

Fire Safety Engineering Design Review for DA Submission



The Emporium Redevelopment

Address **No. 6 The Corso, 46, 47, 48 & 50 East Esplanade**
Date: **4 September 2019**
Document ref: **224419**
Issue No: **V4.0**
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1. General

Scientific Fire Services Pty Ltd has undertaken a preliminary review and assessment of the architectural drawings and design concepts proposed for The Emporium Redevelopment located at 6 The Corso, 50 East Esplanade & 46-48 East Esplanade, Manly NSW. The following provides a summary of the fire safety risk engineering aspects and 'in-principle' support of the proposed design.

2. The Project

The subject site is located at No. 6 The Corso, No. 50 East Esplanade & 46-48 East Esplanade, Manly NSW and is known as "The Emporium Redevelopment". The proposed works entail redevelopment of the site, including minor works to an existing building at 46-48 East Esplanade and construction of a new five (5) storey mixed-use retail & commercial building. The site is bound along the western elevation by East Esplanade which also forms the principle entrance. The public domain known as "The Corso" is situated along the northern elevation. A satellite image is illustrated in Figure 2.1.

The overall development shall be consolidated under one (1) allotment. As part of the works new retail tenancies to The Corso & East Esplanade shall be introduced and situated on ground floor. A number of commercial tenancies shall be distributed throughout the first to fourth floor levels. Retail tenancies situated within the existing building shall be retained. The new & existing building portions shall be interconnected by way of public courtyard at ground level and lobby/corridor arrangements containing pedestrian link bridges at each level.

Occupant egress from the building shall be provided by fire-isolated stair(s) which discharge externally into the public courtyard. A new fire stair shall serve the new building portions and discharge onto "The Corso". It is noted that only one (1) fire stair will be required when The Corso stair is constructed.

The general layout & configuration of the proposed building is illustrated in Figure 2.2.



Figure 2.1: Location plan

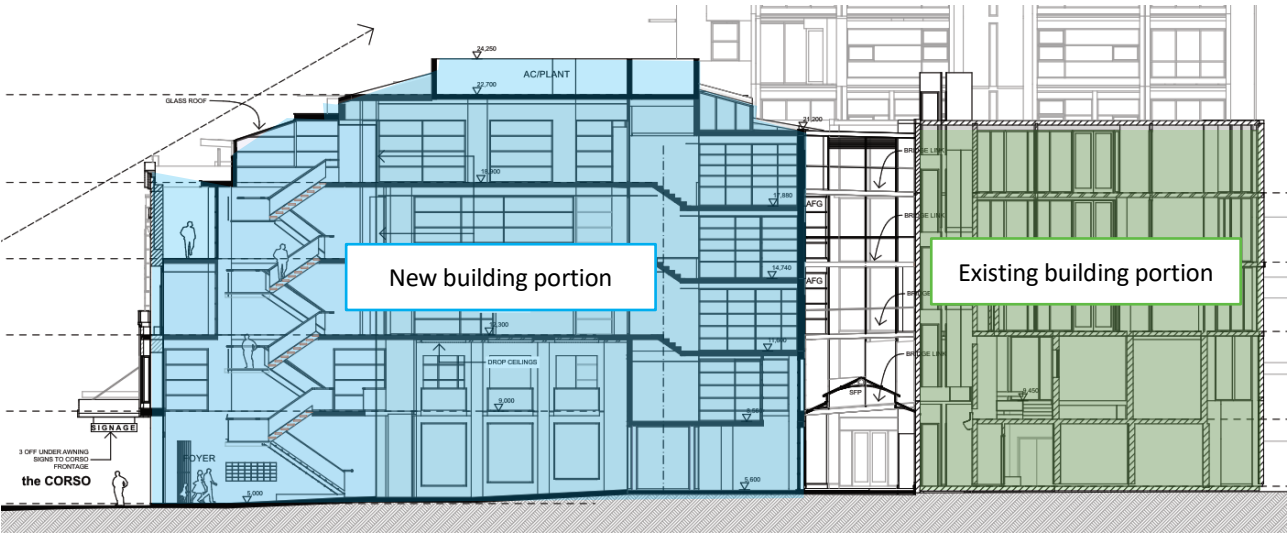


Figure 2.2: Building cross section

Table 2.1: BCA building description

Building Summary	
Building Classification	Class 5 (Office/Commercial), Class 6 (Retail)
Storeys Contained	Five (5)
Rise in Storeys	Five (5)
Effective Height	13m
Type of Construction	Type A fire-resisting construction

3. Purpose

The preliminary fire safety engineering review was undertaken to determine ‘in-principle’ whether the design will achieve compliance with the Performance Requirements of the Building Code of Australia (BCA) (ABCB, 2019). The design review relates to the fire-resisting construction, egress provisions and fire protection services for the proposed redevelopment.

The design issues as identified by the BCA consultant (refer to Appendix A) specific to the subject building will be formally assessed through the application of fire safety risk engineering process in accordance with the International Fire Engineering Guidelines (IFEG) (ABCB, 2005). It is the expectation that a suitable Performance Solution will be developed and supported through robust fire engineering methodologies of the current design proposal.

In the context of fire resistance and compartmentation the design is proposed to adopt rationalised fire resistance level’s (FRL’s) within the new ground floor level retail tenancy suites. In addition, the new fire stair discharging onto “The Corso” shall be separated (in-part) by way of wall-wetting sprinkler protected glazing in lieu of solid bounding construction. These items have been further reviewed in Section 3.1.

From an egress perspective, the design is identified to incorporate extended travel distances to a point of choice at various locations from the L1-L4 commercial tenancy suites. In addition, the path of travel upon discharging from the existing fire stairs is noted to direct occupants past unprotected openings and below the new link bridge walkway. These items have been further reviewed in Section 3.2.

With respect to fire services and equipment, the fire hydrant booster assembly design shall be such that it is situated/recessed within an external wall of the building and not provided with the required 90/90/90 radiant heat shield protection. This item has been further reviewed in Section 3.3.

The above-mentioned design issues shall be addressed through a combination of qualitative & quantitative assessment methodologies. The methodologies will rely upon a combination of enhanced passive and/or active fire safety measures specific to each issued to be rationalised or through a holistic approach.

3.1 Fire Resistance

3.1.1 Rationalisation of Fire Resistance Level's (FRL's)

As part of the fire compartmentation strategy, the new ground floor level retail tenancy suites shall adopt rationalised fire separation achieving a minimum fire resistance level (FRL) of 120 minutes in lieu of the prescribed 180 minutes. The design shall be assessed by means of a quantitative 'deterministic' analysis utilising time equivalence fire severity (i.e. burnout) calculations. The calculations shall consider compartment geometry, fuel load and ventilation characteristics specific to a post-flashover fire scenario within each tenancy arrangement. The analysis shall rely on the outcomes of an evacuation analysis and Fire Brigade Intervention Model (FBIM) to demonstrate that the proposed compartmentation strategy satisfies appropriate safety factors.

The preliminary assessment conducted by Scientific Fire Services suggests that the identified design issue relating to rationalisation of fire resistance levels (FRL's) can satisfy the relevant BCA Performance Requirements, namely CP1 & CP2.

3.1.2 Separation of New Fire Stair

As part of the architectural design, the new building portions shall be served by a new fire stair which shall extend through all levels and providing egress to "The Corso". The fire stair is proposed to be separated from adjacent retail/commercial tenancies through full-height glazing protected by wall-wetting sprinkler heads (tenancy side only) in lieu of solid bounding construction achieving a minimum FRL of 120/120/120. The design shall be assessed by means of qualitative 'comparative' analysis whereby wall-wetting sprinkler protected glazing shall provide an equivalent fire barrier. The analysis shall rely on the research outcomes of tested systems to demonstrate the effectiveness of the proposed form of separation.

The preliminary assessment conducted by Scientific Fire Services suggests that the identified design issue relating to separation of the new fire stair can satisfy the relevant Performance Requirements, namely CP2 & DP5.

3.2 Occupant Egress Provisions

3.2.1 Exit Travel Distances

Occupant egress from the upper commercial tenancy suites shall involve additional travel distances ranging up to 26m-29m to a point of choice to an exit in lieu of 20m. The design shall be assessed by means of quantitative 'comparative' analysis using an RSET/RSET approach. The design shall rely on reduced spacing of the fire detection system to compensate the movement delay associated with the additional travel distances. The design principle is based on providing occupants with an earlier warning/notification time in comparison to an equivalent DtS building solution, thus improving the evacuation phase inclusive of the exit travel distances.

The preliminary assessment conducted by Scientific Fire Services suggests that the identified design issue relating to exit travel distances can satisfy the relevant BCA Performance Requirements, namely DP4 & EP2.2.

3.2.2 Discharge from Existing Fire Stairs

The fire stairs associated with the existing building portion, which are proposed to be retained, shall discharge occupants into the ground level public courtyard area which shall remain partially open to the sky. From the discharge location the path of travel shall direct occupants below the pedestrian link bridge(s) and within 6.0m of unprotected openings associated with the commercial lobby and new/existing retail tenancies. The design shall be assessed by means of qualitative 'deterministic' & 'risk' assessment with consideration of the egress path. The design shall rely on the provision of a secondary egress path through the commercial foyer (i.e. leading to "The Corso") which shall provide occupants with an alternative path, should the primary path become compromised by flame impingement, elevated temperatures or excessive radiant heat flux levels.

The preliminary assessment conducted by Scientific Fire Services suggests that the design issues relating to the proposed egress configuration can satisfy the relevant BCA Performance Requirements, namely CP2 & DP5.

3.3 Fire Services & Equipment

3.3.1 Protection of Fire Hydrant Booster Assembly

As part of the fire services design, the entire development shall be served by a fire hydrant system in accordance with AS2419.1:2005. As part of the design, the fire hydrant booster assembly shall be situated/recessed within an external wall along the ground level courtyard i.e. perpendicular to East Esplanade. In this instance the protective requirements (i.e. 90/90/90 radiant heat shield extending 2m either side and 3m above the upper hose connections) shall not be provided due to the presence of retail openings. The design shall be assessed by means of quantitative 'deterministic' assessment utilising radiant heat transfer calculations. The calculations shall consider the opening sizes and proximity to

the booster assembly. The analysis shall determine whether additional protective measures (e.g. internal wall-wetting sprinkler protection) are required to maintain tenable conditions for attending fire crews whom may be working around or accessing the fire hydrant booster assembly.

The preliminary assessment conducted by Scientific Fire Services suggests that the identified design issue relating to protection of the fire hydrant booster assembly can satisfy the relevant BCA Performance Requirements, namely EP1.3.

4. Statement of Endorsement

The fire and life safety related design issue(s) will be addressed through the performance-based path of compliance. Scientific Fire Services (SFS) can confirm that the proposed design will achieve fire safety design compliance to the relevant Performance Requirements of the Building Code of Australia (BCA) (ABCB, 2019).

The formulation of the Fire Safety Engineering Report (FSER) represents the next step in the approvals process. SFS shall commence the process of developing this document and will provide a formal comprehensive FSER submission. The FSER shall detail the qualitative & quantitative methodologies, approaches and analysis required to substantiate the design. Finally, in order to ensure that the client can obtain a Construction Certificate for the proposed building works, the FSER shall incorporate stakeholder conditions, comments and advice to the satisfaction of the Principal Certifying Authority (PCA).

On the basis of the review of the proposed design issues identified herein, Scientific Fire Services can confirm that the documentation in relation to the subject redevelopment will achieve fire safety design compliance with the relevant Performance Requirements of the National Construction Code Series – Volume 1, Building Code of Australia (BCA, 2019).

I trust the above is satisfactory for your current purposes. Should you have any queries, please do not hesitate to contact me on (02) 9221-3658 or email to derya.horasan@scifire.com.au



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Scientific Fire Services

BPP 2272 – C10 – Accredited Certifier – Fire Safety Engineering Compliance

Appendix A. Relevant BCA/Regulatory Information

No.	Identified Design Issue	BCA-DtS Clause	Performance Requirement
1	It is proposed to permit Class 6 (Retail) tenancies situated within the ground floor to achieve a minimum Fire Resistance Level (FRL) of 120 minutes in lieu of 180 minutes as prescribed by Type A fire-resisting construction.	Clause C1.1 & Specification C1.1	CP1 & CP2
2	It is proposed to enclose parts of the new fire stair exit which fronts The Corso through the adoption of wall-wetting sprinkler protected glazing to achieve an equivalent fire barrier in lieu of solid bounding construction achieving a minimum FRL of 120/120/120.	Clause C1.1, Clause C3.8 & Clause D1.3	CP2 & DP5
3	It has been identified that exit travel distance exceed the maximum travel distances prescribed by the BCA. In this instance it is proposed to review the following: - Exit travel distance to a point of choice to an exit of up to 29m in lieu of 20m within L1-L4 suites; and - Exit travel distance to a point of choice to an exit of up to 26m in lieu of 20m within L3-L4 suites.	Clause D1.4	DP4 & EP2.2
4	It is proposed to review the discharge configuration associated with the existing fire stair which requires occupants to pass within 6m of unprotected openings along the colonnade. In addition, occupants are required to pass below a new link walkway situated above the path of travel leading to road or open space.	Clause D1.7 & Clause D1.10	CP2 & DP5
5	It has been identified that the fire hydrant booster assembly is situated within minimum setback distance of the building without the required 90/90/90 radiant heat shield protection.	Clause E1.3 & AS2419.1:2005	EP1.3

Appendix B. Architectural Drawings

Drawing No.	Title	Date / Issue
DA00	COVER PAGE	27.08.19 / Rev. -
DA01	GROUND FLOOR PLAN	27.08.19 / Rev. F
DA02	FIRST FLOOR PLAN	27.08.19 / Rev. E
DA03	SECOND FLOOR PLAN	27.08.19 / Rev. E
DA04	THIRD FLOOR PLAN	27.08.19 / Rev. E
DA05	FOURTH FLOOR PLAN	27.08.19 / Rev. E
DA06	ROOF / SITE PLAN	27.08.19 / Rev. D
DA07	THE CORSO ELEVATION	20.08.19 / Rev. C
DA08	EAST ESPLANADE ELEVATION	20.08.19 / Rev. C
DA09	VIEW 1 COURTYARD ELEVATION	27.08.19 / Rev. E
DA10	VIEW 2 COURTYARD ELEVATION	27.08.19 / Rev. D
DA11	SECTION A1 (LONGITUDINAL SECTION)	27.08.19 / Rev. E
DA12	SECTION A2 – CROSS SECTION	27.08.19 / Rev. D
DA13	SECTION B1 – CROSS SECTION	27.08.19 / Rev. E