

**TAFE NSW WESTERN SYDNEY CONSTRUCTION HUB**

**BUILDING CODE OF AUSTRALIA 2019 Amendment 1  
SCHEMATIC DESIGN REVIEW**

**JANUARY 2021**

Report prepared for	Gray Puksand 1/156 Clarence Street Sydney NSW 2000  Attention: Barry Hackett
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**DOCUMENT ACCEPTANCE**

Company	Name	Signed	Date
Metro Building Consultancy	Sean Moore		22/01/2021

**REVISION HISTORY**

Description	Prepared by	Revision No.	Date
BCA 2019 Amdt 1 Report	Annika Green	R03	22/01/2021
BCA 2019 Amdt 1 Report	Sean Moore	R02	01/12/2020
BCA 2019 Amdt 1 Report	Sean Moore	R01	02/11/2020

**1.0 Introduction and Documentation**

Introduction

Gray Puksand requested Building Code of Australia 2019 amendment 1 advice in relation to the BCA compliance of the schematic design documents for the proposed new TAFE NSW Western Sydney Construction Hub.

The information submitted to date has been reviewed for compliance with the Deemed-to-Satisfy provisions of the Building Code of Australia 2019 amendment 1 excluding Section B structure, part G5 bushfire, NSW part H101 entertainment venues and Section J energy efficiency. This report is for the exclusive use of Gray Puksand and cannot be used for any other purpose without the prior permission of Metro Building Consultancy. The report is only valid in its entire form.

Documentation available and assessed

The architectural drawings provided by Gray Puksand to Metro Building Consultancy on 15<sup>th</sup> January 2021 have been assessed for compliance to the Building Code of Australia 2019 amendment 1. The list of drawings reviewed is as per the table in Appendix A of this report.

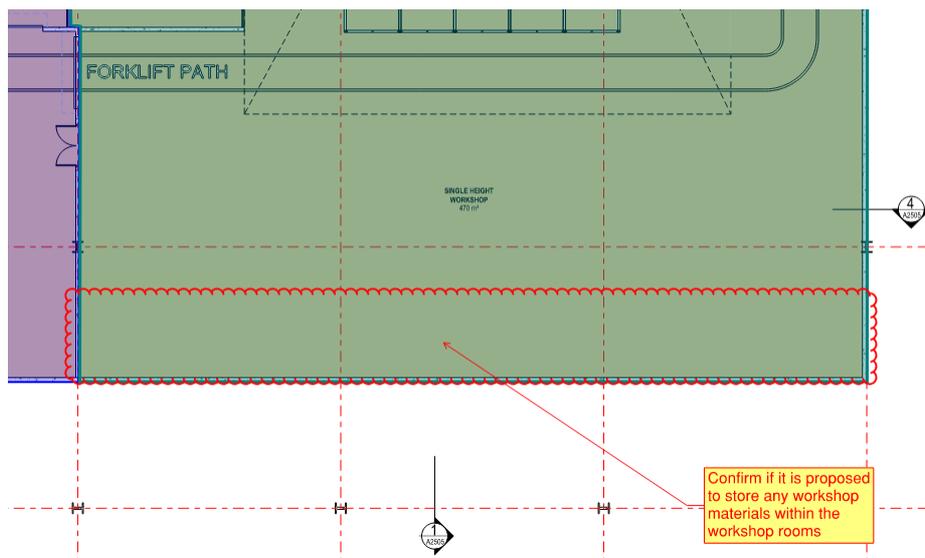
**2.0 Use and class of building**

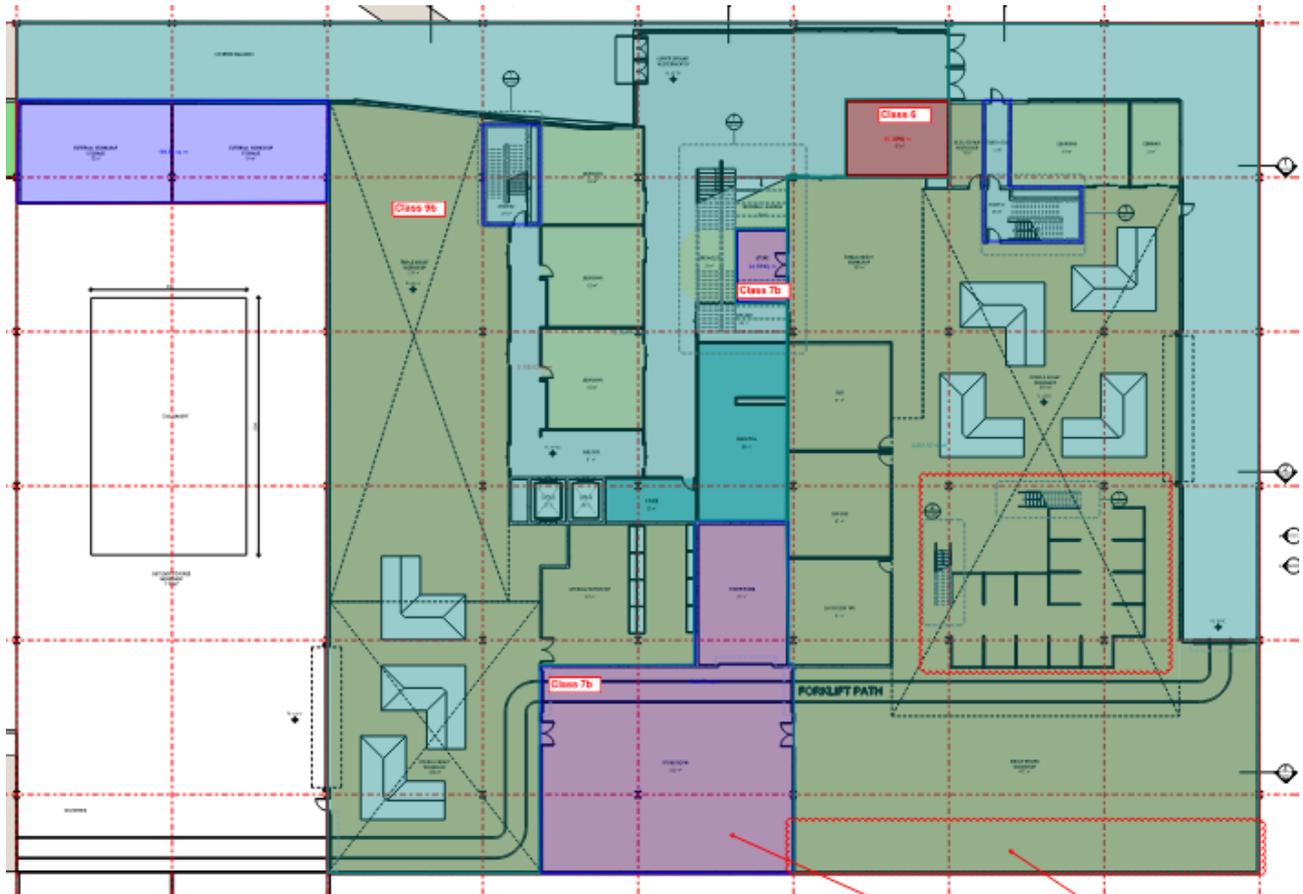
The following table lists the uses and classifications of the proposed building.

Level	Use	Classification
Lower Ground	Storage & assembly Building (workshops & GLS) and ancillary cafe	Class 6, 7b & 9b
Upper Ground	Assembly Building (workshops & GLS)	Class 9b
Level 1	Workplace & Assembly Building (flexible teaching)	Class 5 & 9b

Note that the Class 7b occupies more than 10% of the floor area of the lower ground storage and is required to comply with the FRL's specified for Class 7b construction as listed in Specification C1.1 Table 3. Note the higher FRLs required for Class 7b usage in the table in Appendix B of this report.

Client to confirm if the storage rooms allocated will be utilised for the storage of all materials or if there will be areas within the workshop areas used to store workshop materials.





The building has a rise of storey of 3.  
The effective height of the building is proposed to be approximately 9.5m.

### 3.0 Construction and fire resistance ratings

The proposed building has a rise of storey of 3 and has a classification of 5, 6, 7b & 9b and is required to comply with the Building Code of Australia Type A Construction requirements. These requirements are listed in Appendix B.

#### Exposure of the proposed works to a fire source feature

The BCA sets out provisions for any part of a building element, which is exposed to a fire-source feature, if any of the horizontal straight lines between that part and the fire-source feature, or vertical projection of the feature need to be provided with the relevant FRL.

*Fire-source feature* means—

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

The loadbearing parts of the external walls are required to have the FRL stated in the table in Appendix B of this report.

Fire protection for a support of another part

The BCA states that if the parts of buildings that require an FRL depend upon direct vertical or lateral support from another part to maintain its FRL then that supporting part is required to have the same FRL.

This BCA requirement applies to all structural elements that support the loads from the top storey down to the lower ground. Note that the Class 7b storage occupies more than 10% of the floor area of the lower ground storey and is required to be provided with a concrete floor slab that has an FRL of 240/240/240. All structure providing direct vertical or lateral support to this slab is also required to have an FRL of 240/240/240, this includes columns underneath and also the remainder of the level 1 floor slab if it is one combined slab and providing lateral support.

Mezzanine floors: Concession

A mezzanine and its supports need not have an FRL or be non-combustible provided—

- (i) the total floor area of all the mezzanines in the same room does not exceed 1/3 of the floor area of the room or 200 m<sup>2</sup>, whichever is the lesser; and
- (ii) the FRL of each wall and column that supports any other part of the building within 6 m of the mezzanine is increased by the amount listed in Table 2.6.

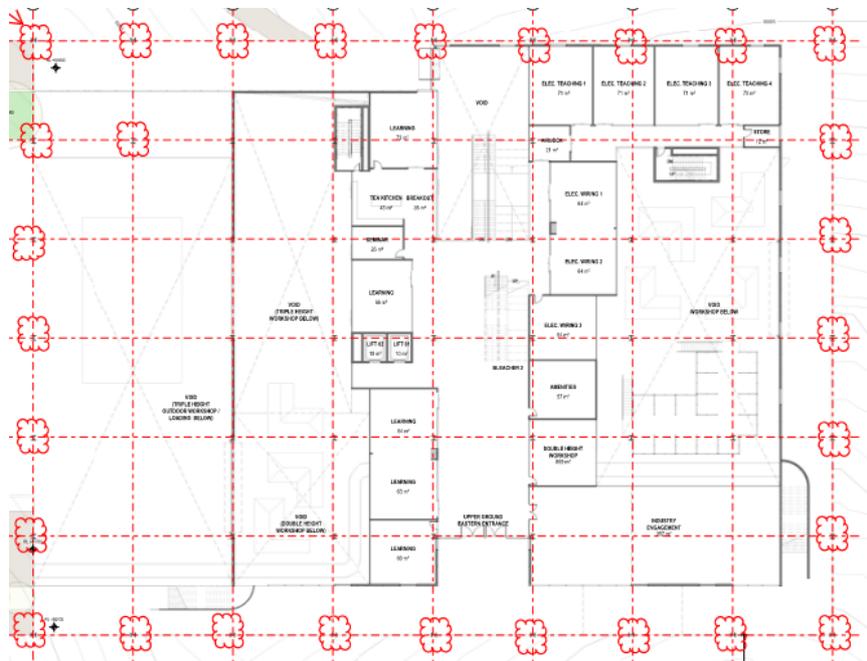
Enclosure of Shafts

If the building is not sprinkler protected the lift shaft is required to be enclosed at the top with construction that achieves an FRL of not less than -/120/120.

If the building is not sprinkler protected the base of the lift shaft is not required to be provided with an FRL if it is laid directly on the ground.

Type A Construction – External Columns

The proposed external columns are required to be provided with an FRL as per the requirements of Type A Construction in Appendix B.



Type A Construction – Floors

All proposed floors are required to have the FRL’s stated in Appendix B for Type A Construction noting that the higher FRL’s for Class 7b construction will apply.

Please note that floors laid directly on the ground are not required to be provided with an FRL.

Type A Construction – Roof

If the proposed roof coverings are non combustible (eg metal sheeting) the roof is not required to be provided with an FRL.

Non-combustible means—

- (a) applied to a material — not deemed combustible as determined by AS 1530.1 — Combustibility Tests for Materials; and
- (b) applied to construction or part of a building — constructed wholly of materials that are not deemed combustible.

Internal columns and walls

Please note that as the building has an effective height of not more than 25 m and having a roof without an FRL the internal columns in the storey immediately below that roof, are not required to have an FRL.

Lightweight construction

Lightweight construction required to have an FRL must comply with Specification C1.8 of the Building Code of Australia.

Non-combustible building elements

The external walls of the building are required to be non-combustible i.e. be constructed of a material that is not deemed combustible by AS1530.1 1994 or have a CodeMark Certificate of Conformity confirming compliance to BCA CP2 and CP4.

Please provide details of the proposed façade types for further review.

Fire Hazard Properties

All new floor, wall and ceiling linings are to comply with the requirements of Clause C1.10 and Specification C1.10 of Building Code of Australia 2019 Amendment 1.

Please provide a copy of the finishes schedule nominating the proposed wall, ceiling and floor linings for further assessment.

Ancillary elements

An ancillary element (i.e. an element that is secondary to and not an integral part of another element to which it is attached) must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is also non-combustible or one of the permitted elements listed under BCA clause C1.14.

Note that one of the permitted exceptions to the ancillary element is an awning, sunshade, canopy, blind or shading hood that meet the specific requirements stated in the BCA.

Compartmentation

The Building Code of Australia 2019 Amendment 1 requirement for the Type A building is that the maximum floor area of each fire compartment must not exceed 8000 m<sup>2</sup> and the maximum volume must not exceed 48,000m<sup>3</sup>.

As the internal communication stair connects all levels of the construction hub, the current compartment size exceeds maximum floor area requirements. The building will be required to be compartmentalized. Where fire walls are introduced to limit the size of the fire compartment the BCA DTS provisions requires them to have an FRL of 240/240/240 as there is also a class 7b storage use on level 01. This FRL is required from both sides and the fire wall is required to extend to extend to a floor with the same FRL as the fire wall or the roof covering. Additionally, Architect to confirm the total volume of the building.

Table C2.2 Maximum size of fire compartments or atria

Classification	Type A construction	Type B construction	Type C construction
5, 9b or 9c	Max <i>floor area</i> —8 000 m <sup>2</sup> Max volume—48 000 m <sup>3</sup>	Max <i>floor area</i> —5 500 m <sup>2</sup> Max volume—33 000 m <sup>3</sup>	Max <i>floor area</i> —3 000 m <sup>2</sup> max volume—18 000 m <sup>3</sup>
6, 7, 8 or 9a (except for <i>patient care areas</i> )	Max <i>floor area</i> —5 000 m <sup>2</sup> Max volume—30 000 m <sup>3</sup>	Max <i>floor area</i> —3 500 m <sup>2</sup> Max volume—21 000 m <sup>3</sup>	Max <i>floor area</i> —2 000 m <sup>2</sup> Max volume—12 000 m <sup>3</sup>

Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or sarking-type material, must not pass through or cross the fire wall unless the required fire-resisting performance of the fire wall is maintained. Fire engineering can be used to address structural penetrations through a fire wall.

If the compartment exceeds the limits stated above the building is required to comply with the BCA large isolated building requirements.

This requires the provision of sprinklers provided throughout the building and a perimeter vehicle access road around it.

The perimeter vehicle access road is required to have a minimum width of 6m and have no part of its furthest boundary more than 18m from the building. No part of the 6m width is permitted to be used for any purpose other than vehicular or pedestrian movement.

### Spandrels

If the building is not provided with sprinklers the BCA requires spandrel protection between window and door openings that are above one another in adjoining storeys.

### Separation of classifications in the same storey

The BCA states that if a building has parts of different classifications located alongside one another in the same storey each building element in that storey must have the higher FRL.

### Separation of classifications in different storeys

The BCA states that if parts of different classifications are situated one above the other in adjoining storeys the floor between the adjoining parts must have an FRL of not less than that prescribed for the classification of the lower storey.

Please note that this means that as the Upper Ground floor has a class 7b usage the floor separating it from Level 1 is required to have an FRL of 240/240/240.

### Lift shaft

If the building is not sprinkler protected the lift is required to be within a fire rated shaft with an FRL of 240/120/120 if loadbearing as per the requirements of Type A Construction in Appendix B of this report.

### Lift Motor Room

Any proposed lift motor room and lift control panels must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

### Battery Rooms

Any rooms that contain a proposed battery system that has a total voltage of 12 volts or more and a storage capacity of 200 kWh or more must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

A battery system means one or more chemical cells connected in series, parallel or a combination of the two for the purpose of electrical energy storage.

### Electricity supply equipment

If the main switchboard sustains emergency equipment operating in the emergency mode it must be separated by construction having an FRL of not less than 120/120/120 and have any door protected with a self-closing fire door having an FRL of not less than 120/30.

Emergency equipment operating in the emergency mode include fire hydrant pumps, fire hose reel pumps and the fire indicator panel etc.

## Doorways in fire walls

The aggregate width of openings for doorways in a fire wall must not exceed  $\frac{1}{2}$  the length of the fire wall, and each doorway must be protected by a fire door or fire shutter which has the FRL of not less than that required by Specification C1.1 for the fire wall except that each door or shutter must have an insulation level of at least 30.

Architect to note where fire walls are introduced to limit the size of the fire compartments and provide the door schedule noting the nominated FRL's of each door.

## Openings in fire-isolated stairs

If any stair connects 3 storeys in a non-sprinkler protected building and is required for egress it is required to be fire isolated and is required to be provided with self-closing -/60/30 fire doors.

## Service penetrations in fire-isolated exits

Fire-isolated exit must not be penetrated by any services other than –

- Electrical wiring permitted by D2.7(e) to be installed within the exit; or
- Ducting associated with a pressurisation system if it –
  - Is constructed of material having an FRL of not less than -/120/60 where it passes through any other part of the building; and
  - Does not open into any part of the building; or
- Water supply pipes for fire services

## Openings in fire-isolated lift shafts

If the building is not sprinkler protected the entrance doorway to the lift shafts must be protected by -/60/- fire doors that comply with AS 1735.11 1986 and are required to remain closed except when discharging or receiving passengers, goods or vehicles.

## Openings in floors and ceilings for services

Where a service passes through a floor that is required to have an FRL with respect to integrity and insulation the service must be protected by a shaft complying with Specification C1.1 or in accordance with BCA Clause C3.15 and Specification C3.15.

## Openings for Services Penetrations

Openings for services penetrations in any fire rated construction must be fire sealed in accordance with the requirements of BCA Clause C3.15 and Specification C3.15.

## **4.0 Egress**

### Principles

The building's egress systems should be designed to ensure compliance with the following principles:

- The maximum distance of travel to an exit will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres.
- The distance between alternate exits is to be not less than 9 metres.
- The construction and discharge of exits, landings, thresholds, balustrades and handrails are required to meet the requirements of the BCA.
- All paths of travel are to be a minimum of 1000mm in clear width.
- Exit doors should swing in the direction of travel i.e. outwards and should have a minimum clear width of 750mm (850mm for accessible doors complying with AS1428.1 2009).
- All doors should be free passage from the side that a person is seeking egress.
- The threshold of all doors (both sides) must be flush or provided with a threshold or kerb ramp.
- Handrails along stairs and ramps are required to have a minimum height of 865-1000mm. (The recommended height the handrail is 900mm.)
- Balustrades are required to have a minimum height of 865mm along stair flights and 1m along landings and walkways where the drop is greater than 1m.

- The balustrade provisions apply to the tops of all new retaining walls that form part of, or are directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings.
- Balustrades are not permitted to have an opening greater than 125mm.
- Balustrades that protect a fall of more than 4m are not permitted to facilitate climbing within a 150-760mm zone measured from floor level.
- Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

### Number of exits

The BCA requires at least 2 exits from any storey or mezzanine that contains more than 50 people. Current design shows 2 exits provided to the mezzanine level.

### Fire Stairs

If any stair connects 3 storeys in a non sprinkler protected building and is required for egress it is required to be fire isolated. Note this applies to Stairs 1 and 2 which will be required to be fire-isolated. Architect to note and comply.

### Travel distances and distances between exits

It appears from the schematic design drawings that there are a few potential deviations from the Deemed to Satisfy provisions. Areas where this applies are as follows:

#### Lower Ground

- Single height workshop – distance to a point of choice 30m in lieu of 20m, travel to an exit 77m in lieu of 40m and distance between exits 98m in lieu of 60
- Please confirm how egress is to be achieved from the external workshop storage areas (i.e. show the doors providing access)

#### Upper Ground

- Industry engagement – distance to a point of choice 34m in lieu of 20m, distance between exits 68m in lieu of 60m

#### Level 1

- Roof terrace and office workspace – distance to a point of choice exceeds 20m, distance between exits approx.. 80m in lieu of 60m
- Auditorium – distance to a point of choice 29m in lieu of 20m

Architect to provide details of all access doors from all rooms as well as furniture plans showing the details of any fixed seating and furniture to the workshops and auditorium to accurately review the egress travel distances.

### Dimensions of exits and paths of travel

All paths of travel are required to have a minimum clear width of 1m.

The unobstructed width of the exit or path of travel to an exit shall not be more than 1m.

Where the storey or mezzanine accommodates more than 100 persons but not more than 200 persons, the aggregate unobstructed width, except for doorways, must be not less than 1 m plus 250 mm for each 25 persons (or part) in excess of 100

If the storey, mezzanine or open spectator stand accommodates more than 200 persons, the aggregate unobstructed width, except for doorways, must be increased to—

- 2 m plus 500 mm for every 60 persons (or part) in excess of 200 persons if egress involves a change in floor level by a stairway or ramp with a gradient steeper than 1 in 12; or
- in any other case, 2 m plus 500 mm for every 75 persons (or part) in excess of 200;

Compliance readily achievable however further details are required. Architect and client to confirm the proposed population numbers to every floor as well as the mezzanine level for further assessment.

## Travel via fire isolated exits

If the stairs are modified to be fire isolated the final exit door is required to discharge directly to a road or open space.

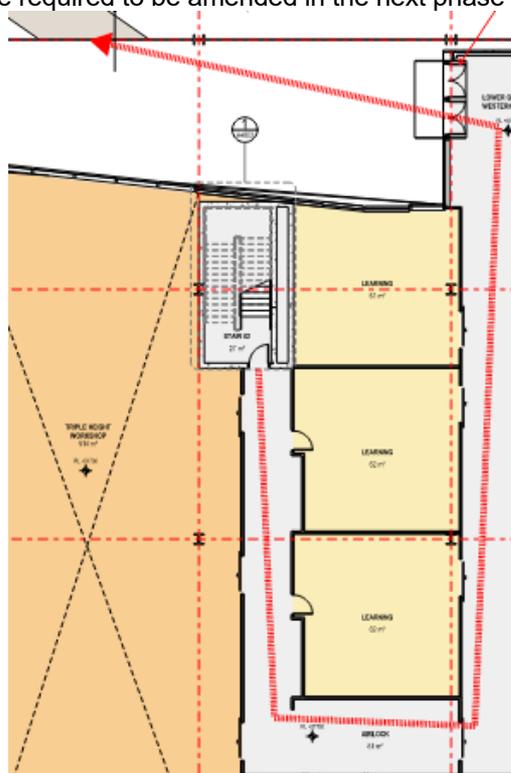
## Travel by non-fire-isolated stairways or ramps

If the required stairs are not fire isolated then they are considered to be non-fire-isolated stairway serving as a required exit and are required to discharge to a level at which egress to a road or open space is provided.

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; or
- to a point in the storey or space of the building that is only used for pedestrian movement and is open for at least 2/3 of its perimeter and from which an unimpeded path of travel is not more than 20m to road or open space.

Architect to note – Stair 2 currently discharges within the building and does not discharge into a fire-isolated passageway. The point of discharge is furthermore not open for more than 2/3 of its perimeter and travel to road or open space is more than 20m. Plans are required to be amended in the next phase of design.



The travel distance using the required non fire isolated stairs are required to have a maximum distance of 80m from the starting point to the discharge point to a road or open space and the stairs are required to discharge at a point not more than 20m from a doorway providing egress to a road or open space.

Provide additional details for review.

## Discharge from exits

The path of travel from the discharge point of the proposed exits in the building to the road must have an unobstructed width throughout of not less than 1m.

The BCA states that an exit must not be blocked at the point of discharge and where necessary, suitable barriers must be provided to prevent vehicles from blocking the exit, or access to it.

If an exit discharges to open space that is at a different level than the public road to which it is connected, the path of travel must be via a ramp with a max grade of 1:8 or a stair.

The discharge point of alternative exits must be located as far apart as practical.

### Non-fire-isolated stairways

The BCA states that non required and non fire isolated stairs must not connect more than 3 storeys in a non sprinkler protected building.

If the building is not sprinkler protected the central stair that connects three storeys is required to be addressed in a fire engineered performance solution.

### Fire-isolated stairways

A stairway or ramp (including any landings) that is required to be within a fire-resisting shaft must be constructed—

- (a) of non-combustible materials; and
- (b) so that if there is local failure it will not cause structural damage to, or impair the fire-resistance of, the shaft.

### Non-fire-isolated stairways and ramps

The non fire isolated stairs that serve as exits including their landings and any supporting building elements are required to be constructed out of one of the following:

- (a) reinforced or prestressed concrete; or
- (b) steel in no part less than 6 mm thick; or
- (c) timber that—
  - (i) has a finished thickness of not less than 44 mm; and
  - (ii) has an average density of not less than 800 kg/m<sup>3</sup> at a moisture content of 12%; and
  - (iii) has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue.

### Installations in exits and paths of travel

Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

Electrical wiring may be installed in a fire isolated exit if the wiring is associated with –

- A lighting, detection, or pressurisation system serving the exit; or
- A security, surveillance or management system serving the exit; or
- An intercommunication system or an audible or visual alarm system in accordance with D2.22; or
- The monitoring of hydrant or sprinkler isolating valves

### Enclosure of space under stairs and ramps

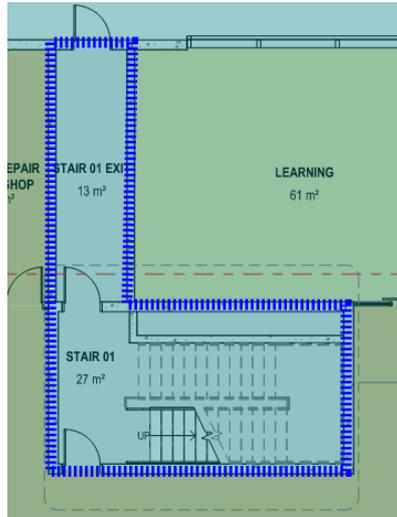
**Fire-isolated stairways and ramps** – if the space below a required fire-isolated stairway or fire-isolated ramp is within the fire-isolated shaft, it must not be enclosed to form a cupboard or similar enclosed space.

**Non fire-isolated stairways and ramps** - For all stairs serving the building that are required for egress the space below these stairs must not be enclosed to form a cupboard or other enclosed space unless the enclosing walls and ceilings have an FRL of not less than 60/60/60 and any access doorway to the enclosed space is fitted with a self-closing –/60/30 fire door.

### Fire-isolated passageways

The enclosing construction of a fire-isolated passageway must have an FRL when tested for a fire outside the passageway in another part of the building of –

- If the passageway discharges from a fire-isolated stairway – not less than that required for the stairway.



Compliance readily achievable. Architect to note that where the Class of building is 7b on the first floor, the fire stair and fire-isolated passageway will need to achieve a FRL of 240/120/120.

### Stairs

The proposed stairs are required to be provided with risers and goings that have a constant dimension throughout the flight and with a handrail with a height of 865-1000mm.

The treads or nosing strips of the proposed external stairs must have a slip-resistance classification not less than P4 when tested in accordance with AS 4586 2013.

The treads or nosing strips of the proposed internal stairs must have a slip-resistance classification not less than P3 when tested in accordance with AS 4586 2013.

Compliance readily achievable. Architect to note and provide details of all stairs in the next iteration of design documentation for further assessment.

### Landings

Landings are required to have a maximum gradient of 1:50 and must be not less than 750mm long, and where this involves a change in direction, the length is measured 500mm from the inside edge of the landing.

The edge of any proposed landings or the nosing strips of the proposed new landings must have a slip-resistance classification not less than P4 when wet and P3 when dry when tested in accordance with AS 4586 2013.

Compliance readily achievable. Architect to note and provide details of all stair landings in the next iteration of design documentation for further assessment.

### Door thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless it is provided with a threshold ramp or step ramp in accordance with AS1428.1 2009.

Compliance readily achievable. Architect to note and provide details where proposed prior to the issue of the Crown works Certificate.

### Balustrades

A balustrade with a minimum height of 1m is required to be provided to protect a fall of more than 1m eg 1100mm.

A balustrade with a minimum height of 865mm is required to be provided alongside any stairs or ramps that protect a drop of more than 1m.

A balustrade with a minimum height of 865mm is required to be provided alongside landings to stairs or ramps that protect a drop of more than 1m and that have a length not exceeding 500mm. Where the landing length exceeds 500mm the balustrade is required to have a minimum height of 1m.

Any balustrade protecting a drop of more than 4m must not have any climbable within a 150-760mm zone measured from the floor. A construction tolerance is also recommended to this eg a 100-800mm no climb zone.

The balustrades to all communication stairs and protecting drops of more than 1m are required to not have any openings greater than 125mm and a construction tolerance should be added eg 100mm.

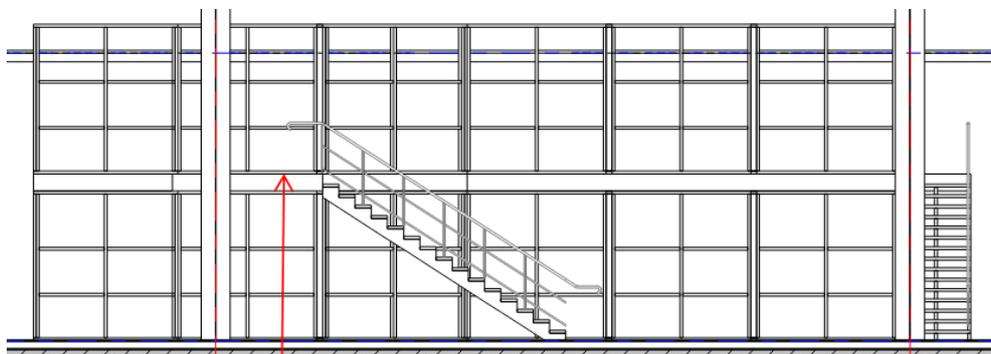
A balustrade with a height not less than 865 mm above the floor is required to an openable window where the floor below the window is 4 m or more above the surface beneath. If the cill heights to such windows are operable and are less than 865mm from the floor the windows will need to be restricted to a maximum opening size of 125mm (100mm recommended).

It is unclear as to whether there is a suitable barrier provided to the mezzanine level as shown on the Architectural Documentation. Architect and client to confirm what the mezzanine area is proposed to be used for.

Where the mezzanine is used for housing machinery or used as a plant room, the balustrade requirements of BCA Clause D2.16 do not apply.

Where the mezzanine is used for general access a barrier is required to be provided along the outside landing and to the stair complying with BCA Clause D2.16 and Table D2.16a. Note that where this is the case, the balustrade serving these stairs must not permit any opening bigger than 124mm. The current detail will not comply.

Client to confirm the proposed use of this mezzanine and the Architect to amend the plans accordingly.



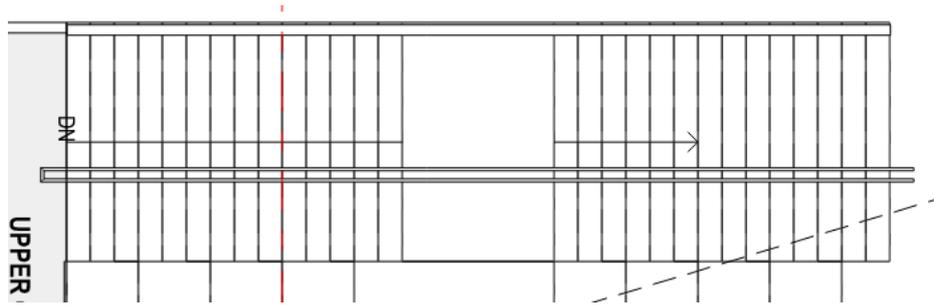
## Handrails

Handrails along stairs and ramps are required to have a minimum height of 865-1000mm. The recommended height for handrails is 900mm.

The proposed stair handrails are required to be designed and constructed to comply with clause 12 of AS 1428.1 2009. This is a requirement even if a stair is not proposed to be used as a communication stair and is only to be used for egress.

Clause 12 (e) of AS1428.1 2009 states that the height of the top of the handrail shall be consistent through the stairs and any landings. This requires the stair flights to be off set from each other so that the handrail does not have a vertical section at the mid landing.

Architect to note that as the general circulation stair is required to be accessible, handrails are required to be provided to both sides of the stair in lieu of the middle.

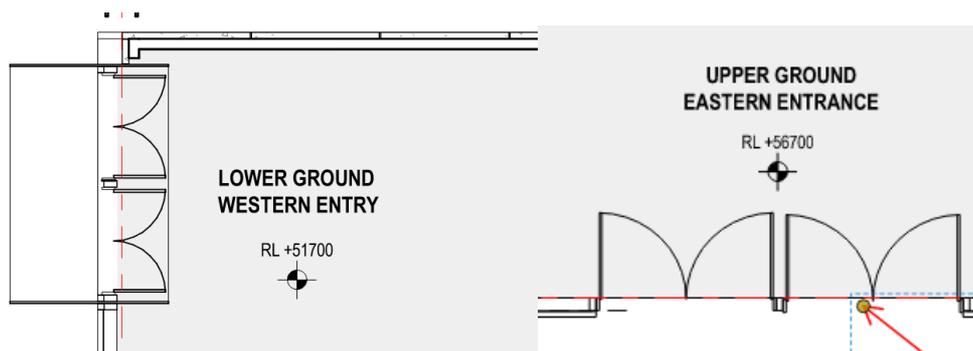


### Swinging Doors

A swinging door in a required exit or forming part of a required exit is required to swing in the direction of egress.

The BCA states that a door must swing in the direction of egress unless it serves a building or part with a floor area not more than 200 m<sup>2</sup>, it is the only required exit from the building or part and it is fitted with a device for holding it in the open position.

Architect to note that the lower ground Western Entry and the upper ground Eastern entrance are required to be exits and must swing in the direction of egress. Compliance readily achievable and to be amended in the next phase of design documentation.



### Door hardware

The door hardware to all proposed swing and sliding doors must be readily openable without a key from the side that faces a person seeking egress by:

- a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45mm or
- a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor.

### Signs on doors

- a sign, to alert persons that the operation of certain doors must not be impaired, must be installed where it can readily be seen on, or adjacent to a
  - Fire door providing direct access to a fire-isolated exit; and
  - A door leading from a fire isolated exit to a road or open space
- For a door discharging from a fire isolated exit, the sign must state "FIRE SAFETY DOOR – DO NOT OBSTRUCT"
- For a self-closing door, the sign must state "FIRE SAFETY DOOR DO NOT OBSTRUCT DO NOT KEEP OPEN"
- The sign must be colour contrasting and the letters must be a minimum 20mm high

## 5.0 Disabled Access

### General building access requirements

Disabled access is required to be provided to and within all areas in the proposed building that are normally used by the occupants. (Refer to the exemption available mentioned below.)

Disabled access must be provided to wheelchair seating spaces provided in accordance with D3.9 and to and within areas normally used by the occupants, except that access need not be provided to tiers or platforms of seating areas that do not contain wheelchair seating spaces.

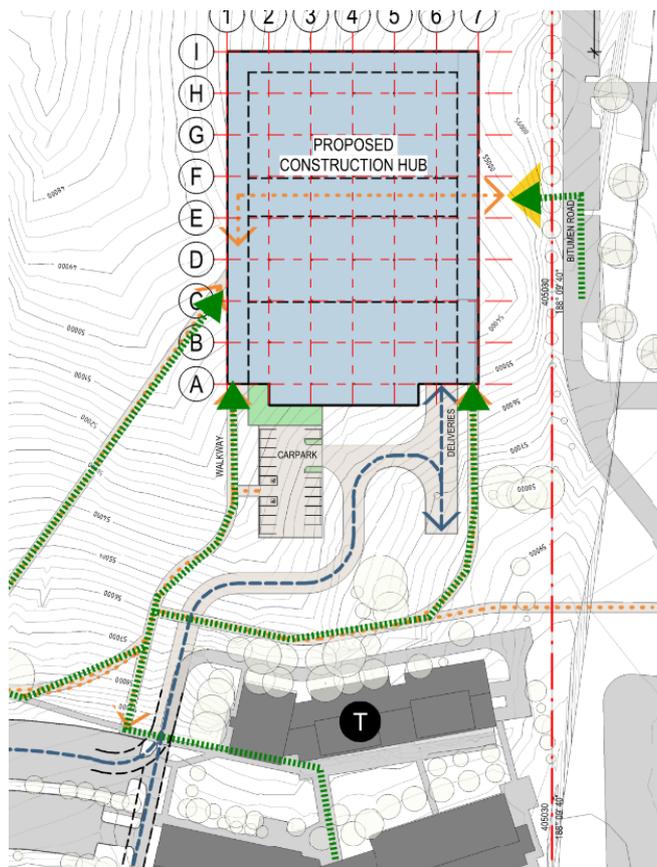
If a part of building is not required to be accessible because of its function the requirements in this section of the report will apply to that part of the building.

### Access to buildings

Disabled access is required to be provided to the proposed building from:

- the existing and proposed main points of a pedestrian entry at the allotment boundary; and
- from another accessible building connected by a pedestrian link; and
- from any required accessible carparking space on the allotment.

Compliance readily achievable. Architect to note the abovementioned requirements and provide details of the accessible paths, walkways, ramps, stairs and the like for further assessment. In particular, details on the pedestrian entrance from the boundary.



### Accessible entries to the building

In a building required to be accessible, an accessway must be provided through the principal pedestrian entrance, and through not less than 50% of all pedestrian entrances including the principal pedestrian entrance.

In a building with a total floor area more than 500m<sup>2</sup>, a pedestrian entrance which is not accessible must not be located more than 50m from an accessible pedestrian entrance.

Architect to note and provide details on the accessible entrances to the new construction hub in the next iteration of design.

### Slip Resistance

A continuous accessible path of travel and any circulation spaces shall have a slip-resistant surface. The texture of the surface shall be traversable by people who use a wheelchair and those with an ambulant or sensory disability. The following table lists the minimum slip resistance classifications for common locations.

Location	Wet pendulum test	Oil-wet inclining platform test
External ramps steeper than 1:14	P5	R12
External ramps and walkways not steeper than 1:14	P4	R11
Wet areas eg toilets	P3	R10
Transitional areas	P2	R9
Dry areas	P1	R9
Stair tread or landing surface - Dry	P3	R10
Stair tread or landing surface - Wet	P4	R11
Stair nosing or landing edge strip - Dry	P3	-
Stair nosing or landing edge strip - Wet	P4	-

### Stairs

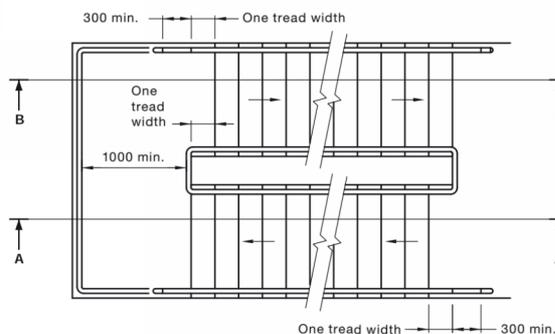
As the building is required to be accessible each proposed stair tread nosing is required to be provided with a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing and is required to have a minimum luminance contrast of 30% to the background. (Note that black nosing strips should be specified to uncoloured concrete stairs.)

Stair handrails with a height of 865-1000mm (900mm recommended) are required to be installed on both sides of the proposed stairs, are to be continuous throughout the stair flight and, where practicable, around landings.

The cross-section of handrails is required to be circular or elliptical, not less than 30mm or greater than 50mm in height or width for not less than 270° around the uppermost surface.

Where a handrail terminates at the bottom of a flight of stairs, the handrail is required to extend at least one tread depth parallel to the line of nosings plus minimum of 300mm horizontally from the last riser. The handrail is required to extend a minimum of 300mm horizontally past the nosing on the top riser.

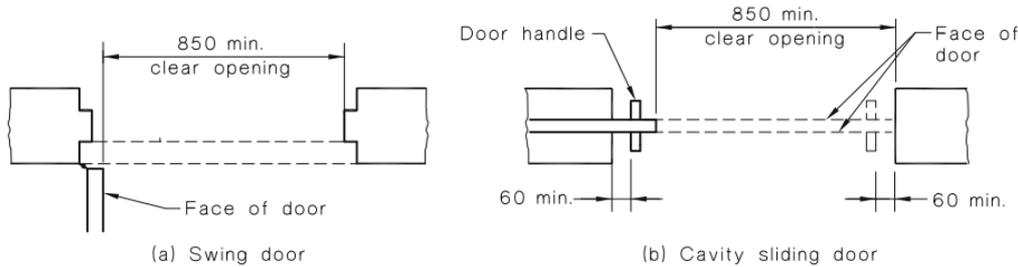
In order to achieve compliance with the requirement for the stair handrail to extend at least one tread width at the base of the flight it is necessary for adjacent flights to be offset from each other as shown in the diagram below.



These handrail requirements apply to proposed general communication stairs and to stairs only used for egress except that a handrail is only required to one side of a stairs that is not used for general communication and the handrail extensions are not required.

## Doorways

Doorways are required to be provided with a minimum clear opening width of 850mm and where sliding doors are provided the clear opening width must allow for a minimum 60mm gap between the door handle and the door frame when the door is open and closed.



At least one leaf of all double doors is required to have a minimum clear width of 850mm.

Circulation spaces are required to be provided at every doorway, gate, or similar entry way, on a continuous accessible path of travel. The circulation space required will depend on the type of door ie swing or sliding and the angle of approach ie side or front on etc.

Where possible the required circulation space should be provided with a construction tolerance and the required dimension of any latch side wall should be stated on the drawings.

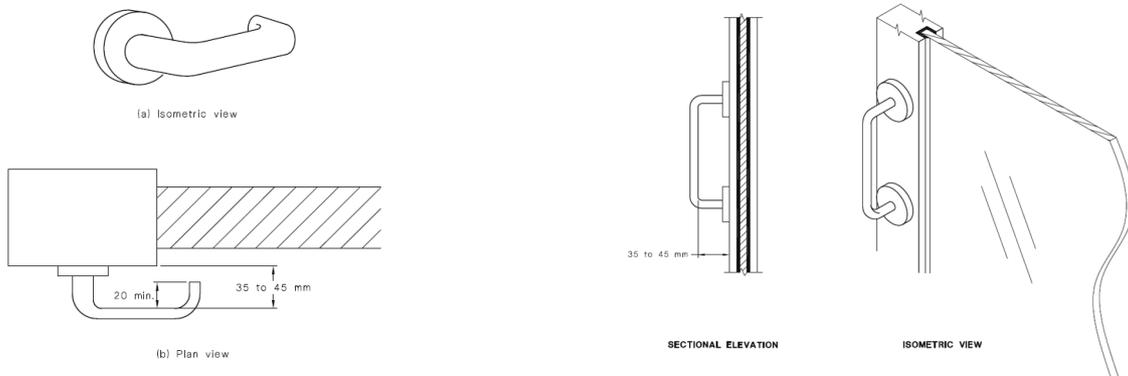
Door handles and related hardware are required to be of the type that allows the door to be unlocked and opened with one hand. The handle is required to be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch. 'D' type handles shall be provided on sliding doors.

The clearance between the handle and the back plate or door face at the centre grip section of the handle is required to be not less than 35mm and not more than 45mm.

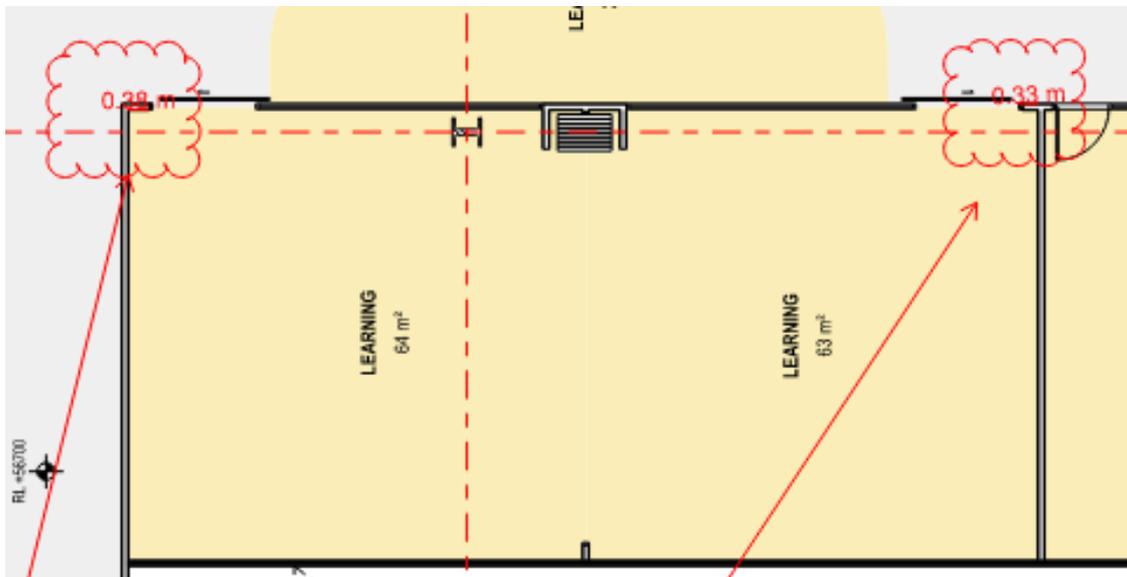
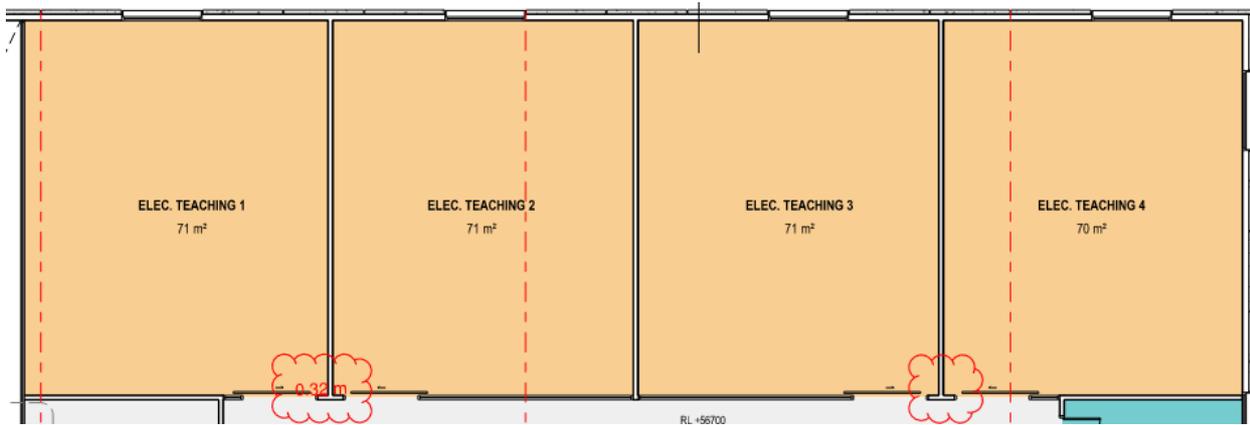
Where snibs are installed, they shall have a lever handle of a minimum length of 45mm from the centre of the spindle.

For doors other than fire doors where a door closer is fitted, the force required at the door handle to operate the door shall not exceed 20N. Note that this applies particularly to the proposed large sliding doors.

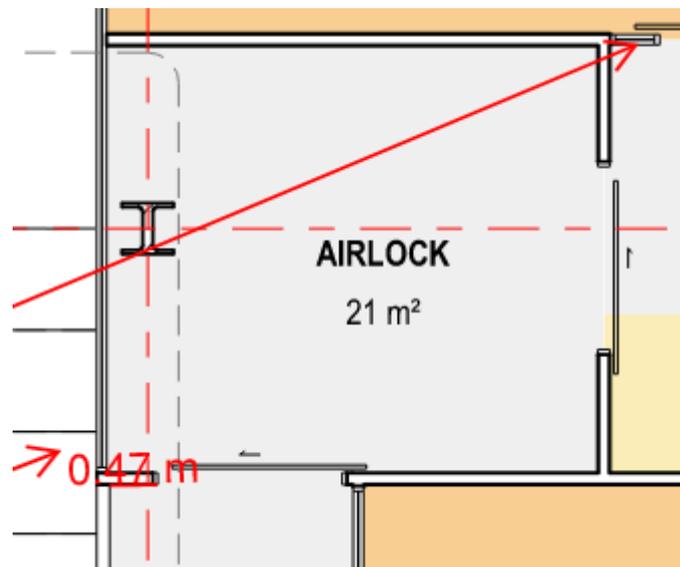
Where an outward opening door is not self-closing, a horizontal handrail or pull bar is required to be fixed on the closing face of a side-hung door.



Compliance readily achievable and to be detailed in the next phase of design. Currently it appears there is insufficient latchside clearance to Electrical Teaching Spaces 1, 2, 3 and 4 as well as the learning rooms (approx. 320mm and 330mm in lieu of 530mm). Architect to note and amend in the next reiteration of design documentation.



Latchside clearance to the general circulation sliding doors adjacent to the Electrical Wiring room 1 lacks sufficient latchside clearance (470mm in lieu of 530mm). Architect to amend plans to comply.



## Switches & Controls

All switches and controls on an accessible path of travel, other than general purpose outlets, are required to be located not less than 900 mm nor more than 1100mm above the plane of the finished floor and not less than 500mm from internal corners.

This applies to light switches, intercoms, card readers etc and this requirement should be stated on the architectural and services drawings.

## Exemptions

The following areas are not required to be accessible:

- An area where access would be inappropriate because of the particular purpose for which the area is used.
- An area that would pose a health or safety risk for people with a disability.
- Any path of travel providing access only to an area exempted by (a) or (b).

This generally applies to plant rooms and other areas used occasionally by maintenance personnel. It should not be used for exempting disabled access into store rooms or other areas used occasionally by staff.

## Signage

Braille and tactile signage complying with the requirements of BCA Specification D3.6 is required to be provided to the doorway to toilets and accessible toilets. The sign to the doorway of the accessible toilet must identify if the facility is suitable for left or right-handed use.

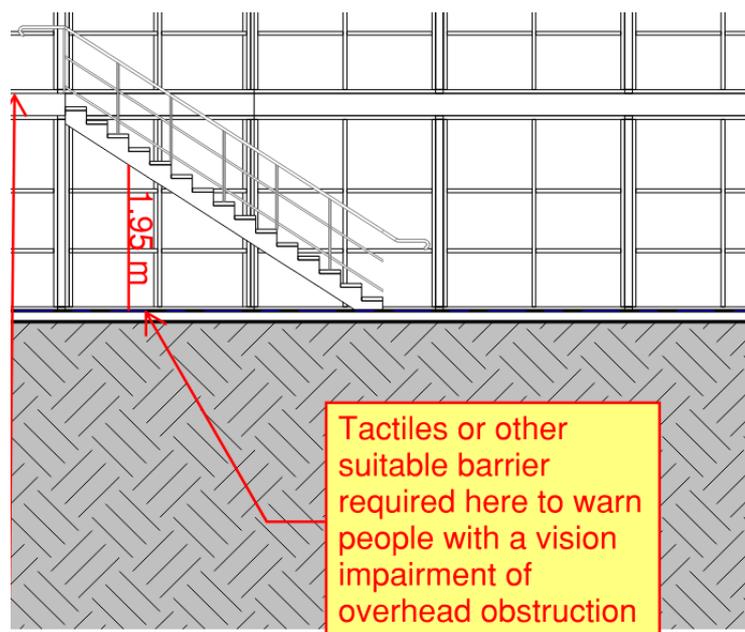
Braille and tactile signage complying with the requirements of BCA Specification D3.6 is required to be provided to the exit doors. The sign is required to state 'Exit Lower Ground', 'Exit Upper Ground' or 'Exit Level 1' as required.

Where a pedestrian entrance is not accessible directional signage incorporating the international symbol of access must be provided to direct a person to the location of the nearest accessible pedestrian entrance.

## Tactile indicators

Tactile indicators comply with AS1428.4.1 2009 must be provided to:

- a non fire rated stairway used for general communication;
- the underside of an overhead obstruction (eg stair soffit) unless a suitable barrier (eg handrail) is provided.



Tactile indicators are required to have a luminance-contrast to the base surface as follows:

- Where the integrated TGSIs are of the same colour as the underlying surface—not less than 30% across its entire area.
- Where discrete TGSIs—not less than 45%.
- Where discrete TGSIs are constructed using two colours or materials, the raised surface shall have a section that has 60% luminance contrast for a diameter of  $25 \pm 1$  mm tested as required below.

### Glazing on an accessway

All frameless or fully glazed doors, sidelights, including any glazing capable of being mistaken for a doorway or opening, shall be clearly marked for their full width with a solid and non-transparent contrasting line.

The contrasting line shall be not less than 75 mm wide and shall extend across the full width of the glazing panel. The lower edge of the contrasting line shall be located between 900 mm and 1000 mm above the plane of the finished floor level.

Any contrasting line on the glazing shall provide a minimum of 30% luminance contrast when viewed against the floor surface or surfaces within 2 m of the glazing on the opposite side.

### Lifts

As the lift in the building travels not more than 12m it must have a lift floor dimensions of not less than 1100mm wide x 1400mm deep.

Handrails complying with AS1735.12 1999 must be provided to the lift.

All lift doors must have a clear opening width of not less than 900mm.

The passenger lift must not rely on a constant pressure device for its operation.

The lift must have a passenger protection system, lighting and lift car and landing control buttons that comply with AS1735.12 1999.

Emergency hands-free communication, including a button that alerts a call centre of a problem and a light to signal that the call has been received must be provided to the lift.

### Accessible toilets

The accessible toilets are required to be provided with the minimum circulation spaces and requirement stated in AS1428.1 2009 which includes:

- A minimum width of 1900mm and minimum length of 2300mm for toilet pans;
- The basin is not to encroach by more than 100mm into the required circulation space;
- A toilet pan with a seat height of 460-480mm, set out 450-460mm from the side wall to the centre line and located 790-810mm from the back wall to the front of the pan;
- A toilet seat with a minimum 30% luminous contrast to the floor finish;
- Grabrails at a height of 790-810mm and able to withstand a force of 1100 N applied at any position and in any direction without deformation or loosening or rotation of the fastenings or fittings;
- Backrests that have a height, at the lower edge of backrest to the top of the seat, of 120mm to 150mm, that have a vertical height of 150–200mm and a width of 350–400mm and that are capable of withstanding a force in any direction of 1100N;
- Washbasins that have a height of 800-830mm to the front edge;
- Ancillary fixtures and fittings eg toilet paper holder, shelves, mirrors, hooks etc and any accessible shower set out as per the requirement of AS1428.1 2009.

Compliance readily achievable and to be documented in the next phase of design. Architect to provide details of the accessible sanitary facilities for further review.

## Wheelchair seating spaces

Where fixed seating is provided, wheelchair seating space shall be as follows:

- (a) Adjacent to, and on the same level as, other seating in the row and shall be accessed by a continuous accessible path of travel.
- (b) Located to allow lines of sight comparable to those for general viewing areas and shall not be obstructed by opaque handrails or balustrades.

The number and grouping of wheelchair seating spaces shall be in accordance with Table D3.9 as shown below.

Number of fixed seats in a room or space	Number of wheelchair seating spaces	Grouping and location
Up to 150	3 spaces	1 single space; and 1 group of 2 spaces.
151 to 800	3 spaces; plus 1 additional space for each additional 50 seats or part thereof in excess of 150 seats	Not less than 1 single space; and not less than 1 group of 2 spaces; and not more than 5 spaces in any other group.

Architect to note and provide further details in the next phase of design.

## **6.0 Services and Equipment**

The following is a status of the services required to be provided to the building.

### Fire Hydrants

As the building will have a floor area that exceeds 500m<sup>2</sup> it is required to be provided with fire hydrant coverage in accordance with BCA Clause E1.3 and AS2419.1 2005.

Note that where external hydrants are proposed to provide system coverage to the Construction Hub, they must be installed a minimum 10m from the building.

Note that where the building is split into fire compartments to comply with the C2.2 floor area and volume requirements, hydrants must be provided to each fire compartment, unless coverage is provided by external fire hydrants or hydrants within the fire isolated exit.

If the campus hydrant system does not provide the required pressure and flow then upgrades may be required to it.

Where the building is not to be compartmentalized and is to be treated as a large isolated building all fire hydrants are required to be connected to a ring main. Fire Services Consultant to note where the proposed construction hub is to be treated as a large isolated building.

Compliance readily achievable. Fire Services Consultant to note and provide details of the hydrant locations for further review in the next phase of design.

### Fire Hose-Reels

As the proposed building will have a floor area that exceeds 500m<sup>2</sup> it is required to be provided with fire hose reel coverage in accordance with BCA Clause E1.4 and AS2441 2005.

Note that fire hose reel coverage is not required to be provided to any Class 5 office areas.

Fire hose reels must be installed as follows:

- Fire hose reels must be located adjacent to an internal fire hydrant (other than those installed in a fire-isolated exit)
- Fire hose reels must be located within 4m of the exit
- Fire hose reels must be located so that they do not pass through any fire or smoke doors

Coverage shall be provided by a 4m stream from a 36m hose.

Compliance readily achievable. Fire Services consultant to note and provide plans for further assessment in the next phase of design.

### Sprinklers

If the fire compartment is provided with combustible goods with an aggregate volume exceeding 1000 m<sup>3</sup> and stored to a height greater than 4 m then sprinklers are required to that fire compartment.

Note that where sprinklers are proposed be installed throughout the building, non-fire isolated exits may be utilised in lieu of fire isolated exit. Additionally, the addition of sprinklers will not invoke the atrium provision requirements.

Client to confirm if sprinklers are proposed to be installed throughout the building.

### Portable Fire Extinguishers

Portable fire extinguishers must be provided to all areas of new works in accordance with BCA Clause E1.6 and AS 2444 2001.

### Smoke hazard management

Smoke detection as per clause 6 of BCA Spec E2.2a is required to be provided to auto shutdown any ducted AC system other than miscellaneous exhaust systems.

If the building contains a class 7b storage use the BCA requires an AS1670.1 2018 smoke detection system or a sprinkler system to be provided.

If the building is a large isolated building the BCA requires one of the following to be provided – sprinklers, an AS1670.1 2018 smoke detection system that is monitored, smoke exhaust, smoke & heat vents, natural smoke venting. (We are assuming that the building volume does not exceed 108,000m<sup>3</sup>), however Architect to confirm the total volume of the building.

### Electric and electrohydraulic passenger lifts

An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with BCA Specification E3.1.

### Warning signs

The lift call buttons must be provided with warning signage stating DO NOT USE LIFT IF THERE IS A FIRE.

### Emergency Lighting and Exit Signs

Exit signs and an emergency lighting system must be provided and must be in accordance with the BCA Clause E4.2, E4.4, E4.5, E4.6, E4.8 and AS 2293.1 2005.

An emergency lighting system must be installed—

- (a) in every fire-isolated stairway, fire-isolated passageway or fire-isolated ramp; and
- (b) in every storey of a Class 5, 6, 7, 8 or 9 building where the storey has a floor area more than 300 m<sup>2</sup>—
  - (i) in every passageway, corridor, hallway, or the like, that is part of the path of travel to an exit; and
  - (ii) in any room having a floor area more than 100 m<sup>2</sup> that does not open to a corridor or space that has emergency lighting or to a road or open space; and
  - (iii) in any room having a floor area more than 300 m<sup>2</sup>; and
- (d) in every required non-fire-isolated stairway; and

An exit sign must be clearly visible to persons approaching the exit, and must be installed on, above or adjacent to each—

- (a) door providing direct egress from a storey to—
  - (i) an enclosed stairway, passageway or ramp serving as a required exit; and
  - (ii) an external stairway, passageway or ramp serving as a required exit; and
  - (iii) an external access balcony leading to a required exit; and
- (b) door from an enclosed stairway, passageway or ramp at every level of discharge to a road or open space; and

(d) door serving as, or forming part of, a required exit in a storey required to be provided with emergency lighting in accordance with E4.2.

If an exit is not readily apparent to persons occupying or visiting the building then exit signs must be installed in appropriate positions in corridors, hallways, lobbies, and the like, indicating the direction to a required exit.

Compliance readily achievable and to be documented in the next phase of design. Electrical Services Consultant to note and provide plans for further review.

## 7.0 Health and Amenity

### Damp & weatherproofing

The external walls of the proposed building are required to comply with BCA Performance Requirement FP1.4.

Where a cladding is proposed it should have a CodeMark Certificate of Conformity confirming compliance to BCA FP1.4.

Please provide copies of the CodeMark Certificates for Façade Types FT01 – FT06 for further review.

### Stormwater drainage

The proposed stormwater drainage is required to comply with AS/NZS 3500.3 2018.

Compliance readily achievable. Hydraulic consultant to note and provide plans for review.

### External above ground Membranes

Waterproofing membranes for external above ground use must comply with AS 4654.1 and AS4654.2. Architect to note and provide details where external waterproofing membranes are proposed i.e. external roof top plants and the like.

### Roof coverings

The proposed metal sheet roofing is required to comply with AS 1562.1 2018. Compliance readily achievable and to be documented in the next phase of design. Structural Engineer to note and provide further details of the roof plans.

### Sarking

Sarking-type material used for weatherproofing of the proposed roofs and walls must comply with AS/NZS 4200.1 2017 and AS 4200.2 2017.

### Waterproofing of wet areas

Building elements in the proposed bathroom or shower room, a sink compartment, a laundry or sanitary compartment must—

- (i) be *water resistant* or *waterproof* in accordance with BCA Table F1.7; and
- (ii) comply with AS 3740 2010.

Compliance readily achievable. Architect to note and provide details prior to the relevant Crown Works certificate.

### Damp-proofing

Moisture from the ground must be prevented from reaching—

- (i) the lowest floor timbers and the walls above the lowest floor joists; and
- (ii) the walls above the damp-proof course; and
- (iii) the underside of a suspended floor constructed of a material other than timber, and the supporting beams or girders.

Where a damp-proof course is provided, it must consist of—

- (i) a material that complies with AS/NZS 2904 1995; or
- (ii) impervious sheet material in accordance with AS 3660.1 2000 or 2014.

## Damp-proofing of floors on the ground

If a floor of a room is laid on the ground or on fill, moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by the insertion of a vapour barrier in accordance with AS 2870 2011, except damp-proofing need not be provided if—

- (a) weatherproofing is not *required*; or
- (b) the floor is the base of a stair, lift or similar *shaft* which is adequately drained by gravitation or mechanical means.

Compliance readily achievable. Architect to note and provide further details prior to the issue of the Crown Works Certificate.

## Subfloor ventilation

Subfloor spaces must be provided with openings in external walls and internal subfloor walls in accordance with BCA Table F1.12 for the climatic zones given in BCA Figure F1.12 and have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor in accordance with BCA Table F1.12.

## Glazed assemblies

The following glazed assemblies in an external wall, must comply with AS 2047 2014 requirements for resistance to water penetration:

- Windows.
- Sliding and swinging glazed doors with a frame, including French and bi-fold doors with a frame.
- Adjustable louvres.
- Window walls with one-piece framing

## Toilets

Please confirm the number of people to be accommodated in the building so that an assessment can be made of the proposed toilets.

Architect to note that in a building required to be accessible, an accessible unisex facility must be provided at each bank of toilets. The accessible unisex sanitary compartment must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary products. All circulation spaces, fixtures and fittings of all accessible sanitary facilities must comply with the requirements of AS1428.1-2009.

In addition to a unisex accessible sanitary facility, a sanitary compartment suitable for a person with an ambulant disability must be provided for use by males and females and shall comply with AS1428.1-2009. Note unisex ambulant facilities cannot be provided.

Architect to note that staff and students in a 9b building cannot share the same facilities.

Compliance readily achievable. Architect to note the abovementioned requirements and provide details of the sanitary facilities for further review in the next phase of design.

## Construction of sanitary compartments

- Sanitary compartments must have doors and partitions that separate adjacent compartments and extend –
  - From floor level to the ceiling in the case of a unisex facility; or
  - To a height of not less than 1.8m above the floor.
- The door to a fully enclosed sanitary compartment must –
  - Open outwards; or
  - Slide; or
  - Be readily removable from the outside of the sanitary compartment

Architect to note and specify where readily removable doors are proposed. Otherwise, doors are to open outwards.

## Room Sizes

All classrooms and offices are required to have a minimum ceiling height of 2.4m.

Storerooms and sanitary compartments are required to have a minimum height of 2.1m.

All stairs are required to have a minimum height of 2m.

In a Class 9b building –

- A school classroom or other assembly building or part that accommodated not more than 100 persons shall have a height of 2.4m; and
- Any part that accommodated more than 100 persons shall have a minimum height of 2.7m
- All associated corridors that -
  - Serve part of a 9b assembly building or part that accommodates not more than 100 persons – 2.4m; or
  - That serves an assembly building or part that accommodated more than 100 persons – 2.7m

Client to confirm the proposed population numbers for all workshops, industry engagement rooms and auditoriums. Architect to note the population numbers and provide details of the ceiling heights for further assessment.

### Light and Ventilation

Artificial lighting must be provided to all rooms that are frequently occupied, all spaces required to be accessible, all corridors, lobbies, other circulation spaces and paths of egress. The artificial lighting system must comply with AS/NZS 1680.0 2009.

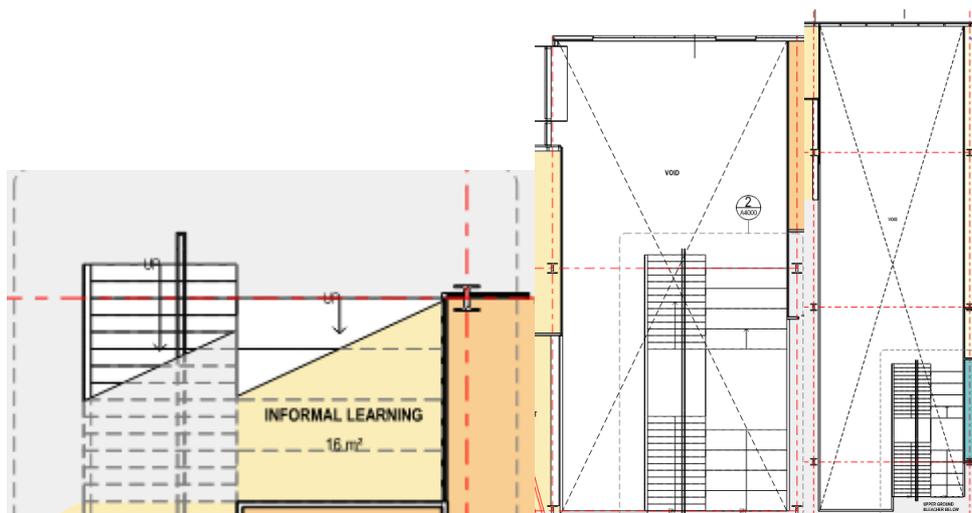
All areas of the buildings, except the storerooms, must be provided with natural ventilation complying with BCA Clause F4.6 or mechanical ventilation complying with AS 1668.2 2012. Natural ventilation requires an opening of size no less than 5% of the floor area of the room.

Compliance readily achievable and to be documented in the next phase of design documentation. Architect to confirm the proposed method of ventilation noting that where natural ventilation is proposed, details of the window openings must be provided for further assessment.

### **8.0 Atrium**

If the building is not provided with sprinklers the 3 level connection / void creates an atrium.

Please confirm if sprinklers are not proposed and if so further details about the atrium requirements can be provided however it is likely that it will require fire engineering rather than DTS compliance.



## 9.0 Energy Efficiency

### Building Fabric

The proposed building fabric is required to comply with the building fabric requirements of Part J1 of the Building Code of Australia 2019 Amendment 1.

### Building Sealing

The proposed openings in the building envelope are required to comply with the building sealing requirements of Part J3 of the Building Code of Australia 2019 Amendment 1.

Where doors in the envelope of the conditioned space are not self-closing they are required to be address in a performance solution.

### Ventilation Systems, Artificial Lighting, Hot Water Supply

The design stage services consultants are required to ensure that the services comply with the requirements of Part J5, J6, J7 & J8 of the Building Code of Australia 2019 Amendment 1.

## 10.0 Conclusion

The schematic design documentation provided to date has been assessed in respect to the deemed to satisfy provisions of the Building Code of Australia 2019 amendment 1 excluding Section B structure, part G5 bushfire, NSW part H101 entertainment venues and Section J energy efficiency.

The design is at a point where the design can be developed during schematic design, further reviews are required to be carried out prior to the completion of the design and the issue of the S6.28 Crown Works Certificate.

**APPENDIX A – DRAWINGS REVIEWED**

**Architectural drawings prepared by Gray Puksand**

<b>Drawing name</b>	<b>Drawing name</b>
A0102 REV. F – SITE PLAN – PROPOSED	A0110 REV. A – SITE PLAN – PROPOSED HUB
A1300 REV. B – LOWER GROUND – GA FLOOR PLAN	A1310 REV. B – UPPER GROUND – GA FLOOR PLAN
A1320 REV. B – LEVEL 1 GA FLOOR PLAN	A2000 REV. A – EXTERNAL ELEVATIONS – CONTEXT
A2005 REV. A – EXTERNAL ELEVATIONS	A2010 REV. A – EXTERNAL ELEVATIONS
A2500 REV. B – BUILDING SECTIONS	A2505 REV. B – BUILDING SECTIONS
A2510 REV. B – BUILDING SECTIONS	

## APPENDIX B – TYPE A CONSTRUCTION REQUIREMENTS

The following table lists the fire resistance levels required for the proposed building

Building Element	Fire Resistance Level in minutes - Structural adequacy/Integrity/Insulation	
	Class 5 & 9b	Class 7b
<b>External wall</b> (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 <i>loadbearing</i> parts		
Less than 1.5m	120/120/120	240/240/240
1.5 to less than 3m	120/90/90	240/240/180
3m or more	120/60/30	240/180/90
For <i>non-loadbearing</i> parts		
Less than 1.5m	-/120/120	-/240/240
1.5 to less than 3m	-/90/90	-/240/180
3m or more	-/-/-	-/-/-
<b>External column</b> not incorporated in an external wall -		
For loadbearing columns	120/-/-	240/-/-
For non-loadbearing columns	-/-/-	-/-/-
<b>Common wall and fire walls</b>	120/120/120	240/240/240
<b>Internal walls</b>		
Fire resisting lift and stair shafts		
<i>Loadbearing</i>	120/120/120	240/120/120
<i>Non-loadbearing</i>	-/120/120	-/120/120
Bounding <i>public corridors</i> , public lobbies and the like		
<i>Loadbearing</i>	120/-/-	240/-/-
<i>Non-loadbearing</i>	-/-/-	-/-/-
Between or bounding <i>sole-occupancy units</i>		
<i>Loadbearing</i>	120/-/-	240/-/-
<i>Non-loadbearing</i>	-/-/-	-/-/-
Ventilation, pipe, garbage, and like shafts not used for the discharge of hot products of combustion		
<i>Loadbearing</i>	120/90/90	240/120/120
<i>Non-loadbearing</i>	-/90/90	-/120/120
<b>Other loadbearing internal walls, internal beams, trusses and columns</b>	120/-/-	240/-/-
<b>Floors</b>	120/120/120	240/240/240
<b>Roofs</b>	120/60/30	240/90/60