BLACKETT MAGUIRE+ GOLDSMITH

BCA ASSESSMENT REPORT

SMALLS ROAD SCHOOL DEVELOPMENT

Prepared for:

NSW GOVERNMENT | Education

August 2017

Ref.: 160339

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BUILDING CODE OF AUSTRALIA ASSESSMENT
Smalls Road School Development

Blackett Maguire + Goldsmith Pty Ltd have been engaged to undertake an assessment of the DA design documentation for the proposed development at Smalls Road, Ryde, being the site of the prior Ryde High School against the requirements of the Building Code of Australia 2016 (BCA).

REPORT OBJECTIVES

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 109R of the Environmental Planning and Assessment Act, 1979* and/or, clause 145 of the *Environmental Planning & Assessment Regulation 2000*; and

c) accompany the Development 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 96 (or s75W) 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.

REFERENCED DOCUMENTATION

Our assessment of the concept design documentation was based on the following:

+ Building Code of Australia 2016 (BCA)
+ Guide to the Building Code of Australia 2016 (BCA Guide)
+ Architectural plans prepared by Conrad Gargett Ancher Mortlock Woolley as referenced in Appendix 4 of this report.

PROJECT TEAM

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

+ Brian Maguire - Project Team Leader
+ Patrick Cameron - Building Surveyor

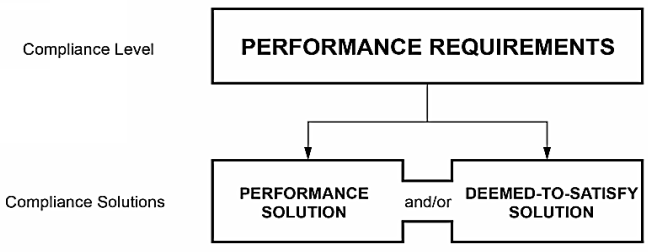
ASSESSMENT METHODOLOGY

The Performance Requirements can only be satisfied by a:

a) Performance Solution; or

b) Deemed-to-satisfy Solution; or Complying with the Deemed-to-satisfy (DTS) Provisions; or

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



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.

PROPOSED DEVELOPMENT

Blackett Maguire + Goldsmith Pty Ltd (BM+G) have been commissioned by Conrad Gargett Ancher Mortlock Woolley (CGAMW) to undertake a BCA assessment of the proposed development which comprises of:

+ Construction of a new three (3) storey educational building containing the following:
  - Ground Floor: Staff offices, staff room and amenities; library; communal hall; Canteen; OOSH; Sports & PE Store and new external on-grade carpark
  - Level 1: Student homebases (classrooms), library; COLAs; amenities and covered walkway
  - Level 2: Student homebases (classrooms); COLAs; amenities and covered walkway.

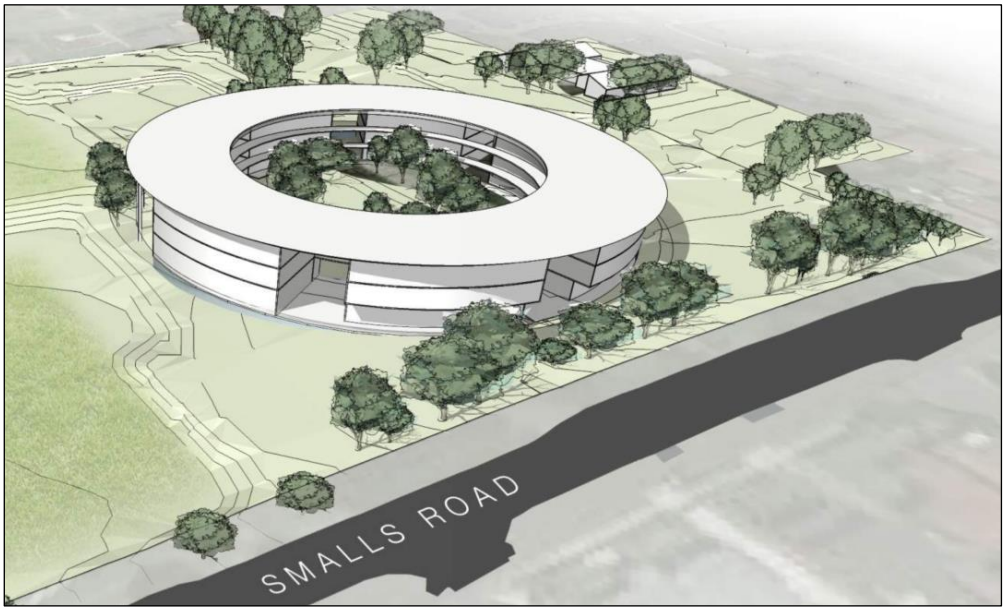


Figure 1: Smalls Road 3D Perspective

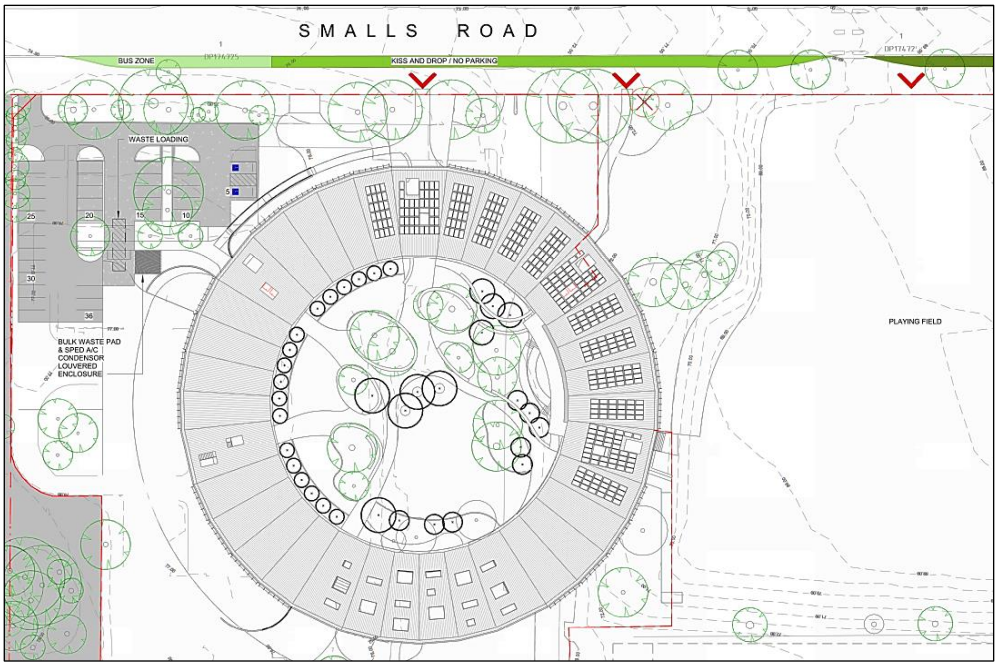


Figure 2: Site Plan

BUILDING CLASSIFICATION

The following table presents a summary of relevant building classification items of the proposed development:

+ **BCA Classification:**	Class 5 (School office part) Class 9b (School Assembly building)
+ **Rise in Storeys:**	Three (3)
+ **Effective Height:**	Less than 12m
+ **Type of Construction:**	Type A
+ **Climate Zone:**	Zone 5
+ **Floor Area / Volume Limitations**	8,000m^2 / 48,000m^3 (complies)*

**Note: The building is considered to have fire compartmentation floor by floor. Accordingly there are 3 fire compartments in the building, each being less than 8,000m2.*

FIRE SOURCE FEATURE

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

BOUNDARY	DISTANCE TO FIRE SOURCE FEATURE
North East	>6m to the Canteen Building
North West	0m to the allotment boundary adjoining the play field (confirmation of this boundary is to be confirmed)
South East	>6m to the far side of Lavarack Road
South West	>3m to the allotment boundary (the louvered enclosure is a Class 10a structure and as such is not a fire source feature)

SUMMARY OF KEY COMPLIANCE ISSUES

The following comprises a summary of the key compliance items identified in the report that will need to be addressed prior to issue of the Crown Certificate:

BCA CLAUSES		DESCRIPTION
1.	Spec. C1.1	A **Fire Engineered Performance Solution** may be pursued to justify not fire rating the external columns supporting the roof above the assembly area to achieve the required 120/-/- FRL as required by Table of Specification C1.1.
2.	C2.6	Spandrel protection is required. Architectural elevations are to be provided for assessment.
3.	C3.2	Where interallotment boundaries are not proposed to be extinguished, and is within 3m of the subject building, we recommend this be subject to a **Fire Engineered Performance Solution** to justify proximity to a fire source feature.
4.	D1.3 / D1.7	A **Fire Engineered Performance Solution** is proposed to be developed to permit the stairs which connect 3 storeys to be constructed without fire isolating shafts. The following is required for the path of travel from the point of discharge of the exit stairs: + The covered areas are required to achieve a minimum ceiling height of 3m. + Walls which are within 6m of the path of travel from the stair to the road are to be of construction which achieves an FRL of 60/60/60 and openings within this wall are to be protected in accordance with Clause C3.4, this will require -/60/30 self-closing fire doors
5.	D1.4	Travel distance exceeds the maximum 20m to a point of choice between alternative exits and 40m to one of those alternative exits in the following areas + Ground Floor - Distance to a point of choice between alternative exits from the KLA Resource Room (G-01) is up to 25m in lieu of the maximum 20m permitted. + Level 1 - Distance to an alternative exit from Homebase (1-55), Special Program room (1-02), and COLA (X1-01) is up to 46m in lieu of the maximum 40m permitted. + Level 2 - Distance to an alternative exit from Homebase (2-03), Homebase (2-39) and COLA (X2-01) is up to 45m in lieu of the maximum 40m permitted. This will need to be addressed by way of amended design or a **Fire Engineered Performance Solution**
6.	D1.5	The travel distances between alternative exits are proposed to addressed as a **Fire Engineered Performance Solution**, noting that they exceed the maximum 60m apart (measured back through the point of choice) as follows: + Ground Floor – Up to 81m + Level 1 – Up to 80m + Level 2 - Up 75m
7.	D2.16/ D2.17	Particular attention is to be given to the interface between barriers (balustrades) and handrails noting that no horizontal or near horizontal members are permitted on or near the balustrade within the zone of 150mm to 760mm above FFL and all stairs require handrails to both sides which include: + one handrail fixed at a height of not less than 865mm; and + a second handrail fixed at a height between 665mm and 750mm
8.	D3	The proposed double leaf doors are to be reviewed, noting that one of the door leaves must have a clear width of not less than 850mm.
9.	E1.3	A fire hydrant system is required to be provided in accordance with AS2419.1-2005. Details are to be provided with respect to the location of the fire hydrant booster assembly and its proximity to the building.

BCA CLAUSES		DESCRIPTION
10.	F2.3/ F2.5	Further detail is required to be provided with regard to the use requirements of the proposed Assisted Amenities (1-40), noting that there is no gender designation and the compartment layouts do not comply with the requirements of Clause F2.5
11.	F2.4	The following will need to be resolved by way of amended design or a **Performance Solution** from an Accredited Access Consultant: + The bank of sanitary facilities (G-39) located within the staff office area at the Ground Floor Level will need to be designated for either male or female use. + The proposed accessible WC (G-43) located between the Sick Bay (G-44) and the Interview Office (G-42) will need to be relocated to bank of staff sanitary facilities (G-39). Alternatively, the location will need to be addressed as a Performance Solution from an Accredited Access Consultant. + The ambulant sanitary facilities located next to the Performance Store at the Ground Floor Level will need to be designated for either male or female use.
12.	F4.8	The proposed sanitary facility (G-05) which opens in to the Ground Floor Level Library Office (G-04) will need to be relocated unless provided with an airlock, or unless the WC is provide with mechanical exhaust, and the door is screened from view.

BUILDING CODE OF AUSTRALIA ASSESSMENT

SECTION B – STRUCTURE

Part B1 Structural engineering details prepared by an appropriately qualified structural engineer are to be provided to demonstrate compliance with Part B1. This will include the following Australian Standards (where relevant):

+ AS 1170.0 – 2002: General Principles
+ AS 1170.1 – 2002
+ AS 1170.2 – 2011: Wind Actions
+ AS 1170.4 – 2007: Earthquake Actions
+ AS 1288 – 2006, Glass in Buildings
+ AS 2047-2014: External Glazing
+ AS 3700 – 2011: Masonry Structures
+ AS 3600 – 2009, Concrete Structures
+ AS 4100 – 1998: Steel Structures
+ AS 4600 – 2005: Cold Formed Steel Structures.

SECTION C – FIRE RESISTANCE AND COMPARTMENTATION

The building will comply with the Performance Requirements of the BCA, having regard to the following specific matters being addressed:

Clause C1.1 (Fire Resisting Construction) All building elements are to achieve the required FRL in accordance with Table 3 in BCA Specification C1.1 for Type A Construction as applicable to Class 5 and Class 9b (See Appendix 1). In this regard the following is noted with respect to our assessment of the development:

+ Due to the fact that the building is required to be constructed of Type A Construction, the FRL to building elements applies in both directions i.e. FRL must be achieved from both sides of the external wall. Note: Non-loadbearing external walls need not be fire rated, with the exception of the spandrel protection portion.
+ All loadbearing walls are to be of concrete and/or masonry construction.
+ The following non-loadbearing elements are to be of non-combustible construction:
  - Internal walls required to be fire-resisting; and
  - A lift, ventilating, pipe, garbage, or similar shaft that is not for the discharge of hot products
+ Should external cladding be proposed, it will need to be assessed for its ability to comply with BCA Spec C1.1, namely:
  - Clause 2.4 where the product is proposed as an attachment to a wall;
  - Non-combustible construction where it forms part of the external wall.

Clause C1.10 (Fire Hazard Properties) Fire hazard properties for all floor, wall and ceiling linings within the building are to comply with BCA Specification C1.10 with regard to smoke development rates, critical radiant flux and group ratings. In this instance, the following fire hazard properties apply:

+ Floor linings and coverings must achieve a Critical Radiant Flux of not less than 2.2kW/m^2 and a maximum smoke development rate of 750 percent-minutes;
+ Wall and ceiling linings are to achieve a material group number as specified in the table below and Smoke Growth Rate Index of not more than 100 or an Average Specific Extinction Area less than 250 m2/kg.

Class of building	Fire-isolated exits and fire control rooms	Public corridors		Specific areas		Other areas
	Wall/ceiling	Wall	Ceiling	Wall	Ceiling	Wall/ceiling
Class 5, 6, 7, 8 or 9b *schools*						
Unsprinklered	1	1, 2	1, 2	1, 2, 3	1, 2	1, 2, 3
Sprinklered	1	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3

Note: With respect to a Class 9b school the reference to "Specific areas" in the table above means classrooms

+ Rigid and flexible ductwork must comply with the fire hazard properties in AS 4254 Parts 1& 2.
+ Sarking material must achieve a Flammability Index of not more than 5.

Clause C2.2 (Compartmentation) The proposed development complies with the maximum floor area and volume limitations of 8,000m^2 / 48,000m^3.

Clause C2.6 (Spandrels) Spandrel protection is required for external walls at Level 1 and 2. Compliance is readily achievable, architectural elevations are required to demonstrate compliance through the provision of either:

- A vertical spandrel which achieves an FRL of 60/60/60 having an overall height of 900 mm or more, extending at least 600 mm or more above the upper surface of the intervening floor, and;
- A horizontal projection (balcony) which achieves an FRL of 60/60/60 having an outwards projection from the external face of the wall of 1100 mm or more, and an extension along the wall beyond the openings of at least 450 mm

Note: Within the context of this clause, a window or other opening means any part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

C2.10 (Separation of Lift Shafts) The proposed lifts must be separated from the remainder of the building by an enclosing shaft which complies with Specification C1.1 i.e. the shaft walls and lift must be of construction which achieves an FRL of 120/120/120 if loadbearing or -/120/120 if non-loadbearing. Compliance is readily achievable noting that the lifts are indicated to be within their own shafts.

C2.12 (Separation of Equipment) Equipment such as the following is required to be fire separated from the remainder of the building by construction achieving an FRL of 120/120/120:

- Lift motors/control panels;
- Emergency generators – emergency equipment in emergency mode;
- Central smoke control plant;
- Boilers;
- Battery or batteries installed in the building that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours
- On-site fire pumps

Details are to be provided for any such rooms contained within any of the buildings.

Clause C2.13 (Electricity Supply) Any switchboard sustaining emergency equipment operating 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.

Clause C3.2 (Protection of openings) Openings with a distance of less than 6m to a fire-source feature and 3m to the boundary are required to be protected in accordance with Clause C3.4. In this instance, there is no exposure to the side or rear boundaries of the allotment, however it is noted that there may be an existing historical inter-allotment boundary adjacent to the eastern portion of the new building (between the sports fields). If this is not proposed to be extinguished via a lot consolidation we recommend a ***Fire Engineered Performance Solution*** be formulated to justify the encroachment, based on the common ownership of the two allotments and the unlikelihood of this ever being built upon.

Clause C3.12 / C3.13 (Openings in floors and ceiling for services / and openings in shafts) Openings to service shafts are required to be protected by -/30/30 panel (if in a sanitary compartment), or a self-closing--/60/30 fire door, or a -/60/30 access panel. If the shaft is a garbage shaft, a door hopper of non-combustible construction is permitted to be installed. Architect to document the fire separating construction around the service shafts on the compartmentation plan accordingly.

Clause C3.15 (Openings for Service Installations) Where service installations penetrate walls or floors required to have an FRL, they are to be protected by fire seals having an FRL with respect to integrity and insulation of the building element concerned. Fire Seals are to comply with the requirements of BCA Clause C3.15 noting the following:

- Fire seals needs to have been tested on the substrate it has been used on i.e. concrete, masonry, fire rated plasterboard, Hebel etc. – a fire stopping system tested in masonry cannot be relied upon for use in Hebel.
- The maximum size of the services and the penetrations cannot exceed those tested.
- The fire stopping system needs to be used in the same orientation that it has been tested on i.e. floor or wall. A fire stopping system tested through a wall only cannot be relied upon when used for a service penetrating a floor.
- The fire stopping system needs to have been tested on the service it is used to seal i.e. metal pipes, UPVC/PVC pipes, conduits, electrical cables etc. A fire stopping system tested on a PVC pipe cannot be relied upon for cables.

- The test fire stopping system needs to include all elements specified to achieve the required FRL i.e. intumescent wraps are commonly required/used to achieve the insulation value (when required) for metal pipes, cable trays and large bundles of cables.
- Where the mechanical ventilation system penetrates floors or walls that require an FRL, the installation is to comply with AS/NZS 1668.1 - 2015.

SECTION D – ACCESS AND EGRESS

The proposal demonstrates that compliance with the Performance Requirements of Section D of the BCA is readily achievable, noting the following:

Clause D1.2 (Number of Exits) Each storey within the building is served by not less than two (2) exits thereby satisfying the minimum requirements for a Class 9b building.

Clause D1.3 (Fire Isolated Exits) Stairs in a Class 5 or 9b building which connect or pass through more than 2 storeys are required to be fire isolated. In this instance, it is understood that a ***Fire Engineered Performance Solution*** is proposed to be developed to permit the stairways within the building which connect 3 storeys to be constructed without fire isolating shafts.

Clause D1.4 (Exit Travel Distances) Travel distances to exits within the building have been assessed as complying with the DTS provisions of the BCA (namely all parts of the floor are within 20m of a point where a choice of alternative exits is available; and no further than 40m to one of those alternative exits) with the exception of the following areas which will need to be addressed by way of amended design or a ***Fire Engineered Performance Solution***:

- Ground Floor - Distance to a point of choice between alternative exits from the KLA Resource Room (G-01) is up to 25m in lieu of the maximum 20m permitted.
- Level 1 - Distance to an alternative exit from Homebase (1-55), Special Program room (1-02), and COLA (X1-01) is up to 46m in lieu of the maximum 40m permitted.
- Level 2 - Distance to an alternative exit from Homebase (2-03), Homebase (2-39) and COLA (X2-01) is up to 45m in lieu of the maximum 40m permitted.

Note: Hinged doors are require at both ends of the undercroft spaces (G-29 & G-32) to ensure that the distance to a point of choice between alternative exits is less than 20m.

Clause D1.5 (Distance between alternative exits) The travel distances between alternative exits are proposed to addressed as a ***Fire Engineered Performance Solution***, noting that they exceed the maximum 60m apart (measured back through the point of choice) as follows:

- Ground Floor – Up to 81m
- Level 1 – Up to 80m
- Level 2 - Up 75m

Clause D1.6 (Dimensions of Exits and paths of travel to Exits) The dimensions of exits and paths of travel to exits are to achieve a minimum 2m height and 1m width. In this instance compliance is readily achievable. Note: All new doorways must have a minimum clear width of 850mm.

Clause D1.7 (Travel via Fire Isolated Exits) 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 an FRL of not less than 60/60/60 and 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. In this instance, the following is required:

- The covered area in which stairs discharge are required to achieve a minimum ceiling height of 3m.
- Walls which are within 6m of the path of travel from the stair to the road are to be of construction which achieves an FRL of 60/60/60, openings within this wall are to be protected in accordance with Clause C3.4, this will require -/60/30 self-closing fire doors

Note: Where the above cannot be achieved, consideration may be given to a ***Fire Engineered Performance Solution.***

Clause D1.8 (External stairways in lieu of fire-isolated exits) This clause is not applicable.

Clause D1.9 (Travel via Non-Fire Isolated Exits) This clause is not applicable

Clause D1.10 (Discharge from Exits) The path of travel from open space to the road must have an unobstructed width of not less than the minimum width of the required exit or 1 m (whichever is the greater). Where the exit discharges to open space that is at a different level than the public road to which it is connected, the path of travel to the road must be by on grade ramps and/or stairs that comply with BCA Clauses D2.13 and D2.17.

Clause D2.2 (Fire Isolated Stairways and Ramps) A stairway or ramp, including landings that are required to be within a fire-resisting shaft must be constructed of non-combustible materials to protect the structural integrity of the shaft

Clause D2.3 (Non-fire Isolated Stairways and Ramps) In a building with a rise in storeys of more than 2, required non-fire-isolated stairways and ramps must be either constructed in accordance with D2.2 or –

- Reinforced or prestressed concrete; or
- Steel at least 6mm thick at all points; or

Timber that has a finished thickness of at least 44mm, has an average density of at least 800 kg/m^3 at a moisture content of 12% and has not been joined by means of glue unless it has been laminated and glued with resorcinol/phenol formaldehyde.

Note: Not applicable to this building. See D2.2 above.

Clause D2.7 (Installations in Exits and Paths of Travel) The construction of Electrical Distribution Boards within the building is to be in accordance with BCA Clause D2.7 with the enclosure bounded by a non-combustible or fire protective covering and smoke seals provided around the perimeter of the doors in each case.

Clause D2.8 (Enclosure of Space under Stairs and Ramps) The space below the required non-fire-isolated stairways must not be enclosed to form a cupboard or other enclosed space unless:

- the enclosing walls and ceilings have an FRL of not less than 60/60/60; and
- any access doorway to the enclosed space is fitted with a self-closing -/60/30 fire door.

Compliance is readily achievable, noting that the current design does not indicate that under stair storage is proposed.

Clause D2.13 (Treads and Risers) All stairs to, around and within the building are to have solid risers, and are to have contrast nosings throughout in accordance with Clause 11.1 of AS1428.1-2009, Furthermore the stairs are required to be slip resistant in accordance with the requirements of Table D2.14 when tested in accordance with AS4586-2014.

	Riser (R)	Going (G)	Quantity (2R+G)
Maximum	190	355	700
Minimum	115	250	550

Clause 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 a non-slip finish throughout or an adequate non-skid strip near the edge of the landing where it leads to a flight below.

Clause D2.15 (Thresholds): Doors must not have a ramp or step closer to the door that the width of the door leaf except where opening to open space, where the change in level may be a maximum of 190mm (applying generally to fire isolated exit doors only).

Note: See D3 below for thresholds throughout 'Accessible Spaces', including the interface at the balconies, and also the entry/exit doors.

Clause D2.16 (Barriers) Barriers to prevent falls (Balustrades) are to be provided to all stairways, floors, corridors, etc. where the fall to the level below is more than 1m in height. Barriers are to comply with Table D2.16a including the following:

- Achieve a minimum height of a balustrade is 1m above the floor of the landing, walkway or the like; and 865mm above the floor of a stairway or a ramp and not permit a sphere of 125mm diameter to pass through.
- Where the floor is more than 4m above the surface beneath the balustrade, any horizontal or near horizontal members between 150mm and 760mm above the floor must not include horizontal or near horizontal members that could facilitate climbing.

Note: Particular attention will need to be paid to the interface between handrails and barriers at Level 2 of the building noting the need for two handrails to stairs (one fixed at a height between 665 mm and 750 mm)

+ For windows where the floor is more than 4m above the surface beneath, the window sill must be a minimum of 865mm in height above the height of the floor surface.

Clause D2.17 (Handrails) 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.

Clause D2.19 (Doorways and doors) Based on the open design of the building, it is understood that there will be no sliding doors serving as a required exit. Notwithstanding, should sliding doors be proposed as a required exit, the door must be able to be opened manually under a force of not more than 110N and open automatically if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door. Refer to comments under Part D3 for accessibility requirements for the proposed sliding doors to the upper levels.

Clause D2.20 (Swinging doors) A swinging door in a required exit or forming part of a required exit must swing in the direction of egress. The current design indicates compliance has generally been achieved.

Clause D2.21 (Operation of latch) Hinged doors in a path of travel to an exit must be readily openable without a key from the side that faces a person seeking egress and have a single handed downward action of pushing action on a single device located between 900mm and 1100mm from the floor.

Part D3 (Access for people with Disabilities) Access for persons with a disability will be provided to address BCA Part D3. In this instance, it is understood that an Accredited Access Consultant will be engaged to assess compliance for both Part D3 provisions and the DDA Access to Premises – Buildings Standards.

The following matters at a minimum will need to be addressed:

+ Access from the street to the principal pedestrian entrance of the building is to be provided in accordance with AS1428.1-2009.
+ All new doors to an within are required to have a clear width of not less than 850mm and comply with the circulation space requirements under AS 1428.1 - 2009.
+ Where an entry door is proposed to have multiple door leaves (except an automatic opening door) one of the door leaves must have a clear width of not less than 850mm.
+ The door thresholds to external areas cannot contain any step or change in level exceeding 3mm.
+ 30% luminance contrasts are to be provided to all new doorways e.g. contrasting between door leaf & jamb; or door leaf & wall; or architrave & wall; or door leaf & architrave and/or door jamb & adjacent wall.
+ All frameless glass panels or fully glazed doors on an accessway are to be clearly marking in accordance with AS 1428.1/AS1288. In this instance, all frameless glass panel or fully glazed doors, including glazing capable of being mistaken for a doorway or opening, shall be marked with a full width solid non transparent contrast line not less than 75mm wide is
+ Walking surfaces to be slip resistant and certification in respect to the slip resistance of any tiles and vinyl will be required at the Occupation Certificate stage to verify compliance with AS/NZS 4586.
+ Every accessible stairway in the building is required to satisfy requirements under Clause 11 of AS 1428.1 – 2009. This includes, contrast stair nosing's 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. This includes the fire EXIT stairs.

- Handrails are required to both sides of the exit stairs with 300mm extensions (top) and 1 tread width +300mm extensions (bottom) and full 180 degree turn downs in accordance with Section 11 of AS1428.1-2009.
- Tactile Ground Surface Indicators are to be provided to all stairs in a building (with the exception of fire isolated exit stairs) required to be accessible. In addition, tactile indicators will need to be provided to an accessway meeting a vehicular way adjacent to a pedestrian entry if there is no kerb or kerb ramp.
- All door hardware, light switches and GPO's controls are to comply with Sections 13 and 14 of AS1428.1-2009 respectively.
- Braille tactile signage is to be provided to all exits

SECTION E – SERVICES AND EQUIPMENT

Clause E1.3 (Fire Hydrants) A fire hydrant system is required to be provided for the Main Building in accordance with AS2419.1-2005 (as the floor area exceeds 500m^2). Fire Hydrant landing valves are to be located within 4m of the exit i.e. the nosing of the first riser of the stairs to level 1 & 2 and the designated exits at the ground level (i.e. the point where the building/roof over ceases is considered to be an exit at ground level.

Details are to be provided with respect to the location of the fire hydrant booster assembly and its proximity to the building.

Clause E1.4 (Fire Hose Reels) Fire hose reels are not required to serve the Homebases or new class rooms and associated corridors within the building. However, they are required to serve other uses within the New Building including the Hall, Administration and staff areas and Library at the ground floor level and will need to be located within 4m of an exit.

Clause E1.6 (Potable Fire Extinguishers) Portable fire extinguishers (PFE) are required to be provided as listed in Table E1.6, to serve the building in accordance with AS 2444-2001.

Clause E2.2 (Smoke Hazard Management) A fire detection and alarm system is not required due to the rise in storeys of the building being less than 4. However, a smoke detection system (allowing for early detection and warning to occupants in the building) may be proposed as part of the Fire Engineering for the proposed egress provisions and the stair design.

Note 1: Should a ducted air-handling system (other than non-ducted air-handling systems serving single enclosures) be designed to the new building, the system must be shut down automatically upon the activation of smoke detectors installed complying with Cl. 5 of Spec. E2.2a, i.e. AS1668.1-2015).

Note 2: The proposed hall is provided with a stage. Unless that stage area (which the calculation can exclude the access steps and an access ramp) is a maximum floor area of 50m^2 it will require automatic smoke exhaust (noting that smoke and heat vents will not apply to the ground floor of a multi storey building).

Part E3 (Lifts) This building does not exceed 12m in effective height and therefore a stretcher facility in the lift is not required.

The lift is required to comply with Clause E3.3 for warnings in fire; E3.5 for Landings; E3.6 for accessibility and AS1725.2 generally.

Clause E4.2 (Emergency Lighting) Emergency lighting is required to be provided in accordance with AS/NZS 2293.1-2005.

Clause E4.5/E4.6 (Exit Signs) Exit and directional exit signage is required to be provided in accordance with AS2293.1.

SECTION F – HEALTH AND AMENITY

The proposal demonstrates that compliance with the DTS provisions of Section F of the BCA is readily achievable subject to the following:

Clause F1.1 (Stormwater drainage): Stormwater drainage must be installed as per AS 3500.3 - 2003.

Clause F1.5 (Roof coverings): A 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/NZS 4256 parts 1, 2 3 and 5 and AS/NZS 1562.3.
- Asphalt shingles complying with ASTM D3018-90 class A.

Clause F1.6 (Sarking): Sarking must be installed to roof and walls for weatherproofing as per AS/NZS 4200.1 and 2 - 1994.

Clause F1.7 (Waterproofing of wet areas): Wet areas in the building are required to comply with AS 3740-2004.

Clause 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

Part F2 (Sanitary and Other Facilities) A preliminary calculation of the maximum population number for students has been completed based on sanitary facilities noted within the building. The proposed sanitary facilities will allow for a maximum population of 2600 Students: (1150 Male and 1450 Female) and 70 Employees (20 Male and 50 Female) as noted below:

Occupant type		Facilities provided		Maximum Population
Employees	Male	Closet Pans =	2	20
		Urinals =	1	
		Washbasins =	3	
	Female	Closet Pans =	4	50
		Washbasins =	4	
Students	Male	Closet Pans =	15	1150
		Urinals =	16	
		Washbasins =	17	
	Female	Closet Pans =	32	1450
		Washbasins =	22	

Clause F2.4 (Facilities for people with disabilities) The project's access consultant will need to review the proposed design and sanitary compartment layouts for accessible and ambulant sanitary facilities to confirm compliance with AS1428.1-2009. However, the following is noted with respect to the proposed sanitary facilities:

- The bank of sanitary facilities (G-39) located within the staff office area at the Ground Floor Level will need to be designated for either male or female use.
- The proposed accessible WC (G-43) located between the Sick Bay (G-44) and the Interview Office (G-42) will need to be relocated to bank of staff sanitary facilities (G-39). Alternatively, the location will need to be addressed as a ***Performance Solution*** from an Accredited Access Consultant.
- The ambulant sanitary facilities located next to the Performance Store at the Ground Floor Level will need to be designated for either male or female use.

The project's access consultant will need to review the proposed design and sanitary compartment layouts for accessible and ambulant sanitary facilities to confirm compliance with AS1428.1-2009.

Clause F2.6 (Interpretation: Urinals and Washbasins) The number of urinal trough provided in the male student sanitary facilities has been calculated based on each 600 mm length of a continuous urinal trough as 1 urinal.

Part F3 (Room Heights) Rooms within the building and are to achieve a minimum floor to ceiling height of:

- Classrooms and other parts which accommodate less than 100 persons — 2.4m;
- Other part of the building which accommodate more than 100 persons – 2.7m;
- Corridors serving parts of the building which accommodate less than 100 persons – 2.4m;
- Corridors that serve parts of the building which accommodate more than 100 persons – 2.7m;
- All bathrooms, sanitary compartments, kitchens, store rooms etc. – 2.1m;
- Above a stairway, ramp, landing or the like — 2m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.

Note: Architectural Sections and Elevations will be required verify compliance with the above requirements.

Clause F4.1 (Natural Lighting) Natural light is required to be provided to all general-purpose classrooms within the Main Building. The windows to all the Homebases are to have an aggregate light transmitting area of at least 10% of the floor area of the room they serve.

Clause F4.4 (Artificial Lighting) Artificial lighting complying with AS/NZS 1680.0-2009 is required to the following rooms/spaces within the building and where natural light cannot be provided, and the periods of occupation or use will create undue hazard to occupants seeking egress in an emergency:

- Rooms that are frequently occupied,
- All spaces required to be accessible,
- All corridors, lobbies, internal stairways, other circulation spaces; and
- Paths of egress.

Clause F4.5 (Ventilation of Rooms): The building is required to be provided with:

- Natural ventilation consisting of permanent openings, windows, doors or other devices which can be opened in and which achieves an open area not less than 5% of the floor area of the room; or
- a mechanical ventilation or air-conditioning system complying with AS1668.2; or
- A combination of the abovementioned natural ventilation and mechanical ventilation/air-conditioning

Clause F4.8 (Restriction of position of water closets and urinals) A room containing a closet pan or urinal must not open directly into

- 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.

The proposed sanitary facility (G-05) which opens in to the Ground Floor Level Library Office (G-04) will need to be relocated unless provided with an airlock, or unless the WC is provide with mechanical exhaust, and the door is screened from view.

PART H1 – 'SPECIAL USE BUILDINGS' THEATRES, STAGES AND PUBLIC HALLS

Clause NSW H1.1 Part H1 applies to a Class 9b building that is not an Entertainment Venue as follows:

- Enclosed 9b buildings – school assembly, church or community hall with a stage / backstage area >300m2; or
- Otherwise a building has a stage / backstage area >200m2; or
- Has a stage with an associated rigging loft.

Notwithstanding, H1.4 (Seating areas on gradients) and H1.7 (aisle Lighting) apply to every enclosed Class 9b building. *In this instance however it is noted that the floor associated with the stage area is not provided with any fixed seating, gradient and is not stepped.* Refer to Clause E2.2 regarding stages in the school building.

SECTION J – ENERGY EFFICIENCY

The following energy efficiency design measures will be required to be implemented into the design of the New Building to satisfy the requirements for Climate Zone 5. In this respect, we note that the following requirements of BCA Section J will apply to the building of which the applicant will engage the services of an Energy Efficiency Consultant:

- J1: Building Fabric - the external fabric to be designed and constructed to reduce heat flow
- J2: External Glazing - Thermal performances, solar orientation, shading
- J3: Building Sealing - Doors, windows, roof lights i.e. to avoid leakage
- J5: Air-conditioning and ventilation systems - operation, e.g. time switches; exhaust
- J6: Artificial lighting and power - type and operation of lighting and power system
- J7: Hot water supply - avoiding heat loss
- J8: Access for maintenance - access to time switches, shading devices, etc.

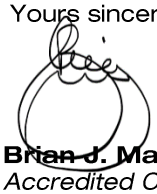
CONCLUSION

In view of the above assessment we can confirm that subject to the above measures being undertaken that compliance with the Performance Requirements of the BCA is readily achievable. In addition, it is considered that such matters can adequately be addressed in the preparation of the tender documentation design documentation without giving rise to any inconsistencies with the development consent.

We trust that the above submission is of assistance to the Consent Authority and we are confident that any design modifications required to the building in order to satisfy the fire and life safety and health and amenity requirements of the BCA will not necessitate the need for submission of an application under Section 96 of the Environmental Planning & Assessment Act 1979.

Should you wish to discuss please do not hesitate to contact me on 9211 7777.

Yours sincerely,



Brian J. Maguire (JP)
Accredited Certifier (BPB Accreditation No.0241)
Director – Blackett Maguire + Goldsmith

APPENDIX 1

TABLE 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building — FRL: (in minutes)			
	Structural adequacy/ Integrity/ Insulation			
	2, 3 or 4	**5, 7a or 9**	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	**120/120/120**	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	**120/90/90**	180/180/120	240/240/180
3 m or more	90/ 60/ 30	**120/60/30**	180/120/ 90	240/180/ 90
For non- *loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	**–/120/120**	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	**–/ 90/ 90**	–/180/120	–/240/180
3 m or more	–/–/–	**–/–/–**	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	**120/–/–**	180/–/–	240/–/–
3 m or more	–/–/–	**–/–/–**	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	**120/120/120**	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	**120/120/120**	180/120/120	240/120/120
Non- *loadbearing*	–/ 90/ 90	**–/120/120**	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	90/ 90/ 90	**120/–/–**	180/–/–	240/–/–
Non- *loadbearing*	–/ 60/ 60	**–/–/–**	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	90/ 90/ 90	**120/–/–**	180/–/–	240/–/–
Non- *loadbearing*	–/ 60/ 60	**–/–/–**	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion—				
Loadbearing	90/ 90/ 90	**120/90/ 90**	180/120/120	240/120/120
Non- *loadbearing*	–/ 90/ 90	**–/ 90/90**	–/120/120	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES				
and COLUMNS—	90/–/–	**120/–/–**	180/–/–	240/–/–
FLOORS	90/ 90/ 90	**120/120/120**	180/180/180	240/240/240
ROOFS	90/ 60/ 30	**120/60/30**	180/ 60/ 30	240/ 90/ 60

APPENDIX 3

PRELIMINARY LIST OF FIRE SAFETY MEASURES

Based on the preliminary assessment of the development, the following fire safety measures are required within the building:

Statutory Fire Safety Measure	Design / Installation Standard
Automatic Fire Detection & Alarm System	BCA Spec. E2.2a & AS 1670.1 – 2015
Emergency lighting	BCA Clause E4.2 and E4.4 & AS 2293.1-2005
Exit Signs	BCA Clause E4.5, E4.6, E4.8 & AS 2293.1-2005
Fire Blankets	AS 3504 – 1995 & AS2444 – 2001
Fire Hydrants	BCA Clause E1.3 and AS2419.1 - 2005
Fire Hose Reels (Non-classroom areas)	BCA Clause E1.4 & AS 2441 -2005
Paths of Travel	EP&A Regulation Clause 186
Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
Fire Engineered Performance Solutions: TBC	TBC

APPENDIX 4

ARCHITECTURAL PLANS PREPARED BY CONRAD GARGETT ANCHER MORTLOCK WOOLLEY

DRAWING NUMBER	REV	DATE	DRAWING NUMBER	REV	DATE
1004	L	23.08.2017	2100	I	27.07.2017
2110	I	27.07.2017	2120	I	27.07.2017

APPENDIX 5

BUILDING CODE OF AUSTRALIA TERMINOLOGY

Performance Solution

A Building Solution which complies with the Performance Requirements other than by reason of satisfying the DtS Provisions.

Building Code of Australia (BCA)

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 New South Wales (NSW) under the provisions of the EP&A Act.

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.

Crown Certificate

Approval issued by the Certifying Authority pursuant to s.109R(2) 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 Provisions (DtS)

Provisions which are deemed to satisfy the Performance Requirements.

Exit

An exit means –

i. Any of a combination of the following if they provide egress to a road or open space:
   a. An internal of external stairway
   b. A ramp;
   c. A fire isolated passageway
   d. A doorway leading to a road or open space

ii. A horizontal exit or a fire isolated passageway leading to a horizontal exit

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).

Fire Source Feature (FSF)

The far boundary of a road which adjoins 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.

Fire Resistance Level (FRL)

The grading periods in minutes for the following criteria-

(a) structural adequacy; and

(b) integrity; and

(c) insulation,

expressed in that order.

Fire Source Feature (FSF)

The far boundary of a road which adjoins 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.