BCA ASSESSMENT MEMO REPORT

TO:	Genton		
ATTENTION:	Steven Toia	PROJECT #	210450
EMAIL:	Steve.Toia@genton.com.au	DATE:	28 February 2022 (Rev.1)
FROM:	Dean Goldsmith	PAGES:	8
SUBJECT:	**WS2, Fujitsu Greystanes Data Centre Project, 4 Bellevue Circuit Greystanes – MEP Plant Structure**		

1.0 INTRODUCTION

Blackett Maguire + Goldsmith Pty Ltd (BM+G) have been engaged to provide a Building Code of Australia (BCA) 2019 Amendment 1 assessment of the proposed WS2 data centre extension and fitout of the Fujitsu Greystanes Data Centre, that is the subject of a SSDA Mod Application, comprising the following:

+ Construction of new Semi-Open 3 Level MEP Plant Gantry Structure
+ Installation of containerised electrical, mechanical ventilation and generator equipment on Ground Floor, Mezzanine Level , Level 01 and Level 02/Roof of the new MEP Plant Gantry Structure
+ Internal Fitout of Data Halls 2DH-2.1 and 2DH-31 on Level 2 of the existing Data Centre structure (which is the subject of separate Complying Development Certificate Application).
+ Installation of new and relocated external water tanks and pump enclosure to the NE corner of the site.

Note: This assessment does not include the previously approved (yet to be constructed) 5 storey data centre extension building on the northern end of the existing building.

2.0 DOCUMENTATION RELIED UPON

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

+ Building Code of Australia 2019 Amendment 1 (BCA).
+ The Guide to the Building Code of Australia 2019 Amendment 1 (BCA)
+ Architectural plans prepared by Genton numbered R.DA00, R.DA01, R.DA02, R.DA03, R.DA04, R.DA04B, R.DA04C, R.DA05, R.DA006, R.DA07, R.DA08; WS2_01_A1000/C, WS2_01_A1001/C, WS2_01_A1002/C, WS2_01_A1003/C, WS2_01_A4000/C, WS2_01_A4500/C & WS2_01_A4501/C.
+ Base Building Fire Engineering Report prepared by Core Engineering numbered s100636_FER_07 dated 16.09.2011.

3.0 BCA CLASSIFICATION

BCA CLASSIFICATION:	Class 7b (Data Halls & Plant / Equipment); Class 10a (Tanks & Pump Enclosure) *Note: Existing Class 5 Office on the southern side of the building is not affected by the proposed works.*
RISE IN STOREYS:	Proposed MEP structure: Six (6) – See Comments under C1.2 below
TYPE OF CONSTRUCTION:	Type A Construction
EFFECTIVE HEIGHT:	Proposed MEP structure: <25m (Approx. 15.95m)
MAX. FIRE COMPARTMENT SIZE:	Proposed MEP structure: Greater than 5,000m^2 & 30,000m^3. See comments under C2.2 below
CLIMATE ZONE:	Zone 6
STRUCTURAL IMPORTANCE LEVEL:	Importance Level 2

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4.0 OBJECTIVES

The objectives of this statement are to:

- Confirm that a preliminary review of the Concept architectural documentation has been reviewed by an appropriately qualified Building Surveyor and Accredited Certifier.
- Confirm that the proposed new building works can readily achieve compliance with the BCA pursuant to clause 145 of the *Environmental Planning & Assessment Regulation 2000*.

5.0 LIMITATIONS & EXCLUSIONS

The limitations and exclusions of this report are as follows:

- The following assessment is based upon a review of the architectural documentation.
- The assessment has been undertaken in accordance with Clause 24 and 25 of the Building and Development Certifiers Regulation 2020. BM+G are the proposed Registered Certifier and the advice provided in this Report is limited to whether submitted documentation complies with the Building Code of Australia or a legislative requirement.
- No assessment has been undertaken with respect to the Disability Discrimination Act (DDA) 1992. The building owner should be satisfied that their obligations under the DDA have been addressed.
- 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.
- BM+G Pty Ltd do not guarantee acceptance of this report by Local Council, NSW Fire Brigades or other approval authorities.
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6.0 BCA ASSESSMENT – KEY ISSUES

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

6.1 SECTION C – FIRE RESISTANCE

- Clause C1.2 – Rise in Storeys: As the average internal height of the Ground & Mezzanine Levels is greater than 6m they are both required to be counted as two storeys each per C1.2(c) – this results in the rise in storeys of the proposed new structure being six.
- Clause C1.9/C1.14 – Non-Combustible Building Elements & Attachments: Any proposed external wall cladding (to the existing building and MEP Gantry Structure), and any architectural attachments or signage must be non-combustible materials.
- Clause C1.10 – Early Fire Hazard Properties: The fire hazard properties of all new building materials and assemblies used in the Data Hall fitouts and MEP gantry structure and must comply with the requirements of C1.10, whereby all new floor materials, floor coverings, wall and ceiling lining materials must comply with Specification C1.10.

    - Floor Linings and Floor Coverings:

    A floor lining or floor covering must have a critical radiant flux of not less than that below;

Class of Building	Minimum Critical Radiant Flux
Class 5 (Sprinkler Protected)	1.2kW/m^2

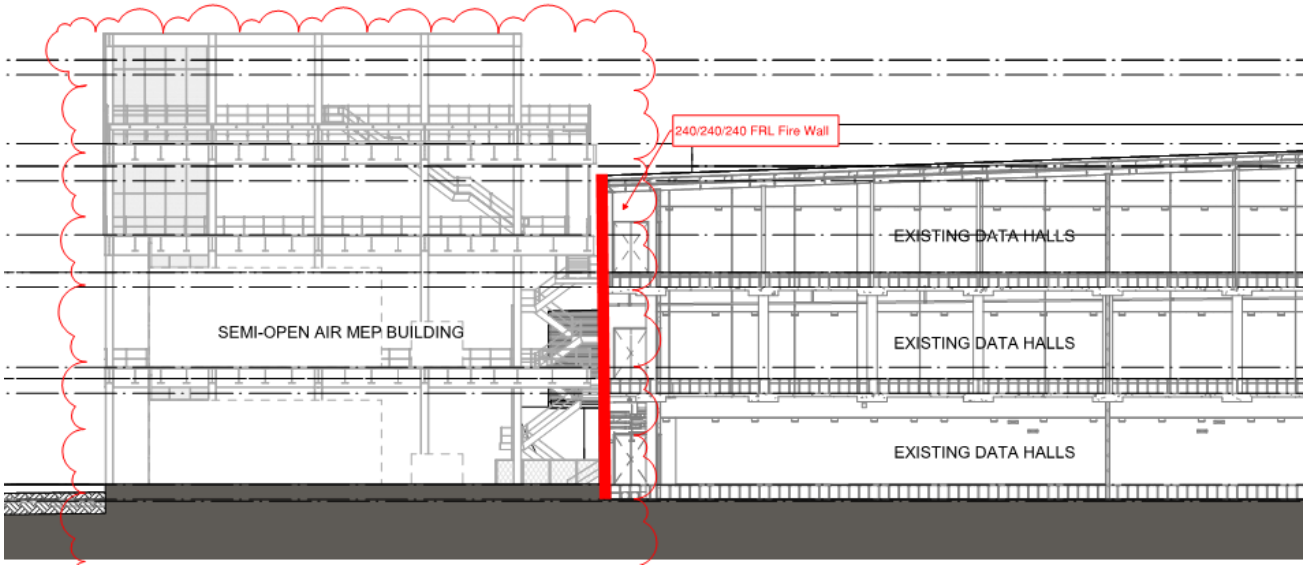
    - Wall and Ceiling Linings:

    A wall and ceiling lining system must comply with the group number specified below and must have:

        - A *smoke growth rate index* not more than 100; or
        - An *average specific extinction area* less than 250 m^2/kg

Class of Building	Public corridors	Other Areas
Class 5 (Sprinkler Protected)	Walls: 1, 2,3 Ceiling: 1, 2,3	Walls: 1, 2, 3 Ceilings: 1, 2, 3

+ Clause C2.2 – General Floor Area and Volume Limitations: The proposed MEP Gantry Structure appears to be single fire compartment (based on interconnecting levels) which is greater than 5,000m^2 & 30,000m^3 (Volume TBC by Genton) and as such is non-compliant with Table C2.2. This non-compliance will need to be addressed a Performance Solution by the Fire Engineer. In addition, it is noted that to maintain compliance within the existing building, the new MEP Gantry Structure will need to be separated by a 240/240/240 FRL C2.7 compliant Fire Wall – see mark-up below. The existing external wall will require verification from a Structural Engineer to confirm compliance with both C2.7 and Spec. C1.1 FRL requirements.

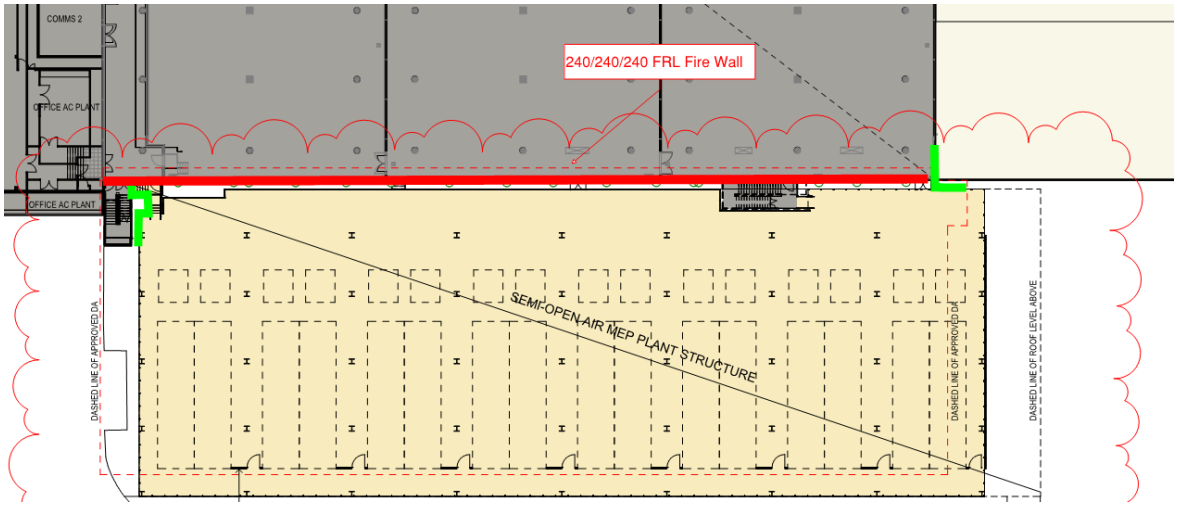


+ Clause C2.6 – Vertical Separation of Openings in External Walls: In any non-sprinklered portions of the building (including the MEP Gantry Structure) compliant fire rated spandrel separation between storeys will be required and/or a Performance Solution from the Fire Engineer will need to be implemented as part of the design.

+ Clause C2.7 – Fire Walls: Fire Walls are required to separate fire compartments and must be designed such that structural elements do not cross the fire wall, the minimum FRL per table Spec. C1.1 is achieved and the openings in the fire wall are compliant with Clause C3.5. See comments under C2.2 above, whereby the existing external wall of the Data Centre will need to be assessed by a Structural Engineer to confirm it complies with C2.7(a) and (c) and achieves a 240/240/240 FRL (per table 3 of Spec. C1.1). Note: If the existing wall is non-compliant a Performance Solution from the Fire Engineer may be considered.

+ Clause C2.12/C2.13 – Separation of Equipment & Electricity Supply: Equipment including lift motors and control panels, emergency generators, central smoke control plant, boilers and batteries exceeding 12V & 200kWh, along with substations, conductors, & main switchboards shall be separated as per Specification C1.1 and not less than FRL 120/120/120.

+ Clause C3.3 – Separation of External Walls and Associated Openings in Different Fire Compartments: Further to the comments in C2.2/C2.7 above, compartmentation plans are to be provided by Genton to determine where additional protection is required to the external walls in the adjoining fire compartments on each level (see indicative zone marked in green below) – similar to the above compartmentation and fire rating issues, a Performance Solution from the Fire Engineer may be considered to address this requirement.



- Clause C3.5 – Doorways in Fire Walls: In addition to comments in C2.2/C2.7, the existing and proposed doors in the required "Fire Walls" must be provided with compliant Fire Doors with equivalent FRL's to the Fire Wall in which they are located (ie. -/240/30 FRL).
- Clause C3.15 – Openings for Service Installations: New services penetrations through floors or fire-rated walls/services risers for hydraulic, electrical, mechanical or other services are to be appropriately fire stopped. Details of the tested systems utilised for fire seals will be required to be presented in a table format and submitted for assessment upon completion of the speculative suites & base build upgrade works.
- Specification C1.1: Design Certification form the Structural Engineer will be required at CC Application stage. Essentially, the Class 7b Data Hall & Plantroom elements are subject to 4hr FRL requirements to all load-bearing elements – see extract of Table 3 of Spec. C1.1 in Appendix 1 below. Note: Any proposed Performance Solutions to reduce FRL's will need to take into consideration FRNSW requirements for quantitative assessment via "fire severity calculations" or equivalent.

6.2 SECTION D – ACCESS & EGRESS

- Clause D1.2 – Number of exits required: The existing x2 fire stairs serving each level of the MEP Gantry Structure are considered adequate to comply with Clause D1.2.
- Clause D1.3 - Fire Isolated Exits / D1.8 – External Stairways in lieu of Fire Isolated Exits: The existing and proposed external exit stairs serving the existing building and proposed MEP Gantry Structure are required to be fire isolated exits given the number of storeys connected by the stairs. The configuration of these stairs is not considered to be compliant with the external stair in lieu of fire isolated stair provisions of D1.8 states and as such a performance solution will be required from the Fire Engineer, whereby protection of the external stairs per D1.8(b)-(d) may also be required.
- Clause D1.4 – Exit travel distances: Exit travel distances within the existing Data Halls and the MEP Gantry Structure (particularly the northern end of each level) exceed the requirements of D1.4 and as such will be required to be addressed as a Performance Solution by the Fire Engineer or additional exit stairs will be required.
- Clause D1.5 – Distance between alternative exits: Distances between alternative exits to the new MEP Gantry Structure must be not greater than 60m.Compliance is readily achievable on all Levels.
- Clause D1.6 – Dimensions of paths of travel to an exit: The minimum clear height through all egress paths is required to be no less than 2m in height (see Part F3 comments below also), and a minimum of 1m wide (this width dimension is measured clear of any obstructions such as handrails). Compliance is readily achievable on all Levels.
- Clause D1.10 -Discharge from exits: Where exits discharge to open space that is at different level to the road, path of travel must be via ramp or incline not steeper than 1:8 or stairway complying with BCA Part D2. Compliance is readily achievable on all Levels.
- Clause D1.13 – Number of Persons Accommodated: In accordance with D1.13(c), confirmation of the population numbers in each portion of the new parts of the building are to be provided by Fujitsu at the CC Application stage.
- Clause D2.13 – Goings and Risers: The proposed new and altered stairways are required to have risers and goings in accordance with Table D2.13 and most have no winders in the required egress stairways. Details to be provided at CC Application stage.
- Clause D2.16 – Balustrades or other barriers: 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. Details demonstrating compliance are to be included on the CC Plans – compliance is readily achievable
- Clause D2.21 – Operation of Latch: Egress doors in a path of travel or incorporated in an exit must be readily openable without a key from the side that faces a person seeking egress, by a single handed downward or pushing action on a single device which is located between 900mm and 1100mm from the floor.
- Part D3 – Access for People with a Disability: Refer to the Access/DDA Report for further details.

6.3 SECTION E – SERVICES & EQUIPMENT

- Clause E1.3 – Fire Hydrants: Fire hydrant coverage to the new MEP Gantry Structure and the Data Halls on Level 2 will be required. Coverage diagrams and details of alterations to the existing system are to be provided for assessment at CC Application stage.
- Clause E1.4 – Fire Hose Reels: Fire Hose Reels are required to be provided to the Class 7b parts of the existing building and the new MEP Gantry Structure. Details to be provided at CC Application stage.
- Clause E1.5 - Sprinkler System: Fire services consultant to provide design certification to confirm compliance with AS 2118.1-2017 within the proposed areas of new building works. Note: Existing base building sprinkler system infrastructure will not be required to be upgraded as part of the proposed new works, subject to a Cl.164B Application at the CC Application stage. Note: If sprinklers are proposed to be omitted from the new MEP Gantry Structure – input from the Fire Engineer will be required – see note under E1.10 below.
- Clause E1.6 – Portable Fire Extinguishers: PFE's are required to be provided within the proposed areas of new building works in accordance with AS 2444-2001

- Clause E1.10/E2.3 – Provisions for Special Hazards: The Fire Engineering team will need to review and consider the additional hazards in the building, such as Lithium-Ion batteries, fuel storage tanks, and large-scale electrical infrastructure, that trigger the need for additional or alternative fire safety systems or smoke control system and make reference to this in their Performance Solutions.
- Table E2.2a – Smoke Hazard Management: A smoke detection system is required throughout to comply with BCA Spec. E2.2a Clause 6 and AS 1670.1-2018 throughout all parts of the proposed new building works. Fire services consultant to provide design certification to confirm compliance – see comment under E1.10/E2.3 above also.
- Clause E4.2-E4.8 Emergency Lighting and Exits Signs: Electrical consultant to provide design certification to confirm compliance with AS 2293.1-2018 throughout all parts of the Levels subject to speculative suites & base build upgrades.

6.4 SECTION F – HEALTH & AMENITY

- Clause F2.3 Sanitary Facilities: Sanitary facilities for any additional/new staff in the building generated by the proposed new building works will be required to be detailed on the CC Application plans, As stated under D1.13 above, Fujitsu are required to confirm additional population numbers in order to assess compliance with Table F2.3 at the CC stage
- Clause F2.4 Accessible Sanitary Facilities: Refer to DDA/Access Consultant Report.
- Part F3 – Room Sizes: The floor to ceiling heights in the proposed Levels subject to new building works must not be less than the following:
  - 2.7m in corridors serving more than 100 persons, otherwise 2.4m; and
  - 2.4m in all habitable rooms; and
  - 2.1m in bathrooms, storage rooms, tea rooms, etc.
- Part F4 – Light and Ventilation: Artificial lighting systems are required to comply with Clause F4.4 and AS 1680.0-2009. All mechanical air-conditioning installations must be in accordance with Clauses F4.5(b) and AS 1668.2.-2012. Design certification to be provided with the CDC Application.
- Parts J5 & J6 – Energy Efficiency: All new air-conditioning, ventilation systems, artificial lighting & power is required to comply with J5 and J6 respectively. Design statements are required for mechanical and electrical installations/modifications, with the CC Application.

7.0 FIRE SAFETY SCHEDULE

The following table is a list of the fire safety measures within the building that will be affected by the proposed new MEP Gantry Structure and Data Hall fitout works and the relevant Performance Standard applicable to the new works.

Statutory Fire Safety Measure	Design / Installation Standard	Existing	Proposed
Access Panels, Doors & Hoppers	Base Building: BCA Clause C3.13 & AS 1530.4 – 2005 and Manufacturer's specifications New Works: BCA Clause C3.13 & AS 1530.4 – 2014 and Manufacturer's specifications	✓	✓
Alarm Signalling Equipment	AS 1670.3 – 2004 and BCA Specifications Clause E2.2A Clause (7)	✓	
Automatic Fail-Safe Devices	BCA Clause D2.21	✓	✓
Automatic Fire Detection & Alarm System	Base Building: BCA Spec. E2.2a & AS 1670.1 – 2004 New Works: BCA Spec. E2.2a & AS 1670.1 – 2015	✓	✓
Automatic Fire Suppression Systems	BCA Spec. E1.5 & AS 2118.1 – 1999 & Raw Fire Report S100636 FER 07 dated 16.09.2011 New Works: BCA Spec. E1.5 & AS 2118.1 – 2017	✓	✓
Automatic Gas Suppression Systems	AS-4214-2002, AS 1670.1-2004, AS/ISO 14520 2009 & AS-2118.1 -1999 & Raw Fire Report S100636 FER 07 dated 16.09.2011	✓	
Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 Clause 6, BCA Spec. 3.22, E2.2a & AS 1670.1 – 2004 New Works: BCA Spec. E1.5 & Spec. E2.2a & AS 1670.1 – 2015	✓	
Emergency Lighting	Base Building: BCA Clause E4.4 & AS 2293.1 – 2005	✓	✓

Statutory Fire Safety Measure	Design / Installation Standard	Existing	Proposed
	New Works: BCA Clause E4.4 & AS 2293.1 – 2018		
Exit Signs	Base Building: BCA Clauses E4.5, E4.6 & E4.8; and AS 2293.1 – 2005 New Works: BCA Clauses E4.5, E4.6 & E4.8; and AS 2293.1 – 2018	✓	✓
Fire Control Centre	BCA Spec. E1.8	✓	
Fire Dampers	Base Building: BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990 and manufacturer's specification New Works: BCA Clause C3.15, AS 1668.1– 2015 & AS 1682.1 / AS 1682.2-2015 and manufacturer's specification	✓	✓
Fire Doors	Base Building: BCA Clause C2.12, C2.13, C3.5, C3.7, C3.8; and AS 1905.1 – 2005 and manufacturer's specification New Works: BCA Clause C2.12, C2.13, C3.5, C3.7, C3.8; and AS 1905.1 – 2015 and manufacturer's specification	✓	✓
Fire Hose Reels	Base Building: BCA Clause E1.4 & AS 2441 – 2005 & Raw Fire Report S100636 FER 07 dated 16.09.2011 New Works: BCA Clause E1.4 & AS 2441 – 2005	✓	✓
Fire Hydrant Systems	BCA Clause E1.3 & AS 2419.1 – 2005 Including Storz Couplings & Raw Fire Report S100636 FER 07 dated 16.09.2011.	✓	✓
Fire Seals	Base Building: BCA Clause C3.15, AS 1530.4 & AS 4072.1 – 2005 and BCA Spec. Clause E2.2 New Works: BCA Clause C3.15, AS 1530.4 & AS 4072.1 – 2005	✓	✓
Mechanical Air Handling Systems	Base Building: BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991 New Works: BCA Clause E2.2, AS/NZS 1668.1 –2015 & AS 1668.2 – 2012	✓	✓
Paths of Travel	Base Building: EP&A Regulation Clause 186 & Raw Fire Report S100636 FER 07 dated 16.09.2011 New Works: EP&A Regulation Clause 186 & Core Engineering Report F200536_FER_11 dated 04.11.2020	✓	✓
Portable Fire Extinguishers	Base Building: BCA Clause E1.6 & AS 2444 – 2001 & Raw Fire Report S100636 FER 07 dated 16.09.2011 New Works: BCA Clause E1.6 & AS 2444 – 2001	✓	✓
Required Exit Doors (power operated)	BCA Clause D2.19(b)	✓	
Warning & Operational Signs	Base Building: Section 183 of the EP&A Regulation 2000, AS 1905.1 – 2005, BCA Clause C3.6, D2.23, D3.6, & E3.3 New Works: AS 1905.1 – 2015, BCA Clause C3.6, D2.23 & E3.3	✓	✓
Fire Engineered Solutions (Base Building): + Non-fire rated steel columns in Level 2 + Non-fire rated roof structure Level 2 + Timber columns in lieu of masonry or concrete + Extended travel distances + Extended distances between alternate exits + Protection of Openings to External Exit Stair in NE corner of the building. + Provision of fire extinguishers in lieu of fire hose reels	Raw Fire Report S100636 FER 07 dated 16.09.2011 and E1.4. Performance Requirements CP1, CP2, DP4, DP5 & EP1.1	✓	

Statutory Fire Safety Measure	Design / Installation Standard	Existing	Proposed
Fire Engineered Solutions MEP1.2: + Rationalised FRL's of new Building Elements to the MEP1.2 structure + Deletion of Fire Rated Spandrel requirement between Ground Floor & Level 1 + Extended distances between alternative exits on Level 1 of up to 74m + Reduced width of path of travel to 600mm in the diesel generator rooms + Horizontal exits on Level 1 make up more than 50% of exits from the storey + Deletion of Fire Hose Reels to Data Halls & Plantrooms + Reduced FRL to chilled water pipe penetrations in Fire Wall	Core Engineering Report F200536_FER_11 dated 04.11.2020 and BCA Performance Requirements CP1, CP2, CP8, DP4, DP6, EP1.1 & EP2.2	✓	

Prepared by:

Dean Goldsmith
Director
Blackett Maguire + Goldsmith

APPENDIX 1- FRL OF BUILDING ELEMENTS – TYPE A CONSTRUCTION

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