GROUPDLA

# Building Code of Australia 2016 Amend 1

Summary Report for BCA Compliance

PROJECT NAME: Alex Avenue Public School

DATE: 28 February 2020

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## Revision History

| Revision | Revision Date | Details | Authorised | |
|---|---|---|---|---|
| | | | Name | Position |
| A | 28/02/2019 | Initial BCA Report | Charles Slack-Smith | Director |
| B | 21/06/2019 | DDR Stage Report | Charles Slack-Smith | Director |
| C | 20/8/2019 | Updated DDR Stage Report | Charles Slack-Smith | Director |
| D | 02/09/2019 | Plans assessed updated | Charles Slack-Smith | Director |
| E | 28/02/2020 | Plans assessed updated | Charles Slack-Smith | Director |

# 1.0 Introduction

## Property Description

The report is for the assessment of the proposed demolition of all existing structures on site and the construction of the new Public School to assess compliance with the Building Code of Australia 2016 Amendment 1 ("BCA"). A summary of all relevant BCA matters is included in the report.

This report is prepared based on review of the preliminary documentation and the information provided by the client and is intended for their use only.

## Reporting Team

The information contained within this report was prepared by Charles Slack-Smith Accredited Certifier Grade A1 (BPB0378) from Group DLA.

## Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979.

The application of compliance with the version of the BCA for Crown Developments is the date on which the Tender is issued for the construction works, this is noted as being after 1st May 2018 and before 1st May 2019, as such in accordance with Section 6.27 of the Environmental Planning and Assessment Ac t 1979, this means that this project will need to achieve compliance with BCA 2016 Amendment 1, this report is against this BCA.

# 2.0 Building Description

## The Project

The development is for a new school consisting of Communal Hall, Library and Admin, and Homebase's, consisting of single and two storey buildings for use as a Public School for Primary school age children. The Site is located in Schofields, at Farmland Drive.

## Building Description

| | |
|---|---|
| Building Use: | School and Administration Building, and Hall |
| Class of Occupancy: | 9b and 5 |
| Type of Construction: | Type B (Fire Engineering justifies oversized fire compartment) |
| Floor Area of Building: | 7,445m2 (Exceeds Type B allowance of 5,500m2) |
| Volume of Buildings: | 32,760m3 |
| Rise in Storeys: | Two (2) |
| Level Contained: | Two (2) |
| Effective Height: | 4m (Less than 12m to First Floor level FFL) |
| Climate Zone: | 6 |
| Importance Level: | Three (3) |

***Note***: As the buildings including the Hall are all interconnected via roofed areas, for the purpose of the BCA are considered one single building, via the United Building provisions of the BCA.

***Note 2:*** Floor Area is approximate and is measured as per the BCA Definition, and includes any area which contributes to the fire load, so is not just the floor area within the external walls, which is why this is over the 5,500m2.

# 3.0 BCA Assessment of Design

The following assessment will provide an overview of compliance with the BCA and identify issues that require attention at this stage of the development.

**B1 – Structural Adequacy**

The structural engineer is required to determine compliance regarding the various components of construction as noted within this Part of the BCA.

Ensure Building is designed to achieve compliance as Importance Level 3.

Architect and Services Consultants are to ensure compliance with Section 8 of AS 1170.4 (relating to Earthquake for the non-structural elements).

Parts of the building constructed to the Standards listed in Clause B1.4 of the BCA will need to be confirmed at the completion stage and ensure that the specification includes these for the design, the below list is some of the standards listed in Clause B1.4 but is not exhaustive.

- AS 3700 – Masonry construction
- AS 3600 – Concrete Construction
- Steel Construction – to AS 4100
- Aluminium to AS 1664.1 and 2
- Piling to AS 2159
- Glazing to AS 1288-2006 and AS 2047
- Termite Protection (Should any primary structural elements be of Timber) to AS 3660.1
- Metal Roofing – to AS 1562.1

**Action Items**

1. Structural Engineer to provide Design Certification (and on completion of the works certification) to confirm compliance with BCA 2016 Amendment 1 Part B1, Part C, Spec C1.1 (Type B Construction), AS 1170.0-2002, AS 1170.1-2002, AS 1170.2-2011 and AS 1170.4-2007, AS 3700, AS 3600, AS 4100
2. Structural Piling – if required is to be certified on completion as being compliant with AS 2159 and BCA Part B1 by Structural or Civil Engineer.
3. Designer / Architect to confirm that the Non-structural elements have been designed to achieve compliance with Section 8 of AS 1170.4-2007 – Design and on Completion of Works certification will be required.
4. Services are to be confirmed as compliant with the Non-structural elements have been designed to achieve compliance with Section 8 of AS 1170.4-2007 – Design and on Completion of Works certification will be required.

**C1 – Fire Resistance and Stability**

*Hall Building*

The proposed development is required to be constructed using Type C construction for the Hall Building as per the requirements of Table 5 in Specification C1.1 of the BCA (refer Appendix A).

Note: As the building is located more than 3m from any allotment boundaries or other buildings, there are no fire rating requirements as a result of this Part of the BCA.

***Note***: Storerooms, Main Switch rooms may require fire rating so please see the relevant other parts of this report to confirm if required to be fire rated for other reasons.

*Remaining Buildings*

The Remaining buildings are connected and as such are considered to be a United Building, Due to the Rise in Storeys this only needs to be Type B Construction, However the floor area exceeds the maximum of 5,500m2 for Type B Construction, as such there are two options to address this:

- Provide a Fire Wall to separate the Fire Compartments in the building to reduce the maximum size to less than 5,500m2 in Floor area (includes timber lined covered walkways) and ensure Fire Wall complies with Clause C2.7c of the BCA **OR**
- Fire Safety Engineer to be engaged to provide a Performance Solution for the oversized fire compartment for Type B Construction, for this non-compliance with BCA Clause C2.2 (Performance Clause CP1 and CP2)

***BCA Specification C1.1 – Fire Resisting Construction***

Based on the assumption that either one of the options above will be undertaken, the following is required to achieve compliance with Type B Construction:

- Structural Elements are to be designed to comply with the fire ratings indicated in Table 4 and 5 of BCA Spec C1.1 (Type B and C Construction).
- Internal and External Columns below the Floor are to be designed and installed to achieve a fire rating of 120/-/- FRL (2 Hours Fire rating)( Table 4 of Spec C1.1)
- Attachments to Fire Rated elements – any attachments are not to reduce the fire rating of the building elements, contractor to confirm no reduction once installation completed (Clause 2.4 of Spec C1.1)
- Lift Shafts Lid – the lift shafts in the building are required to be enclosed on the top with a fire rated -/120/120 FRL (2 hour) fire rated enclosing lid Note: This requires a fire rating from above and below, so ensure the design and installation achieves compliance, if light weight construction then this is fire rated board on the top and underside, not just the underside. (Clause 2.7 of Spec C1.1)
- Lift Shafts – if loadbearing then these are to be constructed of masonry or concrete if fire rated, Note: they are only required to achieve a -/120/120 FRL Fire rating if they provide Direct, Vertical or Lateral support to the building. (Clause 4.1 of Spec C1.1)
- Floor Fire Rating – the floor separating the stories is to be designed and constructed to achieve one of the following:
    a. Have an FRL of 30/30/30 (30min Fire rating) but needs to be from both directions **OR**
    b. Have Fire protective covering to the underside of the floor including around any beams, so 13mm fire rated plaster board to the underside of the floor **OR**
    c. Have a Resistance to Incipient Spread of Fire ceiling of 60 minutes

***BCA Clause C1.9 – non-combustible building elements***

The elements making up the construction of external walls, flooring and floor flaming of lift pits are to be non-combustible as tested to AS 1530.1.

This excludes gaskets, caulking, sealants, and Damp Proof courses, as well as items listed in BCA Clause C1.9 e) which are exempted.

Please note this is via testing to AS 1530.1 to confirm this, other forms of fire hazard testing is not compliant, so if Spread of Fire and other details are provided then that product is not compliant and cannot be used/installed.

## Action Items

5. ***External Wall Construction*** – Installation certification on completion of the construction of the external walls will be required to confirm that the walls have been installed/constructed of the detailed materials and that no materials have been substituted and that all of the materials used are non-combustible
6. Fire Rating of Columns - Installation certificate to be provided on completion for the fire rated columns to confirm compliance with BCA Table 4 of Spec C1.1 of BCA 2016 Amendment 1, and BCA Clause C1.8 and the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019.
7. Attachments to Fire Rated elements – any attachments to fire protected elements in the construction are not to reduce the fire rating of the building elements, contractor to confirm no reduction once installation completed
8. Lift Shafts – Provide confirmation that these have been designed (and constructed) to achieve a fire rating of 120/120/120 FRL including the Lid over the shaft from structural engineer as part of the structural engineering design and installation certification.
9. Fire protective covering to the underside of the floor including around any beams, so 13mm fire rated plaster board to the underside of the floor, Provide installation certification to confirm that this has been provided to BCA C1.8 and BCA Spec C1.1.

***BCA Clause C1.8 – Lightweight Construction***

Should any structural elements be fire protected via intumescent paint, spray or fire rated plaster board then the design and installation is to comply with this clause of the BCA.

- Fire rating of steel columns – to be continuous contact with the steel and protection of the column is to be provided
- Fire rated wall systems – to be designed and installed to comply with Spec C1.8 of the BCA

**Action Items**

10. Lightweight Fire Protection (Fire rated plasterboard) – Design certification and installation certification is to be provided to confirm that the light weight fire rating has been designed and installed to comply with the required Fire rating (120/120/120 FRL), be installed to comply with the manufactures installation guidelines / requirements and be installed to comply with BCA Clause C1.8
11. Lightweight Fire Protection (Fire rated plasterboard) – A Plan indicating the location of these fire rated elements with light weight construction is to be provided at the Completion Stage – as built Work as Executed (WAE) Drawing indicating the location and type of product used on completion of the construction of these works.

***BCA Clause C1.10 – Fire Hazard Properties***

The Fire Hazard Properties of floor linings and floor coverings, wall and ceiling linings, and other material as noted within Clause C1.10, must comply with the provisions of Specification C1.10 as noted below. It is recommended that the Fire Hazard Property Test Reports of the various linings and coverings are submitted to this office for a compliance check prior to installation.

| Item | Location | Requirement |
|---|---|---|
| Floor linings or coverings | All floor areas including external walkways | *CRF of 2.2 or more and smoke development rate of 750 percent minutes or less |
| Wall and ceiling linings | All Areas | **Group Number 1 or 2 **and** a smoke growth rate index not more than 100; **or** an average specific extinction area less than 250 m 2/kg |

Fire Hazard Properties

Note*: CRF stands for critical radiant flux, which is a BCA defined term as follows – “Critical radiant flux means the critical heat flux at extinguishment as determined by AS ISO 92391.1 – 2003.”

Note**: Group Number is a BCA defined term as follows – “Group number means the number of one of 4 groups of materials used in the regulation of fire hazard properties and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling.” The group numbers must be determined in accordance with AS 5637.1 - 2015 and for buildings not fitted with a sprinkler system complying with Specification E1.5, must have—

- a smoke growth rate index not more than 100; or
- an average specific extinction area less than 250 m 2/kg.

**Action Items**

12. Fire Hazard Properties of Wall, Ceiling and Floor Linings are provided and achieve compliance for products provided

**C2 – Compartment**

The maximum fire compartment size and volume for the larger building exceeds that for a Type B Building, i.e. 5,500m2 and 33,000m3 for the Public School.

The Remaining buildings are connected and as such are considered to be a United Building, Due to the Rise in Storeys this only needs to be Type B Construction, However the floor area exceeds the maximum of 5,500m2 for Type B Construction, as such there are two options to address this:

- Fire Safety Engineer has been engaged to provide a Performance Solution for the oversized fire compartment for Type B Construction, for this non-compliance with BCA Clause C2.2 (Performance Clause CP1 and CP2)

**BCA Clause C2.12 – Separation of Equipment**

The following equipment, if provided, will need to be fire separated from the remainder of the building by construction having an FRL of no less than that stipulated below:

- Lift motors and control panels: 120/ - / -
- Emergency generators used to sustain emergency equipment operating in emergency mode including standby power systems: 120/120/120
- Rooms / Comms Rooms provided with UPS or Battery Systems – if these exceed 24 volts **and** 10 Ampere hours
- Main switchboard located within the building which sustains emergency equipment in emergency mode: 120/120/120 FRL

With regard to any installed batteries, the electrical consultant is to confirm whether the above fire rating provision is applicable when considering the limitations of BCA Clause C2.12, i.e. Batteries exceeding 24 Volts and a capacity exceeding 10 ampere hours.

**Action Items**

13. UPS / Battery in Comms Rooms – No UPS or Battery backup provisions are being provided as part of the construction works, as such compliance is achieved for these works.

**C3 – Protection of Openings**

The Title Boundaries or Other buildings are located more than 6m from the building (and if there are title boundaries within the site which has been addressed by the Fire Engineering report)

Careful design consideration will need to be given to all penetrations, both services and structural, of the fire rated walls, floors and ceilings. Steel/timber columns, beams and members are not permitted to pass through the fire rated wall without fire rating the entire member and any member it is in touch with. This includes any steel bracing or other structural steel members. If steel structure passes through or above the fire compartment of bounding construction lines, non-compliance may exist. Fire rating to a certain length along the steel rafter or purlin will not achieve DTS compliance. Fire Safety Engineering Report has detailed requirements for columns and sub floor elements.

***BCA Clause C3.10 – Lift Shaft Doors***

If the Lift shaft is required to be fire isolated by BCA Spec C1.1, then the doors are to achieve compliance with the following – Fire rating of -/60/-, comply with AS 1735.11 and to comply with BCA Clause C3.10 including lift landing control panel fire ratings

***BCA Clause C3.15 / C3.16 – Fire Seals to services and Construction Joints***

Should the 30min fire rated floor option be selected then any services or control joints would need to be fire sealed to the same level of fire rating.

For the purpose of this report it is assumed that the 13mm fire rated plaster board to the underside of the floor option has been selected, and if altered then this clause will have application. So at this stage not applicable for the project.

For Any penetrations to other fire rated elements such as storerooms, switch rooms, cupboards under stairs etc. any services penetrations are to be fire sealed to achieve the required 1 or 2 hour fire protection as applicable to the wall/ceiling concerned.

***BCA Clause C3.7 – Fire rated columns through RISF ceilings***

This is deemed not applicable as this option of ceiling is not expected to be provided, should this be altered in the design then compliance with this clause will be required.

**Action Items**

14. Lift Doors are to achieve compliance with the following – Fire rating of -/60/-, comply with AS 1735.11 and to comply with BCA Clause C3.10 including lift landing control panel fire – Design Stage and installation stage certification is to be provided.
15. Services Penetrations to Fire Rated Shafts or Walls – any services are to be certified on completion to achieve compliance with BCA Clause C3.15, as follows:
    a. Duct works – provided with Fire Dampers to AS 1682.1 and 2, and AS 1668, and be installed to manufactures installation and tested system installation requirements where penetrating fire rated walls or floors
    b. Metal Pipes – fire sealed to maintain the required fire rating and in accordance with the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
    c. Electrical and Cable Trays – fire sealed / wrapped to achieve the required fire rating and the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
    d. PVC Pipes – to be provided with fire collars to suit the proposed service and to be installed in accordance with the test report and manufactures installation requirements and the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
    e. Other Services to be fire sealed to comply with BCA Clause C3.15 and Spec C31.5 of the BCA and the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019

**D1 – Provision for Escape**

The BCA Clause D1.2 requires that at least two (2) exits are required from each storey of a primary or secondary school with a rise of 2 or more storeys, and this design complies.

Clause D1.3 requires stairs that connect more than two (2) storeys are to be fire isolated. There are no buildings that exceed 2 storeys, so compliance is achieved.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***BCA Clause D1.4, D1.5 – Travel Distances***

Compliance is achieved for the majority of the spaces and buildings, the design is such that the exits distances are right on compliance, so any future redesign may require fire engineering if additional doors or walls are introduced.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***Hall Egress Widths – Reduced Exit width***

The Hall has a population of up to 444 persons based on BCA Clause D1.13 calculations, this requires an Aggregate egress clear width of 4.5m.

All paths of travel throughout the building must be not less than 1 m in width and not less than 2 m in height for egress purposes.

However, increased widths are required to areas for the purposes of access for persons with disabilities and health and amenity issues in relation to minimum ceiling heights; see Disabled Access report for details on circulation and passing bays etc.

Door Latching – Architect to ensure all doors in paths of travel are lever action door hardware (not secured) for all areas, including the admin area. Note: secured or fail safe release is not able to be provided as there is no AS 1670.1 detection system proposed to the buildings.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***D1.6 – Dimensions of exits***

All paths of travel throughout the building must be not less than 1 m in width and not less than 2 m in height for egress purposes.

Stairs are to be dimensioned to be a min of 1,000mm clear between handrails and obtrusions into the stair, and all work stations and furniture to be a min of 1,000mm apart (aside from loose chairs and tables)
Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***D1.10 Discharge from exits***

Pathways from the buildings to the public road is to be provided and ensure that the grade does not exceed 1:18 (1:20 for disabled access to avoid tactile and ramps etc).

Site plan indicates the pathway from egress from the buildings to the public road, and any gates or the like are to be provided with lever action door hardware to enable 24/7 egress from the site to the public road, security protection from reach around etc may be required for security purposes.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***D1.13 – Population of School / Buildings***

School – the school is assessed for a maximum of 1200 students, the toilet calculations is based on a Staff population of up to 80 Staff/Teachers based on the available Workspaces in the Administration Building and Toilet facilities available.

Hall – based on floor area using BCA Clause D1.13 – the Hall can seat a maximum of 444 persons (444m2 of Area at 1m2 per person used Table D1.13)

**Action Items**

16. Population Numbers – a Population of 1200 students has been utilised for this assessment.
17. Population Staff – Assessment has been based on a maximum of 80 Staff members/Teachers in total unless advised otherwise using the seating in the admin building as the method under BCA Clause D1.13

***D1.17 – Lift Pits***

For the purpose of this assessment it is assessed that the lift pit is less than 3m deep from FFL / FGL, should this not be the case then additional requirements apply under this clause of the BCA. If this is not the case then this clause of the BCA requirements are to apply to the design.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

**D2 – Construction of Exits**

***Clause D2.3 – non-fire isolated stairs***

Stairs are non-fire isolated but only connect two levels so no requirement of this clause of the BCA.

***Clause D2.7 - EDB / Comms Smoke Seals***

All electrical EDB, central Telecom cupboards and the like to be contained within a smoke sealed non-combustible

cabinet. As such all EDB and the like are to be detailed and constructed to have smoke seals to the doors and be enclosed in non-combustible material (metal backing to doors).

**Action Items**

18. EDB Cupboards are to be certified by the contractor to confirm on completion that these are smoke sealed and metal backed / enclosed EDB and other main telecommunication cupboards as per this clause of the BCA D2.7 d)

***Clause D2.8 – Enclosures under Stairs***

The BCA requires that any rooms or enclosures under non-fire isolated stairs to be enclosed in 60/60/60 FRL ( 1 hour) Fire rated construction of the walls and ceiling, and that any openings achieve the same fire rating, so the doors are to be swing doors, self-closing fire doors achieving a -/60/30 FRL and to AS 1905.1.

Note: being an FRL the fire rating is required in both directions, fire from above and fire from below, so just fire rated lining to the ceiling will not achieve compliance for example, needs fire rating on the top of the ceiling framing as well.

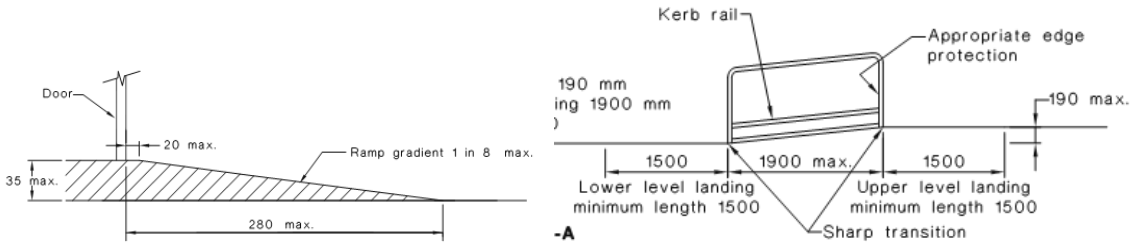
There are no Enclosures under the stairs identified on the plans, should these be proposed then the above requirements will apply.

**Action Items**

***19.*** No store rooms or enclosures under stairs has been proposed – as such design achieves compliance.

***Clause D2.10 Ramps at Doorways***

This clause requires any egress ramp to be no steeper than 1:8 and Clause D2.17 requires such ramps to contain a handrail. This applies to the external paths but the access consultant may want them to comply with the provisions of AS 1428.1-2009 also, I.e. handrails both sides, no steeper than 1:14, etc. Please liaise with the Disabled Access Report and Consultant for compliance.




Threshold Ramp & Step Ramp

***BCA Clause D2.13 & D2.14– Stair Going and Risers and landings***

The Going and risers and ratio of these are to comply with BCA Clause D2.13.

No stairs exceed 18 risers between flights (approx. 12 and 13 Risers) which achieves compliance.

Going and riser compliance is not detailed to the stage to assess compliance at this stage but are to be installed to achieve compliance.

For the purpose of Table D2.13 these stairs are all Public stairs, so the going and risers and ratio are to be designed and installed to achieve compliance including the stairs falling on ground / external levels.

**Action Items**

20. Contractor to certify compliance of all Going and risers and ratio of these are to comply with BCA Clause D2.13 and D2.14.

***BCA Clause D2.14 – Slip Resistance (Stairs and Ramps)***

BCA Table D2.14 requires all stairs and ramps are to be provided with non-slip nosings or surfaces.

***Note***: Disabled Access will review and confirm compliance for the wider slip resistance of other surfaces, BCA only relates to stairs and ramp surfaces

- Stair Nosing strips – Slip Resistance of P4
- Ramp Surfaces – Slip Resistance of P4

Disabled Access requires additional measures to be assessed relating to stair nosing strips, for colour contrast, sizes and details etc, as well as for general circulation spaces slip resistance requirements, please conifer with access consultant relating to this element.

**Action Items**

21. Contractor to certify on completion the slip resistance of the stair and ramps nosing's, Note: if on site materials are used such as concrete, timber or metal or the like, then on site testing will be required if lab test results are not able to be provided, so ensure allowed for in these types of materials. For Elements other than those listed in Table D2.14 of the BCA are to be reviewed and certified as compliant with the Disabled Access Consultant to AS 1428.1.

***BCA Clause D2.16 – Barriers to prevent falls***

All areas with a fall of more than 1m are to be designed with barriers that achieve compliance with BCA Clause D2.16.

The Height of barriers to the balcony areas appear to be detailed as being 1200mm high, which achieves compliance, Dimension is to be provided to the plans to ensure more than 1m

There are not areas that appear to exceed a fall from FFL to level below of more than 4m, so the 4m provisions do not have application for these works, based on this assumption.

***Note***: Stage is excluded from this assessment as this is specifically excluded in this clause from requiring a barrier.

No gaps are to exceed 125mm in the barriers, and it's noted that the proposed barriers are all designed as being solid galvanised metal, so the flex and sphere requirements are not expected to apply if the elements are solid and do not move.

Barriers along stairs only need to be a min of 865mm above the nosing line, which also appears to achieve compliance.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved.

***BCA Clause D2.17 – Handrails***

Dual handrails are required to all stairs, which is indicated on the drawings. Note: Disabled access requirements of nosing's, handrail extensions, tactile indicators are not part of this assessment and to be reviewed by Disabled Access consultant.

Being a primary school, the dual handrails are to be designed, and generally appear to be detailed, clear dimensions of the handrails to ensure compliance with BCA Clause D2.17 a) iii) is to be detailed on the plans and constructed in compliance.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

***BCA Clause D2.19 – Doorways and Doors***

There are numerous Large style Swing doors and tilt up doors detailed on the plans

The large swing doors generally make up the egress door requirement, there are associated Disabled Access issues with these to be considered such as force to open the doors, and latch side clearances etc to be resolved with the disabled access consultant.

It should be noted that then 200m2 rule for door latching and use of tilt up or sliding doors is not applicable for Primary schools, and all doors to rooms / spaces are required to be provided with lever action door hardware or not be provided with locking devices.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved excluding Disabled Access items.

***BCA Clause D2.20 and D2.21 – Doors and Operation of Doors in paths of travel***

The BCA Clause D2.20 requires exit doors servicing areas of more than 200 m2 to swing out ward in the direction of egress.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved

**Part D3 (Access), Part E3 (Lift) and Clause F2.3 (Accessible Sanitary Facilities) - Access for People with a Disability**

This Part and Clause is to be assessed by the engaged Disabled Access consultant for compliance and is not part of our role on the project.

The lift is required to comply with the accessible provision of E3.6, AS 1735.11 and AS 1735.12.

**Action Items**

22. Disabled Access Consultant (Design Stage) is to review the design and provide Design Stage Compliance Certification at the Crown Certificate Stage to confirm the design achieves compliance with the Access to Premises Standard, BCA Part D3, BCA Part E3, Clause F2.3, AS 1428.4.2, AS 1428.1-2009 including the slip resistance provisions.

23. Disabled Access Consultant (Completion Stage) is to inspect and provide Construction Stage Compliance Certification without conditions confirming the design achieves compliance with the Access to Premises Standard, BCA Part D3, BCA Part E3, Clause F2.3, AS 1428.4.2, AS 1428.1-2009 including the slip resistance provisions.

**E1 – Fire Fighting Equipment**

The following firefighting equipment is required to be installed in this building:

- Fire Hose Reels are to be provided to BCA E1.4 and AS2441-2005 (To Multipurpose Hall (Block C and Admin Area only, as classrooms and associated corridors are excluded from the BCA from requiring Fire Hose Reels (FHR))
- Fire Hydrant and associated infrastructure – to BCA Clause E1.3 and AS 2419.1 – 2005 ***Note***: The BCA and Australian standard requires external hydrants and ensure these are located a min of 10m away from any canopy edge or roof overhang edge, as this is considered the extent of the building for the purpose of Hydrant locations.
- Hydrant Booster – Details to be confirmed regarding location of this and that it is in sight of the main entry of the building – Details of location and confirmation of sight lines is required to close this item out
- Portable Fire Extinguishers to BCA E1.6 and AS 2444 – 2001. ***Note***: When FHR are not provided then additional portable extinguishers are required to be installed, and the consultant detailing these needs to ensure provided and spaces allocated on the plans as this increases the number of portable extinguishers, so it is advised to ensure a consultant is detailing the locations and confirming the locations and sizes to ensure compliance is achieved.

**Action Items**

24. Design Certification is required from relevant Consultant Engineers for each of these Fire Services listed in BCA Part E1 (Hydrant, Hose Reels and Portable Extinguishers) at the Crown Certificate Stage
25. Installation Certification on completion is required to confirm compliance from the relevant contractors installing these elements.

## E2 – Smoke Hazard Management

The BCA Clause NSW E2.2, requires the shutdown of air handling systems on activation of a smoke detection system installed and designed to comply with Clause 6 of BCA Specification E2.2a.

**Action Items**

26. Smoke Detection for Air Handling Shutdown – Provide design certification to confirm that the detection system has been designed to comply with Clause 5 of BCA Spec E2.2a at the Crown Certificate Stage of the development.
    Air Handling System – Provide design certification from the mechanical consultant to confirm that all air handling systems that are not those listed in NSW Table E2.2b Class 9b section a) have been designed to shut down on receipt of fire alarm signal from the Smoke Detection system for the building at the Crown Certificate Stage of the development.

## E3 - Lift Installations

The proposed passenger lift is to comply with the requirements of Clause E3.6 & Table E3.6b and AS 1735.12.

The BCA requires the following lift provisions to be implemented for this development:

- Warning signage, i.e. “Do not use lifts if there is a fire”
- Landings are to comply with the access and egress provision of Section D of the BCA. Compliance appears to have been achieved. Access consultant to confirm compliance.
- The lifts must be a type of lift noted in Table E3.6 (a) of the BCA.
- The lifts must have features in accordance with Table E3.6(b), i.e. handrails, certain dimensions, etc, as stipulated within this table as well as AS 1735.12
- Fire Services Controls – consisting of a fire recall switches for the group of lifts and a lift car fire service drive control switch complying with E3.10 for every lift.
- The lift car must have emergency lighting.
- Cooling of the lift shaft to ensure that the dry bulb air temperature in the lift shaft does not exceed 40oC and if the cooling is by ventilated system, be provided with an air change rate determined using a temperature rise of no more than 5 K.
- Emergency access doors may be required for these single enclosed shafts, vertical transport consultant is to advise when considering the multiple prerequisites of Specification E3.1 Clause 6.
- An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with Specification E3.1.

**Action Item**

27. Lift Design Certification – to be provided to confirm compliance to BCA Part E3, AS 1735.1, AS 1735.11, AS 1735.12 and BCA Spec E3.1 at the Crown Certificate Stage of the development.
28. Mechanical Certification for Lift Shaft – provide certificate for the ventilation to confirm compliance with BCA Spec E3.1 for the ventilation / cooling of the lift shaft at the Crown Certificate Stage of the development.

## E4 - Exit signs and Emergency Lighting

The BCA requires the following Emergency Lighting, Exit Signs and Warning Systems for this development:

Emergency lighting and exit signs are required to be installed throughout the building in accordance with the provisions of the BCA E4.2 and AS 2293.1 - 2005.

All exit signs are to be installed at a height less than 2.7 m above floor level ensure detailed / design and installed to achieve compliance. No approval is given for Exit signs higher than 2700mm above FFL in this building.

All Stairs are to be provided with emergency lighting over the stairs, as required by Part E4 of the BCA.

Classrooms / Spaces / Hall are all to be provided with emergency lighting as required by BCA Clause E4.2 of the BCA.

**Action Items**

29. Exit and Emergency Lighting is to be designed to achieve compliance with BCA Part E4 and AS 2293.1-2005 and provided with design certification at the Crown Certificate Stage of the development.
30. Exit and Emergency Lighting is to be installed to achieve compliance with BCA Part E4 and AS 2293.1-2005 and be certified at the Crown Completion stage of the development.

**F1 – Damp and Weatherproofing**

Storm water drainage must comply with AS/NZS 3500.3-2015 and the NCC Plumbing Code of Australia.

Any external above ground membranes are required to comply with AS 4654-2012 Parts 1 & 2.

The internal wet areas must comply with BCA Table F1.7and AS 3740-2010.

Moisture from the ground must be prevented from reaching the building elements such as the flooring, walls above DPC levels, etc. Vapour barriers must comply with AS 2870-2011.

***BCA Clause F1.12 - Sub Floor Ventilation***

The Space below Raised floors and decks are to be designed to comply with BCA Clause F1.12 and Table F1.12

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

*Table F1.12 Subfloor openings and ground clearance*

- Minimum Aggregate Sub Floor Ventilation Openings – 6000 mm2/m of wall
- Minimum Ground Clearance height – 150mm (When all primary building elements are timber termite resistant or steel framing / concrete

Should any manufacturers requirements require a greater clearance between the ground then these are to be followed, as the BCA is a minimum and if a larger is required for warranty or otherwise then these are to be

The Subfloor Space must have the following

- Subfloor space must be cleared of all building debris and vegetation; and
- Have the ground beneath the suspended floor graded to prevent surface water ponding under the building; and
- Contain no dead air spaces; and
- Have openings evenly spaced as far as practicable; and have openings placed not more than 600 mm in from corners.
- In double leaf masonry walls, openings specified in (a) must be provided in both leaves of the masonry, with openings being aligned to allow an unobstructed flow of air.

Where the ground or subfloor space is excessively damp or subject to frequent flooding, in addition to the requirements above:

- the subfloor ventilation required in (a) must be increased by 50%; **or**
- the ground within the subfloor space must be sealed with an impervious membrane; **or**
- subfloor framing must be—
    - where above ground, above-ground durability Class 1 or 2 timbers or H3 preservative treated timbers in accordance with AS 1684.2, AS 1684.3 or AS 1684.4; **or**
    - where in ground, in-ground durability Class 1 or 2 timbers or H5 preservative treated timbers in

accordance with AS 1684.2, AS 1684.3 or AS 1684.4; or

- steel in accordance with NASH Standard 'Residential and Low-Rise Steel Framing' Part 2.

Note as the timber for primary structural elements of the desks is proposed (to be confirmed) as being Termite proof timber / resistant, the termite inspection requirements are not applicable.

External Wall Weatherproofing

Performance Solution confirmation is required for the Waterproofing of the external walls to BCA Clause FP1.4 for the prevention of water through external walls is to be provided, unless priority system that has code mark or other confirmation of compliance.

**Action Items**

31. Storm water drainage must be designed and installed to comply with AS/NZS 3500.3-2015 and the NCC Plumbing Code of Australia.
32. Balcony / Terrace / Walkway External above ground membranes are required to comply with AS 4654-2012 Parts 1 & 2. To be detailed to achieve compliance and confirmed as compliant at the completion stage by the contractor.
33. Architect is to detail a Performance Solution required for the Waterproofing of the external walls to BCA Clause FP1.4 for the prevention of water through external walls (unless the external wall system is provided with a Code mark certificate to BCA Clause FP1.4) at the Crown Certificate Stage of the development.
34. Contractor is to confirm that that requirements of the Performance Solution (or Code Mark installation requirements) required for the Waterproofing of the external walls to BCA Clause FP1.4 for the prevention of water through external walls.
35. Roofing material – certification on completion of the roofing to confirm compliance to AS 1562.1 is to be provided to confirm compliance of the metal roofing proposed.
36. Sarking to be non-combustible as tested to AS 1530.1 and also be in compliant with AS 4200 Parts 1 and 2 certification on completion – Design achieves compliance.
37. Waterproofing of Wet Areas to be certified as being installed to comply with AS 3740 and BCA Clause F1.7 of the BCA
38. Sub Floor Ventilation – is to be designed to achieve compliance with BCA Clause F1.12 – in regard to clearances and openings in the external walls/façade – Architect to confirm compliance of the design and contractor on site to confirm installed buildings achieve compliance at the Crown Certificate Stage of the development.
39. Windows / Glazing – to be installed and provided to comply with AS 2047 and BCA Clause F1.13 certification on completion to be provided for these elements. Note: Section J requires certain U Value and SHGC values to also be confirmed.

**F2 – Sanitary and Other Facilities**

The sanitary facilities achieve compliance in relation to student populations, this is based on population of staff and students as per BCA Clause D1.13 calculation methodology as outlined in this report.

This is based on a campus wide toilet utilisation assessment, excluding staff / admin toilets which are allocated as staff building only

The Toilets will need signage identifying a minimum of Fifteen (15) Toilets as Male, Fifteen (15) Toilets as female, and not be signed as Unisex.

The Remainder are in excess of BCA requirements and may be identified / signed as Unisex toilet facilities

The Remainder are in excess of BCA requirements and may be identified / signed as Unisex toilet facilities as outside of the BCA requirements.

Staff Toilet numbers are sufficient to cater for up to 80 staff – Disabled Toilets have been counted as Staff toilets for the purpose of the BCA.

Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved.

**Action Items**

40. Toilets will need signage identifying a minimum of Fifteen (15) Toilets as Male, Fourteen (15) Toilets as female, and not be signed as Unisex - Design achieves compliance as identified as Boys or Girls on signage schedule, Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved construction to be inspected / assessed to ensure compliance achieved
41. Toilet layout for Disabled and Ambulant facilities are to be assessed and confirmed as compliant for the design and on completion by the Disabled Access consultant.

**F3.1 – Room Heights**

The ceiling height of rooms and other spaces in a Class 9b building must be not less than—

- A classroom is or other assembly building or part that accommodates not more than 100 persons - 2.4m
- A public hall or other assembly building that accommodates more than 100 persons – 2.7m
- Above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.

The sections illustrate compliance with this provision, Design achieves compliance, construction to be inspected / assessed to ensure compliance achieved.

**F4 – Light and Ventilation**

All classrooms must be provided with natural lighting at a ratio of 10% of the floor area of the room.

Artificial lighting must be provided to all rooms in accordance with AS/NZS 1680.0-2009.

**Action Items**

42. Architect is to confirm that the light transmitting area of the windows to the classrooms from outside provide the required 10% of light transmitting area of the window glazing for each classroom area – Design confirmation is required at Crown Certificate stage.
43. Artificial lighting must be provided to all rooms in accordance with AS/NZS 1680.0-2009.

**Part G5.2 – Bushfire**

Bushfire report requirements will need to be closed out / confirmed and confirmed as compliant at the Crown Certificate Stage of the development.

**Action Item**

44. Bushfire Protection level is to be determined in accordance with BCA NSW Clause G5.2 by a bushfire consultant and confirmed as to the extent of Bushfire protection is required for the Buildings at the Crown Certificate Stage of the development.

**Section J – Energy Efficiency**

The building is located within Climate Zone 5 due to its location in Penrith Council area.

**Action Item**

45. Compliance with Section J is required for this development to be confirmed at the Crown Certificate Stage of the development as follows:
    - BCA Part J1 – Thermal insulation is to be detailed and installed to achieve compliance with BCA Clause J1.2 and AS 4859.1 ***Note***: If in the external wall is also required to be non-combustible as tested to AS 1530.1 and includes the Sarking.
    - BCA Part J1 – Building Fabric – Details of wall, floor and ceiling insulation are required to be illustrated on the Construction Certificate plans.
        - Roof Insulation of R 4.2 (unless light roof then can be a lesser R value will depend on USSA Value to determine, this is worst case)
        - Wall Insulation of R2.8
        - Roof Lights – Architect to confirm the RLSI and Floor area served by the roof lights to determine Total System SHGC required, and then to be detailed to achieve compliance with this Clause.
        - Floor – to be insulated and the insulation of R 2.0 required for the floor system is required
    - BCA Part J2 – Glazing – Submission of an ABCB approved glazing calculator and details of the U and SHGC values of the proposed window is required for further assessment and comment. WERS data of the glazed window and door assemblies is also required to be confirmed for the proposed windows, then on completion certified as complying with these requirements.
    - BCA Part J3 – Building Sealing – Details of compliance with this provision is required to be illustrated within the architectural documentation, i.e. where required, self-closing doors, window and doors seals to be illustrated within the schedules. As per BCA Clause J3 and will require certification from the builder and mechanical contractor.
    - BCA Part J5 – Air-conditioning and Ventilation Systems – Certification from the mechanical consultant will be required.
    - BCA Part J6 – Artificial Lighting and Power – Certification from the electrical consultant will be required.
    - BCA Part J7 - Hot Water Supply – Installation and Commissioning Certification from the Plumbing Contractor will be required prior to the issuance of the Occupation Certificate. Compliance with the NCC Plumbing Code of Australia required.
    - BCA Part J8.3 – Monitoring / recording - Design Certification from the service consultant will be required in relation to BCA Clause J8.3 for this element to confirm the required items are being recorded. Note the Building exceeds 2,500m2 for the purpose of this Clause of the BCA.

**NSW Part H101 – Assembly Building (School Hall Provisions)**

- The hall has been confirmed as not being required as an Entertainment Venue as such the requirements of this clause are not applicable.

# 4.0 Fire Engineering Performance Solutions

The Following are elements of the construction that are the subject of Fire Safety Engineering as follows:

**Fire Engineering Performance Solutions**

- BCA Clause C2.2 Oversized Fire Compartment – Addressed in the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
- BCA Clause C1.1 and Spec C1.1 – Columns to Two Storey Buildings – Addressed in the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
- BCA Clause C1.1 and Spec C1.1 – Columns within 18m of Site boundaries – Addressed in the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019
- BCA Clause C3.2 and C3.4 – Lot Boundary Through the Middle of the site Fire Source Feature - Addressed in the Fire Safety Engineers Report issued by BCA Logic, dated 20 August 2019

Note: These items above related to Performance Clauses CP1 and CP1, which under Clause 144 of the Environmental Planning and Assessment Act are not referral requirements to the NSW Fire Brigades, the stakeholder engagement process engaged by the Fire Safety Engineering under the International Fire Engineering Guidelines did not require Fire Brigade input as part of their assessment, and under this above Clause referral is not required if this were a private development. As such no referral to the NSW Fire and Rescue has occurred.

# 5.0 Assessed Drawings

**Documentation Assessed**

This report is based on the following plans prepared by Group GSA on the Group DLA file for the Detailed Design Stage as follows:

| Drawing No. | Title | Prepared By | Issue | Date |
|---|---|---|---|---|
| AA-AR-1100 | Proposed Site And Roof Plan | Group GSA Pty Ltd | 5 | 21.02.2020 |
| AA-AR-1105 | Existing Site Plan | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-1110 | Building Complex Ground Floor Plan | Group GSA Pty Ltd | 4 | 21.02.2020 |
| AA-AR-1111 | Building Complex First Floor Plan | Group GSA Pty Ltd | 4 | 21.02.2020 |
| AA-AR-1112 | Building Complex Roof Plan | Group GSA Pty Ltd | 4 | 21.02.2020 |
| AA-AR-2000 | Floor Plan - GF - Block C - Part 1 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2001 | Floor Plan - GF - Block A - Part 2 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2002 | Floor Plan – GF - Block B1 - Part 3 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2003 | Floor Plan - GF - Block B2 - Part 4 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2004 | Floor Plan – GF - Block B3 - Part 5 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2005 | Floor Plan – GF - Block B3 - Part 5 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2011 | Floor Plan - L1 - Block A - Part 2 | Group GSA Pty Ltd | 2 | 29.08.2019 |
| AA-AR-2012 | Floor Plan - L1 - Block A - Part 2 | Group GSA Pty Ltd | 2 | 29.08.2019 |
| AA-AR-2013 | Floor Plan - L1 - Block B2 - Part 4 | Group GSA Pty Ltd | 2 | 29.08.2019 |
| AA-AR-2014 | Floor Plan - L1 - Block B3 - Part 5 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2015 | Floor Plan - L1 - Block B4 - Part 6 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2020 | Roof Plan – Block C - Part 1 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2021 | Roof Plan – Block A - Part 2 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2022 | Roof Plan – Block B1 - Part 3 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2023 | Roof Plan – Block B2 - Part 4 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2024 | Roof Plan – Block B3 - Part 5 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2025 | Roof Plan – Block B4 - Part 6 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2030 | Roof Plan – Canopy - Main Entry | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2031 | Roof Plan - Cola A | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2032 | Roof Plan - Cola B | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2033 | Roof Plan – Canopy Stair 3 / Walkway | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-2034 | Roof Plan - Cola C | Group GSA Pty Ltd | 1 | 02.08.2019 |

| Drawing No. | Title | Prepared By | Issue | Date |
|---|---|---|---|---|
| AA-AR-2035 | Roof Plan – Canopy - B4/ Stair 5 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-3000 | Elevations – Block C | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3001 | Elevations – Block A | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3002 | Elevations – Block B1 | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3003 | Elevations – Block B2 | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3004 | Elevations – Block B3 | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3005 | Elevations – Block B4 | Group GSA Pty Ltd | 1 | 07.08.2019 |
| AA-AR-3100 | Sections - Block C | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-3101 | Sections - Block A, B1 & B2 | Group GSA Pty Ltd | 1 | 02.08.2019 |
| AA-AR-3102 | Sections - Block B3 & B4 | Group GSA Pty Ltd | 1 | 02.08.2019 |

# 6.0 Fire Safety Schedule

Below is a list of essential fire safety services that are required for the building, and the relevant standards of performance for each measure to be designed/constructed to.

| Fire Safety Measure | Standards | BCA 2016 Amendment 1 Clause(s) |
|---|---|---|
| Emergency lighting | AS 2293.1 – 2005 | E4.2, E4.4, E4.7 |
| Exit signs | AS 2293.1 – 2005 | E4.5, NSW E4.6 & E4.8 |
| Fire hose reel systems<br>(Multipurpose Hall and Admin Building) | AS 2441 – 2005 | E1.4, EP1.1 |
| Fire hydrant system (External system) | AS 2419.1 – 2005 | E1.3, EP1.3 |
| Fire seals (protecting openings in fire resisting components of the building) | AS 4072.1 – 2005<br>AS 1530.4 – 2015 | C3.12, C3.13, C3.15 and Fire Engineering Report (Performance Solution). |
| Mechanical air handling systems - Automatic shutdown of ducted air-conditioning systems only. | AS 1670.1-2015 | NSW E2.2, and Clause 5 of Spec BCA E2.2a |
| Portable fire extinguishers | AS 2444 – 2001 | E1.6 |
| Warning and operational signs | - | D2.23, D3.6 |
| Fire Engineering Report (Performance Solution), Issued by BCA Logic, Revision 4, dated 20 August 2019<br>• Fire Compartment Size<br>• Fire rating / Support of Columns<br>• Allotment Boundary through the site | - | CP1, CP2 |

# Appendix A
# Fire Safety Provisions

## Table 4 – Type B Construction: FRL of Building Elements

| Building Element | Class of Building – FRL (in minutes) Structural Adequacy/Integrity/Insulation | | | |
|---|---|---|---|---|
| | **Class 2, 3 or 4 part** | **Class 5, 7a or 9** | **Class 6** | **Class 7b or 8** |
| ***External Wall*** (including any column and other building element incorporated therein) or other external building element, where the distance from and fire-source feature to which it is exposed is: | | | | |
| *For Loadbearing Parts:* | | | | |
| Less than 1.5m | **90/ 90/ 90** | 120/120/120 | 180/180/180 | 240/240/240 |
| 1.5m to less than 3m | **90/ 60/ 30** | 120/ 90/ 60 | 180/120/ 90 | 240/180/120 |
| 3m to less than 9m | **90/ 30/ 30** | 120/ 30/ 30 | 180/ 90/ 60 | 240/ 90/ 60 |
| 9m to less than 18m | **90/ 30/ -** | 120/ 30/ - | 180/ 60/ - | 240/ 60/ - |
| 18m or more | **-/-/-** | -/-/- | -/-/- | -/-/- |
| *For Non-Loadbearing Parts:* | | | | |
| less than 1.5m | **- / 90/ 90** | - /120/120 | - /180/180 | - /240/240 |
| 1.5m to less than 3m | **- / 60/ 30** | - / 90/ 60 | - /120/ 90 | - /180/120 |
| 3m or more | **- / - / -** | - / - / - | - / - / - | - / - / - |
| ***Common Walls and Fire Walls:*** | **90/ 90/ 90** | 120/120/120 | 180/180/180 | 240/240/240 |
| ***Internal Walls*** – Fire Resisting lift and stair shafts: | | | | |
| *Loadbearing* | **90/ 90/ 90** | 120/120/120 | 180/120/120 | 240/120/120 |
| *Non-Loadbearing* | **- / 90/ 90** | - /120/120 | - /120/120 | - /120/120 |
| Bounding ***Public Corridors*** public lobbies and the like: | | | | |
| *Loadbearing* | **60/ 60/ 60** | 120/ - / - | 180/ - / - | 240/ - / - |
| *Non-Loadbearing* | **- / 60 / 60** | - / - / - | - / - / - | - / - / - |
| Between or Bounding ***Sole Occupancy Units***: | | | | |
| *Loadbearing* | **60/ 60/ 60** | 120/ - / - | 180/ - / - | 240/ - / - |
| *Non-Loadbearing* | **- / 60 / 60** | - / - / - | - / - / - | - / - / - |
| ***Other Loadbearing Internal Walls, Internal Beams, Trusses and Columns:*** | | | | |
| | **60 / - / -** | 120/ - / - | 180/ - / - | 240/ - / - |