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DEVELOPMENT APPLICATION REPORT				Fire Engineering
Project Name:	Loreto Kirribilli School Project		Document No.	CA01
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Client:	Artazan Property Group		Issued for: DA	
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☒	☐	Artazan Property Group	Rachael Keegan	rachael@apg.com.au

Subject: Fire safety engineering assessment of DA plans – Loreto Kirribilli School Project, 85 Carabella Street, Kirribilli

This development application (DA) report indicates the proposed fire safety design strategy for the redevelopment of an independent Catholic day school at 85 Carabella Street, Kirribilli, NSW. The project consists of:

- Western Precinct redevelopment comprising of:
  - Demolition of the existing B Block building
  - Construction of a new Innovation Centre building
  - Modification to the existing gymnasium
  - New connection in the Centenary Hall
- Northern Precinct Connector comprising of the construction of a new stairway and lift to provide improved accessibility and circulation throughout the Science Building and Centenary Hall.
- Southern Precinct Connector comprising of the refurbishment of the existing link connection between the Chapel and J Block Building including installation of a new lift for improved access.

As stipulated within the NSW Environmental Planning & Assessment (EP&A) Regulation 2000, the proposed development is to comply with the Building Code of Australia (BCA), currently titled National Construction Code (NCC).

Based on required compliance with NCC 2016, as advised by Steve Watson & Partners in their BCA Assessment Reports for the Western Precinct (Reference: 2016/1744, R1.4, dated 17 July 2017) and for the Connectors to Northern, Eastern & Southern Precinct (Reference: 2016/1744, R1.2, dated 17 July 2017), a description of the parameters pertaining to the development, in the context of the requirements and definitions provided within the BCA, is provided in Table 1, Table 2 and Table 3.

Table 1 – BCA DtS provision reference criteria for Western Precinct Innovation Centre & Gymnasium

BCA clause		Description or requirement
A1.1	Effective height	Less than 25 metres (approx. 20.5 metres)
A3.2	Occupancy classification	Class 9b
C1.1	Minimum type of construction	Type A
C1.2	Rise in storeys	7, with 7 storeys being contained in total

Table 2 – BCA DtS provision reference criteria for Northern Precinct connector (Science Building & Centenary Hall)

BCA clause		Description or requirement
A1.1	Effective height	Less than 25 metres (approx. 13.5 metres)
A3.2	Occupancy classification	Class 9b
C1.1	Minimum type of construction	Type A
C1.2	Rise in storeys	5, with 5 storeys being contained in total

Table 3 – BCA DtS provision reference criteria for Southern Precinct connector (Chapel & J Block)

BCA clause		Description or requirement
A1.1	Effective height	Less than 25 metres
A3.2	Occupancy classification	Class 9b
C1.1	Minimum type of construction	Type A
C1.2	Rise in storeys	4, with 4 storeys being contained in total

It is proposed that the method of BCA compliance for fire safety be achieved by satisfying the Performance Requirements of the BCA via a combination of prescriptive-based and performance-based design. This approach accords with clause A0.2 of the BCA, which permits satisfying the Performance Requirements of the BCA by one or a combination of the following:

(a) Performance Solution; or

(b) Deemed-to-Satisfy Solution; or

(c) Combination of (a) and (b)

Compliance with aspects of fire safety design that are not intended to meet the BCA deemed-to-satisfy provisions will be addressed as Performance Solutions forming the basis of a fire engineering analysis.

With reference to clause A0.3 of the BCA, the Performance Solution is to either demonstrate compliance with the relevant BCA performance requirements directly or demonstrates fire safety equivalence with the deemed-to-satisfy provisions.

The following assessment methods for the Performance Solutions are proposed with reference to clause A0.5 of the BCA:

- BCA clause A0.5(b), comprising utilisation of “Verification Methods” appropriate to that which the approval authority will accept for determining compliance with the Performance Requirements; or
- BCA clause A0.5(d), comprising utilisation of a comparison of the level of fire safety performance associated with the proposed design to that achieved by the deemed-to-satisfy provisions.

The fire engineering analysis will follow the principles established within the International Fire Engineering Guidelines 2005. The acceptance criteria for the assessment of the Performance Solutions will be established in consultation with the relevant authorities having jurisdiction, the design team and the owner’s representative. This process will continue throughout the development of the design.

For consideration of the impact of the impending fire engineering strategy on the design of the development, Exova Warringtonfire Aus Pty Ltd has undertaken a preliminary fire safety engineering assessment of the DA architectural plans for the proposed development (architectural drawing set dated 07 July 2017), together with BCA 2016 compliance assessment documentation prepared by Steve Watson & Partners (Draft Preliminary BCA Assessment dated 17 July 2017, 2016/1744 R1.4 for Western Precinct and 2016/1744 R1.2 for Connectors to Northern, Eastern and Southern Precinct).

From the assessment undertaken, it is considered that the matters identified that are likely to form fire safety engineering Performance Solutions can be readily addressed, enabling the proposed development to readily achieve compliance with the relevant fire safety-related provisions of the BCA. The areas of design where fire engineering assessment will be required, as identified in the preliminary BCA review, are as shown in Table 4 (for Western Precinct), Table 5 (for Northern Precinct Connector) and Table 6 (for Southern Precinct Connector).

Table 4 – Proposed issues to be addressed on a performance bases fire engineering solution for Western Precinct as per BCA assessment report

BCA Clause	Non-Compliance
C2.7, C3.2, C3.3 and Spec C1.1	The innovation centre/gymnasium is proposed to be fire separated from the adjoining Marian Centre by a performance based fire wall to separate the buildings so that they may be treated separated for the purposes of Section C, D and E of the BCA. The fire wall is proposed to include glazing and a glazed lift.
C2.7, C3.2, C3.3 and Spec C1.1	The innovation centre/gymnasium is proposed to be fire separated from the adjoining Junior School and Centenary Hall by a performance based fire wall to separate the buildings so that they may be treated separately for the purposes of Section C, D and E of the BCA
C2.10 and Spec C1.1	A fire engineered solution is proposed to be investigated for the proposed glass lift shaft.
C3.2 and C3.4	The Marion Centre, Junior School and Centenary hall may have openings located closer than 6m to the new innovation centre and may not be proposed to be protected in accordance with the DTS provisions of Clause C3.4.
C3.2(b)	The glazed openings on the ground floor clouded below, occupy more than 1/3 of the external wall they are located in. A fire engineered solution is required to be investigated.
D1.3 and Spec C1.1	The main communication stairway is proposed to connect more than 3 storeys and not be fire isolated. It currently connects 7 storeys. A fire engineered solution is proposed to be investigated to connect all 7 storeys via a performance based fire isolation with toughened glass, self-closing doors and drenchers.
D1.4 and D1.5	The following exit travel distances are proposed to be addressed as part of a fire engineered solution: **Lower Ground 2:** • 25m to a point of choice in lieu of the 20m permitted by Clause D1.4 of the BCA (cool room/pantry) **Lower Ground 1:** • 25m to a point of choice in lieu of the 20m permitted by Clause D1.4 of the BCA (metal workshop and store room) **Ground:** • 25m to a point of choice in lieu of the 20m permitted by Clause D1.4 of the BCA (store room) **Level 1:** • 25m to a point of choice in lieu of the 20m permitted by Clause D1.4 of the BCA (store rooms) **Level 2:** • 25m to a point of choice in lieu of the 20m permitted by Clause D1.4 of the BCA (Outdoor learning area)
D1.7	A fire engineered solution can be investigated if the openings along the path of travel discharging from the fire stairs aren't protected completely in accordance with Clause D1.7.
E1.3	The existing hydrant booster assembly is located within 10m of the building and does not comply with AS2419.1 - 2005
E1.5	AS2118.1 – 1999 requires sprinklered and non sprinklered spaces to be separated by 2hr construction. The adjoining junior school and centenary hall will not be provided with a DTS 2hr fire wall.

Table 5 – Proposed issues to be addressed on a performance bases fire engineering solution for Northern Precinct Connector as per BCA assessment report

BCA Clause	Non-Compliance
C2.7 and Spec C1.1	The Centenary Hall and Science building are proposed to be fire separated on a performance basis via a fire engineered solution. The performance based fire wall is proposed to separate the buildings so that they may be treated separately for the purposes of Section C, D and E of the BCA
C2.6	A fire engineered solution can be investigated to eliminate the need for spandrels given the low fuel load in the lobby areas
C2.10	Should a glass lift be proposed, a fire engineered solution will be required to be investigated to permit the lift to connect 5 storeys without be in a fire resisting shaft. The fire engineering investigation would need to take into account the fact that the glass lift landing door would breach the separation between the class 7a carpark and class 9b portion above. If compliance cannot be achieved on a performance level, a fire rated lift shaft and lift landing doors will be required in accordance with Clause C2.10 of the BCA
Spec C1.1	The roof is required to be non-combustible and be provided with a ceiling immediately below the roof that has a resistance to the incipient spread of fire of not less than 60 minutes. A fire engineered solution can be investigated to remove the requirement to have a 60 minute incipient spread ceiling below the roof serving the stairway/lobby.
D1.3	BCA Clause D1.3 permits a stairway to connect only 2 storeys before it is required to be fire isolated. The new stairway connects 4 storeys is proposed to connect 4 storeys however it is not proposed to be fire isolated. A fire engineered solution is proposed to be investigated to permit the stair to be non-fire isolated given that the upper 2 storeys are only contain a lobby space with minimal floor area.

Table 6 – Proposed issues to be addressed on a performance bases fire engineering solution for Southern Precinct Connector as per BCA assessment report

BCA Clause	Non-Compliance
C2.10	A lift connecting more than 2 storeys is required to be in a fire resisting shaft achieving an FRL of -/120/120. The proposed lift connects/passes by 5 storeys and therefore should be in a fire resisting shaft in accordance with Clause C2.10. Should a glass lift be proposed, a fire engineered solution will be required to be investigated to determine if it can be achieved on a performance basis. If compliance cannot be achieved on a performance level, a fire rated lift shaft and lift landing doors will be required in accordance with Clause C2.10 of the BCA
Spec C1.1	The roof is required to be non-combustible and be provided with a ceiling immediately below the roof that has a resistance to the incipient spread of fire of not less than 60 minutes. A fire engineered solution can be investigated to remove the requirement to have a 60 minute incipient spread ceiling below the roof serving the stairway/lobby.

Should you have any further queries regarding this, please do not hesitate to contact the undersigned.

Yours faithfully

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For and on behalf of Exova Warringtonfire Aus Pty Ltd.