BLACKETT MAGUIRE+ GOLDSMITH

BCA ASSESSMENT REPORT

BANKSTOWN NORTH PUBLIC SCHOOL

Prepared for:

JDH architects

Ref: 180329

Address
Suite 2.01,
22-36 Mountain St
Ultimo NSW 2007

Contact
Ph: 02 9211 7777
Fax: 02 9211 7774

1.0 EXECUTIVE SUMMARY

It is noted that the proposed building generally complies with the deemed-to-satisfy provisions of the BCA. Notwithstanding, the below is a preliminary list of matters that based on the current design documentation require further verification, consideration for design changes:

1.	**Cl. C.1 (Spec C1.1)**	Roof of the building is to be fire rated, or alternatively provided with a ceiling that has a resistance to the insipient spread of fire for 60 minutes.
2.	**Cl. C2.6**	Spandrel separation is required to be provided to all external walls separating floors in the building. Particular attention is to be given to the areas associated with the floor of the auditorium.
3.	**D2.16**	Upper level stairs are to incorporate protection of horizontal members that could facilitate climbing where the floor surface is more that 4m to the surface level below.
4.	**FP1.4**	The external walls will need to be assessed for compliance against this Performance Requirement.

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REPORT STATUS				
DATE	REVISION	STATUS	AUTHOR	REVIEWED
28.10.2019	-	BCA Report	BM	TH
20.03.2020	1	BCA report for SSDA	BM	TH
22.04.2020	2	BCA report for SSDA	BM	TH
07.05.2020	3	BCA report on revised architectural drwings	BM	TH

Prepared by:

Brian Maguire
Building Surveyor
Blackett Maguire + Goldsmith

Reviewed by:

Tony Heaslip
Director
Blackett Maguire + Goldsmith

2.0 INTRODUCTION

2.1 BACKGROUND

Blackett Maguire + Goldsmith Pty Ltd have been commissioned by JDH Architects to undertake an assessment of the proposed redevelopment of the Bankstown North Public School against the relevant provisions of the National Construction Codes Series volumes 1 and 2, Building Code of Australia 2019 (BCA). The proposed redevelopment consists of the:

- Construction of a new four (4) storey school building which contains a number of Homebase, the main library and staff admin areas; lower ground floor sanitary facilities;
- External on-grade carparking. *Note: this carparking will be the subject of a separate planning pathway*.

Note: this report focuses on the Class 5 and class 9b parts of the building that relate to NCC Volume 1.

2.2 OBJECTIVE OF REPORT

The objectives of this report are to:

a) confirm that the DA architectural documentation has been reviewed by an appropriately qualified Building Surveyor and Accredited Certifier;

b) confirm that the proposed new building works can readily achieve compliance with the BCA pursuant to *section 6.28 of the Environmental Planning and Assessment Act, 1979* and/or, clause 145 of the *Environmental Planning & Assessment Regulation 2000*; and

c) accompany the Application submission to enable the Consent Authority to be satisfied that subsequent compliance with the fire & life safety and health & amenity requirements of the BCA, will not necessarily give rise to design changes to the building which may necessitate the submission of an application under Section 4.55 of the *Environmental Planning and Assessment Act 1979*.

It should be noted that it is not the intent of this report to identify all BCA provisions that apply to the subject development. The development will be subject further assessment following receipt of more detailed documentation at Crown Certificate stage.

2.3 PROJECT TEAM

The following BM+G Team Members have contributed to this Report:

- Brian Maguire – Project Team Leader / Report Preparation (Director)
- Tony Heaslip – Peer Review (Director)

2.4 REFERENCED DOCUMENTATION

The following documentation was relied upon when preparing this Report:

- Building Code of Australia 2019 (BCA).
- Guide to the Building Code of Australia 2019.
- Architectural Plans prepared by JDH Architects:

DRAWING NO.	REVISION	DATE	DRAWING NO.	REVISION	DATE
SD-000	07	06/05/2020	SD-001	08	06/05/2020
SD-002	05	06/05/2020	SD-003	08	06/05/2020
SD-011	20	06/05/2020	SD-012	02	06/05/2020
SD-013	02	06/05/2020	SD-021	17	06/05/2020
SD-022	17	06/05/2020	SD-023	15	06/05/2020
SD-024	15	06/05/2020	SD-025	15	06/05/2020
SD-026	02	06/05/2020	SD-027	02	06/05/2020
SD-028	02	06/05/2020	SD-029	02	06/05/2020
SD-031	14	06/05/2020	SD-032	14	06/05/2020
SD-041	12	06/05/2020	SD-045	03	06/05/2020
SD-051	04	06/05/2020	SD-061	03	06/05/2020
SD-062	03	06/05/2020	SD-063	03	06/05/2020
SD-071	02	06/05/2020	SD-072	03	06/05/2020
SD-073	02	06/05/2020	SD-074	03	06/05/2020
SD-081	04	06/05/2020	SD-082	04	06/05/2020
SD-083	03	06/05/2020			

2.5 LIMITATIONS AND EXCLUSIONS

The limitations of this report are as follows:

- This report is based on a review of the referenced documents. At this point in time, no inspection has been undertaken of the refurbishment areas to ascertain the current level of BCA compliance.
- No assessment has been undertaken with respect to access for people with disabilities and the Disability Discrimination Act 1992 (DDA). The building owner should be satisfied that their obligations under the DDA have been addressed. In this instance, we note that an Access Consultant has been engaged to advise further in this regard,
- The Report does not address issues in relation to the following:
  i. Work Health and Safety Act and Regulations.
  ii. Water, drainage, gas, telecommunications and electricity supply authority requirements.
- No part of this document may be used for anything other than its intended purpose without written permission from BM+G

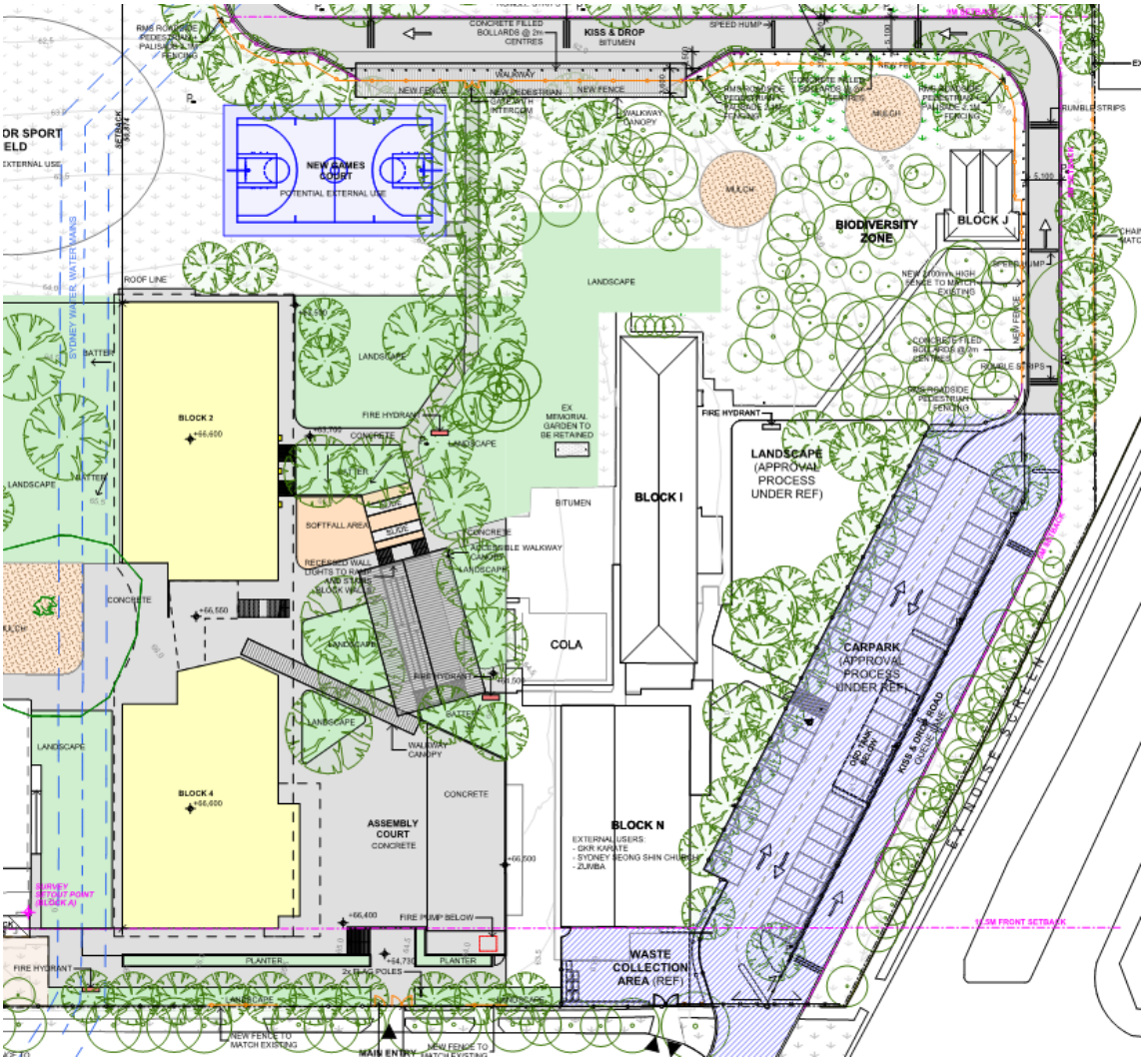
3.0 PROJECT OVERVIEW

1.0 DESCRIPTION OF DEVELOPMENT

This report comprises a review of the Architectural design documentation for proposed redevelopment of the Bankstown North Public School located at 322 Hume Highway, Bankstown against the relevant provisions of the National Construction Codes Volume 1, Building Code of Australia 2019 (BCA).

The proposed redevelopment consists of the construction of a new four (4) storey school building which contains a number of Homebases; student amenities, the Main Library and staff admin areas. Also proposed is the construction of 56 on-grade carparking spaces.

The development is considered a single building for the purposes of assessing against the requirements of the BCA.

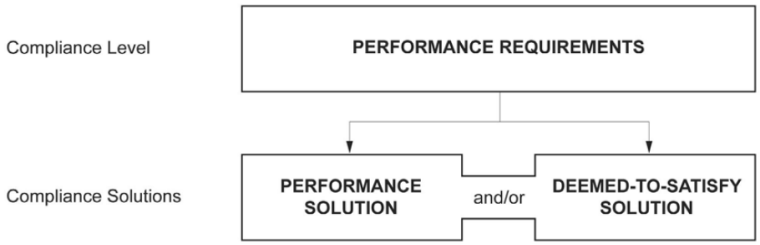


Site Plan

1.1 BCA COMPLIANCE METHODOLOGY

The Performance Requirements can only be satisfied by a:

1. Performance Solution; or
2. Deemed-to-Satisfy Solution; or
3. A combination of (1) and (2).



In accordance with the above, we note that the proposed building design will achieve compliance with the BCA by way of a combination of compliance with the DTS provisions and also via Performance Solutions where appropriate, by the development and justification of Performance Solutions prepared by a C10 Accredited Fire Safety Engineer and/or an Accredited Accessibility Consultant at the *Crown Certificate* stage where required.

1.2 BUILDING CHARACTERISTICS

The proposed building is classified as follows:

BCA CLASSIFICATION:	Class 5 (administration), 9b (school building); Class 10a (metal canopies over stairs and ramps).*
RISE IN STOREYS:	Four (4)
TYPE OF CONSTRUCTION:	Type A
EFFECTIVE HEIGHT:	Less than 12m
MAX. FIRE COMPARTMENT SIZE:	8,000m^2 & 48,000m^3
CLIMATE ZONE:	Zone 5

**The canopy structures will be designed to comply with the relevant requirements of NCC Volume 2 for Class 10 structures.*

1.3 FIRE SOURCE FEATURE

The distances from the nearest Fire Source Features (boundaries and/or buildings situated on the same allotments) are noted as follows:

BOUNDARY	FIRE SOURCE FEATURE
North:	Greater than 6m to Block N & I
South:	Greater than 6m to Block A
East:	Greater than 6m to the far side of the Public Road (Beresford Road)
West:	Greater than 6m to the side boundary

1.4 BCA ASSESSMENT

We note the following compliance matters with relation to proposed building works are capable of complying with the BCA. Please note that this is not a full list of BCA clauses, they are the key requirements that relate to the proposed work and should be read in conjunction with the BCA.

3.1 SECTION B - STRUCTURE

B1

New building works are to comply with the structural provisions of BCA 2019 including Clauses B1.1, B1.2 & B1.3 and the following Australian Standards (where relevant):

+ AS 1170.0 – 2002 General Principles
+ AS 1170.1 – 2002, including certification for balustrading (dead and live loads)
+ AS 1170.2 – 2002, Wind loads
+ AS 1170.4 – 2007, Earthquake loads
+ AS 3700 – 2018, Masonry code
+ AS 3600 – 2019, Concrete code
+ AS 4100 – 1998, Steel Structures and/or
+ AS 4600 – 2005, Cold formed steel.
+ AS 2159 –2009, Piling
+ AS 1720.1 – 2010, Design of timber structure
+ AS/NZS 1664.1 and 2 – 1997, Aluminium construction
+ AS 2047 – 1999, Windows in buildings.
+ AS 1288 – 2006, Glass in buildings.

Structural Design certification confirming that the design achieves compliance with the above is required. This relates primarily to the instances where there is demolition of existing walls that may or may not be loadbearing, the introduction of new works within the upper levels of the building, and also for the construction of the new passenger lift

B1.4

Termite protection measures to be implemented for all new works where appropriate in accordance with AS 3660.1-2014 – Termite Management. In this instance it has been confirmed that the proposed development is using termite resistant materials throughout.

3.2 SECTION C – FIRE RESISTANCE

C1.9

Non-Combustible Building Elements: Documentation (including Test Reports/Codemark Certificates and other suitable evidence) is required to be provided to demonstrate that the following elements of the wall assembly are non-combustible or comply with the concessions under Clause C1.9(e):

+ Any external wall claddings.
+ Any framing or integral formwork systems. i.e. timber framing, plastic formwork, etc.
+ Any external linings or trims. i.e. external UPVC window linings, timber window blades, etc.
+ Any sarking or insulation contained within the wall assembly.

This is not an exhaustive list, and any element incorporated within any external wall assembly must be identified and provided for review. Any departures from non-combustibility or deemed non-combustible materials under this clause (C1.9[e]) will require consideration under a fire engineered performance solution, or alternatively, through compliance demonstrated under CV3.

C1.10

Early Fire Hazard Properties: The fire hazard properties of all new building materials and assemblies used in the development must comply with the requirements of C1.10 and all new floor materials, floor coverings, wall and ceiling lining materials must comply with Specification C1.10 as follows:

+ All wall and ceiling linings system must achieve:
  - A smoke growth rate index not more than 100 or an average specific extinction area less than 250 m2/kg; and
  - A Group Rating/Number as follows:
    - Fire Isolated Exits (if proposed) – Group 1
    - Public Corridors – Group 1 or 2
    - All other areas – Group 1, 2 or 3

  Copies of either AS 3837-1998 or AS ISO 9705-2003 Test Reports are required to verify that the proposed wall and ceilings comply with the above requirements prior to installation.
+ All floor lining assemblies must achieve:
  - A maximum smoke development rate of 750 percent-minutes; and

	▪ A critical radiant flux of net less than 2.2kw/m2 Copies of AS ISO 9239.1-2003 Test Reports are required to verify that the proposed floor lining assemblies comply with the above requirements prior to installation. *Note 1: Particular attention needs to be paid to floor linings such as soft fall materials and synthetic grass and wall/ceiling linings such as timber panelling and the like as these linings often do not comply with the above requirements.* *Note 2: Insulation in all fire rated walls is to be non-combustible. A copy of the AS 1530.1-1994 Test Report is required for any such insulation to verify that it is "Not deemed combustible" in accordance with Clause 3.4 of AS 1530.1-1994.*
C1.14	Ancillary Elements: Documentation (including Test Reports/Codemark Certificates and other suitable evidence) is required to be provided to demonstrate that Ancillary Elements (i.e. elements that are secondary to and not an integral part of another element to which it is attached) will be non-combustible or comply with the concessions under Clause C1.9 of the BCA. Note: the requirement for ancillary elements to be non-combustible does not apply to the below listed elements: + A gutter, downpipe or other plumbing fixture or fitting. + A flashing. + A grate or grille not more than 2 m² in area associated with a building service. + An electrical switch, socket-outlet, cover plate or the like. + A light fitting. + A required sign (i.e. statutory signage) + A sign that: ▪ achieves a group number of 1 or 2; and ▪ does not extend beyond one storey; and ▪ does not extend beyond one fire compartment; and ▪ is separated vertically from other signs by at least 2 storeys. + An awning, sunshade, canopy, blind or shading hood that: ▪ meets the requirements of Table 4 of Specification C1.10 as for an internal element; ▪ serves a storey: - at ground level; or - immediately above a storey at ground level; and - does not serve an exit, where it would render the exit unusable in a fire. + A part of a security, intercom or announcement system. + Wiring + Paint, lacquer or other similar finishes. + A gasket, caulking, sealant or adhesive directly associated with the above elements
C2.2	General Floor Area and Volume Limitations: The area and volume of the fire compartment within the new building is not expected to exceed the maximum permitted for a building of Type A construction **(8,000m²)**, noting that all building parts are connected by the roofed covered connection and the elevated covered bridge. Note: Levels Ground and First Floor are a single fire compartment by virtue of the 'auditorium' space. The Second Floor is a separate fire compartment.
C2.6	Vertical Separation of Openings in External Walls: Spandrel protection is required for the building due to the prescriptive requirements of Type A Construction. This is required wherever a floor intersects with an external wall, and there is a floor below. Note the requirements for ensuring a fire rated seal occurs at the slab edge for any cavity in the external wall design. *Compliance is readily achievable*. *The detail related to the seal at the 'floor slab edge and the wall cladding may differ from project to project.*
C2.8/C2.9	Separation of Classifications: If parts of different classifications are situated one above the other in adjoining storeys they be separated by a floor / Fire Wall with an FRL associated with the use of the lower storey / adjoining part. In this intense the Class 5 part and the Class 9b part have the same FRL (120 minutes) and no further fire separation is required in addition to that of the required FRL for a floor in Type A Construction.
C2.10	Separation of lift shafts: The proposed lift does connect more than 2 storeys and therefore is required to be enclosed in a fire rated shaft (FRL 120/120/120). *Compliance is readily achievable.*

C2.12	Separation of equipment: Any emergency generators, lift motor equipment, boilers where the water is boiled to greater than 100 degrees Celsius, or battery storage enclosures are required to be fire separated from the remainder of the building by construction having a minimum FRL of 120/120/120. Doors to the enclosure are to be self-closing -/120/30 fire doors. Architectural Plans and wall/door type drawings are to specify an FRL of 120/120/120 and doors consist of self-closing -/120/30 fire doors for any rooms in the centre which contain any of the above equipment. *Details of any such equipment is to be provided at the Crown Certificate stage.*
C2.13	Electricity supply system: Any switchboard sustaining emergency equipment such as that listed in Appendix 1 that operates in emergency mode must be separated from the remainder of the building with construction achieving an FRL of 120/120/120 with any doors to be -/120/30 self-closing fire doors. Architectural Plans and wall/door type drawings are to specify an FRL of 120/120/120 and doors consist of self-closing -/120/30 fire doors. *Details of any such equipment is to be provided at the Crown Certificate stage.*
C3.2	Protection of openings in external walls: Openings in an external wall that is required to have an FRL must be protected in accordance with Clause C3.4 where the distance between the opening and the fire-source feature to which it is exposed is less than: + 3m from a side or rear boundary of the allotment; or + 6m from the far boundary of a road adjoining the allotment; or + 6 m from another building on the allotment that is not Class 10 *Complies. Exposure of openings in an external wall to a fire source feature does not occur within the development.*
C3.4	Acceptable methods of protection: Where protection is required by Clause C3.2 above, doorways, windows and other openings must be protected as follows: + Doorways: ▪ Internal or external wall-wetting sprinklers as appropriate used with doors that are self-closing or automatic closing; or ▪ –/60/30 fire doors that are self-closing or automatic closing. + Windows: ▪ External wall-wetting sprinklers as appropriate used fixed glazing; or ▪ –/60/– fire windows that are automatic closing or fixed closed; or ▪ –/60/– automatic closing fire shutters. + Other openings: ▪ Excluding voids — internal or external wall-wetting sprinklers as appropriate; or ▪ Construction having an FRL not less than –/60/– *Applies in this instance when/if there is exposure to a fire isolated exit from any part of the external walls of the building. See Clause D1.7 and D1.8 for further information.*
C3.15	Openings for Service Installations: Where service installations penetrate the walls or floors required to have an FRL with respect to integrity and insulation they are to be protected by fire seals (identical to the Tested Prototype as detailed in an AS 1`530.4 Test Report or Assessment Report) having an FRL with respect integrity, insulation of Resistant to the Incipient Spread of Fire (RISF) of the building element concerned. Where the mechanical ventilation system penetrates floors or walls that require an FRL the installation is to comply with AS/NZS 1668.1. Fire collars used for floor wastes are to have appropriate testing to AS4072.1-2005. *Compliance is readily achievable, details are to be provided at the Crown Certificate stage.*
Spec. C1.1	Fire Resisting Construction: *The Main Building is of Type A Construction and the following FRL requirements are applicable (In this regard the proposed building elements are required to comply with Table 3 of BCA Specification C1.1):* *The following is a summary of the key matters for ease of reference and further attention;* + *Loadbearing columns are to be fire rated to and FRL of 120 minutes. Note, this includes all top floor columns.* + *Any Loadbearing internal walls are required to be masonry or concrete.* + *Where a floor beam is proposed this shall adopt the fire rating requirements of the above.* + *The roof of the building is required to be fire rated (the Class 9b building has a rise of storeys of more than 3). Accordingly, the concession relating to internal loadbearing walls and internal loadbearing columns in the storey immediately below the roof does not apply in this instance.*

Note: As an alternative to a fire rated roof, provide a ceiling immediately below the roof with a resistance to the insipient spread of fire to the roof space of not less than 60 minutes.

+ *External walls are required to be non-combustible construction. Note – A concession is granted to sarking in BCA 2019, refer BCA Clause C1.9.*
+ *Where roof lights are proposed they must not be located closer than 3m to another fire separated part of the building. No further action is required for this item.*
+ *External columns that are loadbearing are required to be fire rated (to 120/-/-), except for those columns associated specifically with the balconies and verandahs on the storeys no more than 2 levels above the storey that provides direct access to the road (noting the concession provided within Clause 2.5 of Spec C1.1)*.
+ *The floor of the building is to achieve an FRL of 120/120/120, including the floor of the proposed auditorium seating*. *Note: The test of a fire rated floor is from below the floor structure.*

Note 1: A Fire Engineered Performance Solution is worthy of pursuing to reduce the required FRL for loadbearing columns of the balcony roof portions of the uppermost storey. This would be based on the structural design of the roof proper i.e. that would not necessarily rely on the balcony for full structural roof support.

Note 2: A Fire Engineered Performance Solution may be worthy of pursuing for the fire rating of the roof, based on the premise that the lowest storey is a small undercroft and toilet block with negligible fire load (noting the AC Plant room can be fire rated if needed to justify the solution).

3.4 PARTS D1 & D2 – PROVISION FOR ESCAPE & CONSTRUCTION OF EXITS

D1.2	Number of exits required: *The proposed design complies with the minimum two (2) exits required for a Class 9b School. There are 2 directions available for egress from the undercroft storey*.
D1.3	When Fire Isolated Exit are Required: Where a required exit stair in a Class 5 and 9b building extends more than 2 storeys, the stair is required to be enclosed in a Fire Isolated Shaft. Note: Concessions for another storey are available where the stair is fire separated from the lowest storey and does not provide egress or access from/for that storey. Further, an additional storey may be permitted if the building has a sprinkler system installed throughout. *All three (3) exit stairs are required to be contained in a fire isolated shaft, noting that the stair in the SE corner adjacent to the Ground Level Staff Room Annex need only be fire rated at its lowest level.* *Note: The proposed central stair has been designed as an 'external stair in lieu of a fire isolated exit' (refer Cl D1.8 below).*
D1.4	Exit travel distances: The exit travel distances are required to be not more than 20 metres to a single exit, or a point where travel in different directions to two or more exits and all points on the floor are required to be within 40 metres to one of those exits. *The proposed design complies with these requirements*.
D1.5	Distance between alternative exits: Distances between alternative exits must be no closer than 9m and not greater than 60m when measured back through the point of choice. *The current design indicates that compliance is achieved.*
D1.6	Dimensions of paths of travel to an exit: The width of the exits and any path of travel must be not less than 1m i.e. measured clear of handrails and fixed joinery, etc. Some corridors need to be greater than 1.0m to accommodate for circulation space and turning bay requirements (1540mm) in accordance with AS1428.1-2009 requirements – refer to Section D3 below. There is also a concession for the unobstructed width of an egress door which can be reduced to 850mm in lieu of the required 1m. Also, the unobstructed height in a required exit or in a path of travel to an exit must be not less than 2m, except for a doorway which may be reduced to 1,980mm. *Three (3) exit stairs are available from Second, First and Ground Floor (with additional exit paths available on Ground Floor from the Admin portion). Aggregate exit compliance for the building is achieved, noting 2 stairs are providing 1.8m in width and the central stair is designed for 2.2m in width (totalling a minimum 5.8m in aggregate width per storey).*
D1.7	Travel via Fire Isolated Exits: A Fire Isolated Exit must discharge directly to open space (see Appendix at end of this report). *Compliance is readily achievable for the western and eastern fire isolated exits.*
D1.8	External Stairs in lieu of Fire Isolated Exit: An external stairway or ramp may serve as a required exit in lieu of a fire-isolated exit (serving a storey below an effective height of 25m) provided that it is constructed in accordance with the requirements of sub-clauses (a) to (d) with respect to being provided with protection from the building by way of distance separation or alternatively by fire rated construction, or a mixture of both. *Compliance is readily achievable, noting that the solid walls are providing protection for the stair where it is exposed to and closer to the building than 6m. The walls and roof to the stair are to be minimum FRL of 60/60/60, however if loadbearing it is to be 120/120/120. See Appendix 3 later in this report.*
D1.9	Travel by Non-Fire-Isolated Stairways or Ramps: A non-fire isolated stairway or ramp serving as a required exit must provide a continuous means of travel by its own flights and landings from every storey served to the level at which egress to a road or open space is available not exceeding 80m. *The stairs in the building are all required to be Fire Isolated. This clause does not apply.*
D1.10	Discharge from Exits: Upon egress from the building, occupants must be provided with suitable paths of travel having an unobstructed width not less than 1m and compliant stairways and ramps (where required) between the building and the Roadway. *The design does not result in any departures from the DTS provisions of the BCA*.
D1.13	Number of Persons Accommodated: The population relevant to this building can be calculated as per Table D1.13, which in this instance relates directly to the required aggregate exit width, and also the volume of sanitary facilitates proposed in the building. Alternatively, the proponent may confirm a prescribed figure of a proposed population for which to address these requirements in lieu of utilising the table. *Compliance is achieved (3 x exit stairs per floor, and large areas of free access from the undercroft).*

D2.2

Fire Isolated Stairways and Ramps: A stairway or ramp (including any landings) that is required to be within a fire resisting shaft must be constructed of non-combustible materials and so that if there is localised failure it will not cause structural damage to, or impair the fire-resistance of the shaft.

Compliance is readily achievable.

D2.7

Installations in Exits and Paths of Travel: Any new or altered electricity and communications cupboards located within a nominated egress paths within the proposed building will be required to be suitably smoke sealed and enclosed in non-combustible construction.

Compliance is readily achievable. It is noted that the EFSG requires the EDBs to be enclosed in construction that achieves an FRL of 60/60/60 (-/60/30 door).

D2.8

Separation of Classification in the Same Storey: The space below a required non fire-isolated stairway (including an external stairway) 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 the access door is a self-closing -/60/30 fire door.

The architectural documentation shows that there is no enclosed space below any of the required non-fire isolated stairs.

D2.9

Width of stairs: The minimum 1m clear width of stairways is required to be measured clear of all obstructions, including handrails, kerbs, balustrades and the like. The current design indicates compliance is readily achievable.

The design does not result in any departures from the DTS provisions of the BCA with respect to width of exit stairs.

D2.13

Treads and Risers: The stairs must comply with the tread, riser and going dimensions of this clause and the nosing of the stairs must be provided with a non-slip treads and meet the provisions of AS1428.1-2009.

Compliance readily achievable, details to be provided at the Crown Certificate stage.

D2.14

Landings: Landings must have a maximum gradient of 1:50 and must:

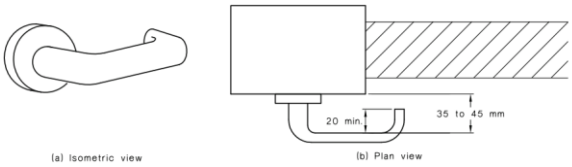
+ be not less than 750mm long, and where this involves a change in direction, the length is measured 500mm from the inside edge of the landing; and
+ Have one of the following:
  - A surface with a slip resistance classification not less than that listed in BCA Table D2.14 below when tested in accordance with AS 4586-2013; or
  - A strip at the edge of the landing with a slip resistance classification not less than that listed in BCA Table D2.14 when tested in accordance with AS 4586-2013 where the edge leads to a flight below.

APPLICATION	DRY SURFACE	WET SURFACE
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

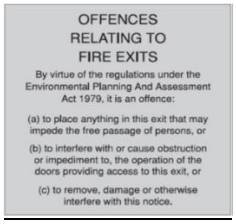
BCA Table D2.14 - Minimum slip resistance ratings for stairs and ramps

In addition to the slip resistance ratings detailed within the table, the following slip resistance ratings are required throughout the building as detailed within the HB 198 – 2014 Guidebook for Slip Resistance Ratings:

LOCATION	MINIMUM SLIP RESISTANCE
Car Park	P3 or R10
External walkways etc	P4 or R11
Building Entry (wet area)	P3 or R10
Building Entry (transitional area)	P2 or R9
Building Entry (dry area)	P2 or R9
Kitchen	P4 or R11
Sanitary Facilities in Common Parts of the Building	P3 or R10
Passenger lifts	P2 of R9

	Minimum slip resistance ratings required
D2.15	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 the doorway opens to a road or open space, external stair landing or external balcony and a threshold ramp is provided in accordance with AS 1428.1-2009. *Compliance readily achievable.*
D2.16	Balustrades or other barriers: All balustrades generally must be compliant in terms of a minimum of 1 metre in height above any fall more than 1m with no gaps that will allow a sphere of greater than 125mm diameter to pass through. Where the window sill height is less than 865mm and the fall exceeds 1m, the window must be fixed so as to open no more than 125mm or that a rail/s will be installed to restrict the gap to 125mm where less than 865mm above the floor. *Compliance is readily achievable, details are to be provided at the Crown Certificate stage demonstrating specific compliance.* *Note, the upper storeys of the building will generally create climbable features that are greater than 4m above the surface below, i.e. the lower primary school handrails. It is recommended to provide a higher barrier to the stair in accordance with the EFSG.*
D2.17	Handrails: A handrail is required along one side of all new stairs which is a minimum of 865mm above the stair nosing and 1m above landings greater than 500mm in length. The handrail must also be continuous between flights. *Handrails are required for stairs and ramps in the building and must be designed to include:* + *one handrail fixed at a height of not less than 865 mm; and* + *a second handrail fixed at a height between 665 mm and 750 mm* *Furthermore, handrails will require extensions at the top of the stair (minimum of 300m) and bottom of the stair (minimum of 300mm + 1 tread width) with either a 180° turn-down or be turned 90° back to the wall as per the diagram from AS1428.1-2009. Refer also to Clause D2.16 above regarding floors more than 4m above the surface below.*
D2.20	Swinging Doors: A swinging door in a required exit or forming part of a required exit must be installed to the requirements of sub-clauses (a), (b) & (c). This clause only applies to swinging doors in doorways serving a required exit or forming part of a required exit. *The current design demonstrates compliance with required exits.*
D2.21	Operation of Latch: A door in a required exit or in a path of travel to an exit must be readily openable from the side facing a person seeking egress, by a single hand downward action or pushing action on a device located between 900mm and 1100mm above FFL. *Note: Throughout the Blocks B, N & I the existing door hardware departs from the requirements of this clause in its location and function.* *Compliance is to be documented with the details provided for the Crown Certification (image below demonstrating compliance).* 
D2.23	This clause requires the use of signs to alert persons that the operation of smoke doors and fire doors and doors discharging form fire isolated exits, must not be impaired and must be installed where they can be readily seen. *Any self-closing fire and/or smoke doors leading into the fire stair (or external stair in lieu of) or forming part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:* FIRE SAFETY DOOR DO NOT OBSTRUCT DO NOT KEEP OPEN *Any new automatic closing fire and/o smoke doors which are held on hold open devices that leads into the fire stair or forming part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:*

In addition to the above, the doors which provide access to the fire isolated exits and also the Horizontal Exits must have signage provided adjacent to the entry doorway which states the following (ref Clause 183 of EP&A Reg 2000):



3.5 PART D3 - ACCESSIBILITY

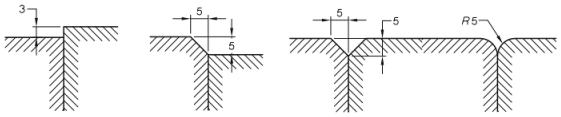
Part D3

Access for People with a Disability: The subject building must be accessible in accordance with AS 1428.1-2009 as follows:

CLASS OF BUILDING	ACCESS REQUIREMENTS
Class 9b	To and within all areas normally used by the occupants.

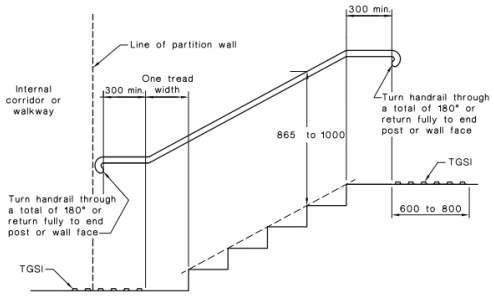
We understand an access consultant has been engaged to determine compliance with Part D3, Clause F2.4 and AS1428.1-2009. Notwithstanding, the following is a summary of the provisions of Clause D3.3 and in turn AS 1428.1-2009 are applicable to the proposed buildings:

- All finished vertically abutting floor surfaces are to be trip free, the following details demonstrate the tolerance level for floor finishes:



Clause 7.2 Construction tolerances for abutment of surfaces

- Stairways are required to be designed and constructed in accordance with the requirements specified under Clause 10 and 11 of AS1428.1-2009 that includes handrails on both sides of the stair with extensions in accordance with the following (relates to the stairs of the Covered Outdoor Learning Areas):



Handrail Details – Clause 10.3 and 12 of AS1428.1-2009

- Stairs are to be provided with contrast stair nosings between 50 and 75mm deep across the full width of the path of travel. The strip may be set back 15mm from the front of the nosing and must possess a minimum luminance contrast of 30% to the background. The strip must not extend down the riser more than 10mm.
- Any proposed carpets within the building are to have a pile height or pile thickness not exceeding 11mm and the carpet backing thickness shall not exceed 4mm (total thickness shall not exceed 15mm).
- A luminance contrast colour of 30% is to be provided to all new doorways; including door frames (to clearly identify the difference between the door and the adjoining wall/door frame).
- Accessible doorways in common areas are to achieve a minimum unobstructed clear width of 850mm (clear opening width does not include the door leaf thickness) and where there are double doors proposed, at least one leaf is to achieve this minimum clearance. *Note: Generally, a proposed door width of 920mm will achieve this minimum requirement.*
- At least one (1) carspace is to be designed for people with a disability in accordance with AS2890.6-2009.
- A hearing augmentation system must be provided where an inbuilt amplification system, other than one used only for emergency warning, is installed –
  - **In a room in a Class 9b building**; or
  - In an auditorium, conference room, meeting room or room for judicatory purposes: or
  - At any ticket office, tellers booth, reception area or the like, where the public is screened from the service provider.

3.6 SECTION E – SERVICES AND EQUIPMENT

E1.3	Fire hydrants: A fire hydrant system is required to be provided in accordance with AS 2419.1-2005 (as the floor area exceeds 500m^2). When required, fire hydrant landing valves are to be located internally within 4m of the exit. External hydrant can be provided, subject to compliance with the maximum and minimum setbacks for firefighting operations. *The standard of performance for the existing hydrants infrastructure is not evidently capable of complying with the requirements of AS2419.1-2005, and will therefore need to be fully upgraded accordingly.* *The location and standard of performance of the fire hydrant infrastructure is to be identified on the architectural documentation and coverage verified at Crown Certificate stage. A design statement from the designing consultant is to be provided confirming that the design achieved compliance.*
E1.4	Fire hose reels: Fire hose reel coverage is required to be provided to the non-classroom areas such as the library. The Class 5 administration area of the building is not required to have hose reel coverage under BCA 2019. *This FHR requirement therefore applies solely to the Auditorium, Library and also to the lower ground floor undercroft area. Verification that coverage is achieved is to be provided at the Crown Certificate stage.*
E1.6	Fire extinguishers: Fire extinguishers are to be provided and designed in accordance with AS 2444-2001. *This equates generally to the location of 1 x extinguishers per Note the use of ABE Powder Extinguishers are discouraged*.
E2.2a	Smoke hazard management: A fire detection and alarm system is required, noting that the class 9b building exceeds a rise of 3 storeys. Further, should a ducted air-handling system (other than non-ducted individual room units <1,000l/s) be designed to the new building, the system must be designed to shut down automatically upon the activation of smoke detectors installed complying with Cl. 5(b) of Spec. E2.2a, i.e. AS1668.1-2015. *Compliance is readily achievable, details are to be provided at the Crown Certificate stage via design statement from the Electrical Design Consultant and indication of the FIP location and WIPs (see also E4.9).* *Note: There is no stage proposed within this development that would necessitate the assessment a stage (eg. if larger than 50m^2 it is required to be served by either an automatic smoke exhaust system complying with Spec E2.2b or a roof mounted automatic smoke and heat vents).*
E3.3	Warning against use of lifts in fire: Signage stating “DO NO USE LIFT IF THERE IS A FIRE” is to be provided near the lift call button in letters not less than 10mm in height. *Compliance is readily achievable.*
E3.6	Facilities for people with disabilities: As the lifts are required to be provided for accessibility, they must be compliant with a lift specified under Table E3.6a (as appropriate) and the provisions of AS1735.12, with the primary matters as below: + Have minimum internal floor dimensions of 1400 x 1600mm. + Have doors with a minimum clear opening width of 900mm + Be fitted with a series of door opening sensory devices / passenger protection devices. *Compliance is readily achievable, details are to be provided to the Crown Certificate stage.*
E4.2-E4.8	Emergency lighting and exits signs: Exit signage and emergency lighting installations are to be provided throughout all new and common spaces to comply with AS2293.1-2005. *Compliance is readily achievable. Details are to be confirmed from the Electrical consultant.*
E4.9	EWIS: The building is required to be provided with an Emergency Warning and Intercommunication System in accordance with AS1670.4-2018 as a result of a Class 9b school with a rise in storeys of more than 3.

3.7 SECTION F – HEALTH AND AMENITY

FP1.4

Performance Requirement - Damp and Weatherproofing: A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause

- Unhealthy or dangerous conditions, or loss of amenity for occupants; and
- Undue dampness or deterioration of building elements.

Compliance with the above for roof coverings can be demonstrated by complying with the requirements of Clause F1.5.

However, there are no Deemed-to-Satisfy provisions for this Performance Requirement with respect to External Walls. Accordingly, a Performance Solution is to be provided with the Construction Certificate application, either by using the Verification Methods in Clause FV1 or by way of Expert Judgement.

F1.1

Stormwater Drainage: Stormwater drainage must be designed and installed in accordance with AS 3500.3 – 2015 and Council requirements.

Certification is to be provided from the Hydraulic Engineer verifying that the proposed design complies.

F1.5

Roof coverings: The proposed roof must be covered with

- Concrete roof tiles complying with AS 2049 and fixed as per AS 2050.
- Cellulose cement corrugated sheeting compiling with AS/NZS 2908.1 and installed as per AS/NZS 1562.2.
- Metal roof sheeting comply with AS 1562.1
- Plastic roof sheeting complying with AS 4256 parts 1, 2 3 & 5 and AS 1562.3.
- Asphalt shingles complying with ASTM D3018-90 class A.

Compliance with the above is readily achievable.

F1.6

Sarking: Sarking-type materials used for weatherproofing of roofs and walls must comply with AS/NZS 4200 Parts 1 and 2.

F1.13

Glazed assemblies: Glazed assemblies in the external wall of the building are required to comply with AS 2047 requirements for resistance to water penetration. All other glazing installations are to comply with AS1288-2006.

F2.3

Sanitary and other Facilities: The number of sanitary facilities required for students within the building is to be determined based on the population proposed.

The table below represents the required facilities for schools, with calculation separate for staff and for students, noting that in a Class 9b building staff and students are not to share sanitary facilities.

Table F2.3
Sanitary Facilities in Class 3, 5, 6, 7, 8 and 9 Buildings

Class of Building	User		Min Number of: Closet Pans	Urinals	Washbasins
9b-	Employees 1, 4, 5				
School	Males =	25	2	2	1
	Females =	45	4		2
	Students				
	Males =	322	6	5	6
	Females =	322	10		6

It is understood that the total Staff population will be in the order of 53. The design indicates that compliance is achieved.

Student population has been advised by JDH architects as a total of 644. The building design indicates that compliance with the minimum number of sanitary facilities is achieved.

F2.4

Accessible Sanitary Facilities: Facilities must be designed in accordance with the requirements of Section 15 of AS 1428.1-2009. Additionally, the ambulant facilities need also comply with Section 16 of AS1428.1-2009.

The Access Consultant will review the proposed design and sanitary compartment layouts for accessible and ambulant sanitary facilities to confirm compliance with AS1428.1-2009. Particular attention will need to be given to ensure that the dimensions of the ambulant compartments comply with the requirements of AS1428.1-2009.

Part F3

Height of rooms and other spaces: The minimum required ceiling heights are required to be as follows:

ROOM OR OTHER SPACE	MINIMUM HEIGHT
+ Sanitary compartment, airlock, store room and the like:	2.1 m
+ Kitchen, Offices:	2.4m
+ First Floor Level (if used as a community hall serving 100 or more people):	2.7m
+ Above a stairway, ramp, landing or the like (measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like)	2m

Compliance is readily achievable, prescriptive floor to ceiling height requirements are to be detailed on the sections and RCPs submitted with the Crown Certificate application.

F4.1

Natural Lighting: Natural light is required to be provided to all general-purpose classrooms within the buildings. The windows to classrooms and similar spaces are to have an aggregate light transmitting area of at least 10% of the floor area of the room they serve.

Compliance is to be confirmed via calculation windows in the perimeter of each of the subject classrooms.

F4.4

Artificial Lighting: Artificial lighting is required in accordance with AS/NZS 1680.0-2009.

Compliance is readily achievable.

F4.5

Ventilation of Rooms: The building is required to be provided with natural ventilation via openings achieving 5% of the floor area of the room served. Where natural ventilation is not provided, AS 1668.2-2012 and AS/NZS3666.1. Mechanical consultant to confirm at the CC stage on how it is proposed to ventilate the premises.

Compliance is to be confirmed via calculation of openable doors/windows in the perimeter of each of the subject classrooms.

F4.8

Restriction of position of water closets and urinals: Unless provided with an airlock, or unless the WC is provided with mechanical exhaust, and the door is screened from view, a room containing a closet pan or urinal must not open directly on to:

+ Kitchen or pantry;
+ Public dining room or restaurant;
+ Dormitory in a class 3;
+ A room used for public assembly (not being a room in an early child hood, primary school or open spectator stand;
+ Workplace normally occupies by more than 1 person.

Compliance is readily achievable.

Part G6

Occupiable Outdoor Areas:

This part does not apply to *an occupiable outdoor area of a sole-occupancy unit in* a Class 2 or 3 building, Class 9c building or Class 4 part of a building (with the exception of the requirements for Fire Hazard Properties), nor does it apply to an occupiable outdoor area with an area less than $10m^2$.

A lining, material or assembly in an occupiable outdoor area must comply with C1.10 as for an internal element. *The following fire hazard properties of a lining, material or assembly in an occupiable outdoor area are not required to comply with C1.10:*

(i) Average specific extinction area.
(ii) Smoke-Developed Index.
(iii) Smoke development rate.
(iv) Smoke growth rate index ($SMOGRA_{RC}$).

	Note 1: For the purposes of the Deemed-to-Satisfy Provisions of C2.7, C2.8 and C2.9, a reference to a storey includes an *occupiable outdoor area*, however a fire wall cannot be used to separate an occupiable outdoor area into different fire *compartments*. Note 2: A reference to a storey or room in Part D1, Part D2, Part E1 *(except for cl 7(b)(i) of Spec E1.5)*, Part E3, Part E4 includes an occupiable *outdoor area*. Note 3: An occupiable outdoor area is not a storey for the purposes of Schedule 3 of the NCC and therefore is not included in the determination of *rise in storeys*. Note 4: For the purposes of the Deemed-to-Satisfy Provisions of F4.4, F4.8 and F4.9, a reference to a room includes an occupiable *outdoor area*. Note 5: Construction in Alpine areas includes an occupiable outdoor *area* for the purposes of displaying notices associated with FIRE ORDERS. *Compliance is readily achievable.*

3.8 SECTION H – SPECIAL USE BUILDINGS

Part H1 – Class 9b Buildings	The DTS provisions of this part apply to an enclosed Class 9b school (or church or community hall) that has a stage in excess of 300m^2. Comment: the MPS is not proposed to have a stage, however see comments in E2.2 above with respect to further requirements pertaining to stage areas. Further, Clause H1.4 applies to every open or enclosed Class 9b Building and Clause H1.7 applies to all enclosed Class 9b buildings
H1.4	This clause relates to seating areas in a Class 9b building: + The gradient of the floor surface must not be steeper than 1:8, or the floor must be stepped so that: o A line joining the nosings of consecutive steps does not exceed an angle of 30 degrees to the horizontal; and o The height if each step in the stepped floor in not more than 600mm; and o The height of any opening in such a step is not more than 125mm; and + If an aisle divides a stepped floor and the difference in level between any 2 consecutive steps: o Exceeds 230mm but not 400mm – an intermediate step must be provided in the aisle; and o Exceeds 400mm – 2 equally spaced intermediate steps must be provided in the aisle; and o The going of intermediate steps must be not less than 270mm and such as to provide as nearly as practicable equal treads throughout the length of the aisle; and + The clearance between rows of fixed seats used for viewing performance arts, sport or recreational activities must not be less than: o 300mm if the distance to an aisle is not more than 3.5m; or o 500mm if the distance to an aisle is more than 3.5m.
H1.7	In every enclosed Class 9b building, where in any part of the auditorium, the general lighting is dimmed or extinguished during public occupation and the floor is stepped or inclined at a slope of more than 1:12, aisle lights must be provided to illuminate the full length of the aisle and tread of each step.

3.9 SECTION J – ENERGY EFFICIENCY

Section J	Energy Efficiency: The new building works subject to compliance with the Energy Efficiency Provisions of Section J relating to: + J1: Building Fabric (including Glazing) + J3: Building Sealing + J5: Air-conditioning and ventilation systems + J6: Artificial lighting and power + J7: Hot water supply + J8: Access for maintenance *Note: New work is to demonstrate compliance. Energy Efficiency report to be provided.*

4.0 CONCLUSION

This report contains an assessment the referenced architectural documentation for the proposed works at 322 Hume Highway, Bankstown against the relevant provisions of the Building Code of Australia 2019 (BCA). Arising from the review, it is considered that the proposed development can readily achieve compliance with the relevant provisions of the BCA subject to minor design amendments (as indicated in the body of the report) and subject to further details and design documentation being provided for assessment.

5.0 APPENDIX 1: FIRE SAFETY SCHEDULE

The following table is a list of measures that are considered applicable to the subject building (note – this is not a schedule of the current fire safety measures in the building).

Statutory Fire Safety Measure	Design / Installation Standard
Automatic Fire Detection and Alarm System (including Occupant Warning)	BCA Clause E2.2 and AS1670.1-2018
Emergency Lighting	BCA Clause E4.4 & AS 2293.1 – 2005
Exit Signs	BCA Clauses E4.5, E4.6 & E4.8; and AS 2293.1 – 2005
EWIS	BCA Clause E4.9 and AS1670.4-2018
Fire Doors	BCA Clause C2.7, C3.5, AS1905.1-2015
Fire Blankets	AS 3504 – 1995 & AS2444 – 2001
Fire Hose Reels (auditorium and undercroft)	BCA Clause E1.4 and AS2441-2005
Fire Hydrant Systems	BCA Clause E1.3 & AS 2419.1 – 2005
Fire Seals	BCA Clause C3.15, AS 1530.4 – 2014 & AS 4072.1 – 2005 and manufacturer's specification
Mechanical Air Handling Systems (automatic shutdown)	BCA Clause E2.2, AS/NZS AS 1668.2 – 2012
Paths of Travel	EP&A Regulation Clause 186
Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
Warning & Operational Signs	Section 183 of the EP&A Regulation 2000, AS 1905.1 – 2015, BCA Clause E3.3
Performance Solution	*TBC*

6.0 APPENDIX 2: TABLE 3 – FRL OF BUILDING ELEMENTS

Building Element	Class 5& 9b
Loadbearing external wall (including any column and other building element incorporated therein)	
+ Less than 1.5m to a fire source feature	120/120/120
+ 1.5 to less than 3m to a fire source feature	120/90/90
+ 3m or more to a fire source feature	120/60/30
Non-Loadbearing external wall	
+ Less than 1.5 m to a fire source feature	–/120/120
+ 1.5m to less than 3m to a fire source feature	–/90/90
+ 3m or more to a fire source feature	–/–/–
External column not incorporated in an external wall	
+ Loadbearing	120/–/–
+ Non-loadbearing	–/–/–
Common walls and fire walls	120/120/120
Fire-resisting lift and stair shafts	
+ Loadbearing	120/120/120
+ Non-loadbearing	–/120/120
Internal walls bounding sole occupancy units	
+ Loadbearing	120/–/–
+ Non-loadbearing	–/–/–
Internal walls bounding public corridors, public lobbies and the like:	
+ Loadbearing	120/–/–
+ Non-loadbearing	–/–/–
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion	
+ Loadbearing	120/90/90
+ Non-loadbearing	–/90/90
Other loadbearing internal walls, beams trusses and columns	120/–/–
Floors	120/120/120
Roofs	120/60/30

7.0 APPENDIX 2: BCA CLAUSE D1.7

D1.7 Travel via fire-isolated exits

(a) A doorway from a room must not open directly into a stairway, passageway or ramp that is *required* to be fire-isolated unless it is from—

(i) a *public corridor*, public lobby or the like; or

(ii) a *sole-occupancy unit* occupying all of a *storey*; or

(iii) a *sanitary compartment*, airlock or the like.

(b) Each *fire-isolated stairway* or *fire-isolated ramp* must provide independent egress from each *storey* served and discharge directly, or by way of its own *fire-isolated passageway*—

(i) to a road or *open space*; or

(ii) to a point—

(A) in a *storey* or space, within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least $^{2}/_{3}$ of its perimeter; and

(B) from which an unimpeded path of travel, not further than 20 m, is available to a road or *open space*; or

(iii) into a covered area that—

(A) adjoins a road or *open space*; and

(B) is open for at least 1/3 of its perimeter; and

(C) has an unobstructed clear height throughout, including the perimeter openings, of not less than 3 m; and

(D) provides an unimpeded path of travel from the point of discharge to the road or *open space* of not more than 6 m.

(c) Where a path of travel from the point of discharge of a fire-isolated *exit* necessitates passing within 6 m of any part of an *external wall* of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have—

(i) an FRL of not less than 60/60/60; and

(ii) any openings protected internally in accordance with C3.4,

for a distance of 3 m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

(d) If more than 2 access doorways, not from a *sanitary compartment* or the like, open to a *required* fire-isolated *exit* in the same *storey*—

(i) a smoke lobby in accordance with D2.6 must be provided; or

(ii) the *exit* must be pressurised in accordance with AS 1668.1.

(e) A ramp must be provided at any change in level less than 600 mm in a *fire-isolated passageway* in a Class 9 building.

8.0 APPENDIX 3: BCA CLAUSE D1.8

Figure D1.8(1) Protection of the external exit using the external wall of the building in accordance with D1.8(c)(i)

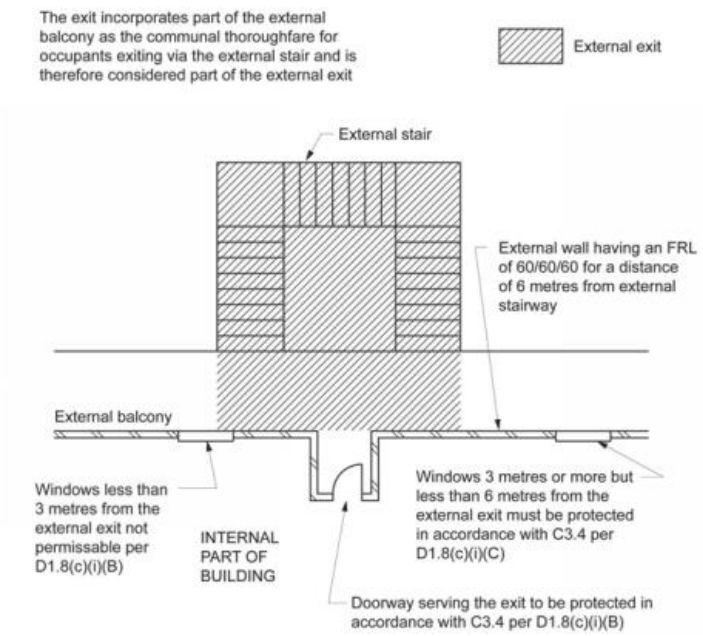


Figure D1.8(2) Protection of the external exit using shielding construction in accordance with D1.8(c)(ii)