ENGINEERS ADVICE – FE001

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To:	Hanan Mansor - Laing O'Rourke
From:	Frazer MacDonald
Project Name:	**USYD ENGINEERING AND TECHNOLOGY PRECINCT (ETP) – STAGE 1 J03**
Project No:	SLOR0102
Email:	hmansor@laingorourke.com.au

Umow Lai

Umow Lai (NSW) Pty Ltd
Consulting Engineers
ABN 80 143 565 324
L7, 657 Pacific Highway
St Leonards NSW 2065
PO Box 103 St Leonards
NSW 1590 Australia
T: +61 2 9431 9431
F: +61 2 9437 3120
ulsyd@umowlai.com.au
www.umowlai.com.au

Sydney Melbourne Brisbane

RE: DA Fire Engineering Statement

This fire engineering Development Application statement is provided for the University of Sydney Engineering & Technology Precinct (ETP). This project relates to Stage 1 which will include a major extension to the existing J03 Engineering Building at the Sydney University Camperdown Campus.

1 Introduction

1.1 Purpose

This document is provided to support the submission of a Development Application. A list of non-compliances with Deemed-to-Satisfy (DTS) provisions of the Building Code of Australia (BCA) to be resolved by way of fire engineering Performance Solutions has been identified in the BCA Report referenced below. Section 3 of this report outlines the relevant fire engineering issues and comments on works being undertaken to ensure that the design meets the Performance Requirements of the BCA.

1.2 Reference Documents

1.2.1 Design Team Documentation

a) Draft BCA Report, Reference 2016/2529 R1.1 BCA Compliance Report, issued by Steve Watson and Partners on 27 Nov 2017.

b) Architectural Drawings by Cox, Reference A-DA-1001 to A-DA-9001 Rev B dated 15 Nov 2017.

1.2.2 Design Guidance

a) National Construction Codes, Building Code of Australia 2016, Australian Building Codes Board (BCA).

b) International Fire Engineering Guidelines, Australian Building Code Board, 2005 (IFEG).

1.3 Limitations

a) Supportability of all items contained in this report is subject to the development of a fire safety strategy in addition to consultation with the fire brigade.

b) At this juncture we assume building works shall not impede on existing building egress. Otherwise additional works may be required to existing building documentation including updating fire strategies and egress assessments, and potentially additional building works.

c) We understand that no staged occupation of the premises is proposed during construction, as outlined in the referenced BCA report.

2 Description of Works

This project relates to Stage 1 which will include a major extension to the existing J03 Engineering Building at the Sydney University Camperdown Campus. Refurbishment works are also proposed to the J03 building to enable the building to function as one seamless building.

The new building is proposed to be up to 41 m in height across 13 Levels, and will contain laboratories (bespoke and generics), teaching facilities, support staff hub and amenities. A high degree of connectivity is proposed including an atrium as shown in the following figure.

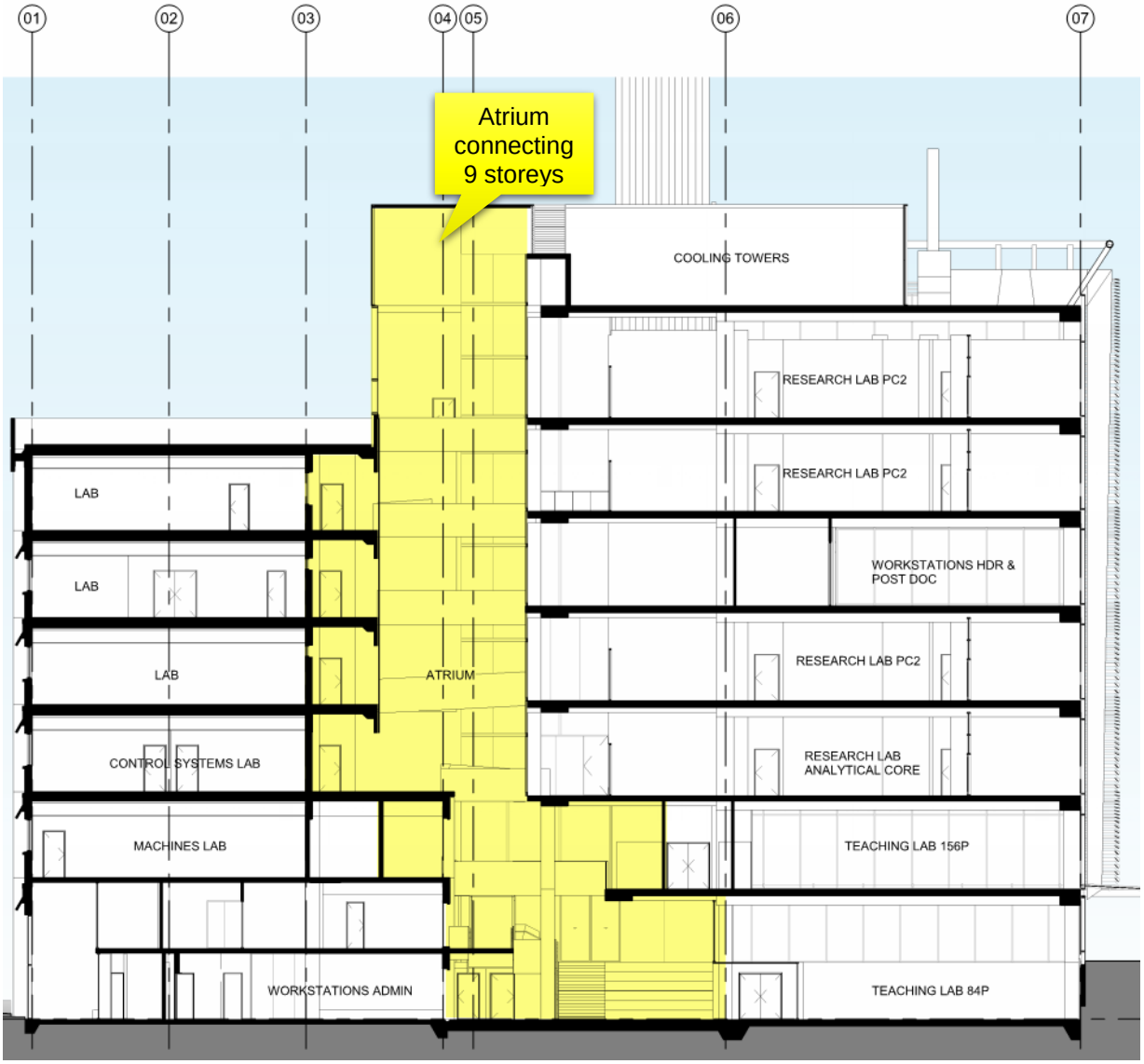

Figure 1 *Building Overview*

2.1 BCA Reference Criteria

The following main BCA parameters are adopted from the BCA from Steve Watson and Partners.

Table 1 *BCA DTS Reference Criteria*

BCA Clause		BCA Criteria
A3.2	Building Classification	Mainly Class 9b – Assembly Building Also includes Class 5, and 8.
C1.2	Rise in Storeys	Ten (10) storeys
C1.1	Type of Construction	Type A
	Effective Height	>25 m (approx. 32 m)
C2.3	Large Isolated Building	Yes (may alternatively assess as an oversized fire compartment).
G3	G3 Atrium	Yes

3 Proposed Performance Solutions

The following deviations from the BCA DTS provisions in the table below, identified by the BCA Consultant Steve Watson and Partners, are proposed to be addressed by way of fire engineering Performance Solutions

This list of departures from BCA DTS provisions plus the proposed fire engineering solutions are to be further developed during the subsequent concept design phase of the project, including a fire engineering options study to resolve the atrium smoke exhaust strategy in tandem with the evacuation regime for the building. Initial design proposals have been outlined below.

Table 2 *BCA DTS non-compliances*

#	DTS Deviations	Comments
1.	C1.1 – Rationalisation of FRLs.	Supportable to rationalize lab FRLs to 120/120/120 in line with the rest of the building, subject to assessment of fuel loading and ventilation in relevant locations.
2.	C2.2, C2.3 and C2.4 – the building is classified as a Large Isolated Building without compliant perimeter vehicle access.	Fire engineering solution proposed to assess as oversized fire compartment under C2.2.
3.	C3.3 – Openings in different fire compartments are less than BCA DTS minimum requirements.	A fire engineering radiation modelling will be undertaken to rationalize/minimize window openings that require DTS window wetting sprinklers.
4.	D1.4, D1.5 – Travel distances are exceeded including to a point of choice, to an exit, between exits, with non-compliances in relation to	Performance based smoke and egress options will be developed to address egress on a performance basis in particular where egress is via smoke exhaust protected sections of the atrium. Note that following limits apply to travel distances addressable through Fire Engineering analysis: • Distance to a point of choice of 30 metres in lieu of BCA DTS limit of 20 m. • Distance of 60 metres to an exit in lieu of BCA DTS limit of 40 metres. • Distance of 90 m between exits in lieu of BCA DTS limits of 60 m (note that this could be extended in some situations subject to a review of other mitigating measures.
5.	D1.6 – Insufficient egress width is provided for the proposed populations	Performance based smoke and egress options and a detailed fire strategy are being developed. Initial comments: • Given the openness proposed in the atrium design currently, we would recommend a simultaneous evacuation strategy, which would be in line with USYD CIS Guidelines. • From preliminary calculations, the current 2 fire stairs could support simultaneous evacuation for a population of approx. 1300-1400 may across Levels 3-8 based (ave of ~230 per level). Populations beyond this without additional above ground exit capacity would not be supportable due to risks of overcrowding. • To accommodate simultaneous evacuation for the above populations, the smoke exhaust strategy will need to ensure that egress routes are protected for extended periods of time. • A smoke exhaust system has been allowed for in the design. • In addition, enhancements may be required to the atrium bounding construction to ensure that both fire stairs cannot be simultaneously compromised by smoke spread from an atrium fire.

#	DTS Deviations	Comments
6.	D1.7 – The eastern stair discharges to a space that is not sufficiently open and exposed to adjacent openings.	Supportable subject to further assessment and design coordination to ensure that the stair discharges to a space that is sufficiently ventilated and/or fire-sterile.
7.	D1.9 – Travel by various stairs result in non-compliant egress not by a single stair.	We understand this relates to a number of internal circulation stairs. Consideration of these will be integrated into the building egress strategy being developed.
8.	D1.11 – Non-compliant horizontal exits are proposed.	Supportable subject to further assessment and design coordination to ensure the proposed egress routes provide accessible and available egress through to a place of safety (considering security gates etc). In addition, works should not detract from the egress conditions of the existing building.
9.	D2.12 – Some discharge points require travel over parts of the building below and do not achieve an FRL of 120/120/120.	We understand that this issue is not yet confirmed but is to be allowed for within the fire engineering scope. Therefore, a fire engineering review would need to be undertaken on a case by case basis to ensure supportability.
10.	E1.8 – Non-compliant location of fire control centre.	We understand that this issue is not yet confirmed but is to be allowed for within the fire engineering scope. The proposed Fire Control Centre would need to be easily identifiable and readily assessible.
11.	G3 – Atrium is to be fire engineered which will result in a variety of non-compliances, including: • Dimension of well • Bounding walls • Balcony construction • Roof separation • Means of egress • Fire and smoke control systems	A performance based smoke and egress options is being developed to address on a performance basis, which will be verified by smoke and egress modelling during the detailed design phase of the project. See comments on item 5 for initial comments on the approach and measures proposed.

If you have any queries in this regard please don't hesitate to contact me.

Kind regards

Frazer MacDonald CPEng, NER (Fire Safety and Building Services), C10 (Fire Safety)

Senior Associate Fire Engineer
T: 02 9431 9470

M: 0407 975 810

E: frazer.macdonald@umowlai.com.au

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