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## **BUILDING CODE OF AUSTRALIA REPORT**

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Revision: C

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**Three Storey Residential Building  
4-18 Doncaster Avenue, Kensington**

**Prepared for:  
BlueSky Private Real Estate**

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Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
12/12/18	1	30	Draft DA Report – Stakeholder review	Vijay Perumal	Paul Curjak	13.13.18
19.12.18	2	30	Final Draft DA Report	Vijay Perumal	Paul Curjak	19.12.18
21.12.18	3	30	Final Report	Vijay Perumal	Paul Curjak	21.12.18

## Executive Summary

### Development Overview

This Project involves the demolition of existing dwellings at numbers 4-8, 14 and 16 Doncaster Avenue and construction of new three storey residential flat building comprising of 48 dwellings, retention and refurbishment of existing terraces at numbers 10 and 12 Doncaster Avenue and basement parking for 71 vehicles.

### Compliance Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Hayball (refer appendix A) for compliance with the Building Code of Australia 2016 Volume One Amendment One.

In this regard the following areas in particular require further review as the project develops:

No.	Items for review	Responsibility
1.	Please advise if there are any proposed alternative building solutions with regard to design of the building services for the project.	Services Consultants
2.	Test reports of all proposed cladding material to be submitted confirm "non-combustibility" as prescribed by the BCA.	Architect
3.	Ensure all clear paths of travel to exits are equal or greater than 1m.	Architect
4.	Confirmation to be provided ensuring rooms/space provided under required fire isolated / non fire isolated stairs comply with Clause D2.8 of the BCA.	Architect
5.	Stair and Balustrade details to be provided for review.	Architect
6.	Staff and population numbers to be confirmed for the residential portions	Client
7.	Access report to be provided for review from an accredited Access Consultant.	Access consultant
8.	Window details to be provided ensuring compliance with Clause D2.24 of the BCA.	Architect
9.	Where spandrel separation has not been re-designed in accordance with C2.6 of the BCA this will need to be addressed through a fire engineered solution.	Architect
10.	Section J Compliance report to be submitted for review	ESD Consultant

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: -

No.	Alternative Solution Description	DTS Clause	Performance Requirement
<b>Fire Safety Items</b>			
1.	<b>Heritage building - Fire resistant levels (FRL's)</b> A fire engineered solution will be obtained for the reduction of required FRL's of the building elements of the heritage building.	Spec C1.1	CP1, CP2
2.	<b>Fire isolated stairs - Fire resistant levels (FRL's)</b> It is proposed to reduce the required FRL's of the following "Fire-isolated stairs" located on ground floor to the following egress stairs: <ul style="list-style-type: none"> <li>Central egress stair</li> <li>Western egress stair</li> </ul>	Spec C1.1	CP1, CP2
3.	<b>Spandrel Separation</b> Where the building is not proposed to be sprinkler protected throughout, the current design does not comply with the above prescriptive requirements and will need to be addressed through a fire engineered solution.	C2.6	CP2
4.	<b>Public Corridors in Class 2 and 3 buildings</b> Public corridors on the residential levels exceed 40m and are not proposed to be smoke separated in accordance with C2.14 of the BCA.	C2.14	CP2, DP4, EP2.2
5.	<b>Protection of openings</b> Multiple openings located along the external walls of the new building that are located within 6m to the existing heritage building on site. Where these openings are not protected in accordance with C3.4 of the BCA, this will be required to be addressed through fire engineered solution	C3.2, C3.4	CP2
6.	<b>Bounding construction: Class 3 buildings</b> Bounding construction to communal rooms adjacent to public corridors within the residential portions of the development have not been provided with construction achieving compliance with C3.11 of the BCA	C3.11	CP1, CP2
7.	<b>Exit Travel Distances</b> Extended Travel distances within the building are as follows:  <u>Basement Portion</u> <ul style="list-style-type: none"> <li>Up to 37m to a point of choice in lieu of 20m (Bin Room) – Design amendments required to reduce egress</li> </ul> <u>Residential Portions</u> <ul style="list-style-type: none"> <li>Up to 15m to a point of choice in lieu of 6m (SOU of clusters) - Design amendments required to reduce egress</li> <li>Up to 22m to a point of choice in lieu of 20m (Common area of clusters)</li> </ul>	D1.4	DP4, EP2.2

8.	<b>Distance between alternative Exits</b> Extended distance between alternative exits from Ground to Level 2 are as follows: <u>Basement Portion</u> <ul style="list-style-type: none"> <li>107m between alternative exits in lieu of 60m</li> </ul> <u>Residential Portions</u> <ul style="list-style-type: none"> <li>Up to 81m between alternative exits in lieu of 45m</li> </ul>	D1.5	DP4, EP2.2
9.	<b>Travel via fire-isolated exit</b> The current design indicates the fire isolated stairs serving residential portions of the development, discharging internally and past multiple openings on ground floor and within 6m from the external wall of the building contravening the prescriptive requirement as per D1.7	D1.7	DP5, EP2.2
10.	<b>Hydrant Booster Location</b> The proposed fire hydrant booster assembly will be located within 10m to the external wall of the building.  Where the booster is not located at the main entrance of the building and not protected by a radiant heat shield of 90/90/90 this will be required to be addressed through a fire engineered solution.	E1.3	EP1.3,

The fire engineered solution relating to EP1.3 & EP2.2 will be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

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.



## 1.0 Introduction

This Project involves the demolition of existing dwellings at numbers 4-8, 14 and 16 Doncaster Avenue and construction of new three storey student accommodation building comprising of 276 beds, retention and refurbishment of existing terraces at numbers 10 and 12 Doncaster Avenue and basement parking for 56 vehicles and 54 motorcycles.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

### 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. For the purposes of this Report, BCA 2016 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

### 1.2 Upgrade to Existing Buildings

The local authority when assessing the development application may require that the existing heritage building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or
- Council are not satisfied the measures contained in the building are not adequate for the safety of present using the building or prevention of special to adjacent buildings.

Further investigations, including a site inspection will be required to ascertain the extent of the upgrade works required for the existing building to ensure that a suitable level of life safety, health and amenity for the occupants within the building is maintained. The upgrade works will be based upon using the current regulations as an applicable benchmark and our expertise to judge what is considered to be suitable.

Notwithstanding the above, where practical benefits and improvements to fire and life safety can be achieved without major cost or disruption, it is recommended that the relevant compliance parameters be upgraded to meet current requirements where possible.



## 2.0 PRELIMINARIES

### 2.1 Building Assessment Data

Summary of Construction Determination: -

Part of Project	Building
Classification	3, 7a
Number of Storeys	4
Rise In Storeys	4
Type of Construction	A
Effective Height (m)	10.4m (RL 35.91 – RL 25.5)

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

Part of Project	BCA Classification	Approx. Floor Area (m <sup>2</sup> )	Assumed Population
Basement carpark	7a	2090m <sup>2</sup>	70
Ground floor new building	3	2,200m <sup>2</sup>	80*
Ground floor heritage building	3	141m <sup>2</sup>	4*
First floor new building	3	2097m <sup>2</sup>	94*
First floor heritage building	3	141m <sup>2</sup>	2*
Second floor new building	3	2097m <sup>2</sup>	95*
Staff	-	-	6
	<b>Total</b>	<b>8766m<sup>2</sup></b>	<b>351</b>

Notes:

1. The above populations for the Basement carpark have been based 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
4. \*Population numbers to the residential portions are based off the number of beds provided

### 2.2 Structural Provisions (BCA B1)

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, including determination of the importance level of the development.

This is to include assessment against the provisions of BCA Clause B1.6 – Construction of Buildings in Flood Areas

## 2.3 Development Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Permit conditions and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

## 3.0 FIRE PROTECTION

### 3.1 Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the Building, the building is required to be Type A Construction in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2016 Amendment 1.

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

- Bounding construction to the sole occupancy units of 90 minutes,
- Separation of residential portions of 90 minutes
- Separation of carpark and residential portions of 120 minutes
- Fire compartmentation of the building at each floor level,

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		Type of Construction
		A
3	N/A	N/A
7a	max floor area—	5 000 m <sup>2</sup>
	max volume—	30 000 m <sup>3</sup>

### 3.2 Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type A Construction, Please refer to the below table which outlines the required fire rating to be achieved by the development.

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 within it) or other external building element, where the distance from any fire-source feature 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	–/–/–	–/–/–	–/–/–	–/–/–
<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

It is proposed to reduce the required FRL's (as per the above table) in the following locations:

- As it is proposed to utilise a fire curtain to fire separate the basement into two (2) fire compartments, where the required FRL of 120/120/120 has not been achieved, this will need to be addressed through a fire engineered solution
- The reduction of required FRL's of the building elements of the existing heritage building.
- The reduction of required FRL's of the following "Fire-isolated stairs" located on ground floor to the following egress stairs:
  - Central egress stair
  - Western egress stair
- Bounding construction to communal rooms adjacent to public corridors within the residential portions of the development have not been provided in accordance with the above requirements.

Where design amendments are not afforded to comply with the above prescriptive requirements of the BCA, the above departures will be required to be addressed through a fire engineered solution.

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

- Hydrant Pump Rooms,
- Sprinkler Pump Rooms, (where provided)

The above areas are to be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

### 3.3 Fire Hazard Properties (BCA C1.10 and BCA C1.12)

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. The following requirements apply:

#### Sprinkler Protected Areas

- a) Floor Coverings – Critical radiant Flux not less than 2.2 kW/m<sup>2</sup>
- b) Wall and Ceiling Linings – Material Group No. 1, 2, 3
- c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8

#### Non-Sprinkler Protected Areas

- a) Floor Coverings – Critical radiant Flux not less than (insert) a maximum smoke development rate of 750 percent-minutes
- b) Wall and Ceiling Linings – Material Group No. (insert) and with a smoke growth rate index not more than 100, or an average specific extinction area less than 250m<sup>2</sup>/kg
- c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if Spread of Flame if >5)

Rigid and flexible air handling ductwork must comply with AS4254 parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

### External Wall Cladding

As the building is of Type A construction the external walls, including any external and internal claddings & linings must be non-combustible as determined by AS1530.1. 1994.

The following materials may be used wherever a non-combustible material is required:

- a) Plasterboard.
- b) Perforated gypsum lath with a normal paper finish.
- c) Fibrous-plaster sheet.
- d) Fibre-reinforced cement sheeting.
- e) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
- f) Bonded laminated materials where—
  - i. each lamina, including any core, is non-combustible; and
  - ii. each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2mm; and
  - iii. the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

The BCA does nominate that ancillary elements may be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

- a) An ancillary element that is non-combustible.
- b) A gutter, downpipe or other plumbing fixture or fitting.
- c) A flashing.
- d) A grate or grille not more than 2 m<sup>2</sup> in area associated with a building service.
- e) An electrical switch, socket-outlet, cover plate or the like.
- f) A light fitting.
- g) A required sign.
- h) A sign other than one provided under (a) or (g) that—
  - i) achieves a group number of 1 or 2; and
  - ii) does not extend beyond one storey; and
  - iii) does not extend beyond one fire compartment; and
  - iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval.

### **3.4 Vertical Separation of openings in external walls (BCA C2.6)**

A building of Type A construction must be provided with spandrel separation between opening on different storeys unless the building is sprinkler protected throughout. Spandrels are required in accordance with BCA Clause C2.6, which stipulates a 900mm high spandrel; with 600mm of this spandrel being above the finished floor level. Alternatively, an 1100mm horizontal slab may be utilized. The spandrel material is required to achieve an FRL of 60/60/60.

Where spandrel separation has not been re-designed in accordance with C2.6 of the BCA this will need to be addressed through a fire engineered solution.

It is noted that any penetrations in the spandrel construction e.g. for drainage, overflow etc. are to be protected.

### **3.5 Public Corridors: Class 2 and 3 Buildings (BCA C2.14)**

Public corridors exceeding 40m in length to be divided into intervals of not more than 40m by smoke proof walls complying with Clause 2 of BCA Specification C2.5.

The current design does not comply with the above prescriptive requirements. Where design amendments are not afforded to comply with the above requirements of the BCA, the above departures will be required to be addressed through a fire engineered solution.

### 3.6 Protection of Openings in External Walls (BCA C3.2)

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the fire source feature requires protection by -/60/- fire rated construction, or externally located wall wetting sprinklers.

Multiple openings located along the external walls of the new building that are located within 6m to the existing heritage building on site.

Where these openings are not protected in accordance with C3.4 of the BCA, this will be required to be addressed through fire engineered solution

Where a building is separated into fire compartments, the distance between parts of external walls and openings within them must be not less than the table below unless those parts of each external wall has an FRL not less than 60/60/60 and openings are protected.

Angle Between Walls	Minimum Distance
0° (walls opposite)	6m
More than 0° to 45°	5m
More than 45° to 90°	4m
More than 90° to 135°	3m
More than 135° to 180°	2m
More than 180°	Nil

*Fire source feature is defined as;*

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

### 3.7 Protection of Openings in fire rated building elements (BCA C3.5 and BCA C3.10)

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

- Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc)
- 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)
- Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs

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.



As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts.

## 4.0 EGRESS PROVISIONS

### 4.1 Provisions for Escape (BCA D1)

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
- Discharge from the Fire Isolated Exits
- Details of the egress provisions to the Road.

Where design amendments are not afforded to comply with the above prescriptive requirements of the BCA, the above departures will be required to be addressed through a fire engineered solution.

### 4.2 Travel via Fire Isolated Exits (BCA D1.7)

The proposed exits are required to be fire isolated.

The BCA requires each fire isolated stairway to 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 in a storey 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 an unimpeded path of travel not more than 20m to a road or open space; or
- 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 of not less than 3m, and provides an unimpeded path of travel to a road or open space of not less than 6m.

Additionally, where the path of travel from the point of discharge requires occupants to pass within 6m of any part of the external wall of the same building (measured horizontally), that external wall must have a 60/60/60 FRL and have any openings protected internally for a distance of 3m above or below the path of travel.

The current design indicates the fire isolated stairs serving residential portions of the development, discharging internally and past multiple openings on ground floor and within 6m from the external wall of the building. Where design amendments are not afforded to comply with the above prescriptive requirements of the BCA, the above departures will be required to be addressed through a fire engineered solution.



### 4.3 Exit Travel Distances (BCA D1.4)

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 be satisfied.

The travel distances to exits should not exceed:

#### Class 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 3

- 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 locations of the proposed exits indicate that the deemed to satisfy requirements in terms of travel distances would be satisfied, with the exception of the following:

#### Basement Portion

- Up to 37m to a point of choice in lieu of 20m (Bin Room) – Design amendments required to reduce egress

#### Residential Portions

- Up to 15m to a point of choice in lieu of 6m (SOU of clusters) – Design amendments required to reduce egress
- Up to 22m to a point of choice in lieu of 20m (Common area of clusters)

Distance between exits does not fully comply in the following areas:

#### Basement Portion

- 107m between alternative exits in lieu of 60m

#### Residential Portions

- Up to 81m between alternative exits in lieu of 45m

Where design amendments are not afforded to comply with the above prescriptive requirements of the BCA, the above departures will be required to be addressed through a fire engineered solution.

### 4.4 Dimensions of Exits (BCA D1.6)

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).

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 920 mm doors).

#### **4.5 Balustrading and Handrails (BCA D2.16 and BCA D2.17)**

##### Generally

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 surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

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

The public stairs and ramps located along an accessible path of travel 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.

Further review will be undertaken to ensure compliance as the design develops.

##### Fire Isolated Stairways

Balustrades in the fire isolated stairways parts of buildings are permitted to contain a 3 rail system, with a bottom rail situated at not more than 150mm above the nosings. The distance between the rails shall not exceed 460mm.

Handrails are required on both sides of all stairways except for fire isolated stairways used only for emergency egress purposes.

In a required exit serving an area required to be accessible, handrails must be designed and constructed to comply with Clause 12 of AS1428.1-2009

##### Openable Windows in Residential Buildings

In bedrooms of Class 3 buildings, where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D2.24.

Where the lowest part of the window opening is less than 1.7m above a floor, the window opening must be:

- a) Fitted with a device to restrict the opening; or
- b) Fitted with a screen with secure fittings

The device or screen required must –

- a) Not permit a 125mm sphere to pass through it; and
- b) Resist an outward horizontal action of 250N; and
- c) Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden

Further review will be undertaken to ensure compliance as the design develops.

## 4.6 Slip Resistance

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

<u>Application</u>	<u>Surface conditions</u>	
	<i>Dry</i>	<i>Wet</i>
<i>Ramp steeper than 1:14</i>	<i>P4 or R11</i>	<i>P5 or R12</i>
<i>Ramp not steeper than 1:14</i>	<i>P3 or R10</i>	<i>P4 or R11</i>
<i>Tread or landing surface</i>	<i>P3 or R10</i>	<i>P4 or R11</i>
<i>Nosing or landing edge strip</i>	<i>P3</i>	<i>P4</i>

## 5.0 ACCESS FOR PEOPLE WITH DISABILITIES

### 5.1 General Building Access Requirements (BCA D3.1)

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 2016 Amendment 1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4-2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Access for persons with a disability is to be provided as follows:-

#### Apartment (Class 3 buildings)

- From the pedestrian entrance to at least 1 floor containing Single Occupancy Units and to the entrance door of all Single Occupancy Units on that floor, and to at least one type of each common facility, such as gyms, shops, laundries (shared), gaming rooms etc.
- Where a 1428.1 compliant lift or ramp is provided in addition to the above and access is required to and within all spaces, and to the entrance of doors to single occupancy units on the levels, served by the lift or ramp.

Where individual Class 3 single occupancy units are provided:

61 to 80	To and within 4 single occupancy units
----------	--

\* Not more than 2 required accessible units may be located adjacent to each other; and

\* where more than 2 single occupancy units are required to be accessible, they must be indicative of the range of units/rooms available.

#### Car parks (Class 7a buildings)

To and within any level containing accessible car parking spaces.

## 5.2 Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building 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.

In buildings over 500m<sup>2</sup> in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

And where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the door leaves must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the door leaves must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

## 5.3 Provisions for Access within Buildings (BCA D3.3)

A building required to be accessible is required to be equipped with either a 1428.1 compliant lift or 1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3 and as attached in appendix 1;
- Doorways must have a clear opening of 850mm;
- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface
- Any glazed capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS 1288 requirements)

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc.

An access report prepared by a suitably accredited access consultant to be submitted for further review.

## 5.4 Stairs (BCA D3.3 inter Alia AS1428.1)

Stairs shall be constructed as follows:

- a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail TGSIs do not protrude into the transverse path of travel.
- b) Where the intersection is at an internal corridor, the stair shall be set back in 300mm, so the handrails do not protrude into transverse path of travel.
- c) Stairs shall have opaque risers.
- d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
- e) Stair nosing profiles shall-
  - Have a sharp intersection;
  - Be rounded up to 5mm radius; or
  - Be chamfered up to 5mm x 5mm

- f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

## 5.5 Provisions for Accessible Sanitary Facilities (BCA F2.4)

### Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary towels and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Class 3 Buildings	a) In every accessible sole-occupancy unit provided with sanitary compartments within the accessible sole-occupancy unit, not less than 1; and b) At each bank of sanitary compartments containing male and female sanitary compartments provided in common areas, not less than 1

It is noted that the one accessible toilet on ground floor is adequate to service the proposed staff numbers for building.

### Accessible unisex showers

Accessible unisex showers must be provided in accordance with 1428.1 and at the following rates

Building	Minimum accessible unisex showers to be provided
Class 3 Buildings	a) In every accessible sole – occupancy unit provided with showers within the accessible sole-occupancy unit, not less than 1; and b) 1 for every 10 showers or part thereof provided in common areas

## 5.6 Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating 'EXIT' and 'Level' number

## 5.7 Lifts (BCA E3.6)

Lifts compliant to BCA E3.6 and BCA E3.7 must be provided, where required to be provided, with a minimum size of 1400 x 1600mm or 1100mm x 1400mm (whichever is appropriate) in size – with appropriate handrails and auditory commands.

## 6.0 FIRE SERVICES AND EQUIPMENT

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

### 6.1 Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005, please provide pressure and flow calculations for review.

Pressure and flow information will be required to confirm the required pressures and flow to the system, depending on the type of hydrant to be utilized;

- Feed hydrants (within 20m of hard stand for pumping appliance), 150 kPa
- Attack hydrant (within 50m of hard stand) 250 kPa
- Hydrants on a pump station, 700 kPa

The building is required to be provided with a booster assembly 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, the booster 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.

The proposed fire hydrant booster assembly will be located within 10m to the external wall of the building. Where the booster is not located at the main entrance of the building and not protected by a radiant heat shield of 90/90/90 this will be required to be addressed through a fire engineered solution

Where the booster is not proposed to be located to be more than 10m away from the substation this will be required to be addressed through a fire engineered solution.

### 6.2 Fire Hose Reels (BCA E1.4)

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005 to achieve coverage in the basement and roof top areas.

Class 7a portions only, fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length. Where required, additional fire hose reels shall be located internally as required to provide coverage.

Fire Hose reel are not to extend through Fire and Smoke Walls.

As the design develops, details are required to be provided for review.

A Fire Hose Reel System

### 6.3 Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444-2001

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
General provisions – Class 3	(a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1)



Occupancy Class	Risk Class (as defined in AS 2444)
	(b) To cover Class F fire risks involving cooking oils and fats in kitchens.
	(c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles).
	(d) To cover Class A fire risks in normally occupied fire compartments less than 500m <sup>2</sup> not provided with fire hose reels (excluding open deck carparks).
	(e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels.
	(f) To cover Class A fire risks associated with Class 2 or 3 building or class 4 part of building.

In addition, extinguishers are to be provided to the class 3 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.

Fire extinguishers are to be located in accordance with AS 2444, often collocated with fire hydrants and/or fire hose reels.

As the design develops, details are required to be provided for review.

#### 6.4 Automatic Sprinkler Protection (BCA E1.5)

Where an automatic sprinkler protection is required to Specification E1.5 and AS2118.1-1999 to the following areas:

- Throughout any Class 7a car park (other than open deck car parks) containing accommodation for more than 40 vehicles;

Where sprinkler protection is provided the Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review.

An occupant warning system should be provided in accordance with BCA Specification E1.5.

#### 6.5 Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with AS2293.1-2005

Details are required to be provided for review.

#### 6.6 Sound Systems and Intercom Systems for Emergency Purposes (BCA E4.9)

A Sound System and Intercom System is required / not required in accordance with AS1670.4-2015 and BCA Clause E4.9

Details are to be provided for our review.



## 6.7 Smoke Hazard Management (BCA E2.2)

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 1668.1-2015;
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004

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.

## 6.8 Lift Services (BCA E3.4 and BCA E3.6)

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.
- At least two emergency lifts with stretcher facilities in accordance with part E3.4 of the BCA. The two emergency lifts shall be located in separate shafts. These lifts are to serve all storeys that are served by passenger lifts.
- 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; and
  - Audible and visual indication at each lift landing to indicate the arrival of the lift car.

## 6.9 Fire Precautions During Construction (BCA E1.9)

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels on every storey covered by the roof/floor structure (except the 2 uppermost storeys); and
- Booster connections installed.

Due to the height of the building this will need to be considered and implemented during construction.

## 7.0 HEALTH AND AMENITY

### 7.1 Sanitary Facilities (BCA F2.2 and BCA F2.3)

#### Apartments

The current design indicates that an accessible sanitary facility is to be provided for staff, on the ground floor. The proposal satisfactory

Each apartment is required to be provided with the following:

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

The design submitted indicates that each apartment should satisfy the above requirements.

#### Bathroom Construction

Where bathrooms or rooms containing water closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

### **7.2 Floor Wastes (BCA F1.11)**

Floor wastes to be provided within bathrooms and laundries where located above another sole occupancy unit. The floor shall be sloped towards these wastes.

Floor wastes are required to be provided where wall hung urinals are provided and the floor shall be sloped towards these wastes.

Floor wastes to be indicated on architectural details

### **7.3 Light and Ventilation (BCA Part F4)**

#### Class 3

Natural light and ventilation is to be provided to all habitable rooms at a rate of 10% and 5% of the floor area of the rooms respectively.

A required window that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must not be less than a horizontal distance from that boundary or wall that is the greater of:

- generally — 1 m; and
- 50% of the square root of the exterior height of the wall in which the window is located, measured in metres from its sill.

#### Class 7a

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

It is noted that the carpark will be mechanically ventilated.

### **7.4 Sound Transmission and Insulation (BCA F5)**

Building elements within Class 3 buildings should provide the following sound insulation levels.

Location	Notes	Sound Insulation Requirement
Walls separating habitable rooms		$R_w + C_{tr} \geq 50$
Walls separating habitable room and kitchen or bathroom	Wall must be of Discontinuous Construction	$R_w + C_{tr} \geq 50$

Floor separating habitable rooms	Impact isolation required	$R_w + C_{tr} \geq 50$ $L_{n,w} + C_i \leq 62$
Duct, soil, waste or water supply pipe, including pipes that is located in a floor or wall cavity, serves or passes through more than one room	Adjacent habitable room or Adjacent non-habitable room	$R_w + C_{tr} \geq 40$ or $R_w + C_{tr} \geq 25$
Door to habitable room		$R_w \geq 30$

Please note for walls requiring impact resistance an air gap between leafs of the wall construction is required to be provided.

Please provide a report from the acoustic engineer verifying design compliance with the provisions of part F5 of the BCA.

## 7.5 Weatherproofing of External Walls (BCA FP1.4)

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building complies with Performance Requirement FP1.4 which reads as follows:

*A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—*

- a) unhealthy or dangerous conditions, or loss of amenity for occupants; and*
- b) undue dampness or deterioration of building elements.*

## 8.0 ENERGY EFFICIENCY

The deemed-to-satisfy provisions of the BCA only apply to thermal insulation in a class 3 building where development consent or a Complying Development certificate specifies that the insulation is to be provided as part of the development.

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

- 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
- 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.

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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.

Due to special nature of the building some energy provisions may not be appropriate.

## Appendix A - Design Documentation

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

Title / Drawing No	Drawn By	Date
TP00.00 COVER SHEET	Hayball	7 December 2018
TP01.01 EXISTING SITE PLAN	Hayball	7 December 2018
TP01.02 PROPOSED SITE PLAN	Hayball	7 December 2018
TP02.01 BASEMENT PLAN	Hayball	7 December 2018
TP02.02 GROUND FLOOR PLAN	Hayball	7 December 2018
TP02.03 LEVEL 1 PLAN	Hayball	7 December 2018
TP02.04 LEVEL 2 PLAN	Hayball	7 December 2018
TP02.05 ROOF PLAN	Hayball	7 December 2018
TP02.06 GROUND - FLOODWATER CHANNEL LOCATIONS	Hayball	7 December 2018
TP03.01 ELEVATIONS	Hayball	7 December 2018
TP03.02 PART ELEVATIONS	Hayball	7 December 2018
TP03.03 FLOODWATER CHANNEL LOCATIONS	Hayball	7 December 2018
TP04.01 SECTION A&B, C&D	Hayball	7 December 2018
TP05.01 DEMOLITION FLOOR PLAN-10&12 DONCASTER AVE	Hayball	7 December 2018
TP05.02 DETAIL FLOOR PLANS-10&12 DONCASTER AVE	Hayball	7 December 2018
TP05.03 WEST ELEVATION-10&12 DONCASTER AVE	Hayball	7 December 2018
TP05.04 SOUTH ELEVATION-10&12 DONCASTER AVE	Hayball	7 December 2018
TP05.05 EAST ELEVATION-10&12 DONCASTER AVE	Hayball	7 December 2018
TP05.06 NORTH ELEVATION-10&12 DONCASTER AVE	Hayball	7 December 2018
TP06.01 AREA PLANS GFA	Hayball	7 December 2018
TP06.02 SHADOW DIAGRAMS	Hayball	7 December 2018
TP06.03 SHADOW STUDY - SOUTHERN INTERFACE - LANDSCAPE	Hayball	7 December 2018
TP06.04 SHADOW STUDY - SOUTHERN INTERFACE 21ST JUNE	Hayball	7 December 2018

## Appendix B - Draft Fire Safety Schedule

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 1670.1 – 2015, AS/NZS 1668.1 - 2015
4.	Automatic Fire Suppression System (where provided)	BCA Spec. E1.5 & AS 2118.1 – 2017 (Carpark)
5.	Building Occupant Warning System	BCA Spec. E1.5, BCA Spec. E2.2a & AS 1670.1 – 2015 – Clause 3.22
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005 Amdt 1 & 2
7.	Exit Signs	BCA Clauses E4.5, NSW E4.6 & E4.8 and AS/NZS 2293.1 – 2005 Amdt 1 & 2
8.	Fire Blankets	AS 2444 – 2001
9.	Fire Dampers	BCA Clause C3.15, AS/NZS 1668.1 – 2015 & AS 1682.1&2 - 1990
10.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8, Spec C3.4 and AS 1905.1 – 2015
11.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
12.	Fire Hydrant System	BCA Clause E1.3 & AS 2419.1 – 2005 Amdt 1
13.	Fire Seals, Collars	BCA Clause C3.15, C3.16 & AS 1530.4 – 2014
14.	Lightweight Construction	BCA Clause C1.8, C3.17 & AS 1530.3 – 1999
15.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 2015
16.	Paths of Travel	EP&A Reg 2000 Clause 186
17.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
18.	Warning and Operational Signs	EP&A Reg 2000 Clause 183, BCA Clause C3.6, D2.23, E3.3 & H101.8
19.	Fire Engineering Report	Prepared by suitably qualified Fire Engineer

## Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2016 Amendment 1:

**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 within it) or other external building element, where the distance from any fire-source feature 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	—/—/—	—/—/—	—/—/—	—/—/—
<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



ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60
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