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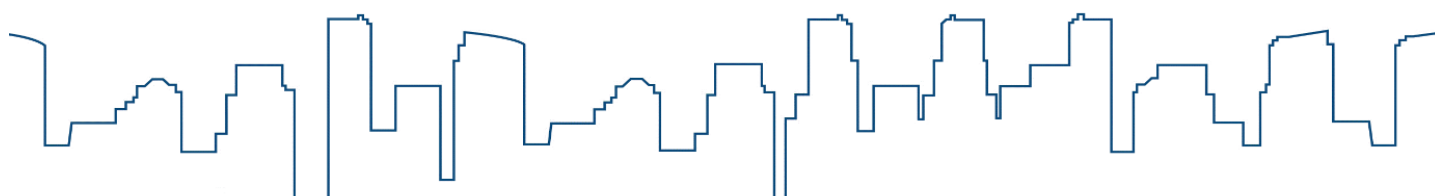
Ref: 17165-Waitara-BCAReportR3-201217R1

WAITARA PUBLIC SCHOOL

**BUILDING CODE OF AUSTRALIA 2016
FINAL DA STAGE REVIEW**

DECEMBER 2017


Report prepared for	GHD Woodhead Level 15,133 Castlereagh Street Sydney NSW 2000 Attention: Sait Buzgan
Report prepared by	Metro Building Consultancy Suite 211, 25 Berry Street, North Sydney NSW 2060 Consultant: Sean Moore
Report reference	17165R03-Waitara BCA
Job number	17165
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CONTENTS

1.0	Introduction and Documentation
2.0	Use and Class of Building
3.0	Construction and fire resistance ratings
4.0	Egress
5.0	Disabled Access
6.0	Services & Equipment
7.0	Health and Amenity
8.0	Energy Efficiency
9.0	Conclusion
Appendix A	Drawings reviewed
Appendix B	Type A Construction Requirements

DOCUMENT ACCEPTANCE

Company	Name	Signed	Date
Metro Building Consultancy	Sean Moore		20/12/17

REVISION HISTORY

Description	Prepared by	Revision No.	Date
BCA Report	Sean Moore	R03	20/12/17
BCA Report	Sean Moore	R02	18/08/17
BCA Report	Sean Moore	R01	26/05/17

1.0 Introduction and Documentation

Introduction

GHD WOODHEAD has requested Building Code of Australia 2016 advice in relation to the BCA compliance of the schematic / DA design documents for the proposed new works to Waitara Public School located at 68 Edgeworth David Avenue, Wahroonga NSW 2076.

The information submitted to date has been reviewed for compliance with the Deemed-to-Satisfy provisions of the Building Code of Australia 2016 excluding Section B structure, part D3 disabled access (see separate report), part G5 bushfire and Section J energy efficiency. This report is for the exclusive use of GHD WOODHEAD and cannot be used for any other purpose without the prior permission of Metro Building Consultancy. The report is only valid in its entire form.

Documentation available and assessed

The drawings provided by GHD WOODHEAD to Metro Building Consultancy on 18/12/17 have been assessed for compliance to the Building Code of Australia 2016. The list of drawings reviewed is as per the table in Appendix A of this report.

Application of Building Code of Australia 2016

Clause 109R (2) of the Environmental Planning and Assessment Act states that the BCA that is applicable to the project is the one in force at the time of the date of invitation to tender. As the tender date is due to be prior to 01/05/17 the BCA that is applicable to the project is BCA 2016.

109R Building, demolition and incidental work

(2) Crown building work cannot be commenced unless the Crown building work is certified by or on behalf of the Crown to comply with the technical provisions of the State's building laws in force as at:

- (a) the date of the invitation for tenders to carry out the Crown building work, or
- (b) in the absence of tenders, the date on which the Crown building work commences, except as provided by this section.

2.0 Use and class of building

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

Level	Use	Class	Approx. floor area
Level 01	Staff, Administration, Hall, Canteen and Classrooms	Class 5 & 9b	1,590m ²
Level 02	Classrooms and amenities	Class 9b	1,065m ²
Level 03	Classrooms and amenities	Class 9b	2,135m ²
Level 04	Classrooms and amenities	Class 9b	2,135m ²

The building has a rise of storey of 4.

The building has an effective height of 11.7m.

3.0 Construction and fire resistance ratings

A class 9b building with rise of storey of 4 is required to comply with the Building Code of Australia Type A Construction requirements. These are listed in Appendix B.

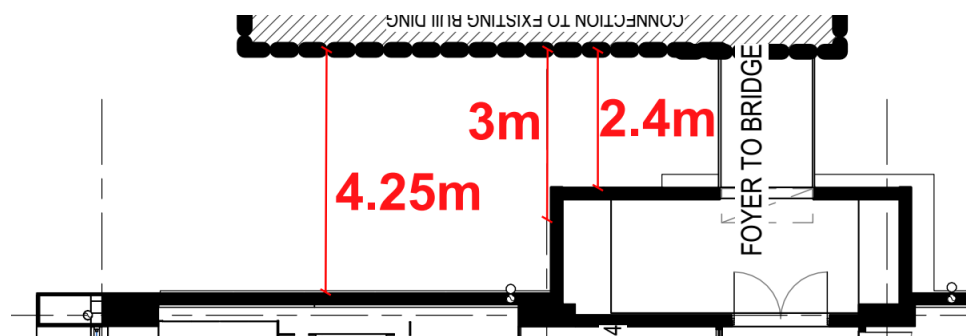
Exposure to a fire source feature

A part of a building element is exposed to a fire-source feature if any of the horizontal straight lines between that part and the fire-source feature, or vertical projection of the feature, is not obstructed by another part of the building that has an FRL of not less than 30/–/–.

Fire-source feature means—

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

The non loadbearing parts of the level 3 and 4 protruding external wall that is located less than 3m from the adjacent existing building are required to be provided with the fire resistance level in the table in Appendix B.



The loadbearing parts of the external wall are required to be provided with an FRL as per the table in Appendix B of this report.

Attachments to fire rated building elements

A combustible material may be used as a finish or lining or other attachment to a building element which has the required FRL if:

- the material is exempted under C1.10 (eg plasterboard) or complies with the fire hazard properties prescribed in BCA Specification C1.10; and
- it is not located near or directly above a required exit so as to make the exit unusable in a fire; and
- it does not otherwise constitute an undue risk of fire spread via the facade of the building.

The attachment or a facing or finish, or the installation of ducting or any other service, to a part of a building required to have an FRL must not impair the required FRL of that part.

Please provide details of any attachments to the external walls of the building prior to the completion of the design.

Enclosure of shafts

Shafts required to have an FRL must be enclosed at the top and bottom by construction having an FRL not less than that required for the walls of a non-loadbearing shaft in the same building, except that these provisions need not apply to:

- the top of a shaft extending beyond the roof covering, other than one enclosing a fire-isolated stairway or ramp; or
- the bottom of a shaft if it is non-combustible and laid directly on the ground

This applies to fire stair shafts, lift shaft and any services shafts eg mechanical services shafts, they must be enclosed at the top with the same FRL as the walls of the shaft or extend above the roof.

External walls

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

Please provide details of the external walls of the building prior to the completion of the design.

Floor

The floors need not be fire rated if—

- they are laid directly on the ground; or
- in a Class 2, 3, 5 or 9 building, the space below is not a *storey*, does not accommodate motor vehicles, is not a storage or work area, and is not used for any other ancillary purpose.

Roof

The BCA states that the roof of a building of Type A Construction is not required to be provided with a FRL of 120/60/30 as long as the roof covering is non combustible and the ceiling immediately below the roof has a resistance to the incipient spread of fire to the roof space of not less than 60 minutes.

Note that this requirement is different than the other schools in the program as the rise in storeys of this building is 4. As the other schools only have a rise in storeys of 3 or less they do not require a 60 minute ceiling under the roof. Waitara does require a 60 minute ceiling because the building has a rise in storeys of 4.

Note also that services in a 60 minute ceiling eg lights are required to be installed as per the 60 minute ceiling's 'tested system' which will may require fire rating to the top of the fixture. It may also be possible to address this 60 minute ceiling in a fire engineered alternative solution report.

Please provide details of the roof covering and 60 minute ceiling prior to the completion of the design or confirm that the lack of a 60 minute ceiling will be addressed in a fire engineering performance solution.

Internal walls & columns on level 3

In the storey immediately below the roof, internal columns and internal walls other than fire walls and shaft walls, are required to have an FRL of 60/60/60 instead of the FRL of 120/-/- required for Type A Construction if the roof is non combustible.

Note that this requirement is different than the other schools in the program as the rise in storeys of this building is 4. As the other schools only have a rise in storeys of 3 or less the internal columns on the top storey do not require any FRL. The internal columns on level 4 of Waitara do require an FRL of 60/60/60 because the building has a rise in storeys of 4.

Lightweight construction

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

Fire Hazard Properties

All new floor, wall and ceiling linings are to comply with the requirements of Clause C1.10 and Specification C1.10 of Building Code of Australia 2016.

Compartmentation

The Building Code of Australia 2016 requirement for a Type A Class 9b building is that the maximum floor area of each fire compartment must not exceed 8,000 m² and the maximum volume must not exceed 48,000m³.

The size of the fire compartments do not exceed the maximum limits imposed by the BCA.

Spandrels

The window and door openings that are directly above one another in the building must be protected by spandrel panels.

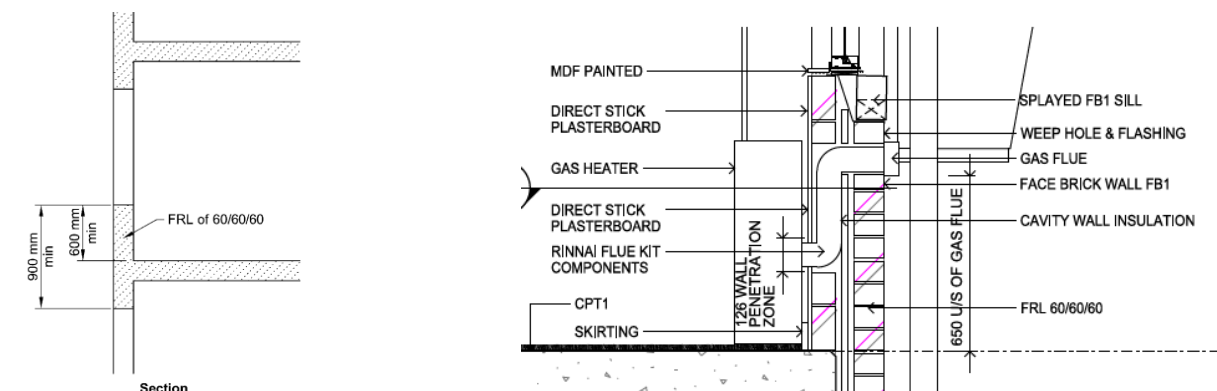
Horizontal spandrel panels ie balconies are required to be non combustible eg concrete, have a Fire Resistance Level of at least 60/60/60 and have a minimum depth of 1100mm. Floor wastes should not be provided in the floor of the balcony unless they are PVC and provided with a 60 minute fire collar.

The horizontal spandrel provisions included a requirement for the spandrel panel to extend at least 450mm past the opening, this requires doorway and windows not to be placed within a distance of 450mm from the edge of balconies.

Vertical spandrel panels are required to be non combustible, achieve a Fire Resistance Level of 60/60/60, have an overall height of at least 900mm and a height from the floor level of at least 600mm ie a cill height of at least 600mm. See below.

(Note that operable windows are required to be provided with a balustrade height of at least 865mm.)

The 900mm high vertical spandrel panels must not be penetrated by any air conditioning service, gas heater flue, weep hole or air brick. Coordination with the services consultants is required. See below.



The vertical spandrel panels beneath the windows in the building should be very clearly identified on the final design drawings and they should be stated to have an FRL of at least 60/60/60.

The horizontal spandrel panels in the building should be very clearly identified on the final design drawings and they should be stated to have an FRL of at least 60/60/60.

Note that it is highly recommended that all BCA critical dimensions are provided with a construction tolerance eg 1m high spandrels instead of 900mm etc.

Lift shaft

The lift shaft must be separated from the remainder of the building by enclosure in a shaft with an FRL of at least 2 hours.

Boilers

Any rooms that contain proposed boilers must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

Boiler means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature means, and—

(a) includes superheaters, reheaters, economisers, *boiler* piping, supports, mountings, valves, gauges, fittings, controls, the *boiler* settings and directly associated equipment; but

(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling temperature of the liquid.

Battery Rooms

Any rooms that contain a proposed battery or batteries that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours (eg UPS) must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours. This does not apply to portable or stationery UPS's connected by plug and socket outlets.

Fire Hydrant Pump Room

Any proposed fire hydrant pump room must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

Electricity supply equipment

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

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

Fire stair doors

Doorways that open to fire stairs must be protected by -/60/30 fire doors that are self-closing, or automatic-closing.

The automatic-closing operation must be initiated by the activation of a smoke detector located not more than 1.5 m horizontal distance from the approach side of the doorway.

A window in an external wall of a fire stair must be protected if it is within 6m of, and exposed to, a window or other opening in a wall of the same building, other than in the same fire-isolated enclosure.

The protection required to a window in a fire stair that is exposed to another opening in the wall of the building must comply with one of the following requirements:

- internal or external wall-wetting sprinklers as appropriate used with windows that are automatic closing or permanently fixed in the closed position
- -/60/- fire windows that are automatic closing or permanently fixed in the closed position
- -/60/- automatic closing fire shutters.

Further reviews of this requirement will take place as the design is being developed.

Service penetrations in fire-isolated exits

Fire-isolated exits must not be penetrated by any services other than:

- Electrical wiring for a lighting, detection, or pressurisation system serving the exit; or
- Electrical wiring for a security, surveillance or management system serving the exit; or
- Electrical wiring for the monitoring of hydrant or sprinkler isolating valves; or
- Water supply pipes for fire services

Openings in fire-isolated lift shafts

The entrance doorway to the lift shaft must be protected by -/60/- fire doors that comply with AS 1735.11 1986 and are set to remain closed except when discharging or receiving passengers, goods or vehicles.

A lift call panel, indicator panel or other panel in the wall of a fire-isolated lift shaft must be backed by construction having an FRL of not less than -/60/60 if it exceeds 35 000 mm² in area.

Openings for Services Penetrations

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

4.0 Egress

Principles

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

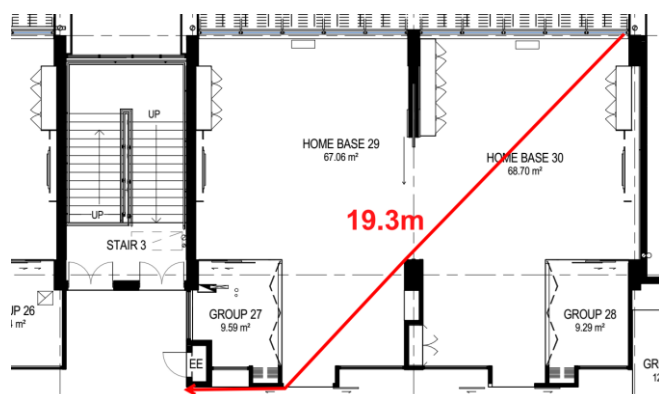
- The maximum distance of travel to an exit will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres.
- The distance between alternate exits is to be not less than 9 metres.
- The construction and discharge of exits, landings, thresholds, balustrades and handrails are required to meet the requirements of the BCA.
- All paths of travel are to be a minimum of 1000mm in clear width.
- Exit doors should swing in the direction of travel ie outwards and should have a minimum clear width of 750mm (850mm for accessible doors complying with AS1428.1 2009).
- All doors should be free passage from the side that a person is seeking egress.
- The threshold of all doors (both sides) must be flush or provided with a threshold or kerb ramp.
- Handrails along stairs and ramps are required to have a minimum height of 865-1000mm.
- Handrails in a Class 9b building used as a primary school are required to have a second handrail fixed at a height between 665mm and 750mm. (The recommended height for both handrails is 700mm and 900mm)
- Balustrades are required to have a minimum height of 865mm along stair flights and 1m along landings and walkways where the drop is greater than 1m.
- The balustrade provisions apply to the tops of all new retaining walls that form part of, or are directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings.
- Balustrades are not permitted to have an opening greater than 125mm.
- Balustrades that protect a fall of more than 4m are not permitted to facilitate climbing within a 150-760mm zone measured from floor level.
- Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.
- The fire doors to the fire stairs are required to be provided with the statutory signage as stated in BCA Clause D2.23.

Fire stair

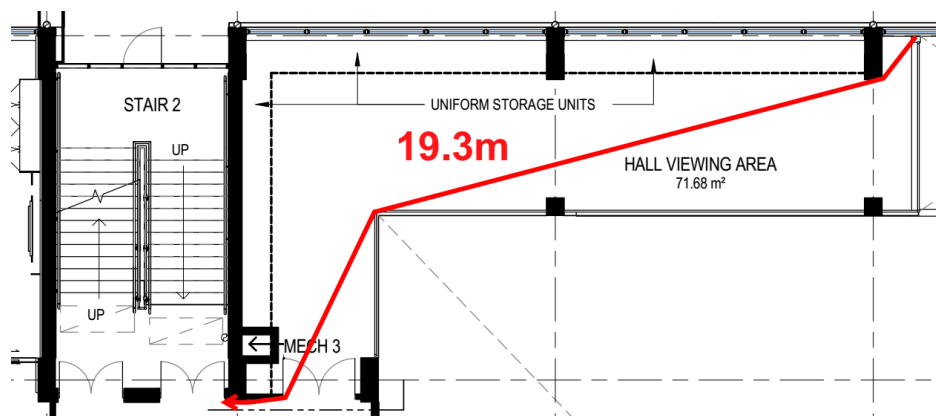
The stairs serving the building are required to be fire isolated as they connect more than 2 storeys. This requires enclosing walls with an FRL of not less than -/120/120 for non loadbearing walls and 1 hour self closing fire doors.

Travel distance

The travel distance from the corner of the homebase 30 on level 4 will have to be reassessed after the furniture plans are provided for review to ensure that the point of choice is within 20m of the starting point. It is expected that egress will be provided from level 3 through the foyer and into the adjoining building.



Please ensure that the hall viewing area on level 2 is not provided with furniture as it may extend the travel distance to the exit to more than the maximum permitted distance of 20m.



Distance between alternative exits

The BCA states that the exits that are required as alternative means of egress must be distributed as uniformly as practicable within or around the storey served.

The exits serving level 1, 2 and 3 are not distributed as uniformly as practicable within the storey as they are only located on the northern side of the floor plate. At least one fire stair should be relocated to the southern side of the floor or the current arrangement should be justified in a fire engineered alternative solution report.

Dimensions of exits

All paths of travel are required to be provided with a minimum 1m clear width and 2m clear head height.

The BCA states that if the storey accommodates more than 200 persons the aggregate unobstructed width, except for doorways, must be not less than:

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

The population of level 1 is taken as the 198 seats in the hall plus the occupants on stage and in the administration areas, special programs and OSHC facilities. The aggregated exit width proposed will cater for the proposed population.

The BCA states that if the storey accommodates more than 100 persons but not more than 200 persons, the aggregate unobstructed width, except for doorways, must be not less than:

- 1m plus 250mm for each 25 persons (or part) in excess of 100.

The population of level 2 is taken to be 150 people (ie 25 staff and students per classroom x 6) and therefore the required aggregate exit width is 1.5m ie 1m per fire stair.

The BCA states that if the storey accommodates more than 200 persons the aggregate unobstructed width, except for doorways, must be not less than:

- 2m plus 500mm for every 60 persons (or part) in excess of 200 persons if egress involves a change in floor level by a stairway;

The population of level 3 and 4 is taken to be 400 people on each floor (25 staff and students per classroom x 16 per floor) and therefore the required aggregate exit width on each floor is 4m ie:

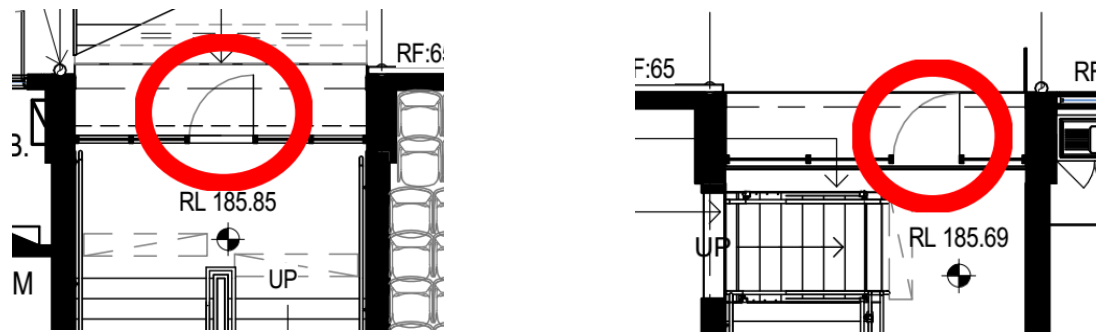
- 1.34m of required exit width for each of the stairs. (Each door to be at least 750mm clear.)

The BCA states that the unobstructed width of a fire stair must not diminish in the direction of travel to a road or open space. Note that this only applies to the 'required' clear width ie 1.34m for each fire stair.

Fire stair final exit doors

The BCA states that the unobstructed width of a final exit doorway from the fire stairs must be not less than the required unobstructed width of each exit (ie 1.34m) minus 250mm (ie 1.09m)

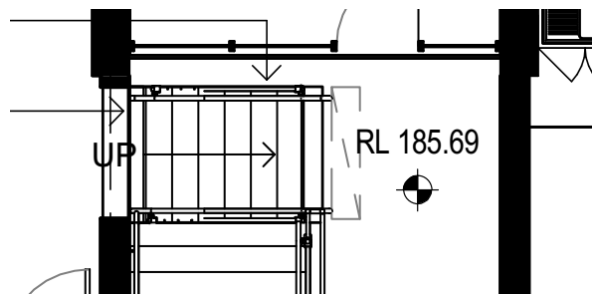
Please ensure that the single exit doors from the fire stairs at grid A4 and A8 each has a clear width of at least 1.09m or provide a double door.



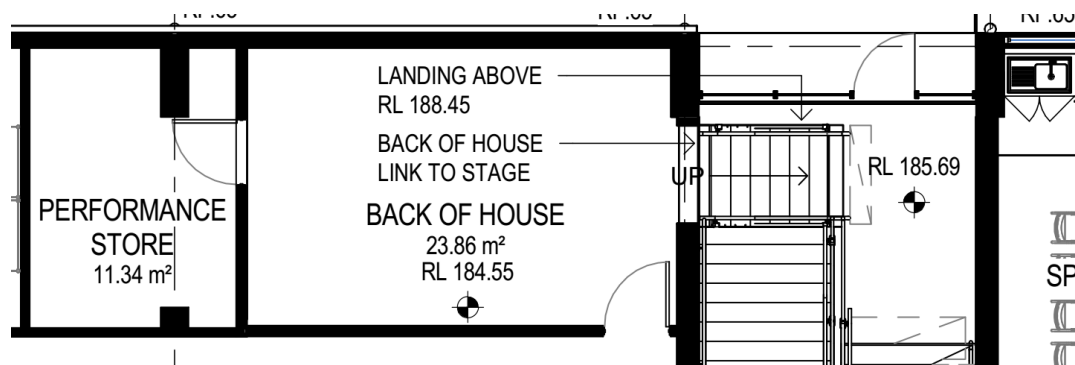
Fire stair entry

The BCA states that a doorway from a room must not open directly into a fire stair unless it is from a public corridor, public lobby or the like.

The opening into the level 1 fire stair at grid 8 is not permitted by the BCA and is required to be addressed in a fire engineered performance solution.



In addition, the opening into the fire stair is required to be provided with a fire door. The door that separates the stage from the back of house and the performance store from the back of house should not be used as the fire stair doors as there will likely be too much combustible goods in the back of house room and it should not form part of the fire stair.



Any door provided should incorporate the required 7500mm minimum long top landing to the stair.

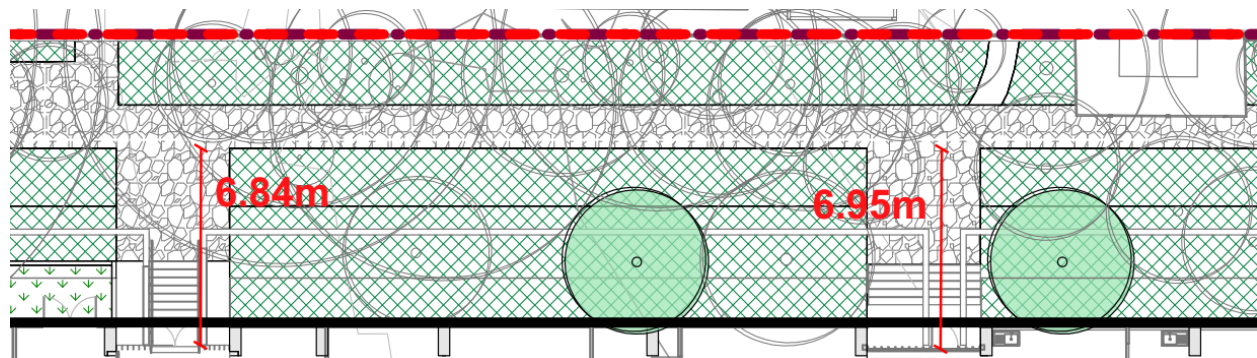
Fire stair discharge

The BCA states that where a path of travel from the point of discharge of a fire stair necessitates passing within 6m 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 (eg wall wetting sprinklers)

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

The discharge from the level 1 fire stairs along the northern elevation to the public road is more than 6m from the façade and no further action is required.



Stairs

The proposed stairs are required to be provided with risers and goings that have a constant dimension throughout the flight and with a handrail with a height of 700mm and 900mm.

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

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

Landings

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

Door thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless it is provided with a threshold ramp or step ramp in accordance with AS1428.1 2009. This applies to all doors including to the door from the fire stairs to the outside.

Balustrades

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

Any balustrade protecting a drop of more than 4m must not have any climbable elements (eg GPOs, high skirting, gas heaters etc) within a 150-760mm zone measured from the floor. A construction tolerance is also recommended to this eg a 100-800mm no climb zone.

This applies to any operable windows that opens more than 125mm. Wall elevations should be coordinated with the services documentation to ensure compliance with this requirement.

All balustrade are required to not have any openings greater than 125mm and a construction tolerance should be added eg 100mm.

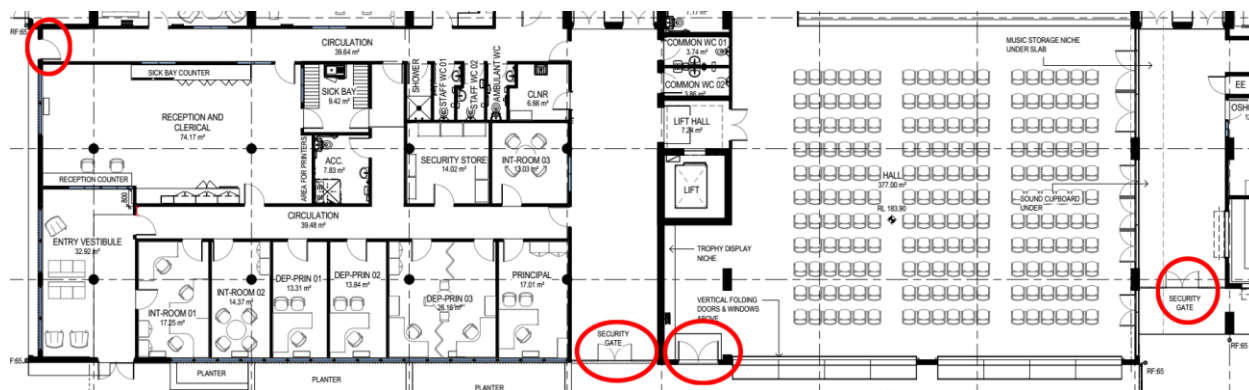
Wall elevations should be coordinated with the services documentation to ensure compliance with this requirement.

A balustrade with a height not less than 865 mm above the floor is required to an openable window where the floor below the window is 4 m or more above the surface beneath.

This applies to windows on level 03 and 04 if they are operable. If the cill heights to operable windows are less than 865mm the windows will need to be restricted to a maximum opening size of 125mm (100mm recommended).

Swinging Doors

A swinging door in a required exit or forming part of a required exit is required to swing in the direction of egress ie outwards. The highlighted exit doors serving level 1 are required to swing outwards and not inwards as shown.



Door hardware

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

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

Fire door signs

Fire doors to fire stairs that are not held open are required to be provided with a sign stating:

**"FIRE SAFETY DOOR
DO NOT OBSTRUCT
DO NOT KEEP OPEN"**

Fire doors to fire stairs that are held open are required to be provided with a sign stating:

"FIRE SAFETY DOOR—DO NOT OBSTRUCT"

Doors from a fire stairs to the outside are required to be provided with a sign stating:

"FIRE SAFETY DOOR—DO NOT OBSTRUCT".

The signs must be in capital letters not less than 20 mm high in a colour contrasting with the background.

Construction tolerances

Note that it is very important to incorporate construction tolerances into the design, while the minimum balustrade height may be 1m any balustrade specified to be installed at 1m may be installed at 995mm which is non compliant and will have to be modified to comply.

5.0 Disabled Access

Refer to the separate report for comments in relation to the disabled access requirements.

6.0 Services and Equipment

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

Fire Hydrants

As the new building will have a floor area that exceeds 500m² it is required to be provided with fire hydrant coverage in accordance with BCA Clause E1.3 and AS2419.1 2005.

Fire Hose-Reels

As the new building will have a floor area that exceeds 500m² all areas, other than the classrooms and associated corridors, are required to be provided with fire hose reel coverage in accordance with BCA Clause E1.4 and AS2441 2005.

Portable Fire Extinguishers

Portable fire extinguishers must be provided in accordance with BCA Clause E1.6 and AS 2444 2001.

Smoke hazard management

The BCA requires a four storey class 9b building to be provided with an AS1670.1 2015 smoke detection system complying with BCA Specification E2.2a to be provided throughout the building.

Smoke hazard management – Automatic shutdown

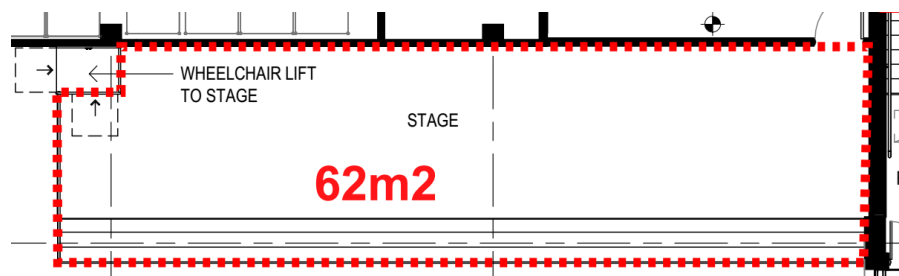
The NSW Variation of the BCA states that Class 9b assembly buildings (eg schools) are required to be provided with automatic shutdown of any air-handling system (other than non-ducted individual room units with a capacity not more than 1000 l/s and miscellaneous exhaust air systems installed in accordance with Sections 5 and 6 of AS/NZS 1668.1 2015) on the activation of smoke detectors installed complying with Clause 5 of BCA Specification E2.2a and any other fire detection and alarm system.

Clause 5 of BCA Specification E2.2a states that detectors must be spaced not more than 20m apart and not more than 10m from any wall, bulkhead or smoke curtain and have a sensitivity in accordance with AS1670.1 2015.

Any proposed mechanical system is required to comply with these requirements.

Smoke hazard management – Stage

As the hall is provided with a stage with a floor area of more than 50m² and not more than 150m² it must be provided with an automatic smoke exhaust system complying with BCA Specification E2.2b.



Electric and electrohydraulic passenger lifts

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

Warning signs

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

Accessible lifts

The lift is required to be an accessible lift complying with BCA Clause E3.6. This includes the requirement that the lift floor has a dimension of not less than 1100 mm wide x 1400 mm deep.

Emergency Lighting and Exit Signs

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

EWIS

The BCA requires a four storey class 9b building to be provided with an AS1670.4 2015 sound system and intercom system for emergency purposes to be provided throughout the building.

7.0 Health and Amenity

Damp & weatherproofing

The external walls of the proposed building are required to comply with BCA Performance Requirement FP1.4. Where a cladding is proposed it should have a CodeMark Certificate of Conformity confirming compliance to BCA FP1.4.

Stormwater drainage

All stormwater drainage must comply with AS/NZS 3500.3 2015.

Roof coverings

All new roofs must be covered with—

- (a) concrete roofing tiles complying with AS 2049 2002 and fixed, except in cyclonic areas, in accordance with AS 2050 2002, as appropriate; or
- (b) terracotta roofing tiles complying with AS 2049 2002 and fixed, except in cyclonic areas, in accordance with AS 2050 2002; or
- (c) cellulose cement corrugated sheeting complying with AS/NZS 2908.1 2000 and installed in accordance with AS/NZS 1562.2 1999; or
- (d) metal sheet roofing complying with AS 1562.1 1992; or
- (e) plastic sheet roofing designed and installed in accordance with AS/NZS 4256 Parts 1, 2, 3 1994 and 5 1996 and AS/NZS 1562.3 1996; or
- (f) asphalt shingles complying with ASTM D3018-90 1994, Class A.

Waterproofing of wet areas

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

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

Where a wall hung urinal is installed—

- (i) the wall must be surfaced with impervious material extending from the floor to not less than 50 mm above the top of the urinal and not less than 225 mm on each side of the urinal.
- (ii) the floor must be surfaced with impervious material and graded to a floor waste

In a room with timber or steel framed walls and containing a urinal—

- (i) the wall must be surfaced with an impervious material extending from the floor to not less than 100 mm above the floor surface; and
- (ii) the junction of the floor surface and the wall surface must be impervious.

Damp-proofing

Moisture from the ground must be prevented from reaching—

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

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

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

Damp-proofing of floors on the ground

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

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

Subfloor ventilation

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

Glazed assemblies

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

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

Toilets - Students

Please provide details of the school student population so that the toilet requirements can be determined.

Toilets - Staff

Please provide details of the school staff population so that the toilet requirements can be determined.

Accessible toilets

Separate accessible toilets must be provided for the staff and students and must comply with the requirements of AS1428.1 2009.

Ambulant cubicles

Separate male and female ambulant cubicles for staff and students are required and must comply with Clause 16 of AS1428.1 2009.

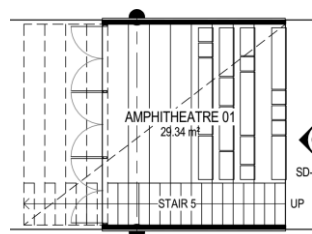
Room Sizes

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

The hall and corridors that serves it must have a minimum ceiling height of 2.7m as it contains more than 100 people.

Storerooms and sanitary compartments are required to have a minimum height of 2.1m and all stairs are required to have a minimum height of 2m.

Any rooms under the amphitheatre are required to have a minimum ceiling height of 2.1m.



Light and Ventilation

All general purpose classrooms must be provided with adequate natural light amounting to at least 10% of the floor area of the room. Windows are required to open to the sky or face a court or other space open to the sky or an open verandah, carport or the like.

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

All areas of the buildings, except the store rooms, must be provided with natural ventilation complying with BCA Clause F4.6 or mechanical ventilation complying with AS 1668.2 2012. Natural ventilation requires an opening of size no less than 5% of the floor area of the room. Note that the window openings must make an allowance for any opening size restrictions placed on the windows by the balustrade requirements.

The proposed kitchen must be provided with a kitchen exhaust hood complying with AS/NZS 1668.1 2015 and AS 1668.2 2012 where:

- (a) any cooking apparatus has—
 - (i) a total maximum electrical power input exceeding 8 kW; or
 - (ii) a total gas power input exceeding 29 MJ/h; or
- (b) the total maximum power input to more than one apparatus exceeds—
 - (i) 0.5 kW electrical power; or
 - (ii) 1.8 MJ gas, per m² of floor area of the room or enclosure.

8.0 Energy Efficiency

Building Fabric

Any parts of the building that are provided with an air-conditioning system (including a gas heater) with an input power of more than 15 W/m² (ie it is a conditioned space) must comply with the building fabric requirements of Part J1 of the Building Code of Australia 2016.

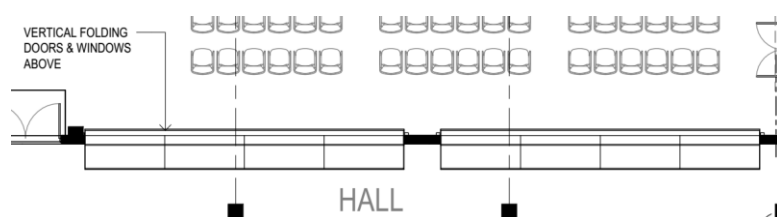
External Glazing

Any parts of the building that are provided with an air-conditioning system (including a gas heater) with an input power of more than 15 W/m² (ie it is a conditioned space) must comply with the glazing requirements of Part J2 of the Building Code of Australia 2016.

Building Sealing

Any parts of the building that are provided with an air-conditioning system (including a gas heater) with an input power of more than 15 W/m² (ie it is a conditioned space) must have seals specified to the external doors and operable windows and must have self closing devices specified to the external swing doors all as per the requirements of Part J3 of the Building Code of Australia 2016.

Should level 1 be a conditioned space the proposed vertical folding doors do not comply with the self closing requirements which will be noted on the S109R Crown Works Certificate.



Ventilation Systems, Artificial Lighting, Hot Water Supply

The design stage services consultants design certificates have confirmed that the services comply with the requirements of BCA Section J.

9.0 Conclusion

The design documentation provided to date has been assessed in respect to the deemed to satisfy provisions of the Building Code of Australia 2016. The design is at a point where the developed design can commence, further reviews will be carried out during the next stages and prior to the completion of the design.

APPENDIX A – DRAWINGS REVIEWED

Architectural drawings prepared by GHD WOODHEAD

Drawing number, title and revision	Drawing number, title and revision
DA-AR-0000 Cover Sheet/Locality Plan/Drawing List Rev C	DA-AR-2003 General Arrangement - Level 4 Rev C
DA-AR-0050 Notification Plan And Elevations Rev C	DA-AR-2010 General Arrangement - Roof Rev C
DA-AR-0101 Context Analysis Site Plan Rev C	DA-AR-3000 North & South Elevations Rev C
DA-AR-0110 Site Demolition Plan Rev C	DA-AR-3001 East And West Elevations Rev C
DA-AR-1000 Site Plan / Set Out Plan Rev C	DA-AR-3100 Sections Rev C
DA-AR-1010 Site Elevations Rev C	DA-AR-5001 Myra Street View Rev C
DA-AR-2000 General Arrangement - Level 1 Rev C	DA-AR-5002 Edgeworth David Ave View Rev D
DA-AR-2001 General Arrangement - Level 2 Rev C	DA-AR-5010 Building Fabric Finishes Rev C
DA-AR-2002 General Arrangement - Level 3 Rev C	DA-AR-9000 Site Shadow Diagrams Rev C

Landscape drawing prepared by GHD WOODHEAD

Drawing number, title and revision
LA-1000 Landscape Site Plan Rev A

APPENDIX B – TYPE A CONSTRUCTION REQUIREMENTS

The following table lists the fire resistance levels for the new school building.

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