



BLACKETT
MAGUIRE+
GOLDSMITH

BCA ASSESSMENT REPORT

BUILDINGS 8 & 12
8-12 UNIVERSITY AVENUE, MACQUARIE PARK

MACQUARIE UNIVERSITY

Revision 7

Date: 26.11.2018

Project No.: 160472



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REPORT STATUS				
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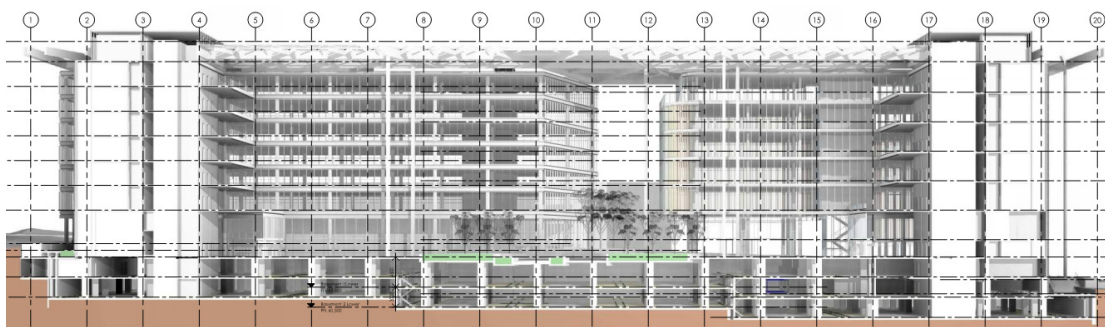


INTRODUCTION

A.1 BACKGROUND / PROPOSAL

Blackett Maguire + Goldsmith Pty Ltd (BM+G) have been commissioned by Macquarie University to undertake a Building Code of Australia (BCA) 2016 Amendment 1 assessment for the proposed commercial building at 8-12 University Avenue, Macquarie University, pursuant to the provisions of clause 145 of the *Environmental Planning & Assessment Regulation 2000* and clause 18 of the *Building Professionals Regulation 2007*.

The proposal includes two A-grade campus style office / laboratory towers across seven levels over podium basement carpark. The buildings will be connected with public corridors and a shade structure / atrium and there will be a through site link connecting the site to the broader campus.



Source: KANNFINCH Drawing No. DA3.02 Revision J dated 2.11.2018

Note 1: The “Galleria” through site link area on ground floor is proposed to be partially covered with a louvered roof structure (for shade and aesthetic purposes only). Note 2: Given the louvered roof structure, the Galleria area may be considered substantially enclosed at the top in accordance with the definition of “Atrium” in BCA Clause A1.1. To this end, the provisions of Part G3 (as referenced in our comments below) will apply.

A.2 AIM

The aim of this report is to:

- + Undertake an assessment of the proposed commercial building against the Deemed-to-Satisfy (DtS) Provisions of the BCA 2016.
- + Identify any BCA compliance issues that require resolution/attention for the proposed development.

A.3 PROJECT TEAM

The following BM+G team members have contributed to this report:

- + Dean Goldsmith (Director) – Report Author
- + Tony Heaslip (Director) – Peer Review

A.4 DOCUMENTATION

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

- + BCA 2016 Amendment 1
- + Guide to the BCA 2016 Amendment 1
- + Email advice from Gordana Klisarova of Kann Finch (Architect) outlining population calculation methodology for East Building Office & Laboratory areas per BCA D1.13(c) dated 30.1.2018, 25.1.18, 24.1.18, & 22.1.18.



+ Architectural plans prepared by Kann Finch Group Pty Ltd:

Drawing No.	Rev	Date	Drawing No.	Rev	Date
DA00.01	J	02.11.2018	DA02.08	J	02.11.2018
DA00.02	J	02.11.2018	DA02.09	J	02.11.2018
DA00.02.1	A	02.11.2018	DA02.10	J	02.11.2018
DA01.01	J	02.11.2018	DA02.11	J	02.11.2018
DA01.02	H	02.11.2018	DA03.01	J	02.11.2018
DA02.01	J	02.11.2018	DA03.02	J	02.11.2018
DA02.02	J	02.11.2018	DA03.03	J	02.11.2018
DA02.03	J	02.11.2018	DA03.04	J	02.11.2018
DA02.04	J	02.11.2018	DA03.05	J	02.11.2018
DA02.05	J	02.11.2018	DA04.01	H	02.11.2018
DA02.06	J	02.11.2018	DA04.02	H	02.11.2018
DA02.06.1	A	02.11.2018	DA04.03	H	02.11.2018
DA02.06.2	A	02.11.2018	DA11.12	J	02.11.2018
DA02.07	J	02.11.2018	DA11.13	G	02.11.2018

A.5 REGULATORY FRAMEWORK

Pursuant to clause 145 of the Environmental Planning and Assessment (EPA) Regulation 2000 all new building work must comply with the current BCA.

In accordance with section 109R of the Environmental Planning and Assessment Act 1979, building works carried out by the Crown may not be carried out until such time as they have been certified as being compliant with the technical provisions of the state's building laws.

A.6 LIMITATIONS & EXCLUSIONS

The limitations and exclusions of this report are as follows:

- + The following assessment is based upon a review of the architectural documentation.
- + No assessment has been undertaken with respect to the Disability Discrimination Act (DDA) 1992, other than the Access to Premises Standards that are equivalent to the BCA specified minimum standard of compliance in Parts D3 and F2 and AS1428.1-2009. It is understood that an Access Consultant has been engaged to carry out a DDA assessment in this regard.
- + The Report does not address matters in relation to the following:
 - i. Local Government Act and Regulations.
 - ii. NSW Public Health Act 1991 and Regulations.
 - iii. Occupational Health and Safety (OH&S) Act and Regulations.
 - iv. Work Cover Authority requirements.
 - v. Water, drainage, gas, telecommunications and electricity supply authority requirements.
 - vi. DDA 1992.
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A.7 TERMINOLOGY

Alternative Solution

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

Atrium

Means a space within a building that connects two or more storeys, and –

- (a) Is wholly or substantially enclosed at the top by a floor or roof (including a glazed roof structure); and
- (b) Includes any adjacent part of the building not separated by an appropriate barrier to fire; but
- (c) Does not include a stairwell, ramp well or the space within a shaft.

Building Code of Australia (BCA)

Document published on behalf of the Australian Building Codes Board. The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia and is adopted in New South Wales (NSW) under the provisions of the EPA Act and Regulation. Building regulatory legislation stipulates that compliance with the BCA Performance Requirements must be attained and hence this reveals BCA's performance based format.

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.

Climatic Zone

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

Crown BCA Design Certification

BCA Certification issued pursuant to section 190R of the Environmental Planning & Assessment Regulation 1979.

Deemed to Satisfy Provisions (DtS)

Provisions 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).

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 which adjoins the allotment; or a side or rear boundary of the allotment; or an external wall of another building on the allotment which is not a Class 10 building.

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

Building Occupation Approval issued by the Principal Certifying Authority pursuant to Part 4A of the EPA Act 1979.

Open Space

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 DtS 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 DtS Provisions; or
- (c) a combination of (a) and (b).

Sole Occupancy Unit (SOU)

A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes a dwelling.



B. BUILDING CHARACTERISTICS

B.1 BUILDING CLASSIFICATION

The following table presents a summary of relevant building classification items of the proposed mixed use commercial building:

▪ BCA Classification:	Class 5 (Commercial / Office / University Collaboration) Class 7a (Carpark) Class 8 (Laboratory) **Note: The Class 6 Retail areas on Ground Floor Level have not been referenced as they do not constitute greater than 10% of the total floor area of the storey (including the Galleria) – this calculation will need to be confirmed when the final ground floor retail layout is confirmed.
▪ Rise in Storeys:	The building has a rise in storeys of nine (9)
▪ Effective Height:	>25m (EH = 33.0m based on RL93.500 – RL60.500)
▪ Type of Construction:	Type A Construction
▪ Climate Zone:	Zone 5

B.2 FIRE SOURCE FEATURE

The distances from the nearest Fire Source Features are:

BOUNDARY	DISTANCE TO FIRE SOURCE FEATURE
Northern Boundary	>3m
Southern Boundary	>3m
Eastern Boundary	>3m
Western Boundary	>3m

BCA ASSESSMENT

C.1 BCA DEEMED-TO-SATISFY COMPLIANCE ISSUES:

The following comments have been made in relation to the relevant BCA provisions relating to the proposed commercial development located at 8-12 University Avenue, Macquarie University.

Note: The following is a précis of the provisions and should be read in conjunction with the BCA.

SECTION B - STRUCTURE

1. Part B1 - Structural Provisions

Structural engineering details prepared by an appropriately qualified structural engineer to be provided to demonstrate compliance with Part B1 in relation to the new structural elements of the building.

Comments: Details are to be provided confirming that the design achieves compliance with the following at the time of application for Construction Certificate/s109R Crown BCA Certificate, inclusive of reference to the following Australian Standards (where relevant):

1. AS 1170.0 – 2002 General Principles
2. AS 1170.1 – 2002, including certification for balustrading (dead and live loads)



3. AS 1170.2 – 2011, Wind Actions
4. AS 1170.4 – 2007, Earthquake Actions in Australia
5. AS 3700 – 2011, Masonry Structures
6. AS 3600 – 2009, Concrete Structures
7. AS 4100 – 1998, Steel Structures
8. AS 4600 – 2005, Cold Formed Steel Structures.
9. AS 2159 – 2009, Piling – Design and Installation
10. AS 1720.1 – 2010, Design of Timber Structure
11. AS/NZS 1664.1 and 2 – 1997, Aluminium Structures
12. AS 2047 – 2014, Windows and External Glazed Doors in Buildings
13. AS 1288 – 2006, Glass in Buildings - Selection and Installation

SECTION C – FIRE RESISTANCE

Part C1 Fire Resistance and Stability

2. Clause C1.1 – Type of Construction Required

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 in this clause.

Comments: Type A construction applies to this building as it has a rise in storeys of more than 3. Refer to comments under Spec. C1.1 below and Appendix 1.

3. Clause C1.9 – Non-Combustible Building Elements

In a building of Type A or Type B Construction a number of building elements are required to be non-combustible including external walls & common walls (including elements incorporated in them including the façade covering, framing and insulation), lift pit flooring and floor framing, services risers, load-bearing internal walls and fire walls.

C1.9(e) provides a list of materials that may be deemed as non-combustible without the need for verification testing per AS 1530.1.

Comments: The external walls, fire walls and the internal services risers in the proposed Building are required to be of non-combustible construction in accordance with C1.9 (a) & (b). Details and design certification will be required to be provided at CC Application stage to demonstrate compliance. Note: Particular attention is drawn to any proposed use of Aluminium Composite Panel Cladding (or other Bonded Laminate type materials) to the external walls – which may not achieve compliance with the above requirements.

4. Clause C1.10 – Fire Hazard Properties

The fire hazard properties of the linings, materials and assemblies in a Class 2 to 9 building and listed within this clause must comply with **Specification C1.10** and the additional requirements of the **NSW Provisions** of the Code.

Comments: Architect to note. Details for compliance will be required at the Occupation Certificate stage.

Note: Confirmation / test data is to be provided regarding fire indices and combustibility of any external wall cladding or attachments. If any proposed products are deemed combustible when tested in accordance with AS1530.1-1994, a project specific alternative solution will be required from the Fire Engineer. The combustibility of skylights and shade structures is also to be clarified.

5. Clause C1.14 – Ancillary Elements

An ancillary element must not be fixed, installed or attached to the internal or external parts of a non-combustible wall unless it is one of the concession items listed in items (b) – (m).



Comments: Any proposed structure attached to the external wall, including signage panels, sunshades, or decorative elements are required to be “non-combustible” materials by definition per C1.9 or tested in accordance with AS 1530.1. Details demonstrating compliance are to be submitted with the CC Application.

Part C2 Compartmentation and Separation

6. Clause C2.2 – General Floor Area and Volume Limitations

Sets out the parameters for the maximum floor area and volume of Class 5, 6, 7, 8 & 9 buildings as required by sub-clauses (a), (b) & (c).

Comments: For a building of Type A construction the maximum size of a fire compartment is as follows: Class 5 – 8,000m² and 48,000m³, and Class 6, 7 & 8 – 5,000m² and 30,000m³

The compartmentation within each tower exceeds the above limitations as the proposed Galleria connects all levels from ground level and above; and in turn has created a single fire compartment. The oversize fire compartmentation created by the atrium is to be addressed as a Performance Solution by the Fire Engineer to demonstrate compliance with Performance Requirements CP1 and CP2 – see further comments under Part G3 below.

Note: The requirements of Table C2.2 do not apply to the Class 7a sprinklered carpark areas.

7. Clause C2.6 – Vertical Separation of Openings in External Walls

If in a building of Type A construction, any part of a window or other opening in an external wall is above another opening in the storey next below and its vertical projection falls no further than 450 mm outside the lower opening (measured horizontally), the openings must be separated by a horizontal or vertical spandrel with an FRL of 60/60/60, and for the purposes of C2.6, window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

Comments: Spandrel protection is not required as the building will be required to be sprinkler protected throughout.

8. Clause C2.7 – Separation by Fire Walls

Separation of Fire Compartments must be constructed in accordance with the following:

- + FRL in accordance with Table 3 of Spec. C1.1 and extend to the underside of a floor with the same FRL, or to the underside of a non-combustible roof covering.
- + Any openings in a fire wall must not reduce the FRL, except where permitted by the Deemed-to-Satisfy Provisions of Part C3 (i.e. fire doors; protection of services).
- + Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or sarking-type material, must not pass through or cross the fire wall unless the required fire resisting performance of the fire wall is maintained.

Comments: If proposed, details of any proposed fire walls per C2.8 below are to be included on the Construction Certificate/s109R Crown BCA Certificate application plans. Note: Any openings in the proposed fire walls are required to be protected in accordance with C3.5.

9. Clause C2.8 – Separation of Classifications in the Same Storey

If a building has parts of different classifications located alongside one another in the same storey, each element must have the required higher FRL for the classifications concerned.

Alternatively, the parts must be separated by a fire wall having the higher FRL for the classifications prescribed in Table 3 or 4 of BCA Specification C1.1 (for Type A or Type B Construction), or Table 5 for Type C Construction.

Comments: The building elements on the Ground Floor and Levels 1-5 of the East Tower (8 University Avenue) must achieve the FRL requirements of the Class 8 Laboratory parts as specified in BCA Specification C1.1 (4-hour fire ratings) in accordance with C2.8(a).

Alternatively, fire separation is required between the different classifications in the same storey achieving the higher FRL of the different parts, i.e. the Class 8 part must be



separated from the Class 5 part by a fire wall of concrete or masonry construction (if loadbearing) achieving an FRL of 240/240/240.

The details are to be shown on the Construction Certificate/s109R Crown BCA Certificate plans per the diagram below OR a Fire Engineered Performance Solution for rationalisation of the above fire separation requirements is proposed to be provided to demonstrate compliance with Performance Requirements CP1 & CP2.

10. Clause C2.9 – Separation of Classification in Different Storeys

This clause specifies the required separation between parts of a building which are of a different classification, situated one above another, to minimise the risk of a fire in one classification causing the failure of building elements in another classification in a different storey.

Comments: The floor level above each different classification in the building is to achieve the applicable FRL for floors applying to the lower level.

11. Clause C2.10 – Separation of Lift Shafts

Applies to all classes of buildings and specifies the protection requirements for openings for lift shafts and lift landing doors. The requirements are set out in sub-clauses (a), (b), (c) & (d) which relate to openings in Type A, B and C construction. Also, note the Deemed to Satisfy Provisions of Part C3.

Comments: The lifts in the building are required to be enclosed in a fire rated shaft achieving an FRL in accordance with Table 3 of Specification C1.1.

12. Clause C2.11 – Stairways and Lifts in One Shaft

A stairway and a lift must not be in the same shaft if either the stairway or the lift is required to be in a fire-resisting shaft.

Comments: The current design is compliant with the above requirement.

13. Clause C2.12 – Separation of Equipment

Equipment as listed below must be separated from the remainder of the building with construction that achieves an FRL of 120/120/120 and doorways being self-closing -/120/30 fire doors:

- + Lift motors and lift control panels; or
- + Emergency generators used to sustain emergency equipment operating in the emergency mode; or
- + Central smoke control plant; or
- + Boilers; or
- + A battery or batteries installed in the building that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours.

Separation of on-site fire pumps must comply with the requirements of AS 2419.1.

Comments: Architect to note. Details of the equipment in the plantrooms and details of the batteries in the UPS room are required to be provided prior to the application for Construction Certificate/s109R Certificate to determine the extent of fire separation required.

14. Clause C2.13 – Electricity Supply System

To ensure certain types of electrical equipment to operate during an emergency the requirements of sub-clauses (a), (b), (c), (d) & (e) must be complied with relating to sub-stations, sub-mains and main switchboards.

- (a) An electricity substation located within a building must –
 - (i) Be separated from any other part of the building by construction having an FRL of not less than 120/120/120; and
 - (ii) Having any doorway in that construction protected with a self-closing fire door having an FRL of not less than -/120/30



- (b) A main switchboard located within the building which sustains emergency equipment operating in the emergency mode must –
 - (i) Be separated from any other part of the building by construction having an FRL of not less than 120/120/120.
 - (ii) Have any doorway in that construction protected with a self-closing fire door having an FRL of not less than -/120/30.
 - (c) Electrical conductors located within a building that supply –
 - (i) A substation located within the building which supplies a main switchboard covered by (b); or
 - (ii) A main switchboard covered by (b),
- Must –
- (iii) Have a classification in accordance with AS/NZS 3013 of not less than –
 - (A) If located in a position that could be straight to damage by motor vehicles – WS53W; or
 - (B) Otherwise – WS52W; or
 - (iv) Be enclosed or otherwise protected by construction having an FRL of not less than 120/120/120

Comments: Details demonstrating compliance are to be included with the Construction Certificate/s109R Crown BCA Certificate documentation. In this regard, the proposed main electrical switch rooms and the substation are required to comply with the above requirements.

PART C3: PROTECTION OF OPENINGS

15. Clause C3.2 – Protection of Openings in External Walls

Openings in external walls that are required to have an FRL, which are to be exposed to a fire-source feature, are required to be protected in accordance with C3.2(a) & C3.2(b).

Openings in an external wall that is required to have an FRL must –

- (a) If the distance between the opening and the fire-source feature to which it is exposed is less than –
 - (i) 3 m from a side or rear boundary of the allotment; or
 - (ii) 6 m 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; or
 - (iii) 6 m from another building on the allotment that is not a Class 10,

be protected in accordance with C3.4 and if wall-wetting sprinklers are used, they are located externally; and

- (b) If required to be protected under (a), not occupy more than 1/3 of the area of the external wall of the storey in which it is located unless they are in a Class 9b building used as an open spectator stand.

Comments: It is understood that there are no openings in external walls that are required to have an FRL which are exposed to a fire source feature.

16. Clause C3.4 – Acceptable Methods of Protection

- (a) Where protection is required, doorways, windows and other openings must be protected as follows:
 - (i) Doorways –
 - (A) Internal or external wall-wetting sprinklers as appropriate used with doors that are self-closing or automatic closing; or
 - (B) -/60/30 fire doors that are self-closing or automatic closing.
 - (ii) Windows –
 - (A) Internal or external wall-wetting sprinklers as appropriate used with windows that are automatic closing or permanently fixed in the closed position; or
 - (B) -/60/- automatic closing fire shutters.
 - (iii) Other openings –



- (A) Excluding voids – internal or external wall-wetting sprinklers, as appropriate; or
 - (B) Construction having FRL not less than -/60/-.
- (b) Fire doors, fire windows and fire shutters must comply with **Specification C3.4**.
- Comments: Not applicable to this development. See Clause C3.2 above.*

17. Clause C3.5 – Doorways in Fire Walls

Openings in fire walls, that are not part of a horizontal exit, must be protected in accordance with one of the methods set out in this clause and must achieve an equivalent fire rating to the fire wall.

Fire shutters installed to openings in fire walls must be self-closing or automatic in accordance with the requirements set out in this clause.

Comments: Refer to C2.7 & C2.8 above in relation to potential fire wall requirements. Where fire walls are proposed, any door openings are required to be protected with compliant fire doors that do not reduce the required FRL of the fire wall. Architect to note.

18. Clause C3.8 – Openings in Fire-Isolated Exits

Specifies that the doorways that open into fire-isolated exits must be protected by -/60/30 fire doors that are self-closing or automatic. This clause also details the deemed-to-satisfy methods of activation. This does not apply to doors opening to a road or open space.

A window in the external walls of fire-isolated exits must be protected in accordance with C3.4 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.

Comments: Details of the proposed fire door locations are to be provided with the Construction Certificate/s109R Crown BCA Certificate application plans in accordance with this requirement.

19. Clause C3.9 – Service Penetrations in Fire-Isolated Exits

Fire isolated exits must not be penetrated by any services other than electrical wiring as permitted by D2.7(e), ducting associated with a pressurisation system or water supply pipes for fire services.

Comments: Architect/Services Consultants to note and ensure compliance with regards to restriction of services penetrating the fire isolated stairs and passageways.

20. Clause C3.10 – Openings in Fire-isolated Lift Shafts

If lift shafts are required to be fire-isolated an entrance doorway must be protected by -/60/- fire doors and the lift indicator panels must be backed by construction having an FRL of not less than -/60/60 if it exceeds 35,000mm²

Comments: Certification from the lift consultant to confirm compliance is to be provided with the Construction Certificate/s109R Crown BCA Certificate application.

21. Clause C3.12 – Openings in Floors & Ceilings for Services

This clause applies to the floors and ceilings in buildings of Types A, B & C Construction and sets out the methods required to limit the spread of fire through openings in these building elements, required to resist the spread of fire.

Comments: Certification will be required at Occupation Certificate application stage.

22. Clause C3.13 – Openings in Shafts

This clause specifies that in buildings of Type A Construction, openings in shafts must be protected (generally with 1 hour fire rated shafts and doors).

Comments: Compliance is to be demonstrated with the Construction Certificate/s109R Crown BCA Certificate documentation.



23. Clause C3.15 – Openings for Service Installations

This clause details the requirements for protection of service openings in building elements that have an FRL, to prevent the spread of fire. C3.15 only applies to an element required to have an FRL with respect to integrity or insulation.

Specification C3.15 prescribes materials and methods of installation for services that penetrate walls, floors and ceilings required to have an FRL. Where the mechanical ventilation system penetrates floors or walls that require an FRL the installation is to comply with AS/NZS 1668.1.

Comments: Compliance is to be demonstrated with the Construction Certificate/s109R Crown BCA Certificate documentation.

SPECIFICATIONS

24. Specification C1.1 – Fire Resisting Construction

The new building works are required to comply with the requirements detailed under Table 3 of Specification C1.1 for Type A Construction. (See Appendix 1)

Comments: Compliance is readily achievable for the requirements of Type A construction. (See Appendix 1 at the end of the report for the required FRL's applicable to each of the proposed classifications in the building). We note that any proposed alternative solution for rationalising the required fire ratings of the various classifications will be required to demonstrate compliance with Performance Requirements CP1 and CP2.

SECTION D – ACCESS & EGRESS

Part D1 Provision for Escape

25. Clause D1.2 – Number of Exits Required

This clause requires the provision of sufficient exits to enable safe egress in case of an emergency. D1.2 provides that all buildings must have at least one exit from each storey and sets out circumstances in which more than one exit may be required (particularly in relation to Class 9 buildings).

Note 1: Not less than 2 exits must be provided from each storey if the building has an effective height of more than 25m.

Note 2: Not less than 2 exits must be provided from any storey that involves a vertical rise within the building of more than 1.5m unless the floor area of the storey is not more than 50m² and the distance of travel from any point on the floor to a single exit is not more than 20m.

Comments: As the building has an effective height exceeding 25m, a minimum of two (2) exits are required to be provided from all parts of the building, including the Collaboration/Retail parts, the Bike Hubs and the Garbage Room/Loading Bay. An Alternative Solution from the Fire Engineer will need to be provided addressing Performance Requirements DP4 & EP2.2 relating to the areas where only a single exit is proposed. A further more detailed assessment will be carried out when the exit configuration is finalised.

26. Clause D1.3 – When Fire-Isolated Stairways & Ramps are Required

This clause indicates when fire isolated stairways and ramps are required to enable safe egress from a building in the case of a fire, setting out the limits to which non-fire isolated exits can be used in Class 2, 3, 5, 6, 7, 8 and 9 buildings. Particular exceptions apply to Class 9a patient care and also class 9c aged care buildings.

Class 5, 6, 7, 8 & 9 – every stairway must be fire isolated if it connects more than 2 consecutive storeys. Concessions apply to the inclusion of an additional storey, or sprinklers, as per the above.

Comments: The exit stairs from the building are required to be fire isolated as they connect more than 3 levels in a sprinkler protected building – the current design complies with this requirement.



Note: The Stairs between the split-level carpark are considered to be a path of travel and are not defined as exits.

27. Clause D1.4 – Exit Travel Distances

This clause specifies the permitted travel distances allowable from Class 2 to Class 9 buildings, specifying the maximum distances to be taken into account for the various uses in each Class of building.

The following applies: (i) In a Class 5, 7a and 8 building:

- + No point on the floor must be more than 20m to an exit, or a point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40m;
- + For the Class 5, the distance to a single exit serving a storey at the level of access to a road or open space may be increased to 30m.

Comments: *The exit travel distances within both the basement levels and the upper floors do not comply with the above requirements. In this regard, the following non-compliances are noted:*

- + *Basement 3 – 45m to the nearest exit.*
- + *Basement 2 – 55m to the nearest exit in the Carpark areas and 65m to the nearest exit from the Change Rooms; up to 30m to a point of choice between alternative exits from the Change Rooms and Switch Room.*
- + *Basement 1 – 65m to the nearest exit in the Carpark areas and 60m to the nearest exit from the Comms Room; 35m to a point of choice between alternative exits from the Car Park areas and the Comms Room.*
- + *Ground Floor – To be confirmed upon confirmation of exit configuration, however, compliance is readily achievable.*
- + *Levels 1-5 (East - 8 University Ave) – 30m to a point of choice to alternative exits from the Collaboration area and up to 55m to the nearest exit. Note 1: These travel distances will be exceeded on Levels 4 & 5 if only a single exit door is provided to the terraces on the northern end of the building – a minimum of two doors should be provided for egress purposes. Note 2: Similar exit travel distances will occur (pending upon the tenancy layout/split) in the 12 University Ave tower, however on an open plan layout it is compliant.*

A further and more detailed assessment of these non-compliances will be required to be carried out as the design develops, however, they will need to be addressed via a performance solution from an accredited Fire Engineer addressing Performance Requirements DP4 & EP2.2.

28. Clause D1.5 – Distances Between Alternative Exits

This clause specifies the minimum and maximum permitted distances between alternative exits. Class 5, 7a and 8 allows a maximum 60m between alternative exits when measured back through the designated point of choice (and to be no closer than 9m apart, and not converge so as to be less than 6m apart).

Exits required as alternative exits must be –

- (a) distributed as uniformly as practicable within or around the storey served and in positions where unobstructed access to at least 2 exits is readily available from all points on the floor including lift lobby areas; and
 - i. not less than 9m apart; and
 - ii. not more than –
 - in a Class 2 or 3 building - 45m apart; or
 - In a Class 9a health-care building, if such required exit serves a patient care area – 45m apart; or



- In all other cases, i.e. the non-patient care areas – 60m apart.
- (b) Located so that the alternative paths of travel do not converge such that they become less than 6m apart.

Comments: The current design has been assessed and is considered to comply with the requirements of D1.5 with the exception of the following areas:

- + Basement 3 – up to 65m between alternative exits;
- + Basement 2 – up to 85m between alternative exits;
- + Basement 1 – up to 92m between alternative exits;
- + Ground Floor – To be confirmed upon confirmation of exit configuration.

Note: Distances between alternative exits may be non-compliant on Levels 1-6 in both Towers dependent upon the tenancy layout/split that is proposed on each level (further assessment will be required when this is determined).

A further and more detailed assessment of these non-compliances will be required to be carried out as the design develops, however, they will need to be addressed via a performance solution from an accredited Fire Engineer addressing Performance Requirements DP4 & EP2.2.

29. Clause D1.6 – Dimensions of Exits

This clause specifies the minimum dimensions such as height and width of paths of travel from Class 2 to 9 buildings. It also specifies the minimum dimensions of doorways from the various compartments and the width of exit doors from buildings depending on the uses and functions carried out within them.

Comments: Exit corridors and stairs and other paths of travel are to be a minimum 1m in width and 2m in height clear of any obstructions. The unobstructed height of any doorway may be reduced to not less than 1980mm.

The maximum population numbers per D1.3 are listed below and based upon these numbers the following requirements for egress width apply per D1.16(c) & (d) apply:

- + Basement 3 – Carpark exit width of 1.25m - Complies
- + Basement 2 & 1 – Carpark exit width of 3.0m - Complies
- + Ground Floor – To be confirmed upon confirmation of exit configuration.
- + Mezzanine (East - 8 University Ave) – Exit width of 1.0m - Complies
- + Levels 1-6 (West - 12 University Ave) – Office exit width of 3.5m – Complies
- + Levels 1-3 (East - 8 University Ave) – Office exit width of 3.5m – Complies
- + Level 4 (East - 8 University Ave) – Office exit width of 3.5m – Complies
- + Level 5 (East - 8 University Ave) – Office exit width of 3.0m – Complies

Note 1: See items further into the report in relation to the minimum ceiling heights for habitable and non-habitable spaces.

Note 2: Landings in fire-isolated stairways must be designed to ensure that the unobstructed clear width clear of handrails, projecting parts of barriers, fire hydrants and the like is a minimum 1m.

30. Clause D1.7 – Travel via Fire Isolated Exits

Sets out the requirements for safe discharge from various compartments and areas within a building, into a fire isolated stairway or passageway or ramp.

Where a path of travel from the point of discharge of a fire isolated exit 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 in accordance with BCA Clause C3.4; and
- + For a distance of 3m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

Comments: Current design drawings show that all fire-isolated exits discharge to open space. Any part of the external walls (on Ground Floor and Basement 1 – to all fire stairs) within 6m measured at right angles to the path of travel from a point of discharge from a fire isolated exit must be protected in accordance with this clause. It is understood that the protection of openings is proposed to be rationalised as a Performance Solution prepared by the Fire Engineer to address Performance Requirements DP4 and EP2.2.

31. Clause D1.10 – Discharge from Exits

This clause requires that an exit must not be blocked at the point of discharge. Barriers such as bollards must be installed to prevent vehicles from blocking the discharge from exits.

This clause also provides the methods of construction, location and separation, at exit discharge points for all building Classes.

Comments: The discharge from all exits must be protected to prevent blocking by vehicles or any form of storage and clearly defined discharge paths are to be provided from the building to Macquarie Walk and University Avenue.

32. Clause D1.13 – Number of Persons Accommodated

Clause D1.13 and Table D1.13 are used to calculate the anticipated number of people in particular types of buildings so that minimum exit widths and the required number of sanitary and other facilities can be calculated. This clause and table are not to be used for non-BCA purposes.

Comments: The following population numbers have been calculated for the various levels of the building based on their proposed use and floor area per Table D1.13 and email advice from Kann Finch dated 24.01.2018, 25.01.18, 29.01.18, & 30.01.18:

- + Basement 3 (Class 7a) – 125 persons
- + Basement 2 (Class 7a) – 300 persons
- + Basement 1 / Lower Ground – Car park (Class 7a): 270 persons; Retail/Collaboration (Class 6): 100 persons (90 Patrons & 10 Staff) – Note: Retail Use is TBC.
- + Ground Floor (West - 12 University Ave) – Office (Class 5): 286 persons (excluding Foyer & Galleria)
- + Ground Floor (East - 8 University Ave) – Office (Class 5): 140 persons Laboratory (Class 8): 94 persons (excluding Foyer & Galleria)
- + Mezzanine (East - 8 University Ave) – Collaboration/Office (Class 5): 60 persons
- + Levels 1-6 (West - 12 University Ave) – Office (Class 5): 380 persons per floor
- + Levels 1-3 (East - 8 University Ave) – Office (Class 5): 244 persons / Laboratory (Class 8): 105 persons per floor
- + Level 4 (East - 8 University Ave) – Office (Class 5): 229 persons / Laboratory (Class 8): 105 persons
- + Level 5 (East - 8 University Ave) – Office (Class 5): 195 persons / Laboratory (Class 8): 105 persons

Note: Confirmation is to be provided on the proposed use of the Galleria & Foyer spaces on Ground Floor to determine if additional population numbers are required to be allocated to these areas.

33. Clause D1.17 – Access to Lift Pits

This clause provides the requirements for access to lift pits not more than 3m deep and the requirements of construction of access for lift pits that are more than 3m deep. The requirement for signage to lift pits is also set out. 10m²



Comments: Lift Contractor to note. Details are to be provided with the Construction Certificate/s109R Crown BCA Certificate documentation.

PART D2 CONSTRUCTION OF EXITS

34. Clause D2.2 – Fire-isolated Stairways & Ramps

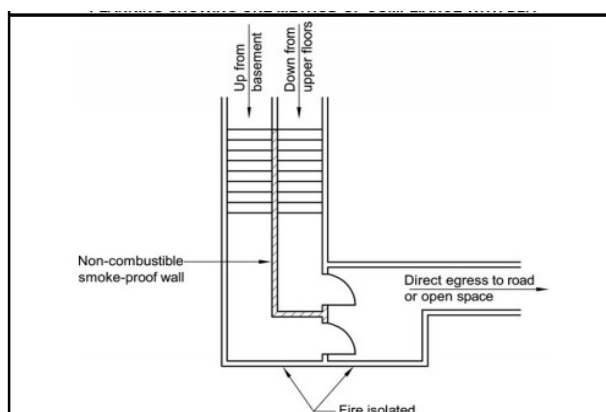
A stairway or ramp, including landings that are required to be within a fire-resisting shaft must be constructed of non-combustible materials to protect the structural integrity of the shaft.

Comments: Certification will be required at Construction Certificate/s109R Crown BCA Certificate application stage for the design of the proposed fire-isolated exits.

35. Clause D2.4 – Separation of Rising & Descending Stair Flights

If a stairway serving as an exit is required to be fire-isolated there must be no direct connection between the rising and descending flights of stairs at the level from which egress is obtained. This clause also prescribes the level of construction required.

Comments: The stairs connecting the Basement Levels to Level 7 are to be separated at the level where egress is obtained in accordance with this Clause. Details are to be provided at Construction Certificate/s109R BCA Crown Certificate application stage detailing the proposed separating construction being non-combustible and smoke sealed, however, it is noted that compliance is readily achievable



36. Clause D2.7 – Installations in Exits & Paths of Travel

This clause restricts the installation of certain services in fire-isolated exits, non-fire-isolated exits and certain paths of travel to exits. It prescribes which services shall not be installed as well as the circumstances in which certain services may be installed in fire-isolated and non-fire-isolated exits.

If installed in a path of travel to an exit, electrical distribution boards, communication cupboards and the like containing motors, etc are to be enclosed with non-combustible construction, and doors are to be provided with smoke seals to the perimeter.

Comments: Architect to note.

37. Clause D2.10 – Pedestrian Ramps

A fire-isolated ramp may be substituted for a fire-isolated stairway if the construction enclosing the ramp and the dimensions comply with the requirements for a fire-isolated stairway. The ramp must also comply with the access requirements of D3 and AS1428.1, not have a gradient steeper than 1:8 and have a non-slip finish.

Comments: Not applicable to this development.



38. Clause D2.13 – Goings & Risers

This clause sets out the detailed requirements for the construction and geometry of the goings and risers in required stairways. These details are set out in sub-clauses (a) to (c) and Table D2.13 Riser and Going Dimensions.

Comments: All stairs are to have solid risers, and are to have contrasting nosings, slip resistant surfaces throughout in accordance with clause 11 of AS1428.1-2009. (See diagram in Part D3 below). Refer to the slip resistance requirements for stairs below under Clause D2.14.

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

39. Clause D2.14 – Landings

The dimensions and gradients of landings in stairways are set out in this clause; the configuration will depend on the proposed use of a building.

Landing surfaces must be slip resistant surfaces OR have slip resistant nosings not less than that listed in Table D2.14 when tested in accordance with AS4586.

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Comments: Architect to note.

40. Clause D2.15 – Thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless –

- (a) In patient care areas in a class 9a health-care building, the door sill is not more than 25mm above the finished floor level to which the doorway opens: or
- (b) In a Class 9c aged care building, a ramp is provided with a maximum gradient of 1:8 for a maximum height of 25mm over the threshold.

Comments: Architect to note – details confirming that there are no steps or ramps proposed within the door thresholds are to be included on the Construction Certificate/s109R Crown BCA Certificate Application plans.

41. Clause D2.16 – Balustrades or Other Barriers

This clause details where balustrades are required to be provided and sets out in specific detail the construction requirements. Typically the following will apply to this class of building:

- + Balustrades are required where the fall to the level below is more than 1m in height. The minimum height of a balustrade is 1m above the floor of the landing, walkway or the like; and 865mm above the floor of a stairway or a ramp.
- + For a fall of more than 4m to the surface level below, a window sill must be a minimum of 865mm in height above the height of the floor surface.
- + Where the floor is more than 4m above the surface beneath the balustrade any horizontal or near horizontal members between 150mm and 760mm above the floor must not facilitate climbing.



- + Balustrades must be constructed so as to not permit a sphere of 125mm diameter to pass through. The exception to this is within fire isolated exits within the building, or within a class 7 or 8 building, where the rails can be positioned a maximum of 460mm apart, so long as a bottom rail is located so a sphere of 150mm cannot pass through the opening between the nosing of the stair treads and the rail or between the floor of the landing, balcony or the like.

Comments: Details of the proposed balustrades are to be provided with the application for the Construction Certificate/s109R Crown BCA Certificate for assessment against the above criteria.

Table D2.16a permits balustrades in fire-isolated stairways to have a traditional 3-bar design with openings between balusters up to 300mm spacing. Balustrades for circulation & egress stairways other than fire isolated exits require balusters to be spaced at maximum 125mm.

Universities often utilise fire-isolated exits to enable everyday circulation for public/students between floors. It is reasonable to suggest that if a fire-isolated stairway is occasionally or infrequently used for circulation of building occupants, then balustrades need only be compliant with the fire-isolated exit requirements. However, if a fire isolated exit is to be made available and promoted for frequent public/student circulation, similar to a non-fire isolated stairway, then it is recommended that the balustrade system to these stairways be compliant in accordance with the requirements for common circulation stairs.

42. Clause D2.17 – Handrails

This Clause sets out the requirements regarding the location, spacing and extent of handrails required to be installed in buildings.

Comments: Details of the proposed handrails are to be provided for assessment with the application for the Construction Certificate/s109R Crown BCA Certificate. Note 1: Refer to Part D3 for additional requirements for handrails associated with accessible compliant stairways. Note 2: At least one handrail within fire isolated exits must comply with the requirements of AS 1428.1-2009 – see design requirements detailed under D3.3 below.

43. Clause D2.19 – Doorways & Doors

This clause applies to all doorways and refers to the types of doors that cannot be used in buildings of prescribed uses, the use of power operated doors and the force required to operate sliding doors.

If the door is also power operated, it must be opened manually under a force of not more than 110N if there is a malfunction or failure to the power source; or upon the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

Comments: Applicable to all parts of the proposed building. Certification will be required at Construction Certificate/s109R Crown BCA Certificate application stage.

44. Clause D2.20 – Swinging Doors

A swinging door in a required exit or forming part of a required exit must swing in the direction of egress and must not otherwise impede egress. In addition, the door must not encroach at any part of its swing by more than 500mm on the required width of the exit (with the exception of airlocks and sanitary compartments, and with the exception of buildings or building parts that are less than 200m²).

Comments: Compliance is readily achievable.

45. Clause D2.21 – Operation of Latch

A door in a required exit or forming part of a required exit and in a path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by a single downward action or pushing action on a single device which is located between 900mm & 1100mm from the floor. This clause prohibits the use of devices such as deadlocks and knobs (rather, lever latches are required). D2.21 also sets out exceptions in relation to buildings where special security arrangements are required in relation to the uses carried out.



Where fitted with a fail-safe device which automatically unlocks the door upon the activation of a sprinkler system or detection system, the above need not apply.

Comments: Architect to note. Compliance must be demonstrated at Occupation Certificate application stage.

46. Clause D2.23 - Signs on Doors

This clause requires the use of signs to alert persons that the operation of certain doors, that are required for evacuation in an emergency, must not be impaired and must be installed where they can be readily seen.

Sub-clauses (a) & (b) provide the requirements for the installation of such signs, the detail contained in them.

Doors of a fire-isolated exit must not be locked from the inside in a Class 9a health-care building, a Class 9c aged care building and in a fire-isolated exit serving a storey above 25m effective height, throughout the exit.

This clause details the exceptions to the above requirements if the doors are fitted with an automatic failsafe device or where sub-clauses (i) & (ii) apply

Comments: Certification will be required at Occupation Certificate application stage.

Any new self-closing fire and/or smoke doors leading into the fire stair or forming part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:



Any new automatic closing fire and/or smoke doors which are held on hold open devices that leads into the fire stair or forming part of a Horizontal Exit or smoke compartment are to be provided with signage as follows:



ACCESS FOR PEOPLE WITH A DISABILITY

47. Clause D3.1 - General Building Access Requirements.

The extent of access required depends on the classification of the building. Buildings and parts of buildings must be accessible as set out in Table D3.1 unless exempted by Clause D3.4.

Commercial, Carpark & Laboratory: Access is required to and within all areas normally used by the occupants, for Class 5, 6, 7a & 8 buildings – refer to comments under D3.2 & D3.3 below in this regard.

Comments: It is noted that an Access Consultant's Report has been obtained for this project and as such reference should be made to that report in relation to compliance with the provisions of Part D3.

48. Clause D3.2 - General Building Access Requirements for People with Disabilities

Access must be provided to and within all areas normally used by occupants (as required by Clause D3.1) within this building from the main points of pedestrian entry at the allotment boundary; from another accessible building connected by a pedestrian link; and any accessible car parking space.

Access must be provided through the principal pedestrian entrance and through not less than 50% of all pedestrian entrances (including the principal pedestrian entry).

In addition, as the building is greater than 500m², the non-accessible entrance must not be greater than 50m from an accessible entrance.



The minimum width of an accessible doorway must have a clear opening width of not less than 850mm in accordance with AS1428.1.

Comments: An Access Consultant's Report has been obtained for this project and as such reference should be made to that report in relation to compliance with the provisions of Part D3. It is noted however, that a dedicated compliant accessible path from the University Avenue footpath to the main entry of the building in accordance with AS 1428.1-2009 will be required in accordance with D3.2 – details are to be provided on a full site plan at the Construction Certificate/s109R Crown BCA Certificate Application stage.

49. Clause D3.3 – Parts of the Building to be Accessible

This part specifies the requirements for accessways within buildings which must be accessible.

In accordance with Clause D3.3; the non-fire-isolated stairways must comply with Clause 11 of AS 1428.1-2009 and the passenger lift must comply with Clause E3.6.

Clause D3.3(g) and (h) requires that the pile height or pile thickness shall not exceed 11mm and the carpet backing thickness shall not exceed 4mm. Moreover, the carpet pile height or pile thickness dimension shall not exceed 11mm, the carpet backing thickness dimension shall not exceed 4mm and their combined dimension shall not exceed 15mm.

Comments: It is noted that an Access Consultant's Report has been obtained for this project and as such reference should be made to that report in relation to compliance with the provisions of Part D3. Regardless, the following is a summary of some of the key matters which need to be considered from Clause D3.3 and AS 1428.1-2009:

- + Access for persons with disabilities must be provided, at a minimum, to and within all areas normally used by the occupants. This includes to and within all common areas.
- + The minimum width of an accessible doorway must have a clear opening width of not less than 850mm in accordance with AS1428.1.
- + All doorways on a continuous path of travel shall have a minimum luminance contrast of 30% provided between: door leaf and door jamb; or door leaf and adjacent wall; or architrave and wall; or door leaf and architrave; or door jamb and adjacent wall. The minimum width of the area of luminance contrast shall be 50mm.
- + Circulation space to the new doorways that are required to be accessible are to comply with Section 13 of AS1428.1-2009, as detailed below.

Dimension D	Dimension L	Dimension W _H	Dimension W _L	Dimension D	Dimension L	Dimension W _H	Dimension W _L
850	1670	660	900	850	1450	110	530
900	1670	610	900	900	1450	110	530
950	1670	560	900	950	1450	110	530
1000	1670	510	900	1000	1450	110	530

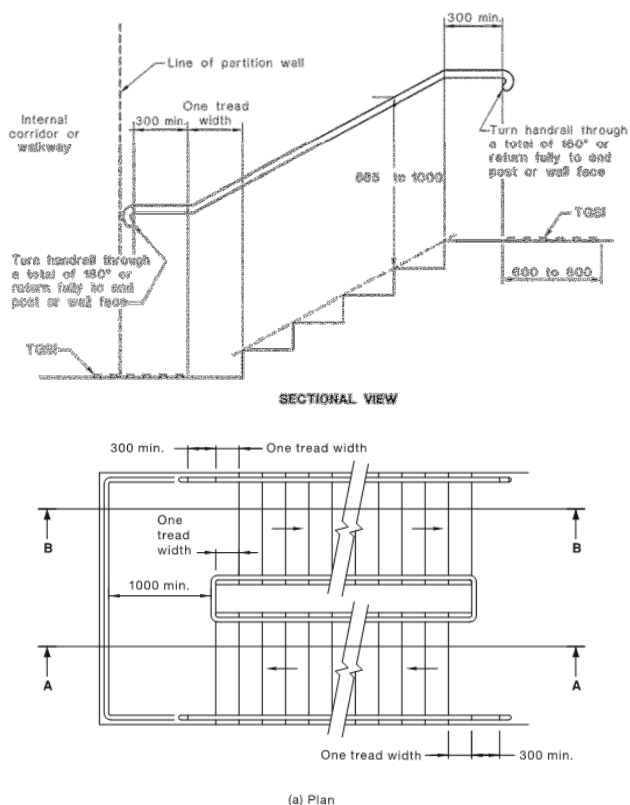
Dimension D	Dimension L	Dimension W _H	Dimension W _L	Dimension D	Dimension L	Dimension W _H	Dimension W _L
850	1240	560	660	850	1450	0	510
900	1210	510	660	900	1450	0	510
950	1175	460	660	950	1450	0	510
1000	1155	410	660	1000	1450	0	510



- + *Turning Spaces and Passing Spaces in all areas are required to be provided on each level of the building in accordance with Clauses 6.4 & 6.5 of AS 1428.1-2009.*

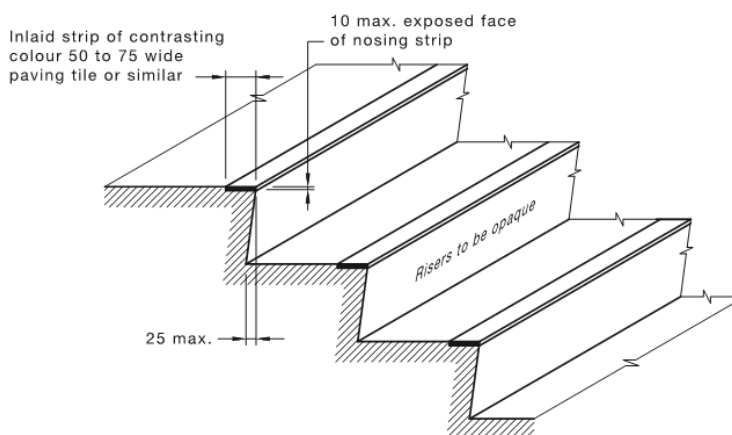
Stairways

- + *Every common area stairway must be constructed in accordance with Clause 11 of AS1428.1, except if they are within a fire isolated exit. As such, the stairways must be designed to comply with the accessibility requirements of Clause 11 of AS1428.1-2009 and details will need to be confirmed on the plans for Construction Certificate/s109R Crown BCA Certificate. This should be reviewed prior to submission.*



(a) Plan
DIMENSIONS IN MILLIMETRES

- + *Stairs shall have opaque risers (i.e. Solid)*
- + *Stair nosing's shall comply with the following diagram, which achieve a colour contrast luminance of 30% to the background (tread):*



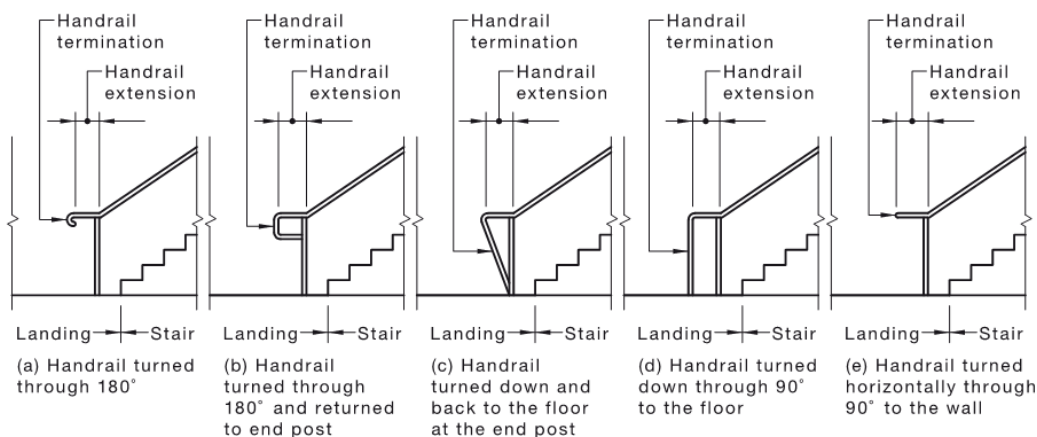
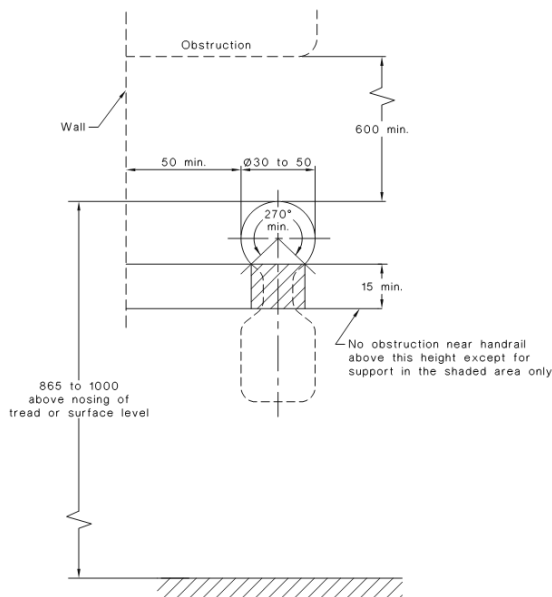
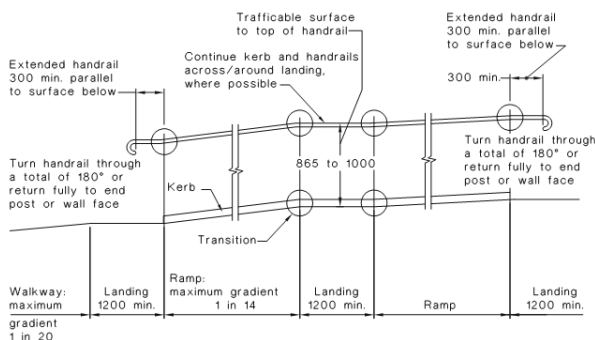
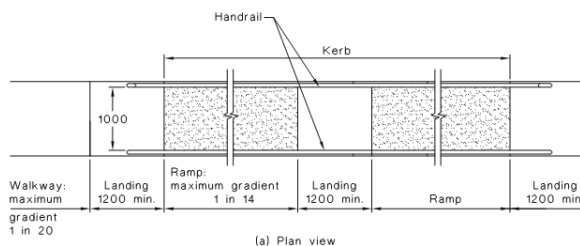
DIMENSIONS IN MILLIMETRES



- + Stairways are to be served by Tactile Ground Surface Indicators in accordance with AS1428.4.1, except if they are within a fire isolated exit.

Handrails

- + Handrails shall be installed along stairways as follows:
 - o Shall be continuous through the flight and where practicable, around landings and have no obstruction on or above up to a height of 600mm,
 - o Installed along both sides of the stairway (giving consideration also to 1m unobstructed width),
 - o See Clause D2.17 for requirements applicable to handrails in Fire Stairs.



Side elevations



50. Clause D3.4 - Exemptions

This clause provides details on buildings or parts of buildings not required to be accessible under the BCA where providing access would be inappropriate because of the nature of the area/use or the tasks undertaken.

Comments: Details of any proposed areas of exemptions are to be included in the Access Consultant's Report at Construction Certificate/s109R BCA Crown Certificate application stage.

51. Clause D3.5 - Accessible Parking

This clause provides details of the number of accessible carparking spaces required in a carpark depending on the classification of the building.

Comments: Compliant Accessible Parking spaces are to be provided at a rate of 1 per 100 spaces for the commercial / office and laboratory areas. Details demonstrating compliance are to be included on the Construction Certificate/s109R Crown BCA Certificate application plans.

52. Clause D3.6 Signage

Braille and tactile signage must be provided to required accessible sanitary facilities, spaces with hearing augmentation, ambulant sanitary facilities, pedestrian entrances that are not accessible, **and** to each door required by Clause E4.5 to be provided with an exit sign. The latter is to state EXIT and state the level eg. LEVEL 1.

Comments: Architect to note.

53. Clause D3.8 - Tactile Indicators

This clause provides for the installation of tactile indicators in buildings required to be accessible and must be provided to warn people who are blind or have a vision impairment that they are approaching a stairway, escalator, passenger conveyor, ramp, overhead obstruction or an accessway meeting a vehicular way, except for areas exempted by D3.4.

Comments: Stairways and ramps serving the building, any overhead projections less than 2 m in height and any paths leading directly to a driveway or roadway without a kerb - will need to be provided with Tactile Ground Surface Indicators in accordance with AS1428.4. It is noted that an Access Consultant's Report has been obtained for this project and as such reference should be made to that report in relation to compliance with the provisions of Part D3.

54. Clause D3.12 - Glazing on an Accessway

This part requires the provision of a contrasting strip, chair rail, handrail or transom across all frameless or fully glazed doorways and surrounding glazing capable of being mistaken for an opening.

Comments: It is noted that an Access Consultant's Report has been obtained for this project and as such reference should be made to that report in relation to compliance with the provisions of Part D3.

SECTION E - SERVICES AND EQUIPMENT

PART E1 FIRE FIGHTING EQUIPMENT

55. Clause E1.3 - Fire Hydrants

A fire hydrant system must be provided to serve a building having a total floor area greater than 500m² and where a fire brigade is available to attend a building fire, installed in accordance with the provisions of AS2419.

The hydrant booster assembly and any external fire hydrants are required to be located greater than 10 metres from an external wall of the building, or affixed to the external wall and protected by a radiant heat shield that has an FRL of 90/90/90 located 2 metres either side and 3 metres above the outlets.



Any gas meter must be located a minimum of 10 metres from the hydrant booster outlet.

A required fire services pump room is required to be accessible directly from the road or open space, or from a door opening from a fire isolated exit.

Comments: The building must be served by a compliant hydrant system (incorporating ring mains as the effective height exceeds 25m). Detailed plans showing the location of the hydrants (and booster assembly) providing coverage to all areas of the building and a design certificate to AS2419.1-2005 are to be provided with the application for a Construction Certificate/s109R Crown BCA Certificate.

Hydrant booster assemblies are required to be accessible to the brigade and located within sight of the main entry of the building. It is noted that a single booster assembly will serve both Towers as they are deemed to be a single building for the purposes of our BCA assessment

The booster assembly on the University Avenue frontage located in the south-eastern corner of the West Tower (12 University Avenue) is required to be protected by a radiant heat shield achieving an FRL of 90/90/90 for 2 metres either side and 3 metres above the outlets.

As the location of the booster assembly is not within site of the main entry of both towers, an Alternative Solution is required to be prepared by the Fire Engineered to demonstrate compliance with Performance Requirement EP1.3.

Note 1: It is noted that the Fire Control Centre may be proposed to be located adjacent to the pump room. In this instance, acoustic insulation should be provided between the two areas – see E1.8 comments.

Note 2: Given the extended egress distances on the lower levels of the building, additional hydrant fittings may be required at remote locations (in addition to those in the fire stairs) in order to achieve compliant coverage.

56. Clause E1.4 – Fire Hose Reels

A fire hose reel system must be provided to serve a building where one or more internal fire hydrants are installed or in a building with a floor area greater than 500m² and for the purposes of this clause, a sole-occupancy unit in a Class 2, 3 building or a Class 4 part is considered to be a fire compartment.

Fire Hose Reels are to be located within 4m of an exit, or located adjacent to an internal hydrant (other than one within a fire isolated exit). Where system coverage is not achieved by the above, additional FHR may be located in paths of travel to an exit.

Comments: The building must be provided with fire hose reels in accordance with this clause and AS2441-2005. A plan shall be provided with the Construction Certificate/s109R Crown BCA Certificate documentation together with a design certificate to AS2441-2005 that details the coverage provided by the fire hose reels on each level.

It is noted that the removal of fire hose reels throughout the Basement Carpark areas is proposed. In this regard, a Fire Engineered Performance Solution will be required to demonstrate compliance with Performance Requirement EP1.1.

57. Clause E1.5 – Sprinklers

A sprinkler system must be installed in a building or part of a building when required by Table E1.5 and comply with Specification E1.5.

Sprinkler alarm valves must be located in a secure room or enclosure which has direct egress to a road or open space.

Table E1.5 sets out which types of building occupancies and Classes require having sprinkler systems installed in them.

Comments: As the building exceeds 25m in effective height it is required to be sprinkler protected throughout with a Grade 1 water supply and ring mains. If any plantrooms or the substation are not proposed to be sprinkler protected a Fire Engineered Alternative Solution to demonstrate compliance with Performance Requirement EP1.4 will be required.



58. Clause E1.8 – Fire Control Centres

A fire control centre facility in accordance with Specification E1.8 must be provided for a building having an effective height of more than 25m and in a Class 6, 7, 8 or 9 building with a total floor area of more than 18,000m².

Specification E1.8 describes the construction and content of required fire control centres or rooms.

Comments: As the effective height of the building exceeds 25m it is required to be provided with a Fire Control Centre facility that complies with Clauses 2-5 of Spec. E1.8. Further details which demonstrate compliance with the requirements of Spec. E1.8 will be required to be included on the Construction Certificate/s109R Crown BCA Certificate application plans.

The Fire Control Centre will house the main Fire Indicator Panel (FIP) and Sound System and Intercom System for Emergency Purposes (SSISEP), and where this is located remotely, it is likely that FRNSW will require either a fully functioning Sub-FIP under the fire engineered strategy for the building.

Note: If access into the Fire Control Centre results in a level change that exceeds 300mm a Fire Engineered Alternative Solution to demonstrate compliance with Performance Requirement EP1.6 will be required. Where the Fire Control Centre adjoins the pump room, an acoustic barrier will be required to achieve a minimum ambient sound rating of 65 dB(A) or less within the FCC.

PART E2 SMOKE HAZARD MANAGEMENT

59. Clause E2.2 – General Requirements

Class 2 to 9 buildings must comply with the provisions of this Clause to remove smoke during a fire, to control the operation of air handling systems and to prevent the spread of smoke between compartments.

Buildings must comply with the provisions of **Table E2.2a**, as applicable to Class 2 to 9 buildings and **Table E2.2b** as applicable to Class 6 and 9b buildings. It deals with the design and construction of air handling systems that are part of a smoke hazard management system and air handling systems that are not part of a smoke hazard management system.

The details relating to the installation and operation of the systems are set out in **Specifications E2.2a, E2.2b and E2.2c**.

Comments: As the effective height of the building exceeds 25m the following smoke hazard management requirements apply:

- + *Zone Pressurisation System in accordance with AS/NZS 1668.1-2015.*
- + *Stair Pressurisation System in accordance with AS/NZS 1668.1-2015 (to the exit stairs serving the upper levels of the building only).*
- + *Smoke Detection and Alarm System in accordance with Spec. E2.2a and AS 1670.1-2015 and AS/NZS 1668.1-2015.*

Design certification shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

Note 1: Any fire-isolated passageway or fire-isolated ramp with a length of travel more than 60m to a road or open space must be provided with an automatic air pressurisation system for fire-isolated exits in accordance with AS 1668.1.

Note 2: A Fire Engineered Alternative Solution to demonstrate compliance with Performance Requirement EP2.2 will be required to address the zone pressurisation and stair pressurisation designs in both towers. Refer to comments under Part G3 below regarding the atrium provisions.



PART E3 LIFT INSTALLATIONS

60. Clause E3.2 – Stretcher Facility in Lifts

Stretcher facilities, complying with this clause, must be provided in lifts in at least one emergency lift as required by E3.4 or in a storey above an effective height of 12m.

A stretcher facility must accommodate a raised stretcher with a patient lying on it horizontally by providing a clear space not less than 600mm wide x 2000mm long x 1400mm high above the floor level.

Comments: The lifts within the buildings serve storeys above an effective height of 12m and as such one of the lifts in each bank are required to be provided to accommodate a stretcher in accordance with the requirements of the clause above. A design certificate from the lift supplier shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

61. Clause E3.3 – Warning Against use of Lifts in Fire

Warning signs required to be provided must be displayed where they can be readily seen and must comply with the details and dimensions of **Figure 3.3**.

Comments: Compliance is readily achievable. Details to be confirmed with the documentation provided with the Construction Certificate/s109R Crown BCA Certificate application.

62. Clause E3.4 – Emergency Lifts

An emergency lift (complying with AS1735.2 or Appendix A of AS1735.1) must be installed in:

- + A building that exceeds 25m in effective height; and
- + A Class 9a building which has patient care areas located on a level that does not have direct egress to a road or open space.

The emergency lift must be contained within a fire resisting shaft; and have minimum internal dimensions (measured clear of all obstructions including handrails) per Clause E3.2 above.

In addition, a minimum of two emergency lifts must be provided where more than one lift serves each floor and emergency lifts must be included in each bank of lifts where more than one bank of lifts serves the building.

Comments: A minimum of two emergency lifts must serve each level of the buildings in each of the two banks of lifts proposed to serve both the upper floors and basement levels. Design certification will be required in this regard at Construction Certificate/s109R Crown BCA Certificate Application stage.

63. Clause E3.5 – Landings

Access and egress to and from lift well landings must comply with the Deemed-to-Satisfy Provisions of Part D.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

64. Clause E3.6 – Passenger 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.

Comments: The passenger lifts are required to be designed to comply with AS1735.2 and AS1735.12. Design documentation shall be provided with the application for the Construction Certificate/s109R Crown BCA Certificate. Note: Also refer to comments in the Access Report regarding lift accessibility provisions.

65. Clause E3.7 – Fire Service Controls

In passenger lifts designed in accordance with AS 1735 Parts 1 and 2, all lift cars serving any storey above an effective height of 12m must be provided with fire service controls.



Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

66. Clause E3.9 – Fire Service Recall Operations Switch

Each group of lifts must be provided with one fire service control switch (required by Clause E3.7 above) that activates the fire service recall operation. This clause details the switch, the labelling, the key and operation procedures for a fire service recall operation.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

67. Clause E3.10 – Lift Car Fire Service Drive Control Switch

The lift car fire service drive control switch required by E3.7 must be activated from within the lift car. This clause details the switch, the initiation, the labelling and operation for the fire service drive control switch.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

EMERGENCY LIGHTING, EXIT SIGNS AND WARNING SYSTEMS

68. Clause E4.2 – Emergency Lighting Requirements

This clause details when emergency lighting must be installed in Class 2 to 9 buildings. The requirements for buildings and parts of buildings are detailed in sub-clauses (a) to (i) and each sub-clause must be considered as more than one may apply to any single building

Comments: Design details shall be provided with the documentation provided with the Occupation Certificate application.

69. Clause E4.5 – Exit Signs

An exit sign must be clearly visible to persons approaching the exit and must be installed on, above or adjacent to each door providing egress from a building. Sub-clauses (a) to (d) set out the situations where exit signs are required to be installed.

Comments: Design details shall be provided with the documentation provided with the Occupation Certificate application.

70. Clause E4.6 – Direction Signs

If an exit is not readily apparent to persons occupying or visiting the building then exit signs must be installed in appropriate positions in corridors, hallways, lobbies, and the like, indicating the direction to a required exit.

Comments: Design details shall be provided with the documentation provided with the Occupation Certificate application.

71. Clause E4.8 – Design & Operation of Exit Signs

Every required exit sign must comply with AS/NZS 2293.1 and be clearly visible at all times when the building is occupied by any person having the legal right of entry into the building.

Comments: Design details shall be provided with the documentation provided with the Occupation Certificate application.

72. Clause E4.9 – Sound System and Intercom Systems for Emergency Purposes

This clause sets out the types of buildings requiring the installation of a sound system and intercom system to assist with the emergency evacuation of occupants. This clause specifies that sound and intercom systems must comply with AS 1670.4 and is to be provided within certain Class 3, Class 9a and Class 9b buildings, and also is to be installed in every building with an effective height greater than 25m, or where there is an atrium.

Comments: The subject building exceeds 25m in effective height and as such is required to be served by a sound system and intercom system for emergency purposes (SSISEP) in



accordance with AS 1670.4. Design certification will be required at Construction Certificate/s109R Crown BCA Certificate application stage in this regard.

SECTION F – HEALTH & AMENITY

PART F1 DAMP AND WEATHERPROOFING

73.Clause F1.1 – Stormwater drainage

Stormwater drainage must comply with AS/NZ 3500.3.

Comments: Design statement to be provided with the Construction Certificate/s109R Crown BCA Certificate application.

74.Clause F1.7 – Waterproofing of Wet Areas

This clause requires that wet areas in Class 2 to 9 buildings must be waterproofed. It prescribes the standards to which the work must be carried on the construction of rooms containing urinals and their installation.

Comments: Details to be provided with the application for the Construction Certificate/s109R Crown BCA Certificate.

PART F2 SANITARY AND OTHER FACILITIES

75. Clause F2.1 – Facilities in Residential Buildings

Sanitary and other facilities for Class 2 and 3 buildings and Class 9c aged care buildings and for Class 4 parts of buildings must be provided in accordance with **Table F2.1**. This Table details the facilities required to be provided in residential buildings.

Comments: Not applicable to this development.

76.Clause F2.2 – Calculation of Number of Occupants & Facilities

This clause sets out the requirements for the calculation of the number of occupants and the number of sanitary facilities required to be installed in Class 2 to 9 buildings. The parameters for the calculation are set out in sub-clauses (a) to (d).

Comments: Noted – refer to D1.13.

77.Clause F2.3 – Facilities in Class 3 to 9 Buildings

This clause provides the requirements for sanitary facilities to be installed in Class 3, 5, 6, 7, 8 and 9 buildings in accordance with Table F2.3.

When accessible sanitary facilities are provided, they account once for each sex.

Comments: The sanitary facilities required on each floor have been calculated based on the calculation of the maximum number of persons to be accommodated in accordance with Table D1.13 along with both the Class 5 and Class 8 split of population on each level.

The following sanitary facilities are required in accordance with Table F2.3 (for reference):

- + Lower Ground/Basement 1 & Ground Floor Class 6 Retail (East – 8 University Ave) – Employee & Patron sanitary facilities are required to be included within Tenancies are subject to confirmation of use;
- + Ground Floor (West – 12 University Ave) – Males (143 persons): 7 Closet Pans, 4 Urinals, 5 Wash Basins; Females (143 persons): 10 Closet Pans, 5 Wash Basins
- + Ground Floor & Mezzanine (East – 8 University Ave) – Males (147 persons): 8 Closet Pans, 5 Urinals, 6 Wash Basins; Females (147 persons): 10 Closet Pans, 6 Wash Basins.
- + Levels 1-6 (West – 12 University Ave) – Males (190 persons): 10 Closet Pans, 5 Urinals, 7 Washbasins; Females (190 persons): 13 Closet Pans, 7 Washbasins;



- + Levels 1-3 (East – 8 University Ave) – Males (173 persons): 9 Closet Pans, 5 Urinals, 7 Washbasins; Females (173 persons) – 12 Closet Pans, 7 Washbasins;
- + Level 4 (East – 8 University Ave) – Males (168 persons): 9 Closet Pans, 5 Urinals, 7 Washbasins; Females (168 persons) – 12 Closet Pans, 7 Washbasins
- + Level 5 (East – 8 University Ave) – Males (150 persons): 8 Closet Pans, 4 Urinals, 6 Washbasins; Females (150 persons) – 10 Closet Pans, 6 Washbasins.

It is noted that compliance with the above requirements of Table F2.3 are readily achievable and a final population calculation and subsequent sanitary facilities assessment will be carried out at CC Application stage.

Note 1: The number of sanitary facilities required to the Basement 1 and Ground Floor Retail spaces is to be confirmed upon confirmation of the proposed use, however it is noted that compliance is readily achievable.

Note 2: The wash basin number calculation for Levels 1-5 in the 8 University Ave (East) building take into consideration the Class 8 Lab population numbers (at a 50% area ratio of Lab/Office per advice from Kann Finch dated 24.1.18)

78. Clause F2.4 – Accessible Sanitary Facilities

Accessible unisex sanitary compartments must be provided, in accordance with **Table F2.4(a)** and unisex showers must be provided in accordance with **Table F2.4(b)**, in buildings or parts that are required to be accessible. The details for the provision of disabled facilities and the standard, AS 1428.1, are set out in sub-clauses (a) to (i).

Comments: The accessible compliant and ambulant sanitary facilities provided on each Level are considered to adequately achieve compliance with the requirements of Table F2.4, with the exception of Basement Levels 1 and 2 where an accessible unisex sanitary compartment is to be provided to each bank on each storey or an alternative solution is required from the Access Consultant.

Design certification confirming compliance with the requirements of AS1428.1-2009 shall be provided with the documentation submitted with the Construction Certificate/s109R Crown BCA Certificate application.

79. Clause F2.5 – Construction of Sanitary Compartments

Other than in an early childhood centre, sanitary compartments must have doors and partitions that separate adjacent compartments and extend –

- + from floor level to the ceiling in the case of a unisex facility; or
- + a height of not less than 1.5m above the floor if primary school children are the principal users; or
- + 1.8m above the floor in all other cases.

The door to a fully enclosed sanitary compartment must open outwards; or slide; or be readily removable from the outside of the sanitary compartment, unless there is a clear space of at least 1.2m, measured in accordance with Figure F2.5 between the closet pan within the sanitary compartment and the doorway.

Comments: The current configuration is able to adequately achieve compliance. Details to be provided at Construction Certificate/s109R Crown BCA Certificate application stage confirming compliance with the above requirements.

PART F3 ROOM HEIGHTS

80. Clause F3.1 Height of Rooms and other spaces

The ceiling heights in Class 2 to 9 buildings must not be less than required in sub-clauses (a) to (f) of this clause.

The ceiling heights are prescribed and should be checked for all classes and parts during assessment or the design process.

The ceiling minimum heights for a Class 5, 6, 7a & 8 buildings are as follows:



- + Corridor or passage – 2.1m;
- + Bathroom, storeroom, etc – 2.1m
- + Remainder – 2.4m.

Comments: Architect to ensure compliance

Note: The basement carpark will require careful consideration, particularly with regard to the ceiling height required for accessible spaces, where services may impact on the required clearances and should be given early attention to ensure compliance. It is advised to discuss the requirements with the access consultant.

Ceiling heights to be reviewed at the Construction Certificate/s109R Crown BCA Certificate stage with the detailed section drawings.

PART F4 LIGHT AND VENTILATION

81. Clause F4.4 – Artificial Lighting

Artificial lighting is required where it is necessary to minimise the hazard to occupants during an emergency evacuation. Sub-clauses (a), (b) & (c) sets out the places where artificial lighting is always required in all classes of buildings and the standard to which it must be installed.

Comments: Compliance is readily achievable. Design documentation shall be provided with the Construction Certificate/s109R Crown BCA Certificate application.

82. Clause F4.5 – Ventilation of Rooms

A habitable room, office, shop, factory, workroom, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person for any purpose must have natural ventilation complying with F4.6 **or** a mechanical or air-conditioning system complying with AS1668.2 and AS/NZS 3666.1.

Comments: Design documentation shall be provided from the mechanical consultant for all ventilation to the building with the Construction Certificate/s109R Crown BCA Certificate documentation.

83. Clause F4.11 – Carparks

Every storey of a carpark except an open-deck carpark must have-

- (a) A system of ventilation complying with AS 1668.2; or
- (b) An adequate system of permanent natural ventilation.

Comments: Details of the mechanical ventilation system and design certificate is to be provided with the application for the Construction Certificate/s109R Crown BCA Certificate.

SECTION G – ANCILLARY PROVISIONS

PART G3 ATRIUM CONSTRUCTION

84. Clause G3.1 – Application of Part

The provisions of Part G3 applies to an atrium that connects greater than 2 storeys in a non-sprinklered building, or greater than 3 storeys in a sprinklered building where one of the storeys is at a level of road or open space.

Comments: The provisions of Part G3 (as referenced below) apply to the Galleria space formed by the roof structure between the two towers. It is understood that the provisions of Part G3 below will be addressed in part as alternative solutions by the Fire engineer.

85. Clause G3.2 – Dimensions of Atrium Well

An atrium well must have a width throughout the well that is able to contain a cylinder having a diameter of not less than 6 m.



Comments: Current design complies with this requirement.

86. Clause G3.3 – Separation of Atrium by Bounding Walls

An atrium must be separated from the remainder of the building at each storey by bounding walls set back not more than 3.5m from the perimeter of the atrium well except in the case of the walls at no more than 3 consecutive storeys if –

- (a) One of those storeys is at a level at which direct egress to a road or open space is provided; and
- (b) The sum of the floor areas of those storeys that are contained within the atrium is not more than the maximum area permitted in Table C2.2.

Comments: As the atrium connects the ground floor and all office / laboratory levels above (being more than 3 consecutive storeys), bounding walls in accordance with Clause G3.4 are required. The provision of atrium bounding walls may be the subject of an alternative solution by the Fire Engineer – the relevant Performance Requirements in this regard are CP1 and CP2.

87. Clause G3.4 – Construction of Bounding Walls

Bounding walls must—

- (a) have an FRL of not less than 60/60/60, and—
 - (i) extend from the floor of the storey to the underside of the floor next above or to the underside of the roof; and
 - (ii) have any door openings protected with self-closing or automatic –/60/30 fire doors; or
- (b) be constructed of fixed toughened safety glass, or wired safety glass in non-combustible frames, with—
 - (i) any door openings fitted with a self-closing smoke door complying with Specification C3.4; and
 - (ii) the walls and doors protected with wall-wetting systems in accordance with Specification G3.8; and
 - (iii) a fire barrier with an FRL of not less than –/60/30 installed in any ceiling spaces above the wall.

Comments: The bounding walls required under Clause G3.3 must achieve an FRL of 60/60/60 or be of fixed toughened safety glass, or wired safety glass in non-combustible frames, and constructed in accordance with this clause. Note: See comments under G3.3 regarding potential alternative solution from the Fire Engineer.

88. Clause G3.5 – Construction at Balconies

A barrier that is imperforated and non-combustible and not less than 1 m high must be provided if a bounding wall separating an atrium from the remainder of the building is set back from the perimeter of the atrium well.

Comments: Not applicable to this development.

89. Clause G3.6 – Separation at Roof

The roof in an atrium must have the FRL prescribed in Table 3 of Specification C1.1 or the roof structure and membrane must be protected by a sprinkler system complying with Specification E1.5

Comments: Compliance is readily achievable. Details are to be provided at the Construction Certificate/s109R Crown BCA Certificate application stage.

It is noted that the requirement to provide a roof structure in the Galleria space that achieves an FRL per Table 3 of Spec. C1.1 or a sprinkler system complying with Spec. E1.5 is proposed to be omitted from the building. In this regard, a Performance Solution prepared by the Fire Engineer addressing Performance Requirement EP1.4.



Note: If sprinklers are proposed to be deleted from the atrium spaces an alternative solution will be required from the Fire Engineer to demonstrate compliance with Performance Requirement EP1.4.

90. Clause G3.7 – Means of Egress

All areas within an atrium must have access to at least 2 exits.

Comments: The current design complies with this requirement.

91. Clause G3.8 – Fire and Smoke Control Systems

Sprinkler systems, smoke control, fire detection and alarm systems, and sound systems and intercom systems for emergency purposes must be installed in compliance with Specification G3.8.

Comments: Consultation is required with the project Fire Engineer regarding the installation of the above services within the atrium. It is understood that the provision of fire services within the Galleria will be the subject of alternative solutions by the Fire Engineer.

SECTION J – ENERGY EFFICIENCY

92. Part J1 – Building fabric

The provision of insulation of the building envelope will be required in the proposed Building, in accordance with **Clauses J1.0 to J1.6**, and the **Tables therein**, including Thermal Construction General, Roof and Ceiling Construction, Rooflights, Walls, and Floors. Design details and/or certification of design will be required to be provided in this regard.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

93. Part J2 – Glazing

Glazing within the external building envelope will be required to be assessed/designed to achieve compliance with **Clauses J2.0 to J2.5**, including the **Tables therein**, having regard to the maximum aggregate air-conditioning energy attributable to each façade of the proposed building. A calculation demonstrating that the proposed design of the building complies with the requirements of **Part J2** is required to be provided in this regard.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

94. Part J3 – Building Sealing

The proposed building envelope will be required to be sealed to prevent air infiltration in accordance with the requirements of **Clauses J3.0 to J3.6**. Details or certification that the proposed building design complies with the requirements of **Part J3** is required to be provided.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

95. Part J5 – Air-Conditioning & Ventilation Systems

Details and/or design certification which confirm that any proposed air-conditioning system or unit within the proposed building achieves compliance with the relevant requirements of **Part J5** will be required to be provided from the mechanical engineer.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

96. Part J6 – Artificial Lighting & Power

Details and/or design certification which confirm that all artificial lighting, power control, and boiling/chilled water units within the proposed building achieves compliance with the relevant requirements of **Part J6** will be required to be provided from the electrical engineer.



Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

97. Part J7 – Hot Water Supply & Swimming Pool & Spa Pool Plant

Details and/or design certification which confirm that any proposed hot water supply system within the proposed building achieves compliance with the relevant requirements of **Part J7** (Section 8 of AS 3500.4) will be required to be provided from the hydraulic engineer.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.

98. Part J8 – Facilities for Energy Monitoring

See NSW Subsection J8 for access to maintenance.

Access must be provided to all plant, equipment and components that require maintenance in accordance with Part I2.

Comments: It is understood that an ESD or Energy Efficiency Consultant will be engaged to provide advice on compliance with the provisions of Section J for the proposed building.



C. CONCLUSION

This report contains an assessment of the referenced architectural documentation for the proposed two (2) commercial towers at 8-12 University Avenue, Macquarie University against the Deemed-to-Satisfy Provisions of the BCA 2016. Arising from the review, it is considered that the proposed development can readily achieve compliance with the relevant provisions of the BCA. Where compliance matters are proposed to comply with the performance requirements (rather than DTS Provisions), the development of an Alternative Solution Report will be required prior to the issue of the Construction Certificate/s109R Crown BCA Certificate.

The following fire safety measures are required for the building:

Essential Fire and other Safety Measures	Standard of Performance
Access Panels, Doors & Hoppers	BCA Clause C3.13 & AS 1530.4 - 2014
Alarm Signalling Equipment	AS 1670.3 - 2004
Automatic Fail Safe Devices	BCA Clause D2.21
Automatic Fire Detection & Alarm System	BCA Spec. E2.2a, Spec. G3.8 & AS 1670.1 - 2015
Automatic Fire Suppression Systems	BCA Spec. E1.5, Spec. G3.8 & AS 2118.1 - 2017
Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5, Clause 8 and / or Clause 3.22 of AS 1670.1 - 2015
Emergency Lifts	BCA Clause E3.4 & AS 1735.2 - 2001
Emergency Lighting	BCA Clause E4.4 & AS 2293.1 - 2005
SSISEP	BCA Clause E4.9, Spec. G3.8 & AS 1670.4 - 2015 & AS 4428.4 - 2004
Exit Signs	BCA Clauses E4.5, E4.6 & E4.8; and AS 2293.1 - 2005
Fire Control Centres	BCA Spec E1.8
Fire Dampers	BCA Clause C3.15, AS 1668.1 - 2015 & AS 1682.1 & 2 - 2015
Fire Doors	BCA Clause C2.12, C2.13, C3.2, C3.4, C3.5, C3.6, C3.7, C3.8 and AS 1905.1 - 2015
Fire Hose Reels	BCA Clause E1.4 & AS 2441 - 2005
Fire Hydrant Systems	BCA Clause E1.3 & AS 2419.1 - 2005
Fire Seals	BCA Clause C3.15, AS 1530.4 - 2014 & AS 4072.1 - 2005
Lightweight Construction	BCA Clause C1.8 & AS 1530.3 - 1999
Mechanical Air Handling Systems	BCA Clause E2.2 NSW Table E2.2b, Spec. G3.8 AS/NZS 1668.1 - 2015 & AS 1668.2 - 2012



Essential Fire and other Safety Measures	Standard of Performance
Mechanical Air Handling Systems (enclosed carpark exhaust)	BCA Clause E2.2, AS/NZS 1668.1 – 2015 & AS 1668.2 – 2012
Paths of Travel	EP&A Regulation Clause 186
Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
Required Exit Doors (power operated)	BCA Clause D2.19(b)
Smoke Hazard Management Systems (Zone Smoke Control)	BCA Part E2 & AS/NZS 1670.1 – 2015
Smoke Hazard Management Systems (smoke exhaust system to the atrium)	BCA Part E2, Spec. G3.8 & AS/NZS 1668.1 – 2015
Smoke Hazard Management Systems (fire-isolated stairway pressurisation system and associated fire-isolated passageways)	BCA Part E2, Spec. G3.8 & AS/NZS 1670.1 – 2015
Smoke Detectors	Clause 5(b) of BCA Spec E2.2a and AS 1668.1 – 2015
Stand-by Power Systems	BCA Spec. G3.
Wall-Wetting Sprinklers	BCA Clause C3.4, Spec. G3.8 & AS 2118.2 – 1995
Warning & Operational Signs	Section 183 of the EP&A Regulation 2000, AS 1905.1 – 2005, BCA Clause C3.6, D2.23, E3.3
Fire Engineered Performance Solutions	TBC

Notes: The measures included and the standards of performances nominated above may vary as a result of any proposed fire engineered alternative solutions.



D. APPENDIX 1

TABLE 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building — FRL: (in minutes)			
	<u>Structural adequacy/ Integrity/ Insulation</u>			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any <u>fire-source feature</u> to which it is exposed is—				
For <u>loadbearing</u> parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
For non- <u>loadbearing</u> parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120	–/240/180
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an <u>external wall</u> , where the distance from any <u>fire-source feature</u> to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
<u>Fire-resisting</u> lift and stair <u>shafts</u> —				
<u>Loadbearing</u>	90/ 90/ 90	120/120/120	180/120/120	240/120/120



Non- loadbearing	-/ 90/ 90	-/120/120	-/120/120	-/120/120
Bounding public corridors , public lobbies and the like—				
Loadbearing	90/ 90/ 90	120/-/-	180/-/-	240/-/-
Non- loadbearing	-/ 60/ 60	-/-/-	-/-/-	-/-/-
Between or bounding sole-occupancy units —				
Loadbearing	90/ 90/ 90	120/-/-	180/-/-	240/-/-
Non- loadbearing	-/ 60/ 60	-/-/-	-/-/-	-/-/-
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion—				
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
Non- loadbearing	-/ 90/ 90	-/ 90/ 90	-/120/120	-/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES				
and COLUMNS—	90/-/-	120/-/-	180/-/-	240/-/-
FLOORS	90/ 90/ 90	120/120/120	180/180/180	240/240/240
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60



Table 3.9 REQUIREMENTS FOR CARPARKS

Building element		FRL (not less than) <i>Structural adequacy/Integrity/Insulation</i>
		ESA/M (not greater than)
Wall		
(a)	<u>external wall</u>	
(i)	less than 3 m from a <u>fire-source feature</u> to which it is exposed:	
	<u>Loadbearing</u>	60/60/60
	Non- <u>loadbearing</u>	-/60/60
(ii)	3 m or more from a <u>fire-source feature</u> to which it is exposed	-/-/-
(b)	<u>internal wall</u>	
(i)	<u>loadbearing</u> , other than one supporting only the roof (not used for carparking)	60/-/-
(ii)	supporting only the roof (not used for carparking)	-/-/-
(iii)	non- <u>loadbearing</u>	-/-/-
(c)	<u>fire wall</u>	
(i)	from the direction used as a <u>carpark</u>	60/60/60
(ii)	from the direction not used as a <u>carpark</u>	as <u>required</u> by Table 3
Column		
(a)	supporting only the roof (not used for carparking) and 3 m or more from a <u>fire-source feature</u> to which it is exposed	-/-/-
(b)	steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a <u>carpark</u>	60/-/- or 26 m ² /tonne
(c)	any other column not covered by (a) or (b)	60/-/-
Beam		



(a)	steel floor beam in continuous contact with a concrete floor slab	60/-/- or 30 m ² /tonne
(b)	any other beam	60/-/-
Fire-resisting lift and stair shaft (within the <u>carpark</u> only)		60/60/60
Floor slab and vehicle ramp		60/60/60
Roof (not used for carparking)		-/-/-
Notes:	1.	ESA/M means the ratio of exposed surface area to mass per unit length.
	2.	Refer to <u>Specification E1.5</u> for special requirements for a sprinkler system in a <u>carpark</u> complying with Table 3.9 and located within a multi-classified building.