial and residential portions of 180 minutes
- Fire compartmentation of the building at each floor level,
- The carpark is considered as one fire compartment

Fire resistance levels for building structural members are as follows:

- Retail Portions 180 minutes
- Car park levels 120 minutes
- Residential portions 90 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 120 minutes or 90 minutes to residential;
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 120 minutes or 90 minutes to residential (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).

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.*

## 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.

The corridors to all Class 2 portions measure 69m and exceed the maximum 40m length:

The above non-compliance is to be addressed through design and the alternative solution report to the provisions of performance requirement CP2 of the BCA.

### 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

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.

### 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 will need to be assessed as part of the alternate solution.

The travel distances to exits should not exceed:

Class 5/6, 7a

- 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

Class 2
- 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
- Alternate exits not more than 45m apart

The following travel distances exceed the above DTS requirements:

Basement Level 003:

- 53m to an exit after a POC in the carpark in lieu of 40m

Basement level 002:

- 56m to an exit after a POC in the carpark in lieu of 40m

Basement level 001:

- 54m to an exit after a POC in the carpark in lieu of 40m

These distances are to be verified as part of the alternate solution to the BCA performance requirements by a suitably qualified fire safety engineer.

### 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 exit width provided is sufficient for the proposed populations.

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e minimum 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. This would be required at the discharge point of each fire-isolated stair on the ground floor for a distance of 3m due to the curved nature of the building.

### 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.

Walls adjacent to windows and balustrades which are required to be not climbable are to be clear of climbable elements for a distance of 1m from the balustrade. This includes GPO's, gas outlets, climbable window and doors sills and the like.

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

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 2014. 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 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.

## 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 throughout the building. Sprinklers are required throughout the carpark and all portions of the tower.
- 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 Room shall be provided in accordance with Clause E1.8 of the BCA. The fire control room will be resolved to comply as part o the design development.

## 6.1 Fire Hydrants

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

A booster assembly is required as part of the fire hydrant requirements. The booster is required to be located attached to the building within sight of the main entrance lobby and adjacent to the vehicular access. Due to the layout of the building, the location of the booster assembly is to be included in the alternate solution to BCA Performance Requirement EP1.3.

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

## 6.2 Fire Hose Reels

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441 to all non-residential portions.

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.

## 6.4 Portable Fire Extinguishers

Portable fire extinguishers are required to be installed in accordance with Table E1.6 of the BCA and AS 2444-2001. In addition, extinguishers are to be provided to the class 2 portions of the building in accordance with the below:

- an ABE type fire extinguisher is to be installed with a minimum size of 2.5 kg; and
- extinguishers are to be distributed outside a sole-occupancy unit

(a) to serve only the storey at which they are located; and
(b) so that the travel distance from the entrance doorway of any sole-occupancy unit to the nearest fire extinguisher is not more than 10 m.

### 6.3 Automatic Sprinkler Protection

An Automatic Fire Suppression System is required to Specification E1.5 and AS2118.1-1999 throughout the building. Sprinklers are required throughout the carpark and all portions of the tower.

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:

**Throughout:**

- Automatic Air Pressurisation to all fire isolated exits to AS/NZS 1668.1-1998
- Automatic Fire Suppression System (Sprinklers) to AS 2118.1-1999

**Carpark Portions:**

- Mechanical ventilation system in accordance with AS 1668.2 must comply with clause 5.5 of AS/NZS 1668.1 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated.

**Residential Portions:**

- Smoke detection and alarm system complying with AS 3786 to be provided within each sole occupancy unit.
- Smoke detection and alarm system complying with AS 1670.1 to be provided to the public areas in residential portions of the building.

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry and should be incorporated within the fire control room. 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 600m wide, 2000mm long and 1400mm high.

- At least two emergency lifts are to be provided in the tower with stretcher facilities in accordance with part E3.4 of the BCA. Where possible, these are to be located in separate shafts.
- 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

Based on a staff population calculated under D1.13 of the BCA the number of persons accommodated on the ground floor for the class 6 portion has been calculated to be100 (cafe juice bar) and class 5 portion (office) 3. Included in these numbers would be an employee number of 4. The following facilities are required (based on a cafe/ office use).

**F2.4 - Sanitary Facility Calculations**

| Description of building or part | Occupant Number | Population No. | | Required | | | Provided | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | WC | Urinals | Basins | WC | Urinals | Basins |
| Office | 3 | Male | 2 | 1 unisex toilet | | | 0 | 0 | 0 |
| | | Female | 2 | | | | 0 | | 0 |
| | | Accessible | | 1 | | | 0 | | |
| Cafe/Juice Bar | 100 | Male | 35 | 1 | 1 | 1 | 1 | 0 | 1 |
| | | Female | 35 | 2 | | 1 | 1 | | 1 |
| | | Male Employees | 2 | Can share the same toilets as public | | | | | |
| | | Female Employees | 2 | | | | | | |
| | | Accessible | | 1 | | | 1 | | |

Disclaimer to Sanitary and Population determinations:-

1. Cafe/ juice bar assumed back of house is considered to be 30% of total area. Back of house is taken at 10m per person and front of house is 1 m per person. Please confirm anticipated number of patrons when known.
2. The community room is considered ancillary to the apartments above therefore no facilities are required. If used for functions, facilities will be required.
3. The figures for $m^2$ per person are based on Table D1.13 of the BCA.
4. The sanitary figures are based on Table F2.3 of the BCA.

Room dimensions for the accessible toilet appear to be capable of achieving AS1428.1-2009.

At this bank, an ambulant facility is required and provided for each sex. It is noted that the circulation spaces at the entry to the male and female facilities are to be rectified to comply with the requirements for ambulant facilities under AS 1428.1-2009.

Each sole occupancy unit is to be provided with:

- A kitchen sink and facilities for preparation and cooking of food; and
- A bath or shower; and
- A closet pan and wash basin; and
- Clothes washing facilities (tub and space for washing machine); and
- Clothes drying facilities (either 7.5m of clothes line or space for a dryer).

As the development contains more than 10 apartments, a closet pan and basin is to be provided at or near ground level for employees that can be accessed without going through a sole occupancy unit. This can be shared with the retail facilities.

## 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 2014 for the following elements:

Floors

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:

- Rw + Ctr (airborne) not less than 50
- Ln,w+CI (impact) not more than 62

Walls

A wall separating sole-occupancy units:

- Rw + Ctr (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:

- Rw (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:

- Rw (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:

- Rw not less than 30

All walls required to have an impact sound insulation rating are to be of discontinuous construction.

## 11.0 Energy Efficiency

The Class 7a (carpark), and 5/6 (commercial/retail) portions of the proposed development shall be provided with insulation, building sealing and services in accordance with NSW Part J of the BCA where conditioned.

The deemed-to-satisfy provisions of the BCA only apply to thermal insulation in a class 2 building where development consent or a Complying Development certificate specifies that the insulation is to be provided as part of the development.

The residential (Class 2) portions of the building are subject to BASIX, and a BASIX Certificate will be required prior to the issuance of the Construction Certificate for the works.

The Class 7a (carpark), and 5/6 (commercial/retail) portion of 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 6.

## Appendix A - Design Documentation

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

| Drawing No. | Title | Drawn By | Rev |
|---|---|---|---|
| DA02.00[02] | PLAN GROUND LEVEL | BATES SMART | 3 |
| DA02.00[01]X | GENERAL ARRANGEMENT PLAN LEVEL 01-03 | BATES SMART | 5 |
| DA02.04[01]X | GENERAL ARRANGEMENT PLAN LEVEL 04 | BATES SMART | 5 |
| DA02.05[01]X | GENERAL ARRANGEMENT PLAN LEVEL 05-09 | BATES SMART | 1 |
| DA02.10[01]X | GENERAL ARRANGEMENT PLAN LEVEL 10 | BATES SMART | 5 |
| DA02.11[01]X | GENERAL ARRANGEMENT PLAN LEVEL 11-15 | BATES SMART | 1 |
| DA02.16[01]X | GENERAL ARRANGEMENT PLAN LEVEL 16 | BATES SMART | 5 |
| DA02.17[01]X | GENERAL ARRANGEMENT PLAN LEVEL 17-24 | BATES SMART | 1 |
| DA02.25[01]X | GENERAL ARRANGEMENT PLAN LEVEL 25-26 | BATES SMART | 4 |
| DA02.27[01]X | GENERAL ARRANGEMENT PLAN LEVEL 27-23 | BATES SMART | 2 |
| DA02.34[01]X | GENERAL ARRANGEMENT PLAN LEVEL 34 | BATES SMART | 1 |
| DA02.35[01]X | GENERAL ARRANGEMENT PLAN ROOF LEVEL | BATES SMART | 1 |
| DA02.B1[02] | PLAN BASEMENT LEVEL 001 | BATES SMART | 5 |
| DA02.B2[02] | PLAN BASEMENT LEVEL 002 | BATES SMART | 5 |
| DA02.B3[02] | PLAN BASEMENT LEVEL 003 | BATES SMART | 5 |
| DA06.01[01] | SECTION A-A NORTH-SOUTH | BATES SMART | 1 |
| DA01.50[01] | SITE PLAN | BATES SMART | |

## Appendix B - Draft Fire Safety Schedule

| | Essential Fire Safety Measures | Standard of Performance |
|---|---|---|
| 1. | Access Panels, Doors | 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 Lifts | BCA Clause E3.4 & AS 1735.2 – 2001 |
| 7. | Emergency Lighting | BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005 |
| 8. | EWIS | BCA Clause E4.9 & AS 1670.4 - 2004 |
| 9. | Exit Signs | BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005 |
| 10. | Exit Signs (non-illuminated) | BCA Clause E4.7 |
| 11. | Fire Control Centre | BCA Spec. E1.8 |
| 12. | Fire Blankets | AS 2444 – 2001 |
| 13. | Fire Dampers | BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990 |
| 14. | Fire Doors | BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2005 |
| 15. | Fire Hose Reels | BCA Clause E1.4 & AS 2441 – 2005 |
| 16. | Fire Hydrant System | Clause E1.3 & AS 2419.1 – 2005<br>Alternate solutions for the following items:<br>▪ Location of the fire hydrant booster is not within sight of all lobby entrances. Due to several entry lobbies the booster location is to be included as part of the fire engineering assessment. |
| 17. | Fire Seals | BCA Clause C3.15 & AS 1530.4 – 1997 |
| 18. | Fire Shutters | BCA Spec. C3.4 & AS 1905.2 – 1989 |
| 19. | Lightweight Construction | BCA Clause C1.8 & AS 1530.3 – 1999 |
| 20. | Mechanical Air Handling System | BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991 |

| | Essential Fire Safety Measures | Standard of Performance |
|---|---|---|
| 21. | Paths of Travel | EP&A Reg 2000 Clause 186<br>Alternate solutions for the following items:<br>▪ The following areas exceed the maximum allowable travel distance:<br><u>Basement Level 003:</u><br>• 53m to an exit after a POC in the carpark in lieu of 40m<br><u>Basement level 002:</u><br>• 56m to an exit after a POC in the carpark in lieu of 40m<br><u>Basement level 001:</u><br>• 54m to an exit after a POC in the carpark in lieu of 40m |
| 22. | Portable Fire Extinguishers | BCA Clause E1.6 & AS 2444 – 2001 |
| 23. | Pressurising Systems (Tower) | BCA Clause E2.2 & AS/NZS 1668.1 – 1998 |
| 24. | Required Exit Doors (power operated) | BCA Clause D2.19(d) |
| 25. | Smoke and/or Heat Alarm System | BCA Spec. E2.2a & AS 3786 – 1993<br>Alternate solution for deletion of zone smoke control from retail area. |
| 26. | Smoke Dampers | AS/NZS 1668.1 – 1998 |
| 27. | Smoke Doors | BCA Spec. C3.4<br>Alternate solutions for the following items:<br>▪ Public corridors exceeding 40m in length are required to be divided into intervals of not more than 40m by smoke proof walls. The proposed corridors are 69m in length and are not proposed to be separated into 40m intervals. |
| 28. | Warning and Operational Signs | Section 183 of the EP & A Regulations 2000, AS 1905.1 – 2005, BCA Clause C3.6, D2.23, E3.3 |

## Appendix C - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2014:

### 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 *fire-source feature* to which it is exposed is— | | | | |
| For *loadbearing* parts— | | | | |
| less than 1.5 m | 90/ 90/ 90 | 120/120/120 | 180/180/180 | 240/240/240 |
| 1.5 to less than 3 m | 90/ 60/ 60 | 120/ 90/ 90 | 180/180/120 | 240/240/180 |
| 3 m or more | 90/ 60/ 30 | 120/ 60/ 30 | 180/120/ 90 | 240/180/ 90 |
| For non-*loadbearing* parts— | | | | |
| less than 1.5 m | –/ 90/ 90 | –/120/120 | –/180/180 | –/240/240 |
| 1.5 to less than 3 m | –/ 60/ 60 | –/ 90/ 90 | –/180/120 | –/240/180 |
| 3 m or more | –/–/– | –/–/– | –/–/– | –/–/– |
| **EXTERNAL COLUMN** not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is— | | | | |
| less than 3 m | 90/–/– | 120/–/– | 180/–/– | 240/–/– |
| 3 m or more | –/–/– | –/–/– | –/–/– | –/–/– |
| **COMMON WALLS and FIRE WALLS—** | 90/ 90/ 90 | 120/120/120 | 180/180/180 | 240/240/240 |
| **INTERNAL WALLS—** | | | | |
| *Fire-resisting* lift and stair *shafts*— | | | | |
| *Loadbearing* | 90/ 90/ 90 | 120/120/120 | 180/120/120 | 240/120/120 |
| Non-*loadbearing* | –/ 90/ 90 | –/120/120 | –/120/120 | –/120/120 |
| Bounding *public corridors*, public lobbies and the like— | | | | |
| *Loadbearing* | 90/ 90/ 90 | 120/–/– | 180/–/– | 240/–/– |
| Non-*loadbearing* | –/ 60/ 60 | –/–/– | –/–/– | –/–/– |
| Between or bounding *sole-occupancy units*— | | | | |
| *Loadbearing* | 90/ 90/ 90 | 120/–/– | 180/–/– | 240/–/– |
| Non-*loadbearing* | –/ 60/ 60 | –/–/– | –/–/– | –/–/– |
| Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion— | | | | |
| *Loadbearing* | 90/ 90/ 90 | 120/ 90/ 90 | 180/120/120 | 240/120/120 |
| Non-*loadbearing* | –/ 90/ 90 | –/ 90/ 90 | –/120/120 | –/120/120 |
| **OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS—** | 90/–/– | 120/–/– | 180/–/– | 240/–/– |
| **FLOORS** | 90/ 90/ 90 | 120/120/120 | 180/180/180 | 240/240/240 |
| **ROOFS** | 90/ 60/ 30 | 120/ 60/ 30 | 180/ 60/ 30 | 240/ 90/ 60 |

## Table 3.9 REQUIREMENTS FOR CARPARKS

| Building element | FRL (not less than) Structural adequacy/Integrity/Insulation |
|---|---|
| | ESA/M (not greater than) |
| **Wall** | |
| (a) *external wall* | |
| (i) less than 3 m from a *fire-source feature* to which it is exposed: | |
| *Loadbearing* | 60/60/60 |
| Non-*loadbearing* | –/60/60 |
| (ii) 3 m or more from a *fire-source feature* to which it is exposed | –/–/– |
| (b) *internal wall* | |
| (i) *loadbearing*, other than one supporting only the roof (not used for carparking) | 60/–/– |
| (ii) supporting only the roof (not used for carparking) | –/–/– |
| (iii) non-*loadbearing* | –/–/– |
| (c) *fire wall* | |
| (i) from the direction used as a *carpark* | 60/60/60 |
| (ii) from the direction not used as a *carpark* | as *required* by Table 3 |
| **Column** | |
| (a) supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed | –/–/– |
| (b) steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark* | 60/–/– or 26 $m^2$/tonne |
| (c) any other column not covered by (a) or (b) | 60/–/– |
| **Beam** | |
| (a) steel floor beam in continuous contact with a concrete floor slab | 60/–/– or 30 $m^2$/tonne |
| (b) any other beam | 60/–/– |
| **Fire-resisting lift and stair shaft** (within the *carpark* only) | 60/60/60 |
| **Floor slab and vehicle ramp** | 60/60/60 |
| **Roof** (not used for carparking) | –/–/– |

Notes:
1. ESA/M means the ratio of exposed surface area to mass per unit length.
2. Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.