BCA REPORT

100% Schematic Design Stage

PROJECT:
Irrawang High School

PREPARED FOR:
Schools Infrastructure

Revision: 2
Date: 21st October 2022
Project No.: N220067

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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 BCA Certification for the project and through further design development.

MATTERS REQUIRING ADDITIONAL INFORMATION AT DD STAGE:

	BCA (DtS) Clause	Description
1.	**C1.1** *Type of Construction Required*	We note that the design is proceeding on the basis that Block I and N are separate buildings namely; All structures being independent with no physical connection between, No connection between Block N and Block I in terms of roof structures columns and the like, Linkway/Awning being a sterile area no fuel load which would constitute a fire compartment. No sharing of services between buildings reticulation of services between whether it be exposed and or via a concealed space. Compliance achieved based on the SD docs to be reviewed as part of the finalisation of the DD phase. Structural engineer to provide design drawings and certification confirming the fire rating requirements of this clause have been addressed.
2.	**C1.9 C1.14** *Non-combustible Building and Ancillary Elements*	An external wall schedule outlining the proposed materials to be used and associated test certificates and reports are to be submitted to BM+G for review and comment demonstrating compliance having regards to non-combustibility.
3.	**C2.12 C2.13** *Separation of Equipment and Electrical Supply System*	Services consultants in consultation with the project architect to ensure required fire rating is provided around electrical equipment and other services where required to be separated under this clause.
4.	**D1.10** *Discharge from Exits*	Further details are to be provided with respect of the path of travel from the exits to the road namely any proposed ramps or the like to be coordinated during the DD phase.
5.	**D2.13, D2.14 & D2.17** *Stairs, Landing and Handrails*	Detailed stairway sections and the like are to be submitted for review to BM+G this is to include details with respect of the proposed handrail details.
6.	**D2.16** *Barriers to Prevent Falls*	Whilst compliance is readily achievable based on current documentation with respect of balustrades noting also additional EFSG requirements that are above and beyond minimum BCA requirements. This will be subject to further review as part of the DD phase having regards to climb ability and the like.
7.	**D2.21** *Operation of Latch*	Door hardware along egress paths including through various general learning spaces is to be coordinated during the DD phase to ensure free egress at all times along the path of travel to achieve compliant travel distances.
8.	**E1.3/E1.4** *Fire Hydrants and Fire Hose Reels*	Hydraulic consultant to provide details demonstrating compliance having regards to the Fire Hydrant and Fire Hose Reel system including design drawings and certificate. In addition, coverage diagrams will need to be provided along with the application for Crown Certificate.
9.	**E2.2** *Smoke Hazard Management*	Design drawings and certification to be provided by the dry fire consultant having regards to the fire detection and warning system as part of the DD phase, location of fire panels and the like to be coordinated with the projects architect.

	BCA (DtS) Clause	Description
10.	**F2.3** *Facilities in Class 3 to 9 Building*	Total number of students and staff to be accommodated within the building will need to be provided in order to confirm the number of required sanitary facilities. It is noted however that compliance is readily achieved based on EFSG requirements.
11.	**F4** *Light and Ventilation*	Compliant natural lighting to be maintained to all classrooms subject to further review as part of the DD phase
12.	**Section J/JV3** *Energy Efficiency*	A copy of the independent Section J/JV3 report is to be provided to BM+G for review and comment.

MATTERS REQUIRING PERFORMANCE SOLUTIONS:

	BCA (DtS) Clause	Description
1.	**D1.10** *Discharge from Exits*	To permit travel back via covered areas (walkways/awnings) once open space has been reached To permit lockable gates to be located between the exits from the building and the public road
2.	**E1.3** *Fire Hydrants*	Location of the FH booster not being within site of the main entrance to the building also not adjacent to the primary vehicular entrance
3.	**E2.2** *Smoke Hazard Management*	Extent of installation of the smoke detection and alarm system within the proposed library space
4.	**FP1.4** *Weatherproofing*	An FP1.4 performance solution report outlining how suitable weatherproofing will be achieved is to be provided for review and comment.

TABLE OF CONTENTS

REPORT STATUS

DATE	REVISION	STATUS	AUTHOR	REVIEWED
29.07.2022	0	Draft – Schematic Design Report	BS	JH
10.08.2022	1	100% Schematic Design Report	BS	JH
21.10.2022	2	Revised 100% Schematic Design Report	BS	JH

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INTRODUCTION

PROPOSAL

Blackett Maguire + Goldsmith Pty Ltd have been commissioned by Schools Infrastructure C/- APP to undertake a Building Code of Australia (BCA) assessment and Access assessment of the Schematic Design for Irrawang High School located at 80 Mount Hall Rd, Raymond Terrace NSW 2324 against the relevant provisions of the Building Code of Australia 2019, Volume 1 (BCA).

Figure 1: Existing Site

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 (Amendment 1).
+ Architectural Plans prepared by EJE Architecture:

Drawing No.	Revision	Date	Drawing No.	Revision	Date
A-0-001	J	29/07/22	A-0-002	H	29/07/22
A-0-003	BB	29/07/22	A-0-004	R	29/07/22
A-0-010	P	29/07/22	A-0-050	D	29/07/22
A-0-100	A	29/07/22	A-1-100	G	29/07/22
A-1-101	G	29/07/22	A-1-120	G	29/07/22
A-1-140	F	29/07/22	A-1-141	F	29/07/22
A-1-170	E	29/07/22	A-1-171	E	29/07/22
A-1-180	E	29/07/22	A-1-181	E	29/07/22
A-1-190	B	29/07/22	A-1-191	B	29/07/22
A-1-200	G	29/07/22	A-1-201	C	29/07/22
A-1-202	G	29/07/22	A-1-300	G	29/07/22
A-1-400	A	29/07/22	A-1-500	C	29/07/22
A-1-501	C	29/07/22	A-1-502	C	29/07/22
A-1-503	C	29/07/22	A-1-504	C	29/07/22
A-1-505	C	29/07/22	A-1-506	C	29/07/22
A-1-507	C	29/07/22	A-1-508	C	29/07/22
A-1-509	C	29/07/22	A-1-510	C	29/07/22
A-1-511	C	29/07/22	A-1-512	C	29/07/22
A-1-513	C	29/07/22	A-1-514	C	29/07/22
A-1-515	C	29/07/22	A-1-516	C	29/07/22
A-1-517	C	29/07/22	A-1-518	C	29/07/22
A-1-519	C	29/07/22	A-1-520	C	29/07/22
A-1-521	C	29/07/22	A-1-522	C	29/07/22
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A-1-527	C	29/07/22	A-1-528	C	29/07/22
A-1-529	C	29/07/22	A-1-530	C	29/07/22
A-1-531	C	29/07/22	A-1-600	B	29/07/22
A-1-601	B	29/07/22	A-1-602	A	29/07/22
A-2-110	U	29/07/22	A-2-130	D	29/07/22
A-2-140	F	29/07/22	A-2-170	E	29/07/22
A-2-180	E	29/07/22	A-2-190	B	29/07/22
A-2-200	H	29/07/22	A-2-300	E	29/07/22
A-2-400	A	29/07/22	A-2-500	B	29/07/22
A-2-501	B	29/07/22	A-2-502	B	29/07/22

A-2-503	B	29/07/22	A-2-504	B	29/07/22
A-2-505	B	29/07/22	A-2-506	B	29/07/22
A-2-507	B	29/07/22	A-2-600	B	29/07/22
A-3-002	Q	29/07/22	A-3-100	R	29/07/22
A-3-101	F	29/07/22	A-3-110	S	29/07/22
A-3-130	D	29/07/22	A-3-131	D	29/07/22
A-3-132	D	29/07/22	A-3-140	E	29/07/22
A-3-141	E	29/07/22	A-3-142	E	29/07/22
A-3-170	D	29/07/22	A-3-171	D	29/07/22
A-3-172	D	29/07/22	A-3-180	E	29/07/22
A-3-181	E	29/07/22	A-3-182	E	29/07/22
A-3-200	E	29/07/22	A-3-201	F	29/07/22
A-3-202	E	29/07/22	A-3-300	E	29/07/22
A-3-301	E	29/07/22	A-3-302	E	29/07/22
A-0-000	L	29/07/22			

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.

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).

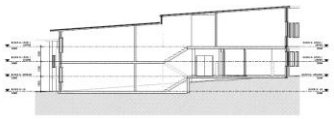
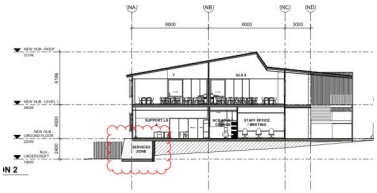
Performance Solution (Alternative Solution) – Means a method of complying with the performance requirements other than by a *Deemed-To-Satisfy Solution.*

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

EXISTING 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 G	BLOCK New Learning Hub including Block I
+ **BCA CLASSIFICATION:**	Class 9b (Class-rooms)	Class 9b (Class-rooms)
+ **RISE IN STOREYS**	Two (2) (Split Level)  *Figure 2*	Two (2)  *Figure 3*
+ **STOREYS CONTAINED**	Two (2) (Split Level)	Two (2)
+ **TYPE OF CONSTRUCTION:**	TYPE B	TYPE B
+ **EFFECTIVE HEIGHT:**	<12m	<12m
+ **MAX. FLOOR AREA**	5,500m^2	5,500m^2
+ **MAX. VOLUME:**	33,000m^3	33,000m^3
+ **SPRINKLER PROTECTED:**	No	No
+ **CLIMATE ZONE:**	Zone 5	Zone 5

**Note:*

The space below the learning space in Block N must not be enclosed to form a space which would be deemed a storey under the BCA. Further details will need to be provided for review and comment in this regard to confirm this space does not constitute a storey for the purpose of the BCA i.e. plans showing that the under croft is not enclosed and or plant area being located outside of the building as such does not constitute a storey for the purpose of the BCA.

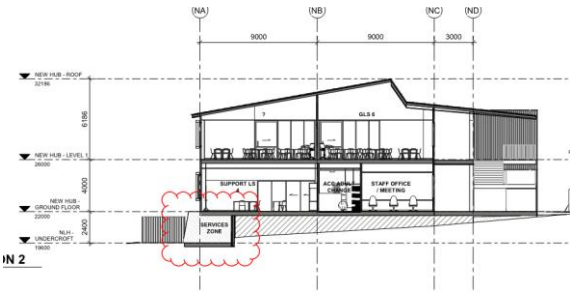


Figure 4

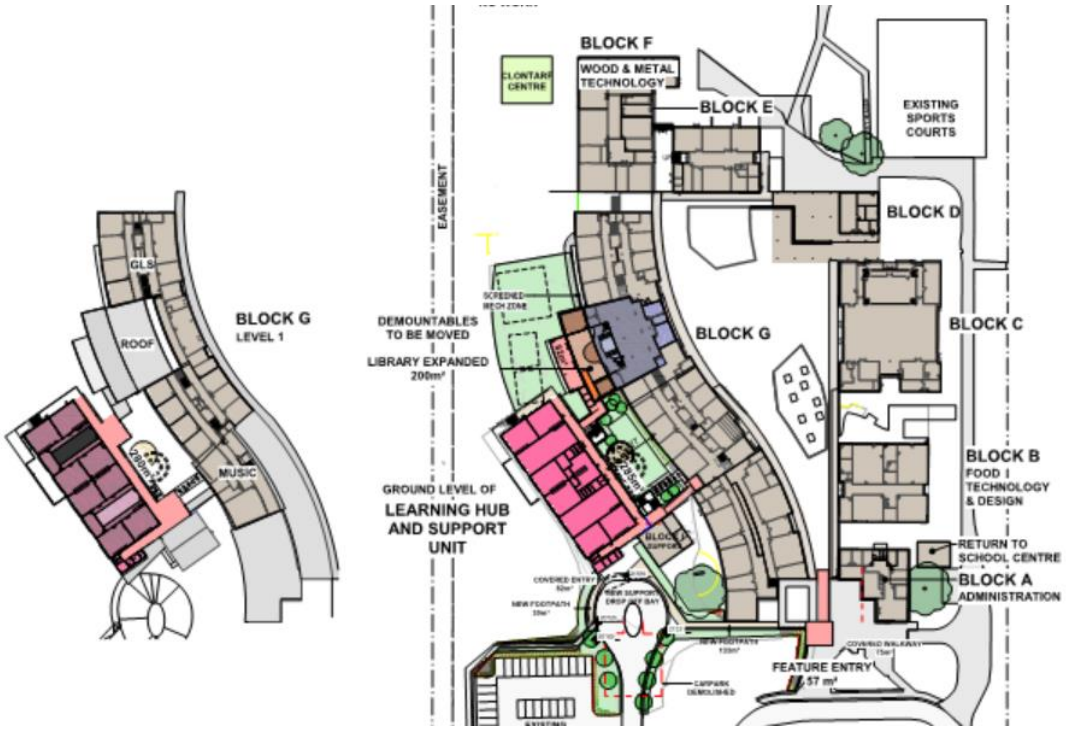
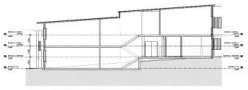


Figure 5: Proposed building layout

BUILDING CLASSIFICATIONS

The following table and figure present a summary of relevant building classifications for the proposed development namely the items for potential inclusion into the project.

BUILDING CHARACTERISTICS	BLOCK G	BLOCK A	BLOCK B
+ **BCA CLASSIFICATION:**	Class 9b (Class-rooms)	Class 5 (Administration)	Class 9b (VET) (Class-rooms) *Note: Class 9b on the basis that the VET function is associated with a secondary school*
+ **RISE IN STOREYS:**	Two (2) (Split Level) 	One (1)	One (1)
+ **STOREYS CONTAINED**	Two (2) (Split Level)	One (1)	One (1)
+ **TYPE OF CONSTRUCTION:**	TYPE B	TYPE C	TYPE C
+ **EFFECTIVE HEIGHT:**	<12m	<12m	<12m
+ **MAX. FLOOR AREA**	5,500m^2	3,000m^2	3,000m^2
+ **MAX. VOLUME:**	33,000m^3	18,000m^3	18,000m^3
+ **SPRINKLER PROTECTED:**	No	No	No
+ **CLIMATE ZONE:**	Zone 5	Zone 5	Zone 5

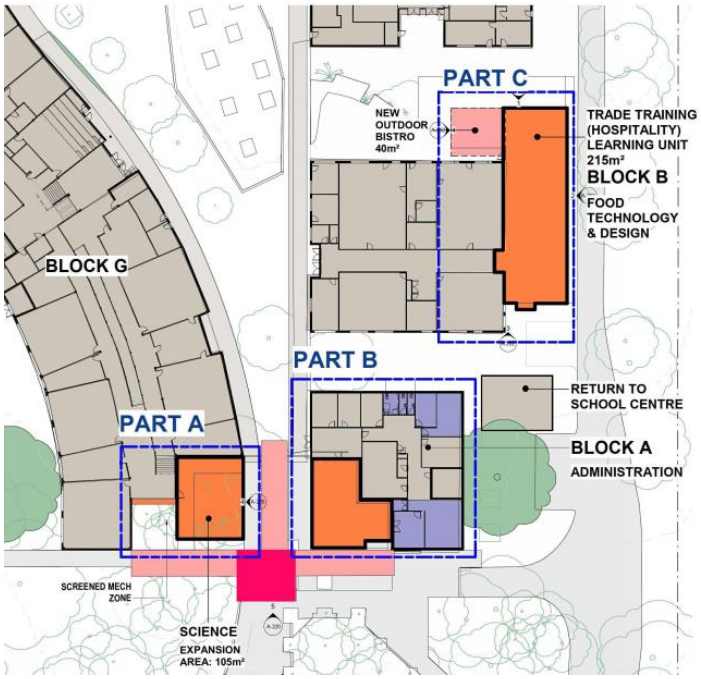


Figure 6: Proposed building layout

BCA ASSESSMENT & RECCOMENDATIONS

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

EP&A Reg. 2000	**General Note**
	No Annual Fire Safety Statements have been produced for any buildings subject to assessment. BM+G will prepare the fire safety schedules for the proposed buildings once the design and compliance strategy progresses to a stage at which required systems can be determined.
B1.4 ***Structure***	**General Note**
	New building works are to comply with the structural provisions of the BCA 2019 and referenced standards including AS 1170. The structural engineer will need to certify that the structural capacity of the building will not be reduced as a result of the new works and that the building is considered structurally adequate for its intended use. The Importance Level provisions of BCA (Section B) are to be acknowledged by the Structural Engineer and addressed to the degree necessary. New building works to the existing building must be compliant with earthquake provisions of AS1170.4 – Earthquake Actions in Australia. Consideration may be given to compliance with AS 3826-1998 - Strengthening existing buildings for earthquake for any required remedial works to the existing building where appropriate.
C1.1 ***Fire Rating***	**General Note**
	Type of Construction: The type of construction for each respective block is as noted below **Learning Hub Building including Block I – Type B**

Figure 7: Block N and Block I Buildings

Note: We note that there is potential opportunity for Block N and Block I to be considered separate buildings where the following is achieved.

- All structures being independent with no physical connection between,
- No connection between Block N and Block I in terms of roof structures columns and the like,
- Linkway/Awning being a sterile area no fuel load which would constitute a fire compartment.

+ No sharing of services between buildings reticulation of services between whether it be exposed and or via a concealed space.

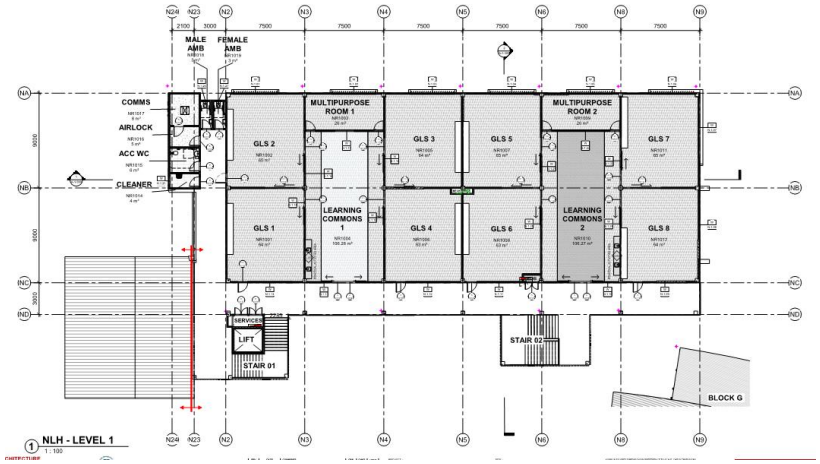


Figure 8: Block N and Block I – Separation

We note that the design can readily achieve compliance.

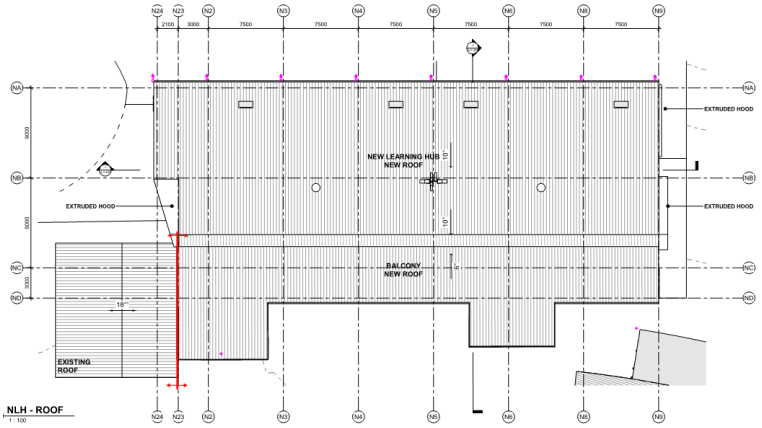


Figure 9: Block N and Block I – Roof Separation

Block G – Type B

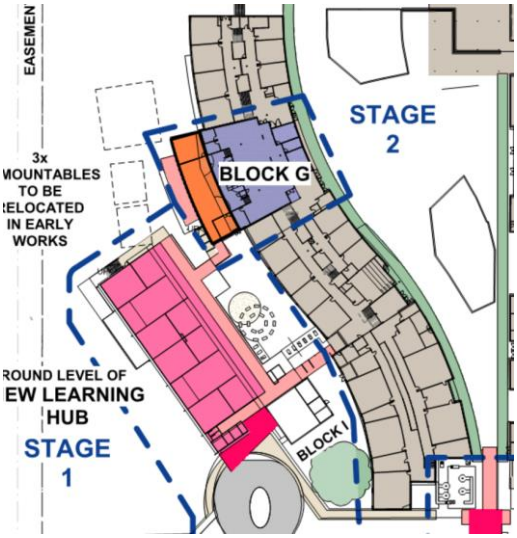


Figure 10: Block G

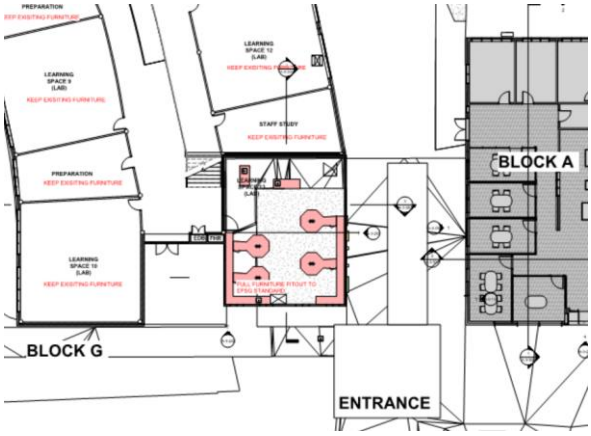


Figure 11: Block G – Scope of Works

Block A – Type C

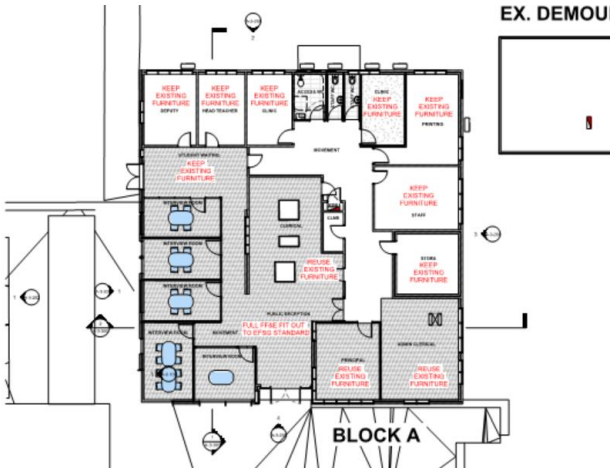


Figure 12: Block A – Scope of Works

Block B – Type C

Figure 13: Block B – Scope of Works

The relevant FRLs as listed in Table 4 and 5 of Specification C1.1 must be adhered to. Refer to ***APPENDIX A.***

Further Information

Based on a review of the design to date, The linkway connections between Block N And Block G are noted as being designed as separate structures and fully ventilated as such Block N and G are deemed separate building for the purpose of the BCA.

Figure 14: Proposed Linkways

All new works to be designed to comply with the requirements of Spec C1.1 of the BCA this includes the existing elements within Block G and I where impacted by the proposed works. In this regard, the structural engineer is to confirm whether the external walls are loadbearing and or non-loadbearing. Where the external walls are loadbearing exposure between buildings occur in several locations particular arears of concern are as shown below.

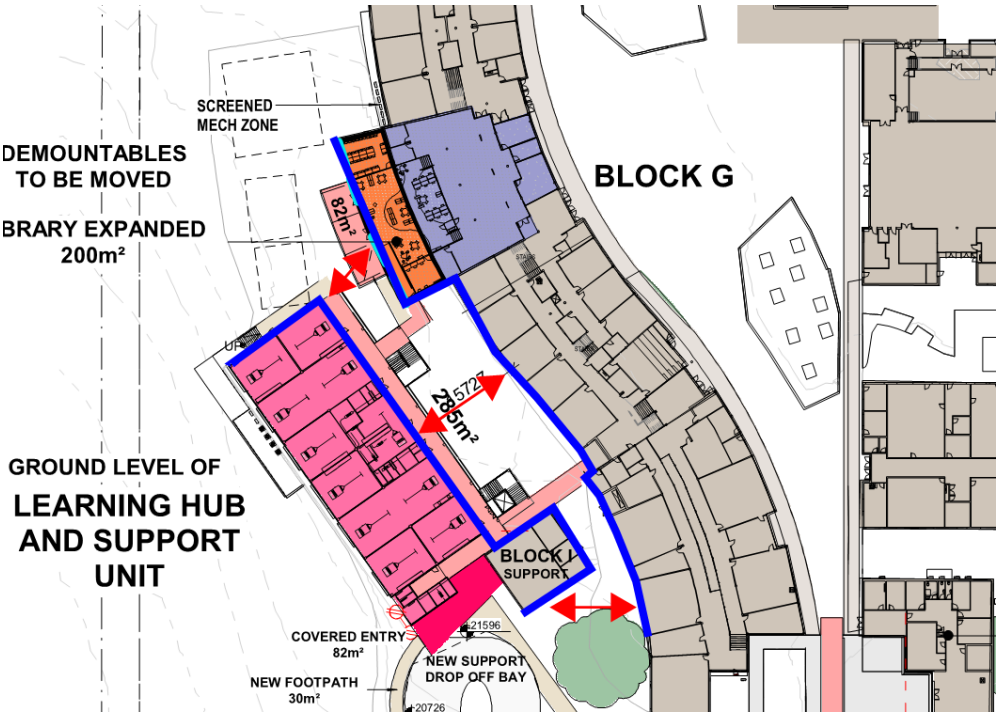


Figure 15: Exposure between Block G and Block I

Having regards to the new learning hub and library extension, it appears the structural design incorporates loadbearing external walls as such the external walls would be required to be rated in accordance with Spec C1.1 unless the design was to incorporate internal columns and non-loadbearing external walls. Structural engineer to review and confirm, further details are to be provided during the DD phase.

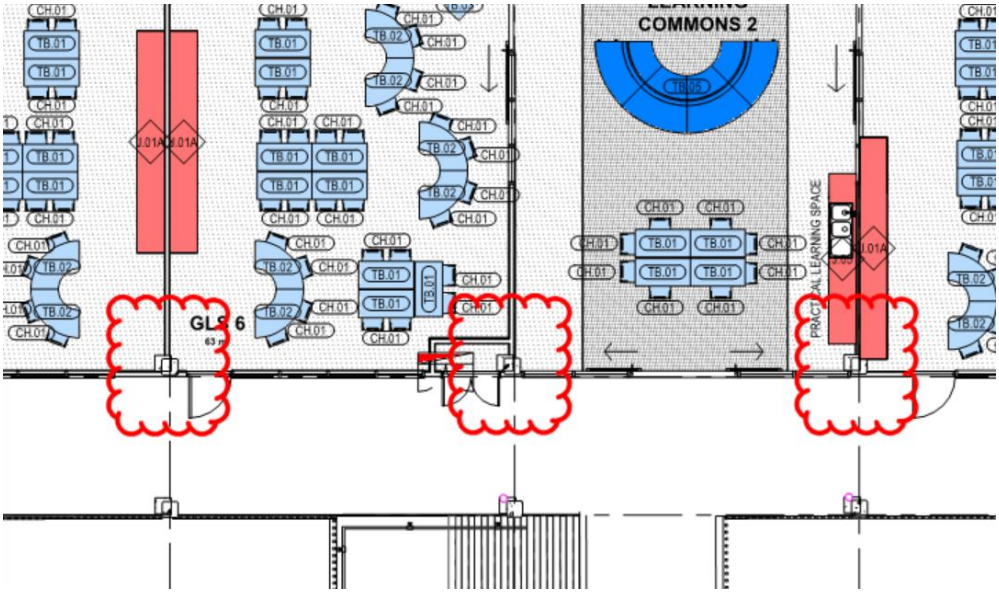


Figure 16: Learning Hub – Internal Columns

In addition to the above, the optional scope for the extension to Block G includes the construction of an external wall within 18m of the existing Block A building, structural engineer is to confirm whether the external wall is loadbearing and or non-loadbearing where loadbearing the external wall will need to be fire rated where within 18m. Structural engineer to review and confirm, further details are to be provided during the DD phase.

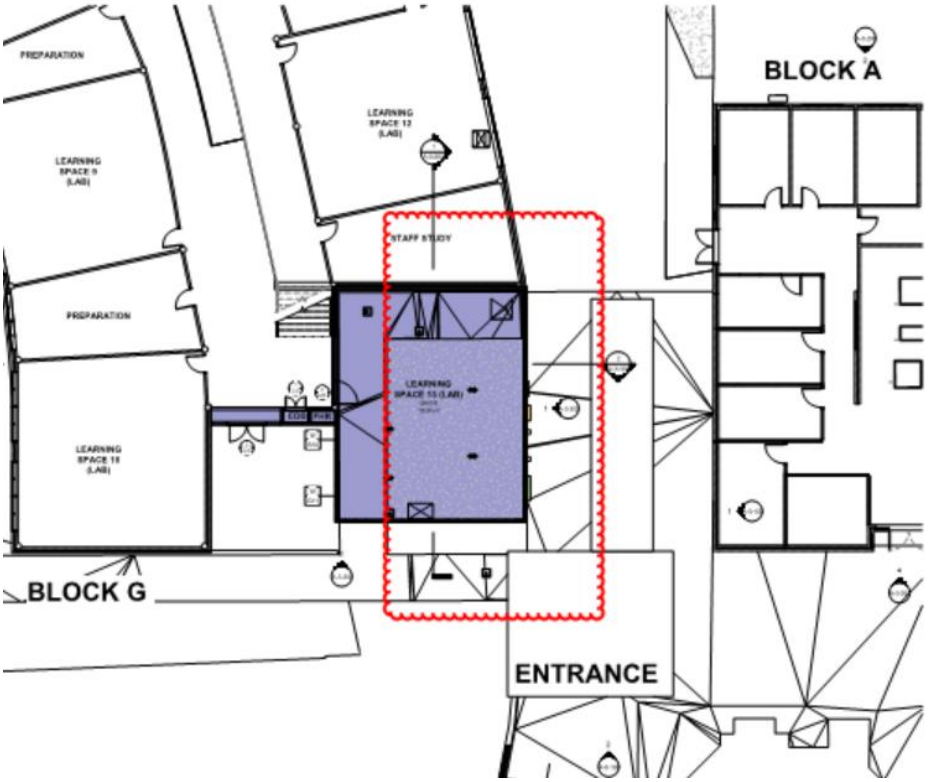


Figure 17: Exposure between Block G and Block A

The design incorporates a number of loadbearing external columns all of which are within 18m of an adjoining fire source feature and would need to achieve a minimum FRL of 120/-/-. Structural engineer to note and ensure compliance details demonstrating compliance to be provided during DD phase.

Figure 18: Loadbearing External Columns – Learning Hub

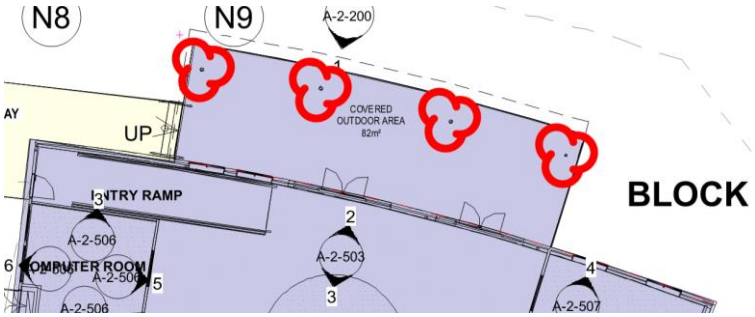


Figure 19: Loadbearing External Columns – Block G

Where there are works proposed within the existing buildings - loadbearing capacity of the existing buildings in terms of ability to support the proposed works will need to be confirmed by a structural engineer as part of the Crown Certificate process.

Performance Solution

Where the existing external walls of Block G are determined to be loadbearing, it is recommended that the exposure between building be considered under a Fire Engineered solution to determine scope for the distance between building to be rationalised via radiant heat calculations. Details are to be included in architectural documentation. Areas of concern are as shown in the figure below.

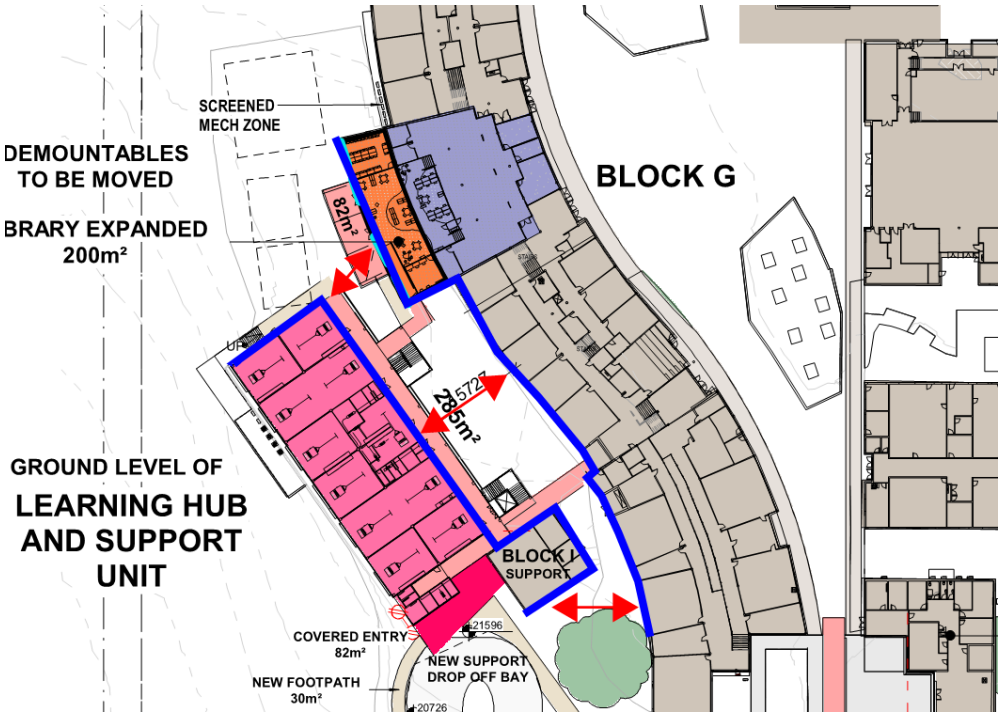


Figure 20: Exposure between Block G and Block I

C1.9
Non-Combustible

Non-Combustible Building Elements: Buildings of TYPE A & B the following elements are required to be non-combustible:

+ Any external walls including all components incorporated in them,
+ Any framing or integral formwork systems i.e. timber framing, sacrificial formwork, etc. external wall will be non-combustible.
+ Any external linings or trims i.e. external UPVC window linings, timber window blades, etc.
+ Any sarking or insulation contained within the wall assembly.

General Note

New works to comply. Test Reports, Codemark Certification or other suitable evidence is to be provided to demonstrate non-combustibility requirements for the external wall construction.

This is not an exhaustive list, and any element incorporated within any external wall assembly must be identified and provided for review.

BUILDING ELEMENT	TYPE A CONSTRUCTION
External wall	Non-combustible
Common wall	Non-combustible
Floor and floor framing of lift pit	Non-combustible
All loadbearing internal walls (including those of shafts)	Concrete, masonry or fire-protected timber
Loadbearing fire walls	Concrete, masonry or fire-protected timber
Non-loadbearing internal walls required to be fire-resistant	Non-combustible
Non-loadbearing lift, ventilating, pipe, garbage and like shafts which do not discharge hot products of combustion	Non-combustible

Figure 21

It is noted that the external wall systems are being developed however we note that compliance is readily achievable further details will need to be provided along with the DD phase.

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

C1.14
External Wall Fixtures

An ancillary element must not be fixed, installed and or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is one of the following;

- An ancillary element that is non-combustible
- A gutter, downpipe or other plumbing fixture or fitting
- A flashing,
- A grate or grille not more than 2m2 in area associated with a building service,
- An electrical switch, socket outlet, cover plate or the like,
- A light fitting,
- A required sign
- A sign other than one permitted under this clause that-
    - Achieves a group number 1 or 2, and
    - Does not extend beyond one storey, and
    - Does not extend beyond the fire compartment, and
    - Is separated vertically from other signs permitted under this clause by at least two storeys
- An awning, sunshade, canopy, blind or shading hood other than one provided under this clause that-
    - Meets the relevant requirements of table 4 of specification as for an internal element, and
    - Serves a storey -
    - At ground level, or
    - Immediately above a storey at ground level, and
    - Does not serve an exit, where it would render the exits unusable in a fire.
- A part of a security, intercom or announcement system
- Wiring
- A paint, lacquer or a similar finish
- A gasket, caulking, sealant or adhesive directly associated with elements allowed under this clause.

General Note

New works to comply.

Test Reports, Codemark Certification or other suitable evidence is to be provided to demonstrate that the ancillary elements (i.e. elements attached to the external wall, but which do not form part of the external wall such as decorative panels/fins and signage) are non-combustible or comply with the concession under Clause C1.9(e).

Wall systems and external wall system makeups will be developed in the DD phase and details demonstrate compliance will need to be provided for BM+G review and comment.

Further Information

Further details are to be provided during developed design stage with respect of the proposed materials and types of ancillary elements attached to the external walls, this includes any building identification signage. Signage specifications and details with respect of the proposed material to be used will need to be confirmed. Compliance readily achievable details demonstrating compliance to be provided along with the DD phase.

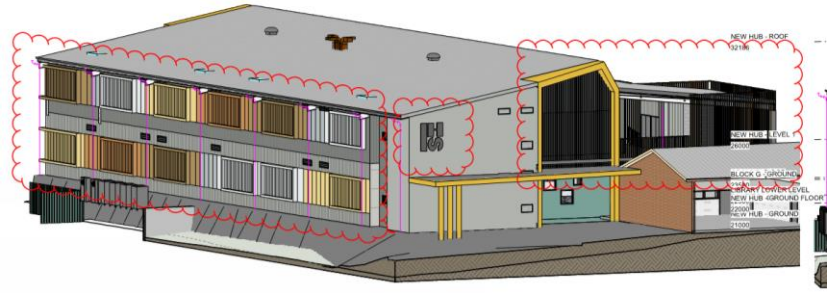


Figure 22: Ancillary Elements attached to External Walls

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.

Based on the information provided to BM+G we note that compliance is achieved all buildings have been confirmed to not exceed the limitations under this clause.

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 will need to review and 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. Typical example below.

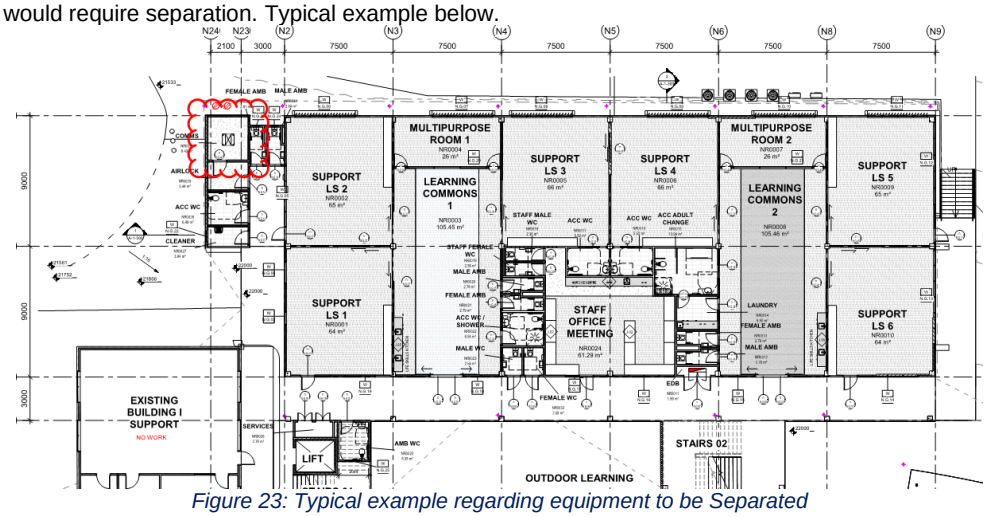


Figure 23: Typical example regarding equipment to be Separated

The type of equipment proposed and any required fire separation where required will need to be shown on the DD documentation.

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 along with the DD phase.

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.

General Note

It is noted that there is an existing demountable building which will be located within 3m of Block A however this being an existing building and based on the proposed works being light refurbishment in nature no upgrade works are deemed necessary.

C3.3

Separation between different fire compartments

The distance between parts of external walls and any openings within them in different fire compartments separated by a fire wall must not be less than that set out in Table C3.3, unless—
(a)those parts of each wall have an FRL not less than 60/60/60; and
(b)any openings protected in accordance with C3.4.

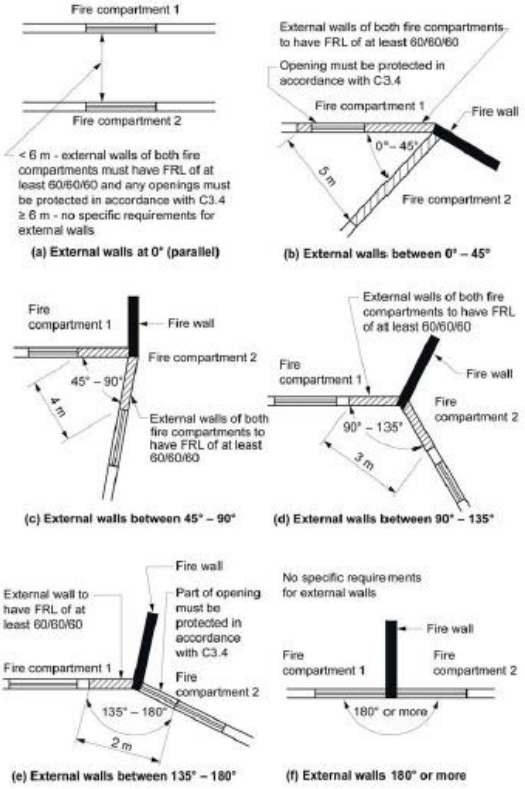


Figure 24

General Note

Currently we note that there are no locations where the requirements of this clause will apply, subject to further assessment during the DD phase.

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

The minimum number of exits have been provided, final number of exits required will be derived from the exit travel distances and aggregate egress width requirements.

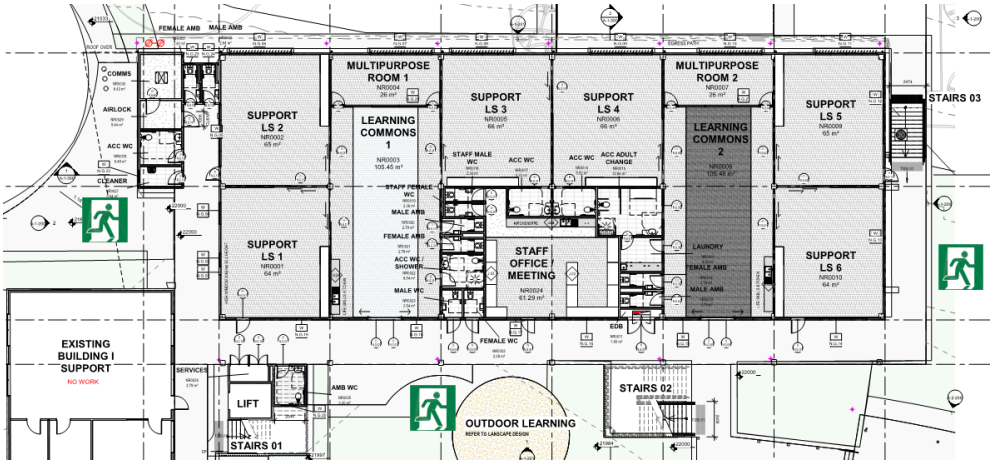


Figure 25: Block N - Ground Floor Exits

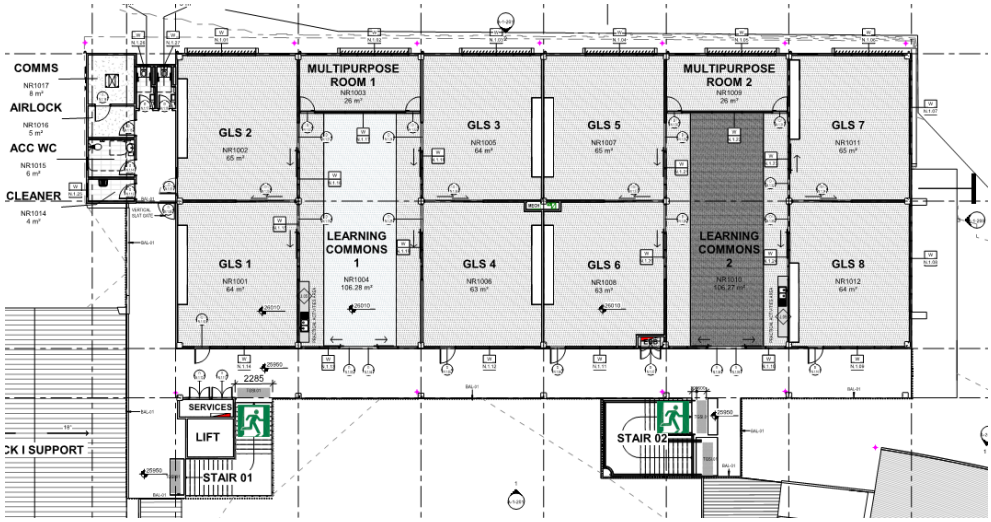


Figure 26: Block N - First Floor Exits

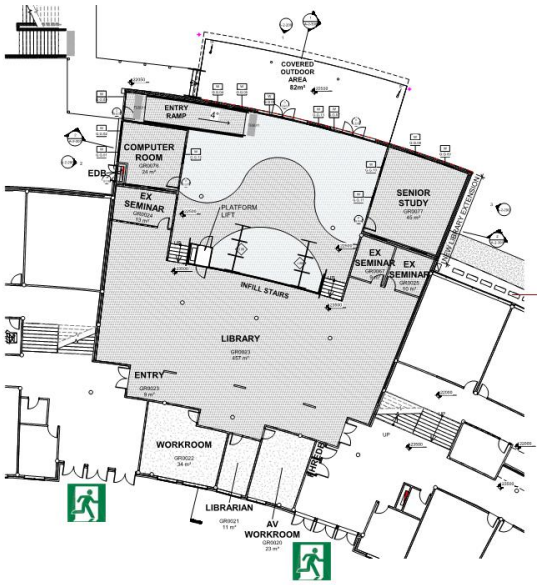
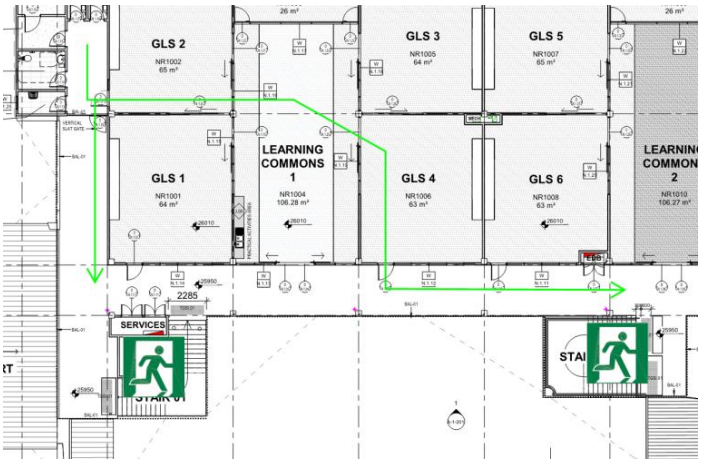
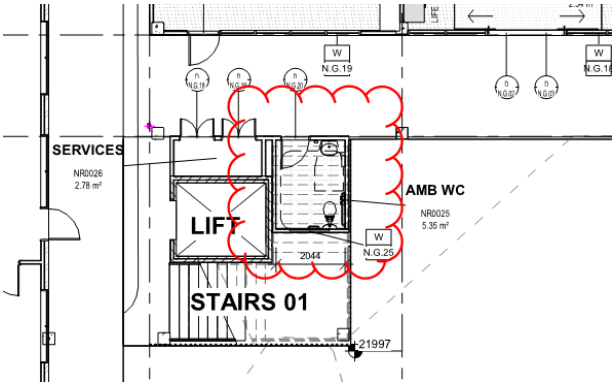


Figure 27: Block G – Available Exits

D1.3 ***Fire Isolated Stairs***	Every stairway serving as a required exit in a class 9b building must be fire isolated where it connects passes by or through more than two (2) consecutive storeys and an additional storey may be included where a sprinkler system is installed within the building or additional separation is provided as outlined within this clause. **General Note** With the exception of Block G, learning hub and support unit, all of the buildings subject to the proposed works are of single storey. We note, all the proposed stairways within Block G, learning hub and support unit serve connect and/or pass by not more than two (2) storeys as such are not required to be fire isolated. Notwithstanding as they are required for egress purposes these stairways will need to comply with the relevant provisions of D1.9 of the BCA.
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** Having regards to the new works we note that compliance is readily achievable based on the location of the available exits. **Further Information** Whilst compliance is readily achievable as noted above, egress within the New Learning Centre requires travel from the external balcony's back through various support LS and common areas to achieve compliant travel distances as shown below. Compliance is readily achievable door hardware to the doors located on the required egress path to be readily openable at all times for the occupants.  *Figure 28: Learning Hub Egress Path* Refer also comments under D1.10 with respect of path of travel to the public road. All internal landscaped areas will be subject to further assessment for compliance during the DD phase.
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. The new learning hub particularly Lv. 1 has access to 2 exits (non-fire isolated stairways) having a width 2m total of 4m as such would be capable of accommodating a maximum of 440 persons based on a nominated maximum number of occupants being 240persons we note that compliance is readily achievable.
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 (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 We note that the plans currently demonstrate compliance in this regard.
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 the required exits to the road via open space is to be confirmed through the sub mission of further detail during the DD phase including landscape drawings. We note that compliance is readily achievable through further information being provided along with the landscaped documentation. **Performance Solution** The egress arrangement from the proposed buildings in terms of passing back under the covered linkways and the like will be subject to further consideration in future design stages as necessary will be subject to a fire engineered performance solution.
D1.11 Horizontal Exits	Horizontal exits must not be counted as required exits between sole occupancy units and in a Class 9b building used as an early childhood centre, primary and or secondary school We note that no fire separation and or Horizontal exits are proposed as part of the proposed works.
D2.7 ***Equipment in Corridors***	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 aforementioned 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 ***Enclosures below Stairs/Ramps***	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. **Further Information** A sanitary compartment is shown below one of the non-fire isolated stairs serving the New Learning Hub and Support Unit – this will need to be enclosed with 60min construction including a -/60/30 door details to be shown on the architectural documentation in this regard.  *Figure 29: Separation of Sanitary Compartment required*
D2.9 ***Width of required stairways and ramps***	A required stairway or ramp that exceeds 2m in width is counted as having a width of only 2m unless it is divided by a handrail or divided by a barrier continuous between landings and at not more than 2m intervals

General Note

For the purpose of this assessment both stars serving the new learning hub are considered to be 2m in width only.

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.

Further Information

Stair details will need to be provided for review and comment during the DD phase, the plans provided to date do not contain sufficient information to confirm compliance however we note that compliance is readily achieved.

These details are to include sectional stair details showing tread and riser dimensions, handrail, nosing, tactile details etc. This includes all external stairways within landscaped areas.

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 unless otherwise rationalised under FP1.4 Performance Solution report.

D2.16

Balustrades

Balustrade details are to be provided for review and comment as part of the schematic design stage. Although the plans show that balustrades have been documented sufficient details have not currently been provided.

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.

Further balustrade details will need to be provided for review and comment during the DD phase however based on the documentation to date we note that compliance is readily achievable noting also the additional requirements with respect of EFSG requirements in terms of balustrade/barrier heights.

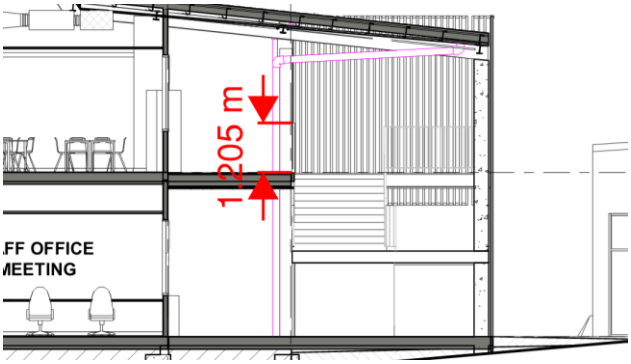


Figure 30: Balustrade Height

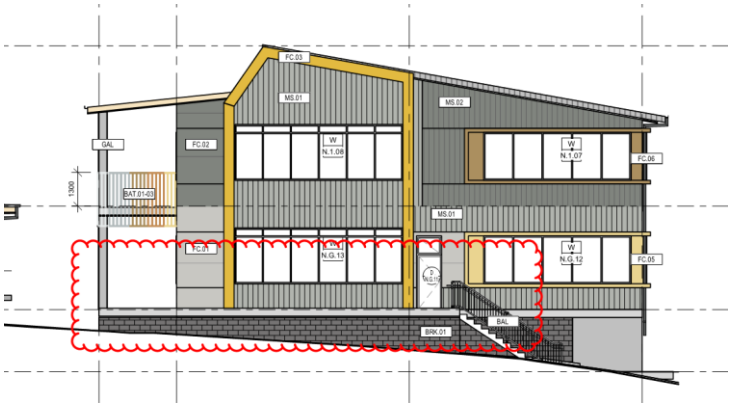


Figure 31: Balustrade Heights

General Note

As part of the proposed works, it is recommended that upgrade works to the existing balustrades to be undertaken such that they incorporate openings that will not permit a sphere greater than 125mm to pass through and achieve a minimum 1m in overall height where directly associated with the works based on the current scope this would be limited to the areas subject to the refurbishment works within Block G.

D2.19

D2.20

D2.21

Door construction including type latching, swing

Doors and latching: 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. This will include ensuring existing door hardware within existing buildings where located on a path of travel and or on a required exit from the building being upgraded to the degree necessary.

Further Information

As noted under D1.4 and D1.5 the external door opening into GLS2 which will need to be free egress at all times door hardware is to be specified to achieve compliance otherwise this will need to be addressed by way of a Fire Engineered Solution.

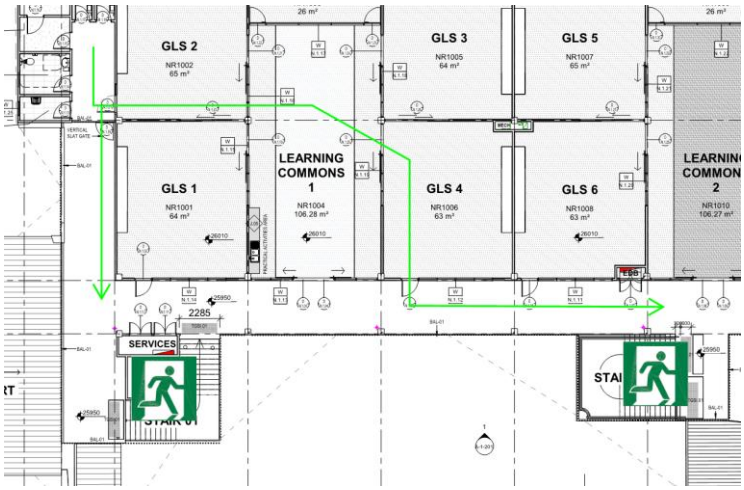


Figure 32: Learning Hub Egress Path

All of the required exit doorways from each building generally swing in the direction of egress and in this regard, compliance is readily achieved.

There are a number of sliding doors proposed to the Learning Hub building including doors in a path of travel and final egress doors these doors will need to be opened with a force not more than 100N and 20N under AS 1428.1-2009 also be openable with a single downward hand action the type of hardware proposed will need to be confirmed as part of the design development.

Performance Solution

Any proposed lockable gates or the like located in the path of travel and or permitter gate (D1.10).

E1.3 ***Fire Hydrant System***	Existing external hydrants have been provided, although coverage is not confirmed to the existing building in addition the usability of the current system is not known. All new works are to be services by a Hydrant system complying with E1.3 and AS 2419.1-2005 subject to the works being subject to compliance with BCA2019. The performance of the existing infrastructure would need to be confirmed by the hydraulic engineer to determine suitability to be relied upon. **General Note** As part of the proposed works a compliant FH system is to be provided to serve all new and altered parts in accordance with, the requirements of E1.3 of the BCA and AS2419.1-2005. Compliant hydrant coverage is to be achieved throughout all new areas and refurbished parts of the buildings where being of a size requiring services coverage. For the light refurbished buildings, compliant coverage is to be maintained from existing outlets. Compliance readily achievable Hydraulic consultant to ensure compliance and provide design certification and relevant drawings to be provided along with the application for Crown Certificate. **Performance Solution** Location of the proposed hydrant booster will need to be confirmed and addressed under the Fire Engineered Strategy as it is not both at the principle vehicular entrance and not within site of the main entrance
E1.4 ***Fire Hose Reel System***	Fire hose reel(s) are to be provided to achieve coverage to any 9b part not being a classroom i.e. a hall library or the like. Hydraulic consultant will need to provide coverage mark-ups demonstrating that compliant FHR coverage has been provided to the library and laboratories in this regard. We note that compliance is readily achieved design drawings and certification to be provided along with the application for Crown Certificate.
E1.6 ***Portable Fire Extinguishers***	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 required 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, Whilst EFSG compliance is not required by the BCA, it is expected that compliance with EFSG will be required. Accordingly, 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.
E2.2a ***Smoke Hazard Mgmt. & Detection***	<u>Detection for shutdown:</u> The buildings on site either have a RIS of two (2) or less as such detection will only be required where the building contains a ducted air conditioning system, which under the NSW variation of E2.2, requires the provision of smoke detection to initiate shutdown in accordance with Clause 6 of Spec. E2.2a – there was no detection identified on site at the time of inspection. Notwithstanding, the benefits of providing an AS 1670.1 system are substantial, both in relation to asset protection and fire and life safety. This additional measure will also contribute positively to assessment of the proposed performance solutions. **General Note** It should be noted that additional fire safety measures may be required by the projects fire safety engineer as a result of the proposed performance solutions. Dry fire consultant to confirm if the size of the fire compartment exceeds 2000m^2 and requires AS1670.1 – 2018 Automatic Fire Detection and Alarm Systems throughout the fire compartment to comply with NSW Table E2.2b. to be confirmed as part of the finalisation of the Schematic Design stage. **Performance Solution** Where it is proposed to protect only the library part of Block G then this is to be addressed by way of a Performance Solution.
Part E3 ***Lifts***	In an accessible building, every passenger lift must be one of the types identified in Table E3.6a, have accessible features in accordance with Table E3.6b and not rely on a constant pressure device for its operation if the lift car is fully enclosed. In addition, the requirements of the BCA, the following EFSGs also apply: **EFSG SG 1011 - Lift Design and Install Requirements Summary** + All new installations and lift modernisations at any of NSW Department of Education campus shall provide access for persons with disabilities in compliance with AS1428.1 and A1735.12.

- Where compliance with AS 1428 and/or AS 1735.12 cannot be achieved, approval from the NSW Department of Education in writing is to be provided, and the lift(s) shall still comply with at least the Building Code of Australia requirement for Facilities for People with Disabilities Clause E3.6.
- All lift car control buttons shall comply with AS 1735.12 Clauses 8.3 Tactile Information and Clause 8.4 Shape of Characters.
- All passenger lifts must have lift car audio (voice, not just a sound) position indication regardless of how many floors are served.
- Unless prior approval from the NSW Department of Education in writing is provided the following lifts shall not be used for the access of people with disabilities:
  - AS 1735.7 – Stairway Lifts
  - AS 1735.15 – Low rise passenger lifts – Non automatically controlled
  - AS 1735.16 – Lifts for persons with limited mobility – Restricted use
  - AS 1735.17 – Lifts for persons with limited mobility – Restricted use – Water-drive
  - AS 1735.18 – Passenger Lifts for Private Residence

EFSG SG 1011.1.5 Passenger Lifts Requirements Summary

- Passenger lift cars are to have a minimum size of 1400mm wide by 2000mm deep. Unless prior approval from the NSW Department of Education in writing, no passenger lift car shall be smaller than this size.
- Car sizes may be larger than this as required to suit code requirements and lift traffic studies.

In addition to the above, it is also noted that a platform lift is proposed within the library to provide access between the split levels. The total distance travelled cannot be more than 1000mm.

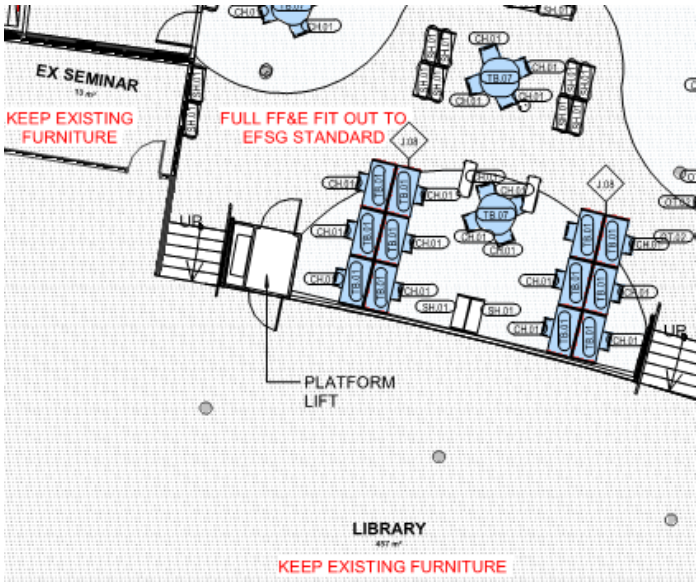


Figure 33: Block G – Platform Lift

E4.2-E4.8
Emergency lighting and Exits Signs

Emergency lighting and exit signage to be installed in accordance with AS 2293.1-2018. Additional Exit/directional will need to be installed throughout the existing building in accordance with AS2291.1-2018.

General Note

Emergency lighting, exit and directional signage is to be updated throughout to ensure all altered areas achieve compliant coverage. Electrical consultant to review and ensure compliance in this regard.

F1.4
Weatherproofing

Thresholds were observed throughout the site incorporating various steps and ramps. Where these are amended for compliance with access requirements, they must also have regard to the design information below

The design of seamless door thresholds as required between external and internal areas, is to comply with AS 4654-2012.1 & 2 and the sub-sill is recessed, the design will need to incorporate a linear grate and drain system before the sub-sill or with an integrated sub-sill to mitigate water ingress into the building.

Note: An FP1.4 performance solution report will need to be provided for review and comment by the façade consultant.

Details to be developed and provided along with the DD phase.

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 along with the Schematic Design stage.

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

F4.1 & F4.2
Natural lighting

Natural lighting is required to be provided to all general-purpose classrooms. Architect to review and ensure compliance, details demonstrating compliance will need to be provide for review and comment along with the DD phase.

Part G6 *Outdoor Occupiable Areas*

Outdoor occupiable areas are subject to additional compliance requirements under the BCA including with respect of fire services coverage, egress requirements, fire hazard properties and the like.

Compliance is readily achievable having regards to the proposed works based on the SD phase.

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 Irrawang High School, against the relevant provisions of the Building Code of Australia 2019, 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 A - REQUIRED CONSTRUCTION & FRLs OF BUILDING ELEMENTS

BCA SPEC. C1.1 TABLE 4 - TYPE B 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—				
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/ 30	120/ 90/ 60	180/120/ 90	240/180/120
3 to less than 9 m	90/30/ 30	120/30/ 30	180/90/ 60	240/ 90/ 60
9 to less than 18 m	90/30/–	120/30/–	180/ 60/–	240/ 60/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
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/ 30	–/ 90/ 60	–/120/ 90	–/180/120
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—				
For *loadbearing* columns—				
less than 18 m	90/–/–	120/–/–	180/–/–	240/–/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
For non-*loadbearing* columns—	–/–/–	–/–/–	–/–/–	–/–/–
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
Fire-resisting stair *shafts*—				
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
OTHER LOADBEARING INTERNAL WALLS and COLUMNS—	60/–/–	120/–/–	180/–/–	240/–/–
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Notes:

1. Any wall required to have an FRL with respect to integrity and insulation must extend to the underside of the floor next above if that floor has an FRL of at least 30/30/30; or the underside of a ceiling with a resistance to the incipient spread of fire to the space above itself of not less than 60 minutes; or the underside of a non-combustible roof covering; or 400mm above the roof covering if it is combustible.
2. The method of attaching or installing a finish, lining, ancillary element, or service installation to a building must not reduce the fire-resistance of that element to below that required.

3. All elements of an external wall assembly (except those allowed under Clause C1.9) must be non-combustible. This includes, framing, integral formwork, insulation, sarking, façade coverings, and the like. Any departures from this will require consideration under CV3 or potentially, a fire engineered performance solution.
4. A loadbearing internal wall and a loadbearing fire wall must be constructed from concrete, masonry, or a combination of the two.
5. In the storey immediately below the roof, internal columns and internal walls other than fire walls and shaft walls need not comply with Table 4.
6. Any lightweight construction in a fire wall or an internal wall required to have an FRL is to comply with Specification C1.8.
7. Non-loadbearing parts of an external wall that are more than 18m from a fire source feature need not be fire rated.

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. The method of attaching or installing a finish, lining, ancillary element, or service installation to a building must not reduce the fire-resistance of that element to below that required.
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.