BLACKETT MAGUIRE+ GOLDSMITH

BCA REPORT

REF SD Design

PROJECT:
Hunter River High School

PREPARED FOR:

RICHARD CROOKES CONSTRUCTIONS

Revision: 3
Date: 19 April 2024
Project No.: N230091

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EXECUTIVE SUMMARY

The following comprises a summary of the key compliance issues identified following an assessment in this report that will be addressed prior to the Crown Certification for the project and through further design development.

MATTERS REQUIRING ADDITIONAL INFORMATION AT CROWN CERTIFICATE STAGE:

	BCA (DtS) Clause	Description
1.	**Part B1** *Structural Provisions*	Where buildings are subject to new works have the capacity to serve greater than 250 people, Importance Level 3 will apply, the structural engineer is to incorporate this requirement within the design, with details to be provided at DD Stage. Services consultants are to incorporate seismic restraints where required, to comply with AS1170.4-2007 relevant to the earthquake design category, as determined by the importance level and height of the buildings.
2.	**C1.10 & Spec.C1.10** *Fire Hazard Properties*	Architect to specify internal linings and finishes in accordance with the requirements of the requirements of C1.10 and Spec C1.10. Details demonstrating compliance including an external wall schedule will need to be provided along with the application for Crown Certificate
3.	**C2.12 & C2.13** *Separation of Equipment and Electrical Supply System*	Services consultants, in consultation with the project architect, are to ensure fire separating construction is provided for relevant main switchboard rooms and equipment, as required to satisfy EFSG requirements. Where works are to be undertaken within the existing Main Switchboard Room, separating construction and service penetrations are to be reviewed, with details to be provided by the electrical design consultant.
4.	**D2.21** *Operation of Latch*	There are a number of sliding doors proposed on a path of travel within Block Z, latch hardware must be readily openable with a single downward hand action to achieve compliant travel distances. Details are to be provided prior to Crown Certificate stage.

MATTERS REQUIRING PERFORMANCE SOLUTIONS:

	BCA (DtS) Clause	Description
1.	**C1.1, C3.2 & C3.4** *Fire resistant construction, separation between building and protection of openings*	The fire resistance of the existing external load-bearing columns serving Block R, where located within 18m of the external wall of Blocks X, are addressed under the fire engineering strategy – with the area between buildings to remain sterile, and free of additional fire load.
2.	**D1.10** *Discharge from Exits*	Where egress from the buildings via open space require passing back under covered areas such as awnings/linkways and the like before reaching the public road this is to be addressed under the fire engineering strategy.
3.	**D2.21** *Operation of Latch*	Any proposed lockable gates associated with the new buildings, located in the paths of travel to reach open space are to be addressed under the fire engineering strategy, as applicable, where a single action device is not provided on the side seeking egress or the gate automatically opens in fire mode on activation of a detection system installed throughout the building.
4.	**Part D3** Access for people with a disability	Where evident in the developed design, are to be addressed by the project access consultant: + Mobile Hearing Augmentation system. + Unisex Ambulant Sanitary Facilities. The relevant Performance Solution Reports are to be provided prior to Crown Certificate stage.

	BCA (DtS) Clause	Description
5.	**E1.3** *Fire Hydrants*	The following matters are to be addressed under a fire engineered Performance Solution where compliance with BCA clause E1.3 and AS2419.1-2005 cannot be achieved: + The location of the fire hydrant booster assembly will need to be rationalised under a fire engineered Performance Solution, as it is not located adjacent to the main vehicular entrance to the site, as there are four (4) vehicle entry points nominated on the site. + It is to be confirmed if the fire hydrant booster is within sight of the main entrance serving Block Z. The abovementioned departures are to be addressed under the fire engineering strategy.
6.	**FP1.4** *Weatherproofing*	A performance solution report outlining the method of weatherproofing the externals walls and roof to negate water ingress. The Performance Solution may be provided by the project architect prior to Crown Certificate stage.
7.	**F2.3 (a) &** **F2.4 (c)** *Unisex Ambulant Facilities*	The following non-compliances are to be addressed under a Performance Solution: + a single unisex ambulant sanitary facility provided at an accessible bank of toilets, in lieu of separate male and female ambulant facilities being provided – this is currently proposed in Block X. + where two (2) ambulant facilities are provided and proposed to be nominated unisex, in lieu of separate male and female – this may be applicable to Block Z. This is to be provided by the DDA/access consultant prior to Crown Certificate stage.
8.	**F4.8 & F4.9** *Location of sanitary compartments*	A Performance Solution is to be provided prior to Crown Certificate stage to address the sanitary facilities opening directly into areas not permitted under the BCA, this may be achieved with suitable exhaust rates being provided to the mechanical exhaust system and self-closing doorways between the relevant parts.

TABLE OF CONTENTS

REPORT STATUS

DATE	REVISION	STATUS	AUTHOR	REVIEWED
06.12.2023	0	Draft – Developed Design (50%) Report	LV	JH
12.02.2024	1	Draft – Developed Design (90%) Report	LV	JH
11.04.2024	2	Draft – Revised SD Design Report	LV	JH
19.04.2024	3	REF_SD Design	LV	JH

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INTRODUCTION

PROPOSAL

Blackett Maguire + Goldsmith Pty Ltd have been commissioned by Richard Crookes Construction to undertake a Building Code of Australia (BCA) assessment of the Developed Design for Hunter River High School located at 36 Elkin Avenue, Heatherbrae NSW 2324 against the relevant provisions of the Building Code of Australia 2019 Amendment 1, Volume 1 (BCA).

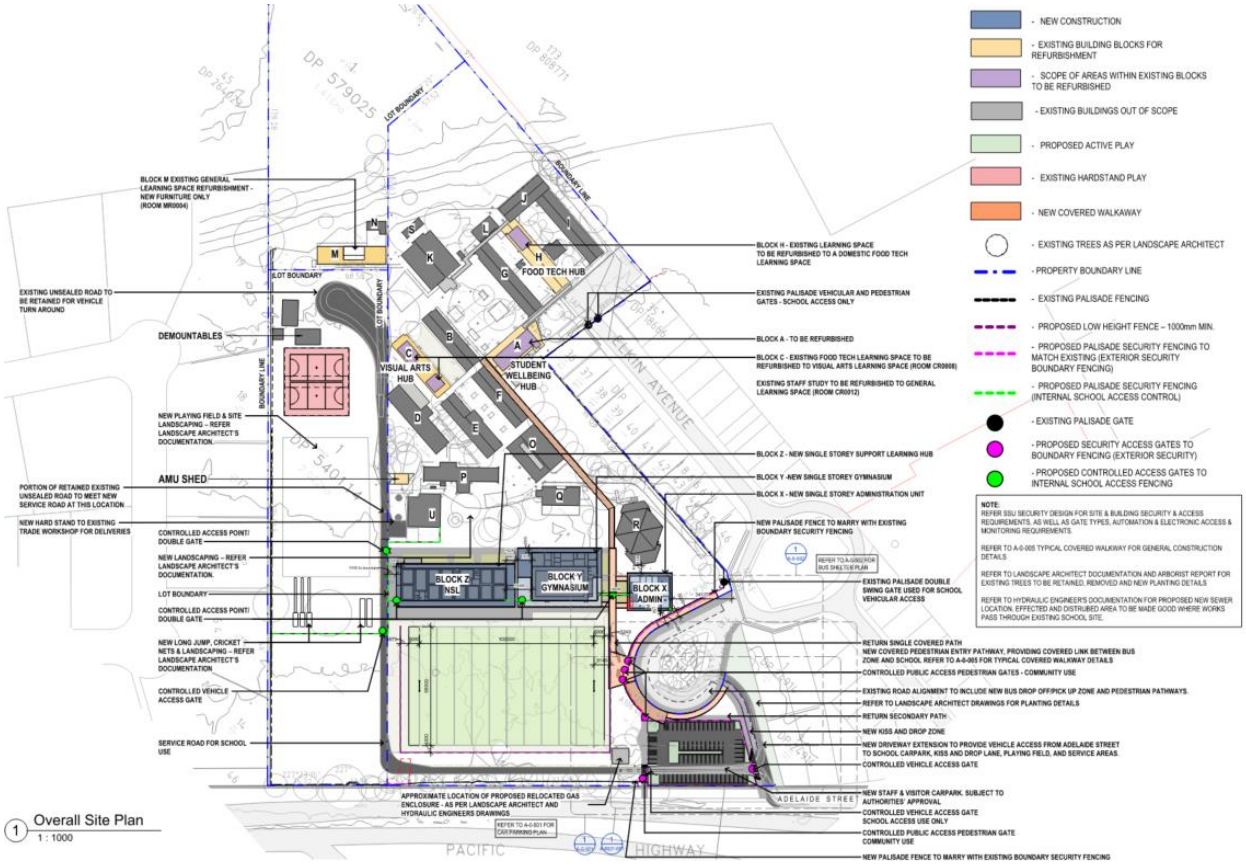


Figure 1: General Arrangement/Site Plan

AIM

The aim of this report is to:

+ Undertake an assessment of the existing and proposed development against the deemed-to-satisfy provisions of the BCA;
+ Identify matters that require rectification works or plan amendments (as applicable) in order to achieve compliance with the BCA;
+ Identify matters that are to be required to be addressed by Performance Solutions to the degree necessary;

REFERENCED DOCUMENTATION

The following documentation has been reviewed, referenced and/or relied upon in the preparation of this report:

- Building Code of Australia 2019 Amendment 1, Volume 1 (BCA)
- Guide to the Building Code of Australia 2019 Amdt.1.
- 50% SD - Architectural Plans prepared by EJE Architecture (Block X & Z):

DRAWING NO.	REVISION	DATE	DRAWING NO.	REVISION	DATE
A-REF-001	F	17.04.2024	A-REF-010	H	17.04.2024
A-REF-020	C	17.04.2024	A-REF-050	F	17.04.2024
A-REF-X-100	F	17.04.2024	A-REF-X-110	F	17.04.2024
A-REF-X-140	F	17.04.2024	A-REF-X-200	F	17.04.2024
A-REF-X-300	F	17.04.2024	A-REF-Z-100	F	17.04.2024
A-REF-Z-110	F	17.04.2024	A-REF-Z-140	F	17.04.2024
A-REF-Z-200	F	17.04.2024	A-REF-Z-201	F	17.04.2024
A-REF-Z-300	F	17.04.2024			

LIMITATIONS AND EXCLUSIONS

The limitations and exclusions of this report are as follows:

+ BM+G has not conducted an inspection of the buildings for which demolition has been confirmed, nor have we inspected buildings that we have been instructed not to. The scope of our audit focused on the area of work.
+ The Report does not address matters in relation to the following Local Government Act and Regulations:
    i. Work Health and Safety Act and Regulations.
    ii. Work Cover Authority requirements.
    iii. Water, drainage, gas, telecommunications and electricity supply authority requirements.
    iv. Disability Discrimination Act 1992.
+ BM+G cannot guarantee acceptance of this report by Local Council, Fire & Rescue NSW or other approval authorities.
+ No part of this document may be reproduced in any form or by any means without written permission from BM+G. This report is based solely on client instructions, and therefore should not be used by any third party without prior knowledge of such instructions.

BCA COMPLIANCE METHODOLOGY

The proposed building work will be subject to compliance with the relevant requirements of BCA 2019 as required by Section 6.28 of the Environmental Planning & Assessment Act 1979, pending the date of the invitation for tenders to carry out the works being prior to 1 May 2023. It is understood that the date for tender will be prior to 1 May 2023 as such BCA 2019 Amendment 1 applies to the development.

REPORT TERMINOLOGY

Building Code of Australia - Document published on behalf of the Australian Building Codes Board. The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia and is adopted in NSW under the provisions of the Environmental Planning & Assessment Act & Regulation.

Climatic Zone – Is an area defined in BCA Figure A1.1 and in Table A1.1 for specific locations, having energy efficiency provisions based on a range of similar climatic characteristics.

Construction Certificate – Building Approval issued by the Certifying Authority pursuant to Part 4A of the EP&A Act 1979.

Construction Type – The construction type is a measure of a buildings ability to resist a fire. The minimum type of fire-resisting construction of a building must be that specified in Table C1.1 and Specification C1.1, except as allowed for—

(i) certain Class 2, 3 or 9c buildings in C1.5; and

(ii) a Class 4 part of a building located on the top storey in C1.3(b); and

(iii) open spectator stands and indoor sports stadiums in C1.7.

Note: Type A construction is the most fire-resistant and Type C the least fire-resistant of the types of construction.

Deemed-to-Satisfy (DTS) Provisions of the BCA – Means the prescriptive provisions of the BCA which are deemed to satisfy the performance requirements.

Effective Height – The vertical distance between the floor of the lowest storey included in the calculation of rise in storeys and the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift, or other equipment, water tanks or similar service units).

Exit – Any, or any combination of the following if they provide egress to a road or open space;

+ An internal or external stairway.
+ A ramp.
+ A fire-isolated passageway.
+ A doorway opening to a road or open space.

Fire Compartment – The total space of the building; or when referred to in

+ The Performance Requirements – any part of a building separated from the remainder by barriers to fire such as walls and/or floors having an appropriate resistance to the spread of fire with any openings adequately protected; or
+ The Deemed-to-Satisfy Provisions – any part of a building separated from the remainder by walls and/or floors each having an FRL not less than that required for a fire wall for that type of construction and where all openings in the separating construction are protected in accordance with the Deemed-to-Satisfy Provisions of the relevant part.

Fire Resistance Level (FRL) – The grading periods in minutes for the following criteria-

(a) structural adequacy; and

(b) integrity; and

(c) insulation,

and expressed in that order

Fire Source Feature (FSF) - The far boundary of a road adjoining the allotment; or a side or rear boundary of the allotment; or an external wall of another building on the allotment which is not a Class 10 building.

National Construction Code Series (NCC) – The NCC was introduced 01 May 2011 by the Council of Australian Governments. The BCA Volume One (Class 2 to 9 Buildings) is now referenced as the National Construction Code Series Volume One — BCA.

***Occupation Certificate* (OC)** – Building Occupation Approval issued by the Principal Certifying Authority pursuant to Part 4A of the EPA Act 1979.

Open Space - Means a space on the allotment, or a roof or other part of the building suitably protected from fire, open to the sky and connected directly with a public road.

Performance Requirements of the BCA - A Building Solution will comply with the BCA if it satisfies the Performance Requirements. A Performance requirement states the level of performance that a Building Solution must meet.

Compliance with the Performance Requirements can only be achieved by-

(a) complying with the Deemed-to-Satisfy Provisions; or

(b) formulating an Alternative Solution which-

(i) complies with the Performance Requirements; or

(ii) is shown to be at least equivalent to the Deemed-to-Satisfy Provisions; or

(c) a combination of (a) and (b).

Performance Solution (Alternative Solution) – Means a method of complying with the performance requirements other than by a *Deemed-To-Satisfy Solution.*

Rise in Storeys – The greatest number of storeys calculated in accordance with C1.2.

BUILDING CHARACTERISTICS

BUILDING CLASSIFICATIONS

The following table and figure present a summary of relevant building classifications for the proposed development the below has focused on the buildings subject to works only:

BUILDING CHARACTERISTICS	BLOCK X	BLOCK Z
	Admin (B00X)	New Support Learning (B00Z)
+ BCA CLASSIFICATION:	Class 5 (Office/Admin)	Class 9b (Classrooms) Note 1*
+ RISE IN STOREYS	One (1)	One (1)
+ STOREYS CONTAINED	One (1)	One (1)
+ TYPE OF CONSTRUCTION:	TYPE C	TYPE C
+ EFFECTIVE HEIGHT:	<12m	<12m
+ TOTAL FLOOR AREA (APPROX.)	Ground - 437m^2	Ground - 1,664m^2
+ MAX. AREA/VOLUME:	3,000m2 / 18,000m^3	3,000m2 / 18,000m^3
+ SPRINKLER PROTECTED:	No	No
+ CLIMATE ZONE:	Zone 5	Zone 5

***Note 1**: The Class 5 staff office part within the building does not account for more than 10% of the floor area of the storey, therefore, Class 9b classification applies throughout the building for the benefit of the BCA.*

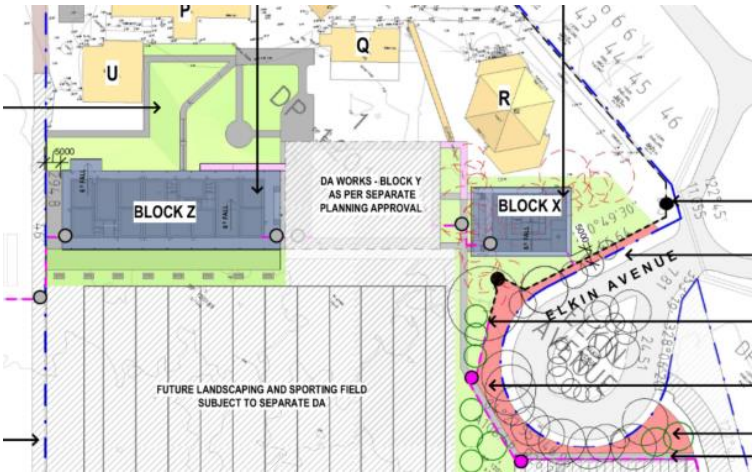


Figure 2: Proposed site layout

BCA ASSESSMENT & RECOMMENDATIONS

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

LEGEND

	General Note
	Matters Requiring Redesign / Further Information
	Performance Solution

B1.4 ***Structure***	**General Note** New building works are to comply with the structural provisions of the BCA 2019 Amdt.1 and referenced standards including AS 1170. In addition to the above, the loadbearing capacity of existing balustrades (where retained) should be reviewed, particularly with respect to loadings under AS 1170 in particular where relied upon for access or egress from refurbished parts shall be brought up to compliance with the relevant structural requirements. This due to the significant risk dilapidated balustrading presents to the safety of the occupants. The Importance Level provisions of BCA (Section B) are to be acknowledged by the Structural Engineer and addressed to the degree necessary. Where buildings have the capacity to serve greater than 250 people, Importance Level 3 will apply, the structural engineer is to incorporate this requirement within the design. New building works (including non-load bearing components) are to comply with the requirements of AS1170.4-2007 relevant to the earthquake design category, services consultants are to incorporate seismic restraints where required as determined by the importance level and height of the buildings.
C1.1 ***Type of construction required***	**General Note** Type of Construction: The type of construction for each respective block is as noted below: ***+ Block X – Type C***

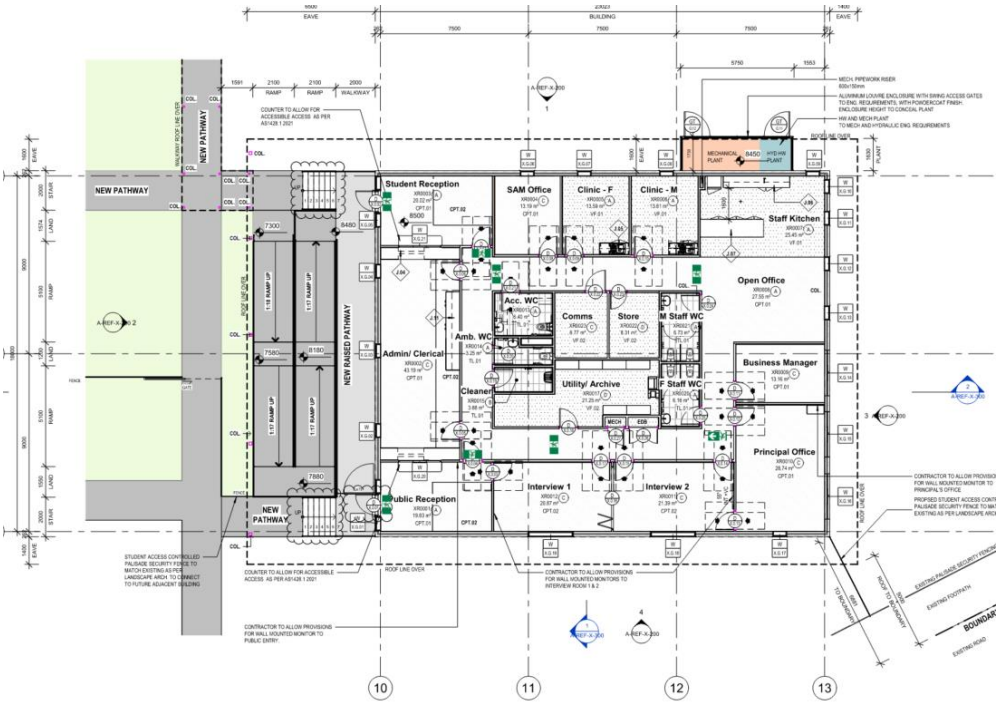


Figure 3 – Block X – Ground Floor

Block Z -Type C

Figure 4: Block Z – Ground Floor

The relevant FRLs as listed in Table 5 of Specification C1.1 must be adhered to.

Refer to **APPENDIX A.**

General Note

For the benefit of the new works all covered walkways are to be separate structures fully ventilated comprising of non-combustible construction, with no storage of items that may contribute to the fire load of the adjacent buildings, constructed in a manner which will allow each building to be treated as a separate building for the purpose of the BCA.

The existing building Block R is within 18m of the new buildings, it has been confirmed that the load-bearing external wall achieves a minimum FRL of 120 min – therefore, no upgrades are required to the external walls where within 18m of new fire source features.

All new works are to be designed to comply with the requirements of Spec C1.1 of the BCA.

Structural engineer to review and ensure compliance with design certification to be provided with the application for Crown Certificate.

Performance Solution

The existing Block R building is required to achieve the minimum fire resistance of building elements as outlined in Table 4 (Type B) of Spec.C1.1 where exposed to a fire source feature such as another building on the same allotment.

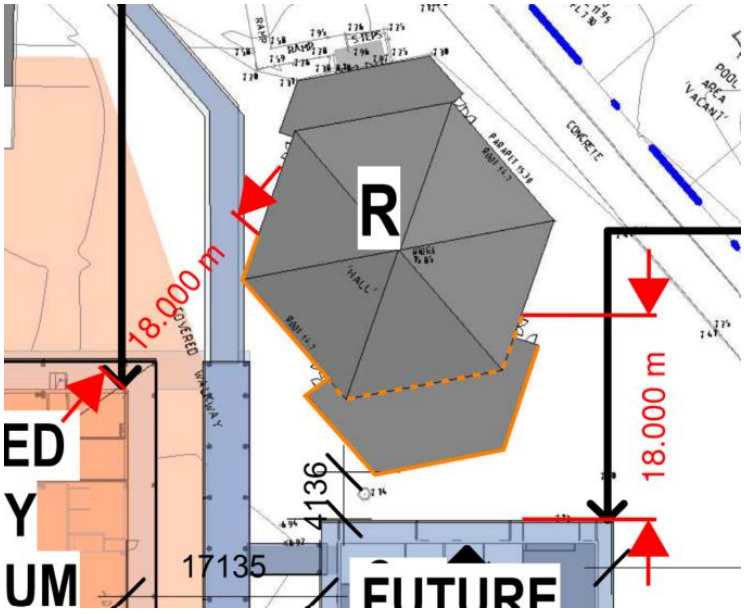


Figure 5: Block R exposure to new buildings

Where external columns of Block R do not achieve the minimum required FRL of 120/--/--, it may be rationalised under a fire engineered strategy – this is to be developed with the project fire engineer prior to Crown Certificate stage.

C1.10

Fire Hazard Properties

Architect to specify internal linings and finishes in accordance with the requirements of the limitations set out in Spec C 1.10 of the BCA details demonstrating compliance will need to be provided along with the Completion Certificate. These summaries are outlined below.

General Note

Floor linings and floor coverings

CRF – not less than 2.2 kW/m2 with a maximum smoke development rate of 750 percent-minutes

Where the covering continues up a wall more than 150mm a group number must also be achieved

Wall and ceiling lining

The building is not fitted with a sprinkler system as such a wall and ceiling lining must achieve a group number in accordance with table 3 (relevant part below) and have:

+ A smoke growth rate index not more than 100 or
+ An average specific extinction area less than 250m2/kg

Fire Isolated exits/Fire control rooms

- Walls: 1
- Ceilings: 1

Public corridors

- Walls 1, 2
- Ceilings 1, 2

Specific areas

- Walls: 1, 2, 3
- Ceiling: 1, 2

Other Areas

- Walls: 1, 2, 3
- Ceiling: 1, 2, 3

C2.2 & C2.7

Compart-mentation &

Fire Separation

The maximum floor area volume limitations under C2.2 of the BCA must be maintained according to the TYPE of construction.

Classification	Type B construction	Type C construction
5, 9b or 9c	Max *floor area*—5500 m^2 Max volume—33000 m^3	Max *floor area*—3000 m^2 max volume—18000 m^3
6, 7, 8 or 9a (except for *patient care areas*)	Max *floor area*—3500 m^2 Max volume—21000 m^3	Max *floor area*—2000 m^2 Max volume—12000 m^3

Where additional compartmentation is required to maintain the maximum limitations set out within this clause fire walls must achieve an FRL not less than that required under Spec C1.1 of the BCA.

General Note

The new buildings proposed are within the limitations of Type C construction with regards to floor area and volume.

Where covered walkways are proposed to physically connect buildings on the site, the size of fire compartments is not to exceed 2,000m2 – where relevant there is potential to rationalise the oversize fire compartments under a fire engineering strategy.

Further information is to be provided at developed design stage.

C2.12

Separation of Equipment

The following equipment is required to be separated from the remainder of the building by construction having an FRL of not less than 120min including self-closing fire doors having an FRL of not less than --/120/30

+ Lift controls and lift control panels
+ Emergency generators sustaining equipment operating in emergency mode
+ Central smoke control plant
+ Boilers
+ A battery system installed in the building having a total voltage of 12 volts or more and a storage capacity of 200kWh or more.

Further Information

Services consultants are to advise of any proposed equipment within the building requiring separation under this clause. We note that there are a number of comms rooms proposed however it is not clear whether there is equipment proposed within these rooms which would require separation i.e. battery system.

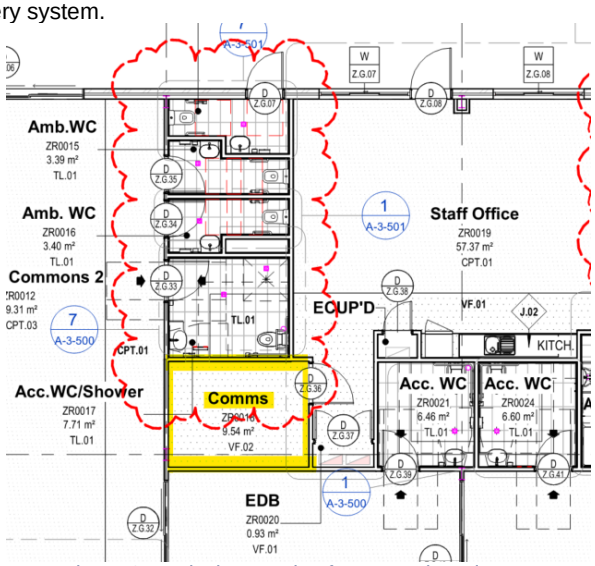


Figure 6: Typical Example of Proposed Equipment

The type of equipment proposed, and any required fire separation where required is to be confirmed prior to Crown Certificate stage.

Note: Refer also D2.7 of the BCA with respect of additional separation requirements. Where fire separation is not required D2.7 will require enclosure of non-combustible construction with smoke sealing to enclosing construction.

C2.13

Separation of Main Switch room

An electrical substation and an electrical main switchboard sustaining emergency equipment operating in the emergency mode must be separated off from the remainder of the building by construction having an FRL of not less than 120min including self-closing fire doors having an FRL of not less than -/120/30

General Note

Any new proposed substations and or main switch rooms will need to be shown on the architectural documentation to be provided on the architectural documentation submitted at Crown Certificate stage.

All new works will need to comply, whilst we note that there are no new substations/main switch rooms shown on the architectural documentation any new works associated with existing switch rooms and or substations within the existing buildings will need to comply with current code requirements i.e. treatment of new services penetrations within bounding construction etc.

C3.2

Protection of openings in external wall

Openings in external walls that are required to have an FRL must be protected in accordance with C3.4 of the BCA where located as per the below. If the distance between the opening and the fire source feature to which it is exposed in less than:

- 3m from a side or rear boundary of the allotment; or
- 6m from the far boundary of a road, river, lake or the like adjoining the allotment, if not located in a storey at or near ground level;
- 6m from another building on the allotment that is not Class 10

The openings requiring protection above must not occupy more than 1/3 of the area of the external wall of the storey.

Further Information / Performance Solution

As Block R is of Type B construction and the external walls are confirmed as being load-bearing requiring an FRL, therefore openings in parts of the external wall that are within 6m of Block X are to be addressed under a fire engineered strategy where not protected in accordance with C3.4.

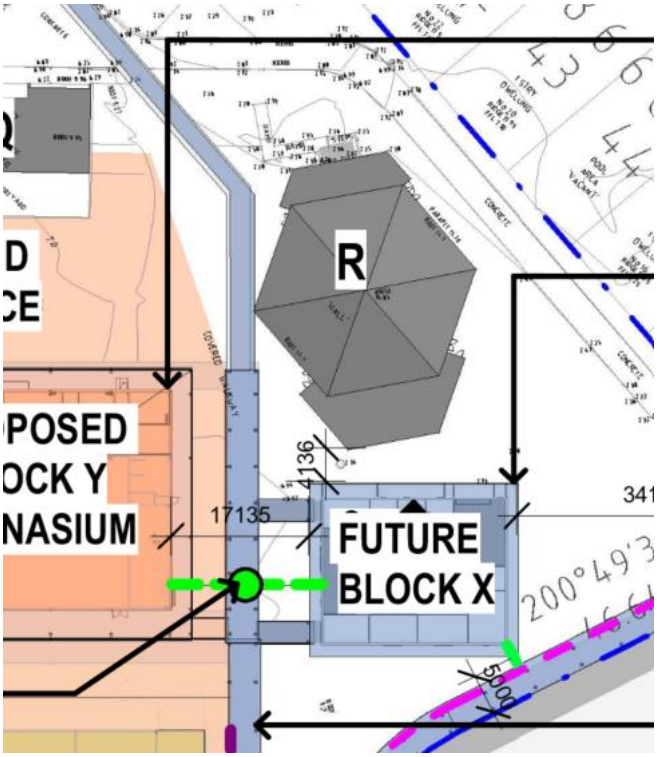


Figure 7: External Walls within 6m.

Figure 8: Block R – External Wall within 6m.

D1.2

Number of Exits Required

Every building is required to have access to at least one exit from each storey.

In addition to the above, in addition to any horizontal exit not less than 2 exits must be provided from the following;

- Each storey if the building has a rise of more than 6 or an effective height of more than 25m
- Each storey in a primary or secondary school with a rise in storeys of 2 or more,
- Any storey or mezzanine that accommodates more than 50 persons

We note that the minimum number of exits has been provided from the building in this regard.

General Note

Notwithstanding the above, the minimum number of exits have been provided.

The required exit from each building particularly where a large covered area adjoins the space will be the point at which open space is reached which is relevant having regards to travel distance

calculations, location of exit signage, emergency lighting and other fire safety measures (such as Fire Hose Reels).

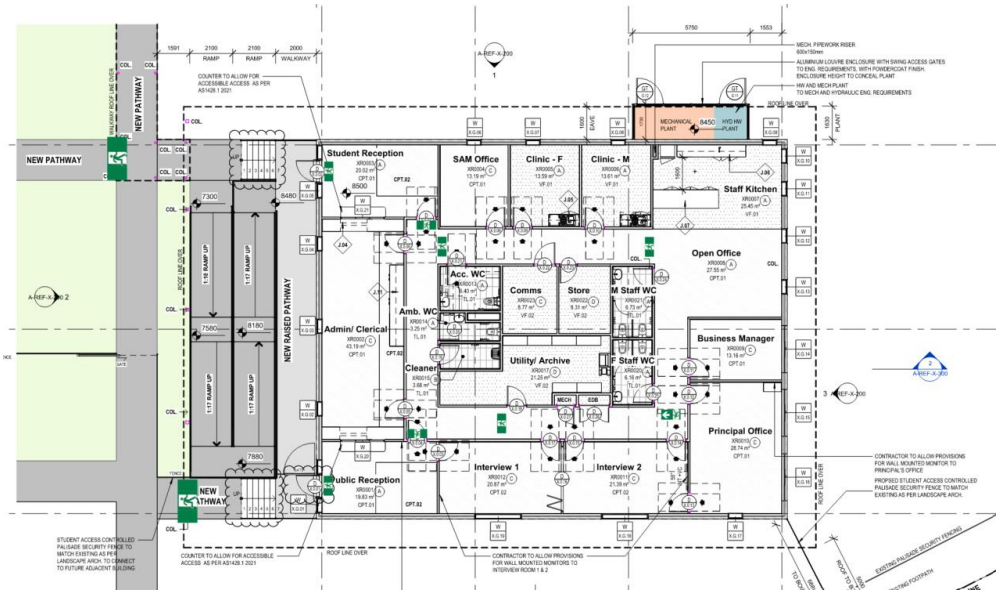


Figure 9: Block X – Required Exits

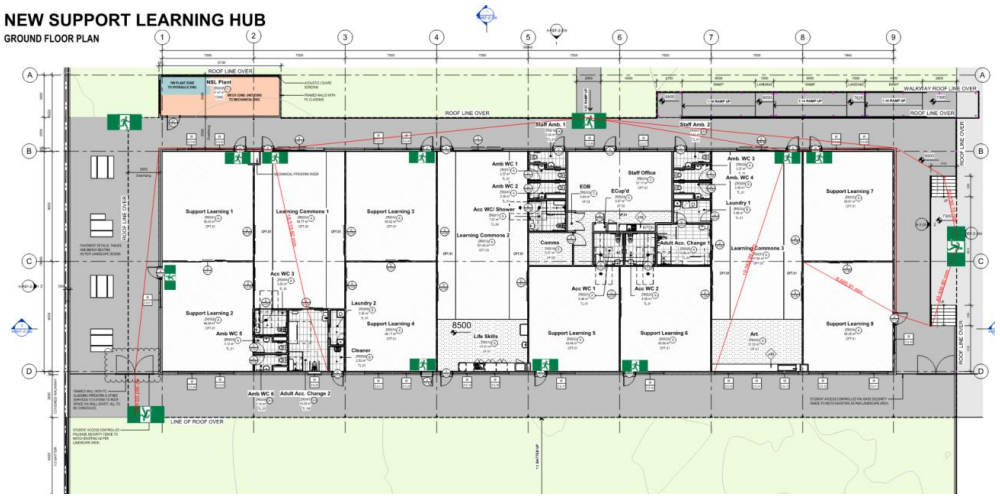


Figure 10: Block Z – Required Exits

Note: For the purpose of assessing travel distances under D1.4 and D1.5 of the BCA it has been assumed that open space will readily be available adjacent to the egress points noted in the figure above which needs to be coordinated with the projects landscape architect – final locations of the external egress paths around the buildings will need to be confirmed, with consideration of reaching open space connected to the road without passing under covered walkways or the like.

D1.4 & D1.5

Exit travel distances

Exit travel distances will need to comply with the following limitations:

- 20m to a point of choice between alternative exits
- 40m to one of the two alternative exits
- 60m between alternative exits

General Note

Compliance is readily achievable based on the current design documentation and layout of the new buildings – the arrangement of FF&E is to ensure complaint travel distances are maintained, with alternate paths in Block Z to be indicated with directional exit signage where passing through adjacent rooms via sliding doorways.

Details are to be included in the electrical plans at Crown Certificate stage.

D1.6

Dimensions of exits paths of travel

A breakdown of the maximum number of occupants to each storey of the building will need to be confirmed in order to determine compliance having regards to the aggregate egress width requirements. This will include review of the maximum population numbers for each storey and any increase in the number of persons accommodated to determine whether sufficient width has been provided.

Based on the number of available exits however we note that compliance is readily achievable based on the current design.

A minimum 1m clear unobstructed width and a height of not less than 2m (Doorways 1980mm) is to be achieved throughout all paths of travel throughout the building. This clear space requirement is to be measured between all objects and obstructions and any projection parts.

The minimum unobstructed width requirements under this clause are to be maintained from the discharge point of the required exit to the road connected.

General Note

Compliance readily achievable based on the current design, ensure compliant unobstructed heights and widths are provided to the following areas:

Where encroachments occur the departure may be addressed under a Performance Solution on a case-by-case basis, including BCA clauses D1.6 or F3.1.

Details are to be provided at Crown Certificate stage.

D1.9

Travel via non-fire isolated stairways

A non-fire isolated stairway must provide a continuous means of egress by its own flights and landings from each storey served to the level at which egress to road or open space is provided.

The distance from any point of the floor to a road or open space by way of a stairway and ramp is not to exceed 80m.

The discharge point of the stairway is to be not more than 20m from a doorway providing egress to a road or open space and/or 40m to one of two (2) such doorways or passageways if travel to each of them from a no-fire isolated stairway or ramp which may be in opposite directions.

General Note

Compliance is achieved with regards to Blocks X and Z.

D1.10

Discharge from Exits

Required exits are to discharge to open space which is to be connected to a public road by a stairway complying with D2.13 and or a ramp having a gradient of not more than 1:8 and or 1:14 where required to be accessible under the BCA.

The current egress strategy necessitates passing under linkways after discharging from buildings. This does not comply in respect to D1.10.

Further Information

The discharge from required exits to the road is to be confirmed, based on the positioning the proposed buildings occupants may be required to pass back under structures or awnings, where apparent this may be rationalised under a fire engineered performance solution.

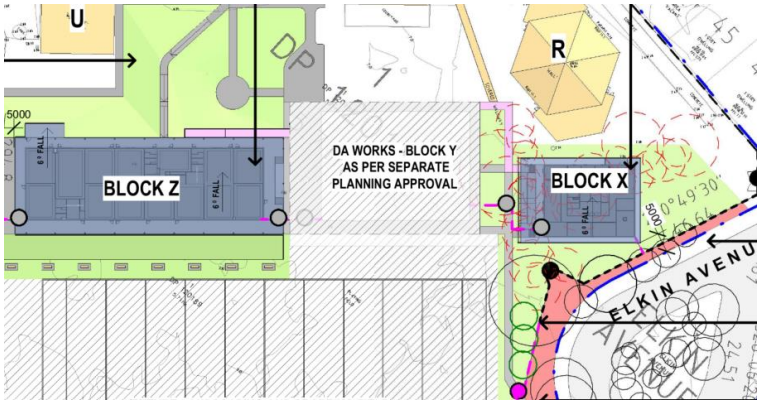


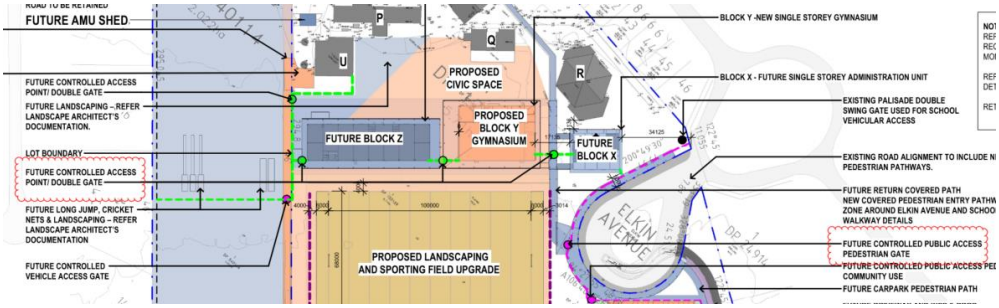
Figure 11: Paths of travel to the road from open space

Performance Solution

Where the path of travel to the road from open space is not open to the sky for its length, necessitating passing back under covered areas such as awnings/linkways or the like before reaching the public road this is to be addressed by way of a Fire Engineered Strategy.

In the same regard, where egress to the road from open space requires access via gates that may be locked during operation of the school in accordance with EFSG guidelines, this is to be addressed under a Performance Solution with co-ordination with the evacuation strategy currently serving the school.

D2.7 ***Installations in exits and paths of travel***	Electrical equipment both new and existing has been identified in paths of travel to exits (along corridors) throughout the development. These must be smoke separated and bound by non-combustible construction. Compliance is readily achievable based on the current documentation architect to note and ensure enclosures are smoke sealed from the remainder of the building. Upgrade works will be required within the existing building where there are EDB cupboards located within the refurbishment zones. **General Note** Existing electrical equipment must be upgraded to achieve compliance with the requirements. Namely, separation from the remainder of the building by non-combustible construction this includes smoke sealing existing penetrations within the bounding construction where being impacted as a result of the proposed works.
D2.8 ***Enclosure under stairs***	This clause sets out the requirements for fire separation below stairways including fire isolated stairways and non-fire isolated stairways. For required non-fire isolated stairways the space below where enclosed to form a cupboard or other enclosed space it must be enclosed with construction having an FRL of not less than 60min. **General Note** Based on updated architectural documentation the works do not include any enclosed space beneath non-fire isolated stairs or ramps – this is to be confirmed with regard to the proposed ramps serving Blocks X and Z at DD stage.
D2.13, D2.14 & D2.17 ***Stair Construction & Handrails***	Stairways: + A stairway must have no more than 18, nor less than 2, risers in each flight. + Landings must be not less than 750mm in length. + Landings must accommodate a stretcher, 2m long and 600mm wide, throughout all flights of all stairs. This includes navigating landings that may turn 90-180°. Handrails: + Handrails must be located on both sides of all stairways and ramps except for fire-isolated stairs. We note that all of the stairways within the building are used for general circulation and as such handrails will be required both sides accordingly. **General Note** Based on the architectural documentation there are no stairways proposed to be constructed or altered within the buildings or landscaped areas, this is to be confirmed by the project architect/landscape architect. Where existing stairs, landings and handrails are utilised by the proposed works we recommend upgrade to achieve compliance with current requirements. Clarification with respect of the extent of upgrades will be confirmed as part of the design development. If required, stair details are to include sectional drawings showing tread and riser dimensions, handrail, nosing, tactile details etc. This also includes all stairways within landscaped areas. **Further Information** The current design of the stairs and ramps serving Blocks X and Z does not indicate compliant handrails with 300mm extensions to satisfy the requirements of AS1428.1-2009. Compliance is readily achievable, details of handrails to be provided at DD stage.
D2.15 ***Thresholds***	The threshold of a door must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf itself unless it opens to a road or open space, external landing or balcony and the sill is not located more than 190mm above the finish surface to which the doorway opens. **General Note** In addition to BCA requirements summarised above particular attention is to be paid to the requirements of D3 and AS 1428.1-2009, to ensure compliance the design is to incorporate flush transitions at doorways and or a threshold ramp where permissible. Grated drains shall be allowed for in the design in accordance with AS4654.1 & 2 unless otherwise addressed under a FP1.4 Performance Solution report.
D2.16 ***Balustrades***	Balustrade details are to be provided for review and comment as part of the finalisation of the developed design stage. Although the plans show that balustrades have been documented sufficient details have not currently been provided to confirm compliance. Balustrades: + All balustrades must achieve a minimum height of 1m above finished floor level.

	+ Balustrades (except for fire-isolated stairs) must not permit a 125mm sphere to pass through any opening. + Balustrades in fire-isolated exits must comprise no gap larger than 150mm between nosing line (or landing) and bottom rail. Other openings in the balustrade must not exceed 460mm. **General Note** It is recommended that consideration be given to increasing the height of the proposed balustrades to external balconies and internal void areas to 1.2-1.5m to avoid climbability issues and or the EFSG requirements. Further balustrade details will need to be provided for review and comment, however, based on the documentation to date we note that compliance is readily achievable.
D2.18 ***Fixed platforms, walkways, stairways and ladders***	A fixed platform, walkway, stairway, ladder, any going and riser, any balustrade or other barrier attached thereto may comply with AS1657 if it only serves a machinery or plant room. **General Note** Based on updated architectural documentation, no access is required via ladders or platforms to Block X and/or Z.
D2.19 **D2.20** **D2.21** ***Door construction including type latching, swing***	<u>Doors and latching:</u> All egress doorways must swing in the direction of egress and must be readily openable without a key from the side that faces a person seeking egress, by a single handed downward or pushing action on a single device which is located between 900mm and 1100mm from the floor. **General Note** Door hardware will need to be specified in accordance with the requirements of this clause architect to note and specify accordingly. A door can swing against the direction of egress where it is the only required exit from a building and the building or part has a floor area of not more than 200m^2 and or it being a sanitary compartment. **Performance Solution** Any proposed lockable gates or the like located in the path of travel are to be addressed under a fire engineering strategy, with consideration of any emergency evacuation strategy proposed by the school – this may include flood refuge areas due to the flood planning levels. Refer to additional comments above relating to clause D1.10.  *Figure 13: Proposed Internal and Boundary Gates*
E1.3 ***Fire Hydrant System***	All buildings greater than 500m^2 are required to be provided with compliant Fire Hydrant coverage in accordance with AS2419.1-2005 based on BCA 2019 Amdt.1 applying to the development. As part of the new works operational compliance issues where readily apparent are to be addressed, including: + Existing external hydrants not provided with Stroz couplings complying with AS 2419.3 + External hydrants located less than 10m from the external wall of a buildings it serves, + Installation of FH booster assembly and/or pumpset where required to achieve sufficient pressure and flow; + Location of FH outlets are to be not more than 20m from a fire brigade pumping hardstand or as otherwise required subject to the installation of a booster assembly, No service records have been provided to indicate whether the required hydraulic capacity can be achieved and sustained in the event of pressurisation by FRNSW. The usability of the current system is not confirmed and requires further clarification by the hydraulic consultant.

	General Note As part of the proposed works a compliant Fire Hydrant system is to be provided to serve all new buildings in accordance with the requirements of E1.3 of the BCA, AS2419.1-2005 or as modified by the fire engineering report. FH coverage diagrams showing the location of the proposed outlets will need to be provided for review and comment prior to Crown Certificate stage. **Performance Solution** The following matters are to be addressed under a fire engineered Performance Solution where compliance with BCA clause E1.3 and AS2419.1-2005 cannot be achieved: + The location of the fire hydrant booster is not within sight of the main entrance to Block Z, or adjacent to the main vehicular entry to the site. Details are to be provided prior to Crown Certificate stage, with the abovementioned non-compliances addressed under a fire engineering report.
E1.4 ***Fire Hose Reel System***	Fire hose reel(s) are to be provided to serve Class 9b parts, to the exclusion of classrooms and associated corridors, where the fire compartment is 500m2 or more. **General Note** Fire hose reels are not required for Block X and Z.
E1.6 ***Portable Fire Extinguishers***	**General Note** Portable fire extinguishers are required throughout the building in accordance with Table E1.6 of the BCA, in addition to the more stringent EFSG requirements, the BCA requires PFE to cover Class A fire risk in classrooms and associated corridors. PFEs are to be provided throughout the development in accordance with AS 2444-2001. The designer is to be mindful of the requirements of Clause 4.2.1 of AS 2444-2001 which specifies that fire extinguishers be located within 15m of any point within the school building. Furthermore, it is recommended that the Fire Services Designer review that the requirements of EFSG Specification Guide SG573, noting that there is an opportunity when documenting extinguisher types and locations to address compliance with both EFSG and BCA.
E4.2-E4.8 *Emergency lighting and Exits Signs:*	Emergency lighting and exit signage to be installed in accordance with AS 2293.1-2018. **General Note** Exit/directional will need to be installed throughout the existing buildings in accordance with AS2291.1-2018, with consideration of required travel distances as required to comply with Part D of the BCA. Existing signage will need to be updated throughout where impacted by the proposed works albeit through modification of the paths of travel, affecting coverage or the like.
F1.4 *Weatherproofing*	The transition between external and internal areas not to incorporate a step, with consideration of the requirements of AS 4654.1& 2-2012 and AS3500.3-2018, where required drainage is to be provided to the sub-sill with a linear grate and drain system before the sub-sill to mitigate water ingress into the building. **General Note** Compliance is readily achievable. A Performance Solution report is to be provided prior to Crown Certificate stage.
F1.9 **F1.12** *Damp-proofing and Subfloor Ventilation*	The subfloor space beneath buildings is to be provided with damp proofing and ventilation to mitigate rising damp from affecting building elements and amenity of the internal space. **General Note** Compliance is readily achievable. Details are to be provided prior to Crown Certificate stage.
F2.3 *Sanitary Facilities*	Confirmation of the total student population is to verify that the proposed sanitary facilities will cater for the student population. Details demonstrating compliance will need to be provided for review and comment.

Confirmation of the total staff population and the location of existing sanitary facilities that will serve the staff population is required.

F2.3 of the BCA requires separate student and staff sanitary compartments to be provided.

We note that EFSG requirements for sanitary facilities are significantly in excess of those required under the BCA. Nevertheless, to confirm compliance with BCA Clause F2.3, we provide the below tables for your information:

Required Sanitary Facilities– Class *9b School Employees*						
	Closet Pans		**Urinals**		**Washbasins**	
	Population	**Required Facilities**	**Population**	**Required Facilities**	**Population**	**Required Facilities**
Male	1 – 20	1	1 – 10	0	1 – 30	1
	>20	Add 1 per 20	11 – 20	1	>30	Add 1 per 30
			21 – 45	2		
			>45	Add 1 per 30		
Female	1 – 5	1	-	-	1 – 30	1
	>5	Add 1 per 15	-	-	>30	Add 1 per 30

Required Sanitary Facilities– Class *9b School Students*						
	Closet Pans		**Urinals**		**Washbasins**	
	Population	**Required Facilities**	**Population**	**Required Facilities**	**Population**	**Required Facilities**
Male	1 – 25	1	1 – 50	1	1 – 10	1
	26 – 75	2	51 –100	2	11 – 50	2
	76-150	3	>100	Add 1 per 100	51 – 100	3
	151 – 200	4			>100	Add 1 per 75
	>200	Add 1 per 100				
Female	1 – 10	1	-	-	1 – 10	1
	11 – 25	2	-	-	11 – 50	2
	26 – 100	Add 1 per 25	-	-	51 – 100	3
	>100	Add 1 per 50	-	-	>100	Add 1 per 75

Further Information / Performance Solution

Where an unisex ambulant sanitary facility is provided at an accessible bank of toilets, in lieu of separate male and female ambulant facilities being provided, this is to be addressed under a Performance Solution by the project access consultant – this is apparent in Block X (refer to below).

Additionally, where ambulant facilities are to be nominated as unisex, such as where two (2) ambulant facilities are proposed in Block Z, this is to be addressed via a Performance Solution in lieu of satisfy the requirements of the deemed-to-satisfy provisions.

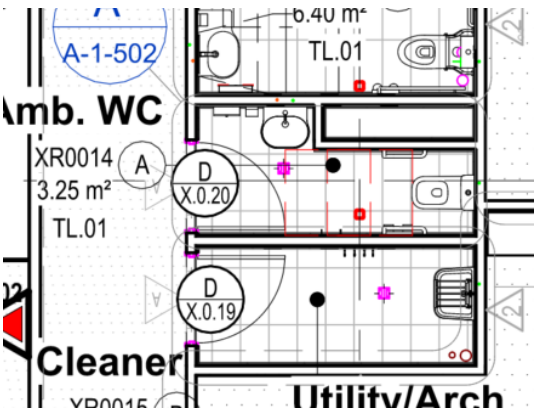


Figure 14: Block X – Ambulant WC

F4.1 & F4.2
Natural lighting

General Note

Natural lighting is required to be provided to all general-purpose classrooms.

The Block Z Support Learning Space 1 and Learning Commons 1 achieve adequate natural light where the location of mechanical plant adjacent to the northern façade does not enclose the covered veranda serving the building with sufficient light transmitting to the external windows.

Where any changes are proposed to the mechanical plant enclosure to satisfy acoustic requirements, the architect is to review and ensure compliance in this regard.

Figure 15: Block Z - Mechanical Plant Proposed in front of Classroom Window

F4.8, F4.9

Restriction on location of sanitary compartment

Sanitary compartments must not open directly into a room used for public assembly in a school other than a primary school unless access is via an airlock, hallway or other area of not less than 1.1m2 and fitted with self-closing doors to all access doors or the sanitary compartment is to be provided with mechanical exhaust ventilation and the door way to the room is to be adequately screened from view.

Performance Solution

Currently the sanitary compartments open directly up into learning commons particularly areas used for areas used for public assembly, and office areas where more than one person would normally occupy the space.

In this regard, either a hallway or a screen with a self-closing doorway and sufficient mechanical exhaust is to be provided to the sanitary compartments.

Where proposed to be addressed under a Performance Solution, a suitably qualified mechanical consultant is to provide expert judgement and/or a comparative assessment to determine the adjacent spaces are not adversely affected by objectionable odours – this may be achieved with suitable exhaust rates being provided to the mechanical exhaust system and self-closing doorways between the relevant parts.

Details are to be provided at Crown Construction stage.

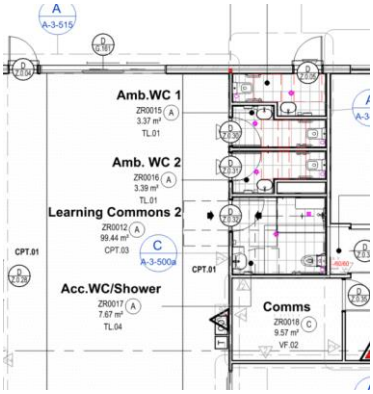


Figure 16: Block Z – Sanitary facilities

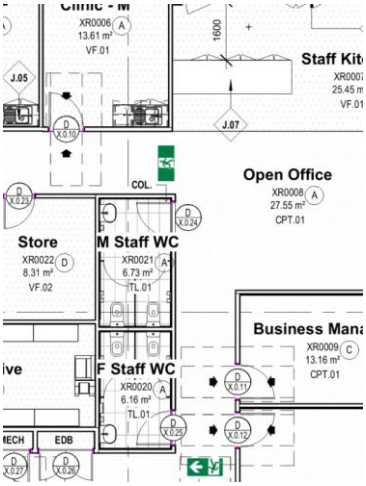


Figure 17: Block X - Sanitary facilities

NSW G5.2

Bushfire Protection

A Class 9 building located in a *designated bushfire prone area* must comply with the following:

+ AS 3959 – subject to Planning for Bush Fire Protection and Section 9 Construction for Bushfire Attack Level FZ.
+ the requirements of (a) above as modified by the development consent following consultation with the NSW Rural Fire Service under section 4.14 of the Environmental Planning and Assessment Act 197, or
+ the requirements of (a) above as modified by development consent with a bushfire safety authority issued under section 100B of the Rural Fires Act 1997 for the purposes of integrated development.

Further Information

The development consent is subject to consultation with NSW Rural Fire Services, as determined in the final consent the requirements of the BSA are to be incorporated into the design – including but not limited landscaping, vehicular access, bushfire construction and hydraulic fire infrastructure.

This is to be assessed at the Crown Certificate stage, in accordance with conditions of the development consent.

Section J

Energy Efficiency

Independent Section J/JV3 consultant to be engaged to provide advice with respect of compliance. Where a JV3 approach is proposed a copy of the report is to be provided to BM+G for review and comment.

CONCLUSION

This report contains an assessment of the referenced existing buildings and architectural documentation for the proposed works at the Hunter River High School, against the relevant provisions of the Building Code of Australia 2019 Amdt.1, Volume 1 (BCA).

Arising from the assessment, key compliance issues have been identified that require further resolution, either by way of Performance Solutions or plan amendments. Subject to resolution of these matters, it is considered that the proposed development can readily achieve compliance with the BCA subject to resolution of the matters identified under Section 3 of the report and further design development.

APPENDIX 1- REQUIRED CONSTRUCTION & FRLs OF BUILDING ELEMENTS

BCA SPEC. C1.1 TABLE 5 - TYPE C CONSTRUCTION

Building element	Class of building—FRL: (in minutes) *Structural adequacy / Integrity / Insulation*			
	2, 3 or 4 part	**5, 7a or 9**	**6**	**7b or 8**
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
1.5 to less than 3 m	–/–/–	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
INTERNAL WALLS—				
Bounding *public corridors*, public lobbies and the like—	60/60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—	60/60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated—	60/60/ 60	60/60/60	60/ 60/ 60	60/ 60/ 60
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Notes:

1. New external walls that are located 1.5m or more from an allotment boundary / fire source feature require no FRL's.
2. An external wall required to have an FRL is only required from the outside.
3. Any lightweight construction in a fire wall or an internal wall required to have an FRL is to comply with Specification C1.8.
4. Any insulation installed in the cavity of the wall is required to be non-combustible.
5. Where a combustible material is used as a finish or lining to a wall or roof, or awning, to a building element required to have an FRL, the material must comply with the fire hazard properties prescribed under BCA Specification C1.10 and it is not located directly above an exit so as to make the exit unusable and does not otherwise constitute an undue risk of fire spread via the façade of the building.
6. Any internal loadbearing wall or column is required to achieve an FRL of not less than 90/90/90.
7. The floor separating the two storeys is required to achieve an FRL of not less than 90/90/90 to achieve separate fire compartments.
8. No structural elements are permitted to pass through fire-rated walls.
9. Fire rated shafts are required to be enclosed at the top and bottom by construction having an FRL of not less than what the shaft requires.