



FIRE ENGINEERING
P R O F E S S I O N A L S
ENGINEERING BETTER ALTERNATIVE SOLUTIONS FOR THE CONSTRUCTION INDUSTRY

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FIRE ENGINEERING DA STATEMENT
FOR
STAGE 2 DEVELOPMENT APPLICATION
WESTFIELD WARRINGAH MALL

Report 2016/1265 DAIS- R3.2

July 2018

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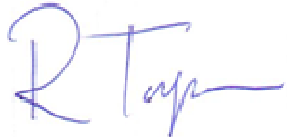
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Northern Beaches Council – Local Government Authority

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REPORT AUTHORISATION

| Report by: | Reviewed by: | Authorised by: |
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|  |  |  |
| Date: 12/07/2018 | Date: 12/07/2018 | Date: 12/07/2018 |

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1. EXECUTIVE SUMMARY

This report documents the findings of a high level fire safety engineering review carried out for the proposed new construction forming part of the Stage 2 Development at Westfield Warringah Mall. Fire Engineering Professionals Pty Ltd (FEP) undertook this assessment at the request of Scentre Design & Construction, who are the Project Managers for the construction project.

Stage 2 redevelopment of Warringah Mall is proposed to consist of 9845m² of additional Gross Leasable Area over four storeys. Additionally, car spaces are to be provided as per a ratio of 4.1 cars/ 100sqm. The following works are nominated as part of the Stage 2 Development Application:

- a. 9845m² net additional GLA
- b. additional car spaces in a ratio of 4.1 cars/ 100sqm
- c. Reconfiguration of an existing Major retail tenant with a reduced GLA of 5 310m²
- d. Rebuilt Cinema complex
- e. Construction to include the following:
 - i. Mini-Major and Specialty retail tenants
 - ii. Extension of existing Fresh Food Market adjacent to Coles supermarket
 - iii. A Casual Dining precinct
 - iv. Hospitality, Lifestyle and Entertainment
 - v. Associated public malls and amenities

Fire Engineering Professionals Pty Ltd have been requested to review the proposed works with a view to providing Northern Beaches Council with a statement whether the likely non-compliances with BCA DTS provisions associated with the proposed works may be able to be addressed by an Performance Solution and whether the proposed modifications will impact on the ability of the remaining portions of the existing building to maintain consistency with the documented fire engineering strategy for those portions of the building. The report is also proposed to serve as a confirmation to the Northern Beaches Council for the intention of Fire Engineering Professionals Pty Ltd to provide an Performance Solution for the identified list of non-compliances with the proposed building concept design.

It must be noted that this is a general overview of the likely requirements from the proposed new works with regards to the existing and new fire services and not a detailed fire engineering review, which will be developed in consultation with relevant stakeholders as part of the detailed fire engineering study. Any recommendations contained in this DA Statement report will require agreement with relevant stakeholders including the Council and Fire & Rescue NSW and is subject to modifications based on a detailed assessment.

FEP have been supplied with a brief BCA assessment outlining the issues of non-compliance with the BCA DTS provisions which may require a detailed fire engineering assessment. This review is based on the existing and proposed building configuration provided to Fire Engineering Professionals Pty Ltd by Scentre Design & Construction and review of the previous fire engineering reports prepared for Westfield Warringah Mall building including those applicable to the recent Stage 1 Development.

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2. INTRODUCTION

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FEP have been supplied with a brief BCA assessment outlining the issues of non-compliance with the BCA DTS provisions which may require a detailed fire engineering assessment. This fire engineering review is based on the existing and proposed building configuration provided to Fire Engineering Professionals Pty Ltd by Scentre Design & Construction and review of the previous fire engineering reports prepared for Westfield Warringah Mall building including those applicable to the recent Stage 1 Development.

3. PURPOSE

The purpose of this preliminary review is to provide a brief on the likely impact of the proposed construction associated with the proposed Stage 2 Development of Westfield Warringah Mall building on the fire safety systems serving the base building and any new fire safety requirements arising from the proposed works. The report is also proposed to serve as a confirmation to the Northern Beaches Council for the intention of Fire Engineering Professionals to provide an Performance Solution for the likely non-compliances with the proposed building design.

This report is also likely to form the basis of a Fire Engineering Brief (FEB) for further discussions with Fire & Rescue NSW.

4. FIRE SAFETY OBJECTIVES

The core fire safety objectives of this review are:

- To provide preliminary information on the fire safety systems within the affected areas that are likely to require upgrade and any new fire safety systems required to meet the Performance Requirements of the BCA with regards to the likely non-compliances which may require a Performance Solution.
- The preliminary assessment will take into consideration the ability of the fire safety systems in meeting the following fire safety objectives in the affected areas:
 - a. Facilitating safe evacuation of building occupants in the event of fire; and
 - b. Facilitating Fire Brigade access to the building and intervention in the event of fire.

Objectives such as protection of property; protection of furnishings; protection of reputation and ensuring business continuity; safety other than fire safety; have not been identified as design objectives of this assessment. However, by satisfying the core fire safety objectives some of the above objectives may also be satisfied.

5. ASSUMPTIONS AND LIMITATIONS OF THIS REVIEW

The following assumptions and limitations apply to this review:

- This review is a preliminary high level review only and is not based on detailed site inspections or review of system design drawings or condition reports.
- This preliminary assessment is limited to a review of the proposed works taking into account the potential non-compliances identified by the Principal Certifying Authority. Should additional non-compliances to those which are noted in this report be identified at a later date, then these will need to be reviewed at that time and the likely impact on fire system requirements identified.
- FEP take no responsibility in respect to costing of the works and the accuracy of any budgets developed by Scentre Group.
- This review may not identify all fire safety system requirements accurately and is based on FEP's knowledge of Westfield Warringah Mall building without any specific smoke and evacuation modelling being carried out.

6. PRINCIPAL BUILDING CHARACTERISTICS

Warringah Mall is an existing major urban shopping centre development located in Brookvale, NSW 2100. The building is located within an industrial business precinct and is bounded by Cross Street, Pittwater Road, Condamine Street and Old Pittwater Road.

The existing building is spread over three (3) interconnected retail levels and currently accommodates a number of major tenancies (Myer, David Jones, Coles, Woolworths, Target and Big W). The shopping centre also contains a number of mini-major and specialty tenancies. There are a number of multi-level undercover and open deck carparks and a cinema complex, library and a community centre forming part of the building.

The original building is understood to have been constructed in the mid 1960s with two major developments occurring from 1997 through to 2002 known as Stage 1 and 2. A recent development (Stage 1 development) are generally located within Zones 1, 2, 5, 9 and 13 of the building as shown hatched in **Figure 6-1** below has been completed in 2016.

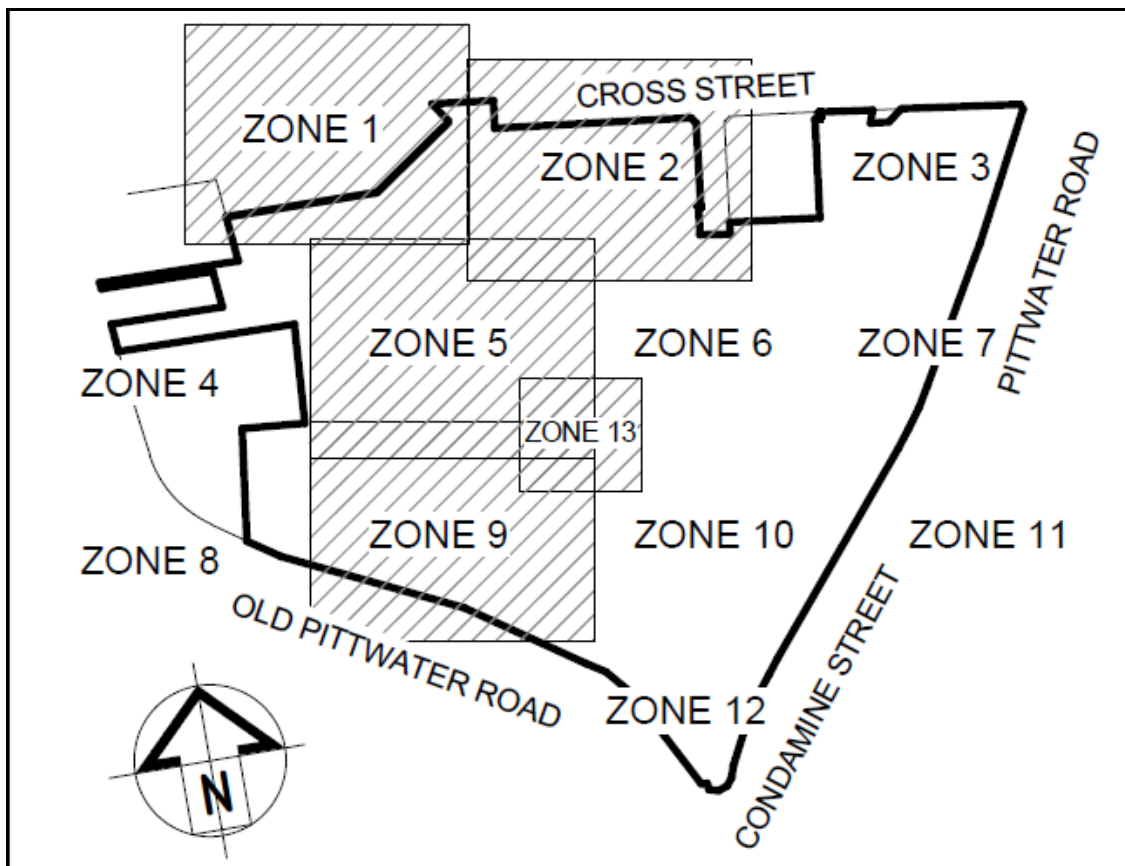


Figure 6-1: Zoning Plan – Warringah Mall showing the recent Stage 1 Development

The existing Warringah Mall shopping centre building is understood to have the following characteristics:

Table 6-1: BCA descriptive characteristics for Westfield Warringah Mall

| Characteristic | Description |
|------------------------------------|--|
| Classification | <p>Class 6 – Retail;</p> <p>Class 7a – Car parking;</p> <p>Class 9b – Cinemas, Library and Community Centre</p> |
| Number of Retail Storeys Contained | 3 main retail levels |
| Type of Construction | Type A is nominated in the base building FER |
| Effective Height | 16m |
| Approximate Retail Floor Area | 135,000m ² (approximately) including recently completed Stage 1 Development |

The existing shopping centre and its footprint are shown in **Figure 6-2** below.

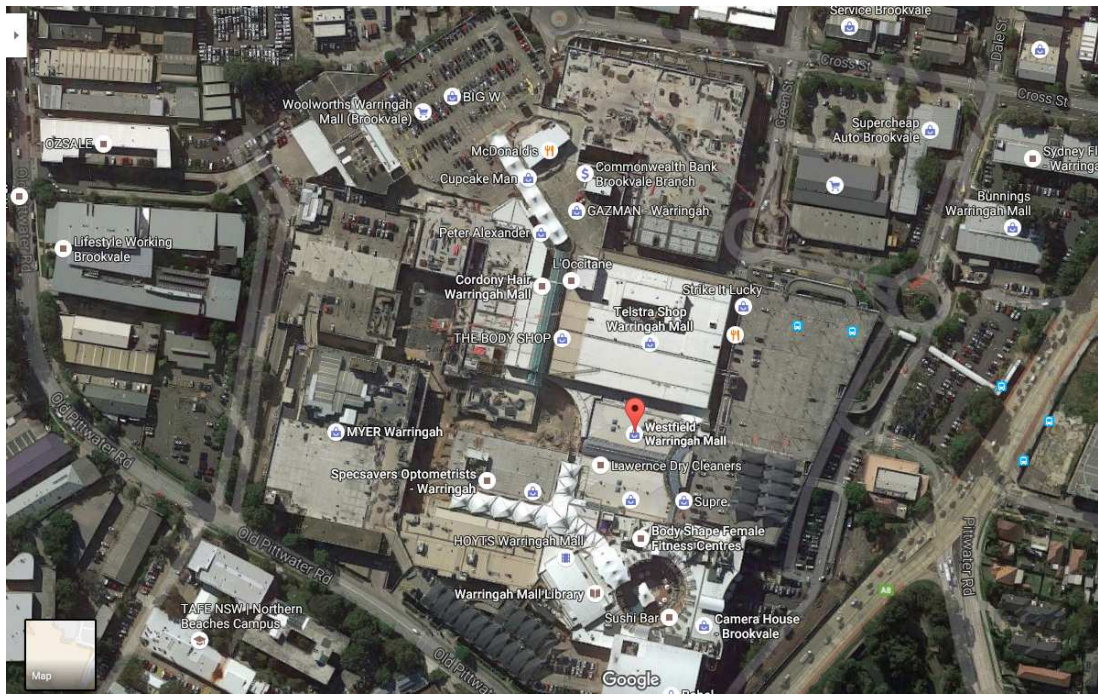


Figure 6-2: Aerial view of Warringah Mall Shopping Centre during construction works associated with Stage 1 redevelopment (courtesy Google Maps)

6.1 BRIEF DESCRIPTION OF THE PROPOSED WORKS

The proposed building works associated with Stage 2 DA for Warringah Mall incorporate an additional gross leasable floor space of 9,845m² and an additional associated carparking spaces in a ratio of 4.1 cars/ 100m² of additional GLA created.

The redevelopment of retail areas is to include the reconfiguration (with a reduced GLA) of an existing major tenancy (Target – Tenancy M01) located on the Ground Level at the eastern end of the existing building. A number of mini-major tenancies; specialty shops and a commercial office tenancy are also proposed as part of additional retail space on Ground Level in conjunction with reconfiguration of existing tenancies along the Target mall.

The existing Food Court and a mini-major tenancy (Rebel) on Level 1 is to be converted into new retail spaces incorporating a number of mini-major tenancies; food tenancies and associated mall area in proximity of the Centre Court. The proposed development also incorporates an entertainment and lifestyle precinct (ELP) on Level 2 incorporating a number of mini-major tenancies; specialty shops and a restaurant precinct. The existing cinema complex is also to be redeveloped and located on Level 3 as part of the proposed works.

The location and the extent of retail mall and tenancy areas incorporating new works is shown in **Figure 6-3** through to **Figure 6-7**.

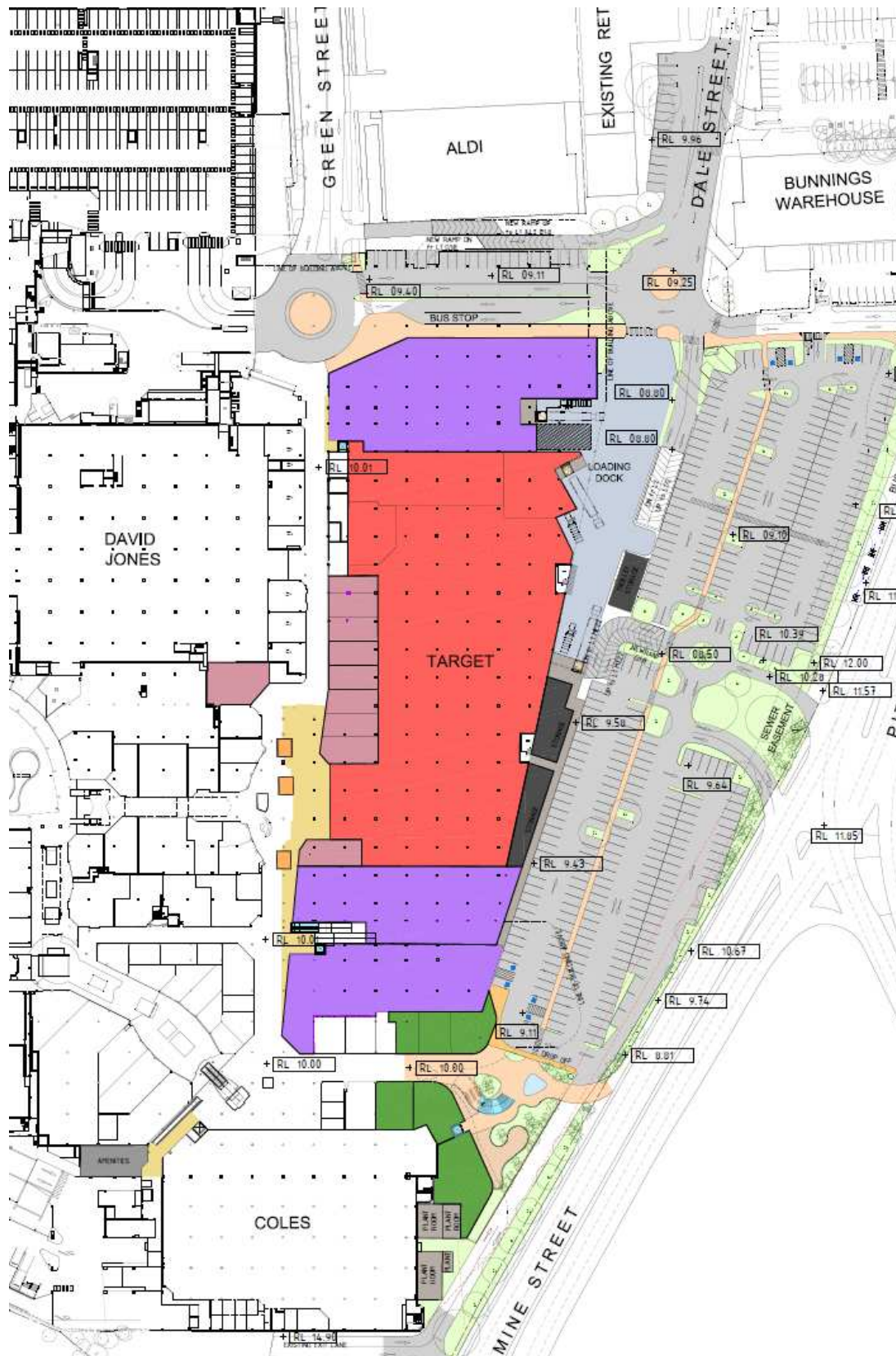


Figure 6-3 Part Ground Level Plan showing the proposed development

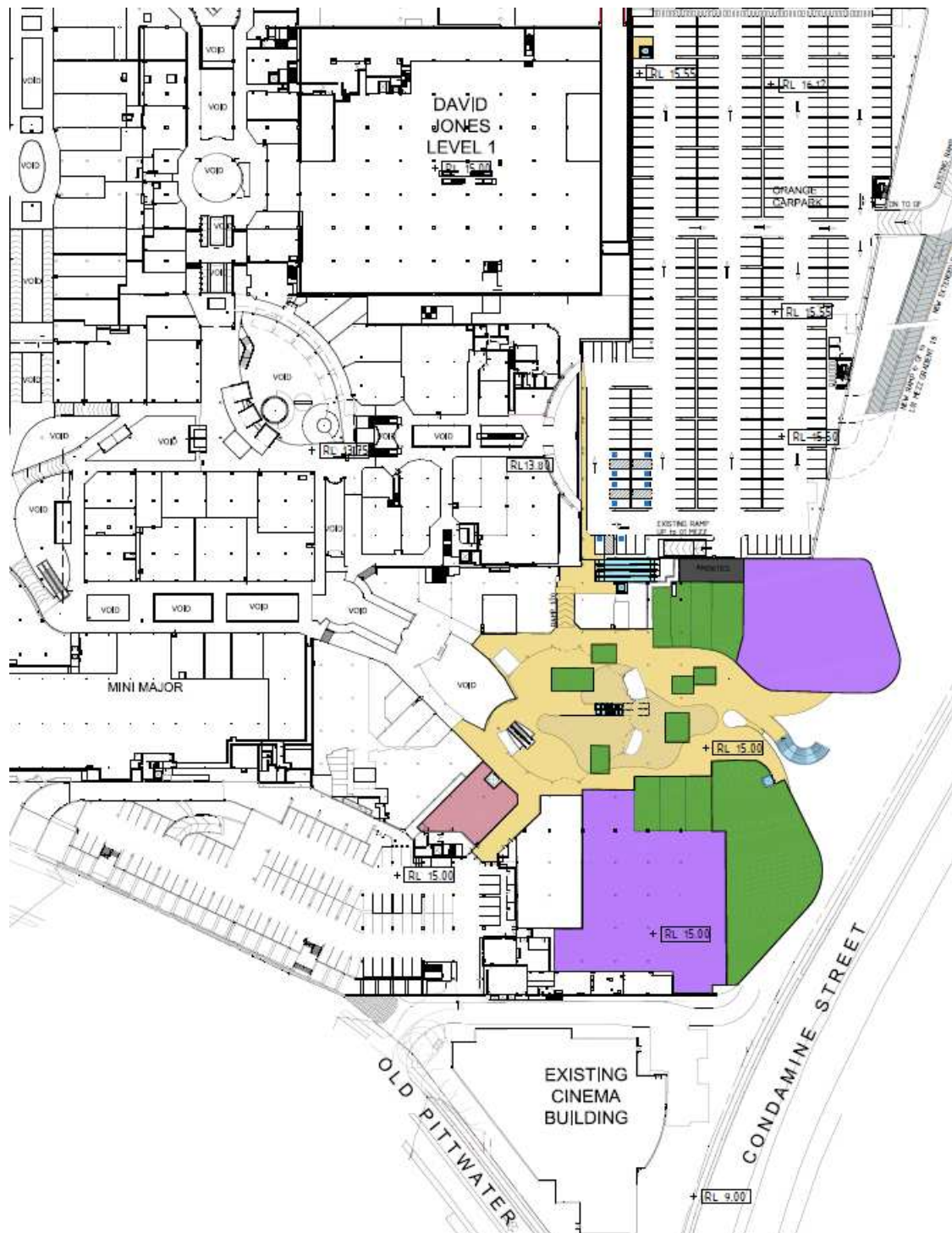


Figure 6-4 Part Retail Level 1 floor plan showing the proposed retail and carparking areas

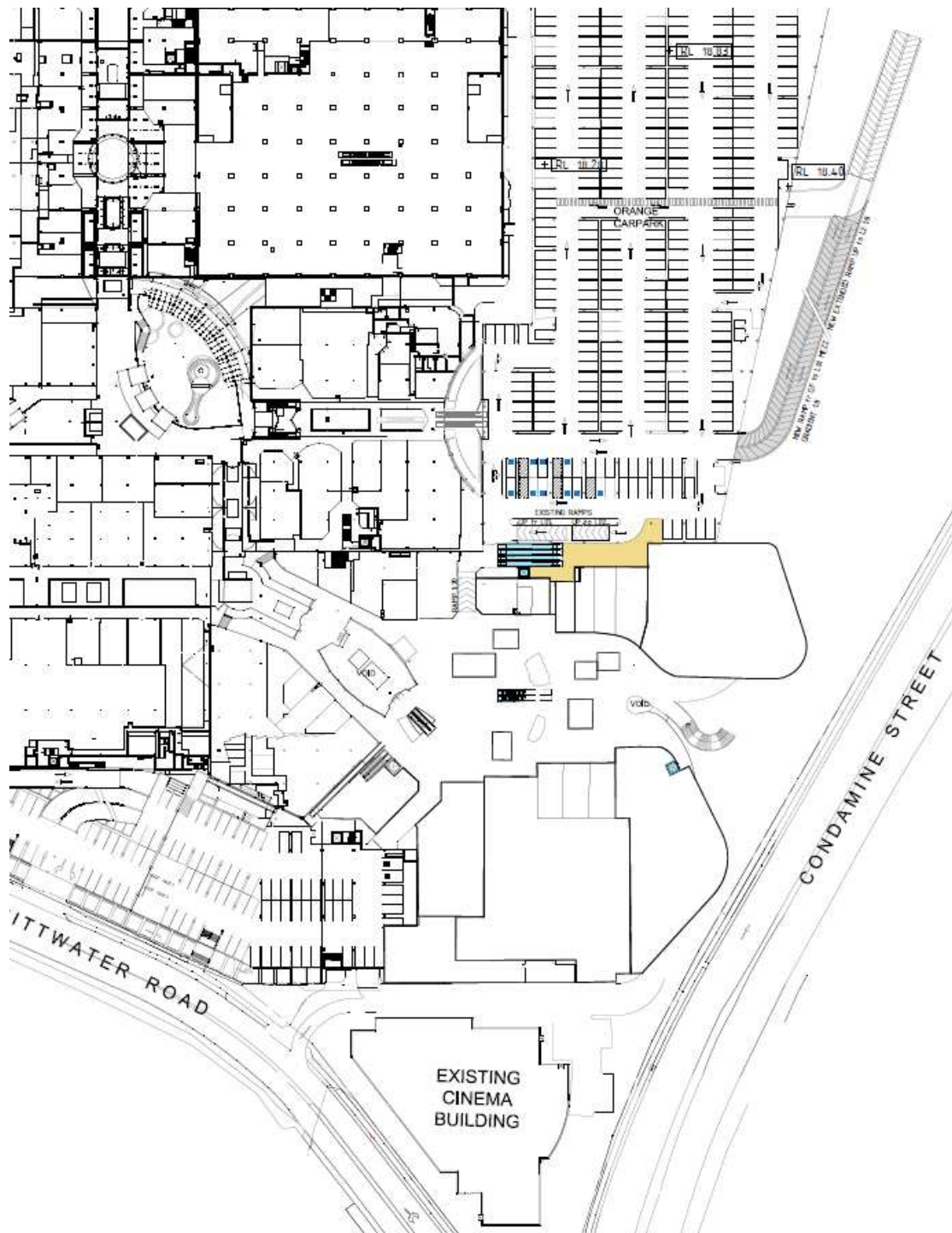


Figure 6-5 Part Retail Level 1M floor plan showing the proposed carparking areas

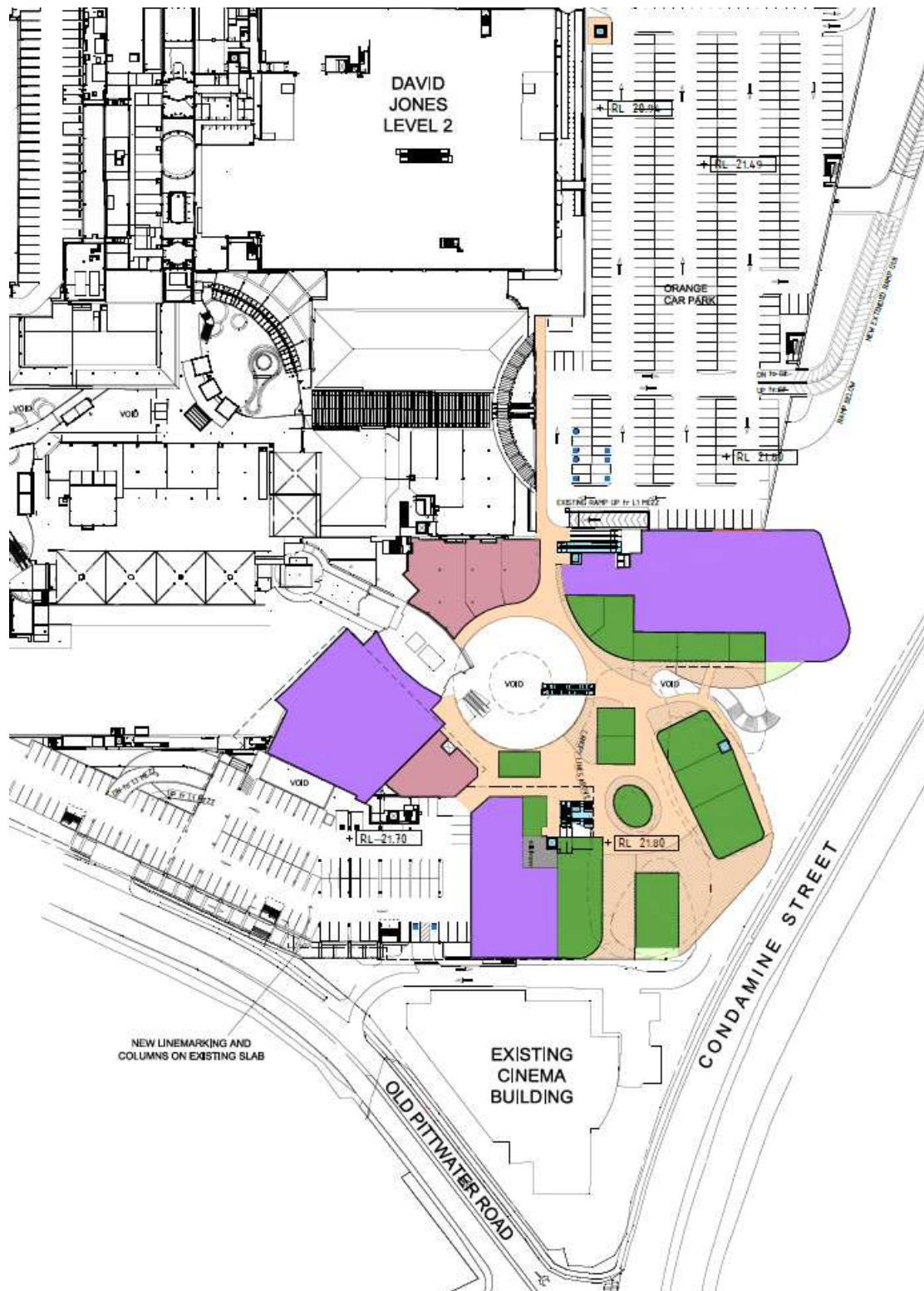


Figure 6-6 Part Retail Level 2 floor plan showing the proposed retail and carparking areas

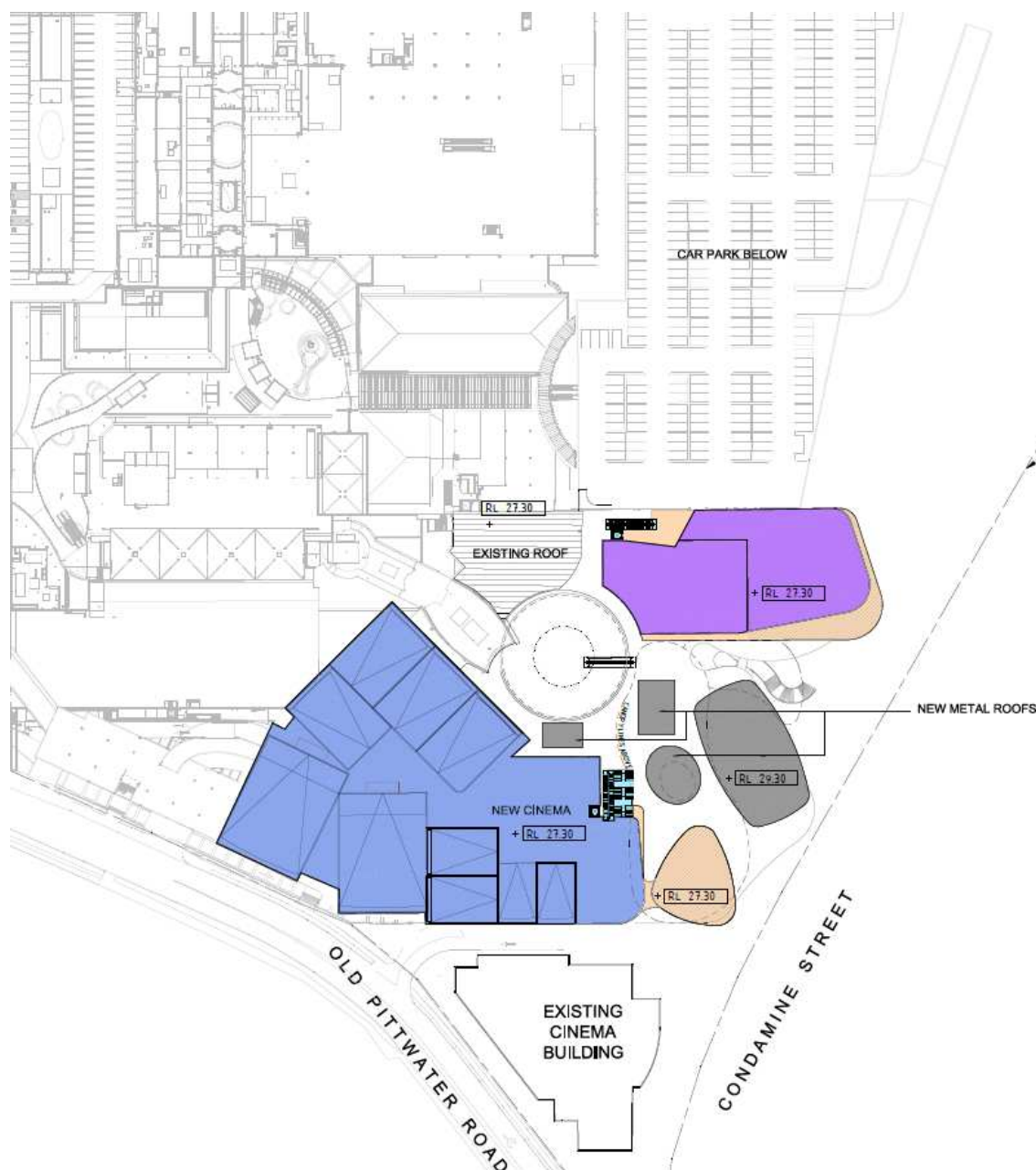


Figure 6-7 Part Level 3 floor plan showing the proposed redeveloped cinema areas

6.2 FIRE AND RESCUE NSW ACCESS

The existing fire brigade perimeter vehicular access around the Warringah Mall building is provided via the access roads as shown in **Figure 6-8** below. The proposed Stage 2 Development is not considered to cause an adverse impact on the existing perimeter vehicular access around the Warringah Mall building. The proposed development works and the perimeter vehicular access will be subject of a detailed discussion with Fire & Rescue NSW.

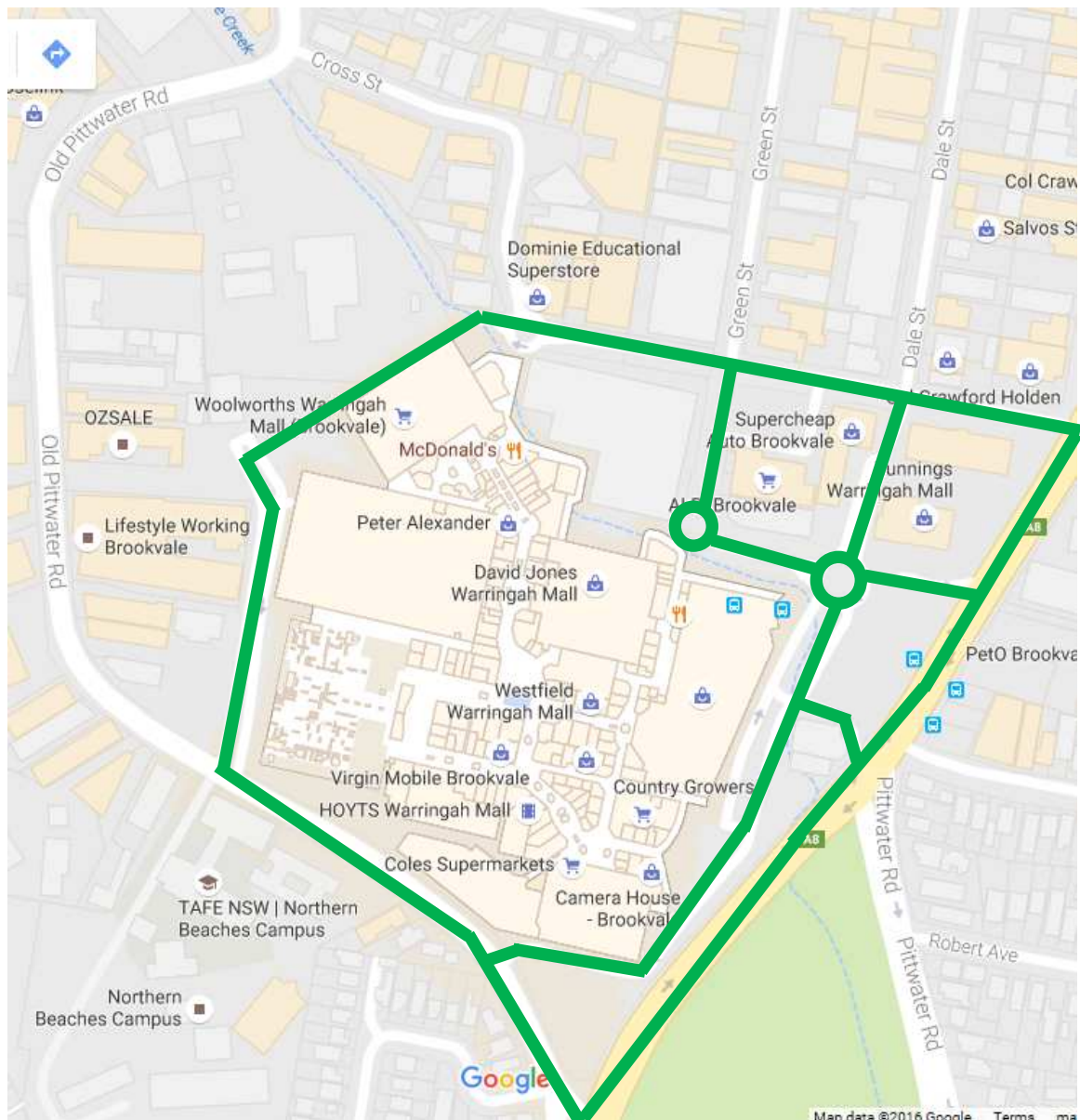


Figure 6-8: Fire Brigade perimeter vehicular access around the existing Warringah Mall building

The perimeter vehicular access around the Warringah Mall building is understood to comply with the BCA DTS provisions, with the exception that this access is greater than 18m from the external building wall in some locations. Furthermore, the following provisions have been made in respect to the perimeter vehicular access:

- No materials are permitted to be stored in or adjacent to the access road north of Woolworth tenancy.
- Provision of dedicated parking bays for emergency vehicles including fire brigade appliances within proximity of the fire control room.
- The access roads being maintained with a minimum clear useable width of not less than 6m.
- The perimeter vehicular access has a clear unobstructed vertical clearance above the road surface of not less than 4.5m.

- Provision of alternative access routes (where possible), detours and additional signage and plans as necessary if access roads are blocked due to building or road works.
- Notifying the local two fire stations (Dee Why and Manly) of any temporary or permanent arrangements with respect to the perimeter vehicular access roads.
- The evacuation and traffic management plans developed by Centre Management is required to provide priority to Fire Brigade access to the roads.

6.3 PREVENTIVE AND PROTECTIVE MEASURES

The fire preventive and protective measures for Westfield Warringah Mall involve various passive and active fire protection systems. The International Fire Engineering Guidelines (IFEG) indicate that to assist in analysing a fire safety system, it is convenient to consider the system as comprising six 'sub-systems' [ABCB, 2005a]. Therefore, preventive and protective measures detailed in **Table 6-2** are grouped in accordance with the different 'sub-systems' recommended by the IFEG.

Table 6-2: Preventive and protective measures

| Sub-System | Comment |
|---|--|
| <p>Sub-System A</p> <p>Fire Initiation and Development and Control</p> | <p>Strict enforcement of the "No-Smoking" policy shall be implemented throughout the building;</p> <p>Strict enforcement of cleaning regimes for the restaurant tenancies, including regular cleaning and inspection of ductwork, to prevent accumulation of combustible residue in the ducts and rubbish in kitchens;</p> <p>Regular maintenance and inspection of all plant, electrical equipment and appliances shall be enforced in accordance with the relevant regulations.</p> |
| <p>Sub-System B</p> <p>Smoke Spread and Control</p> | <p>The existing and new retail portions of the building will be provided with natural or mechanical smoke management systems as per the existing and proposed smoke management strategy. The smoke management systems are expected to maintain conditions tenable for the duration of occupant evacuation from these areas;</p> <p>All air-handling systems within the new areas shall comply with the DTS provisions of Part E2.2 of BCA 2014 and, if they do not form part of the smoke hazard management systems, shall shut-down on fire trip (unless considered as minor systems under AS1668.1 which may continue to operate), which is expected to prevent smoke spread between different smoke zones;</p> <p>The inter-tenancy walls and other non-combustible and fire rated construction between different functional areas of the existing and new portions of the building are expected to prevent smoke spread throughout the building.</p> |
| <p>Sub-System C</p> <p>Fire Spread and Impact and Control</p> | <p>Westfield Warringah Mall retail areas form a single fire compartment with the exception of the cinema auditoria which are to be designed and constructed as a separate fire compartment to the retail areas. This fire compartmentation is expected to assist in the prevention of fire spread within the building areas which form subject of the proposed Stage 2 redevelopment;</p> <p>Potential fire spread is expected to be controlled by the automatic fire sprinkler system provided which is to compliant with BCA DTS provisions;</p> <p>Should the sprinkler system fail to operate as designed, fire-rated walls and</p> |

| Sub-System | Comment |
|--|--|
| | non-fire-rated inter-tenancy walls are expected to provide temporary barrier in the path of spreading fire. |
| Sub-System D Fire Detection, Warning and Suppression | <p>An automatic sprinkler system is provided throughout Westfield Warringah Mall generally in accordance with AS2118.1-1999 with the exception of kiosk tenancies located in well ventilated areas of the building as nominated;</p> <p>A fire detection and alarm system is provided throughout the enclosed portions of the building generally in accordance with Clause 5 of BCA Specification E2.2a and AS1670.1-2004;</p> <p>The automatic fire sprinkler and fire detection and alarm systems serving the new areas are interfaced with the Fire Indicator Panel (FIP) and linked to a 24 hour Monitoring Station via Alarm Signalling Equipment (ASE);</p> <p>Portable fire extinguishers and fire hose reels are to be installed throughout the building generally in accordance with the DTS provisions of the BCA.</p> |
| Sub-System E Occupant Evacuation | <p>Emergency lighting and exit signage is to be installed throughout the building in accordance with AS/NZS2293.1-2005;</p> <p>An occupant warning system is installed throughout the building. It is understood that this existing system is to be extended to provide coverage to the new areas of the building. The warning system shall be capable of providing pre-recorded evacuation messaging and allowing for live directives to be broadcast from the fire panel. Activation of either the fire detection and alarm or sprinkler systems shall activate the occupant warning system.</p> |
| Sub-System F Fire Services Intervention | <p>Professional fire service (Fire and Rescue NSW) available 24/7;</p> <p>Fire hydrant protection is to be provided from fire hydrants installed internally throughout the building. Internal fire hydrants are installed inside fire isolated stairs. However, additional fire hydrants are proposed to be located outside of the fire-isolated exits owing to extended travel distances.</p> <p>Fire & Rescue NSW vehicle access shall be available around the building as shown in Section 6.2 above.</p> |

6.4 HAZARDS

Identification of hazards that are expected to affect life safety of building occupants is crucial to undertaking a fire safety engineering assessment. Special attention must be paid to those hazards that are not commonly associated with the type of the occupancy. Hazards associated with the general layout and activities as well as the ignition and fuel sources for Westfield Warringah Mall have been identified in **Table 6-3** below:

Table 6-3: Hazards and ignition sources

| Type | Comment |
|----------------|---|
| General Layout | <p>No areas within the proposed works are currently identified with extended dead end travel distances.</p> <p>The proposed retail areas are provided with alternative exits;</p> |

| | |
|------------------|--|
| | however, due to the building layout and location of exits, extended travel distances to the nearest of the alternative exits and between alternative exits, when measured through the point of choice are present via the naturally ventilated or mechanically smoke exhausted mall and tenancy areas. |
| Activities | Activities associated with the day-to-day operation of Westfield Warringah Mall are considered to present a medium fire risk in terms of the expected fire loads and potential ignition sources. |
| Ignition Sources | The main ignition source throughout the retail and restaurant tenancies would be expected to be faulty electrical wiring; lighting and/or electrical equipment, such as computers, projection instruments, microwaves or kitchen equipment etc.; |
| | The main ignition sources through the car parks would be expected to be faulty motor vehicles; |
| | Potential for arson attack while remote is still possible. |
| Fuel Sources | The main fuel source throughout the retail tenancies would be expected to be stock in the tenancies and storage areas associated with the tenancy; |
| | The main fuel source throughout any food court areas or restaurant tenancies forming part of the new development would be expected to be combustible cooking oils equipment and furniture; |
| | The main fuel source throughout the car parks adjacent to the new construction would be expected to be motor vehicles. |

6.5 OCCUPANT CHARACTERISTICS

The characteristics of the occupant groups expected to be present in the building during the day-to-day operations of Westfield Warringah Mall are detailed below:

- **Centre Management Staff and Security** – Good familiarity with the building and the fire safety systems, fully trained in emergency procedures. This occupant group is expected to be mobile and able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. This occupant group is expected to be awake and fully conscious at all times when inside the building; and
- **Tenancy Staff** – Good familiarity with the respective shops and the means of exits from within the shops. Generally familiar with the building and the location of main exits. This occupant group is also expected to be able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. This occupant group is expected to be awake and fully conscious at all times when inside the building; and
- **General Public (Customers)** – May or may not be familiar with the layout of the building and may require assistance in locating the exits. This occupant group may require assistance with walking and may have hearing and visual impairment in line with general public; and
- **External Maintenance Contractors** – This occupant group is expected to have a reasonable familiarity with the building and contractors will be required to undergo

emergency training prior to commencing work in any portion of the building (prior to signing in as contractors). This occupant group is also expected to be able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. The contractors are expected to be awake and aware of their surroundings at all times when inside the building; and

- **Fire & Rescue NSW Personnel** – this occupant group will be equipped with safety equipment and will be educated in fire-fighting activities and the dangers associated with fire incidents. This occupant group would be expected to be in a position to assist other occupants requiring assistance to evacuate. It is not expected that this occupant group would be present in the building at the time of fire ignition; however, they are expected to enter the building at a later stage to assist with the evacuation of occupants, if required, and to undertake fire suppression activities.

The occupant densities used in determining the occupancy levels and required egress times are to be confirmed by the PCA.

An Emergency Management Plan complying with AS 3745-2010 must be developed by the Centre management so that retail staff and security personnel within Westfield Warringah Mall are familiar with the fire safety systems and the egress provisions within the building for an efficient evacuation of the Centre during a fire emergency.

7. ASSESSMENT DATA

Information related to this analysis is taken from the documentation identified in **Appendix “A”** of this report.

8. RELEVANT STAKEHOLDERS

This Fire Engineering Report has been developed by Fire Engineering Professionals Pty Ltd in collaboration and consultation with the following relevant stakeholders as identified in **Table 8.1** below:

| Role | Company |
|--------------------------------------|---|
| Client | Scentre Developments |
| Project Managers | Scentre Design and Construction Pty Ltd |
| Local Government Authority (LGA) | Northern Beaches Council |
| Principal Certifying Authority (PCA) | To be confirmed |

Table 8.1: Relevant stakeholders for the project

9. BCA REQUIREMENTS ASSOCIATED WITH THE PROPOSED ALTERNATIVE SOLUTION

Table 9.1 provides a summary of the non-compliances with the BCA DTS provisions and BCA Performance Requirements associated with the Alternative Solution.

SUMMARY OF ITEMS WHICH REQUIRE ALTERNATIVE SOLUTIONS

- Fire Resistance levels
- Large isolated building requirements for open spaces and vehicular access
- Exit travel distances
- Travel via fire-isolated exits
- Horizontal exits
- Rood as open space
- Performance based open space
- Sprinklers
- Operations of latch
- Smoke hazard management
- Exit signs

Table 9.1: Non-compliances with proposed new works which are to be addressed by a “Performance Solution” (extracted from BCA report prepared by Steve Watson & Partners)

10. PERFORMANCE REQUIREMENTS

Performance Requirements of BCA 2016 identified in **Table 9.1** are provided in **Table 10.1** below:

| Performance Requirement | Description |
|-------------------------|--|
| CP1 | <p><i>A building must have elements which will, to the degree necessary, maintain structural stability during a fire appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the function or use of the building; and</i> <i>(b) the fire load; and</i> <i>(c) the potential fire intensity; and</i> <i>(d) the fire hazard; and</i> <i>(e) the height of the building; and</i> <i>(f) its proximity to other property; and</i> <i>(g) any active fire safety systems installed in the building; and</i> <i>(h) the size of any fire compartment; and</i> <i>(i) fire brigade intervention; and</i> <i>(j) other elements they support; and</i> <i>(k) the evacuation time.</i> |
| CP2 | <ul style="list-style-type: none"> <i>(a) A building must have elements which will, to the degree necessary, avoid the spread of fire—</i> <ul style="list-style-type: none"> <i>(i) to exits; and</i> <i>(ii) to sole-occupancy units and public corridors; and</i> <i>(iii) between buildings; and</i> <i>(iv) in a building,</i> <i>(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—</i> <ul style="list-style-type: none"> <i>(i) the function or use of the building; and</i> <i>(ii) the fire load; and</i> <i>(iii) the potential fire intensity; and</i> <i>(iv) the fire hazard; and</i> <i>(v) the number of storeys in the building; and</i> <i>(vi) its proximity to other property; and</i> <i>(vii) any active fire safety systems installed in the building; and</i> <i>(viii) the size of any fire compartment; and</i> <i>(ix) fire brigade intervention; and</i> <i>(x) other elements they support; and</i> <i>(xi) the evacuation time.</i> |
| CP9 | <p><i>Access must be provided to and around a building, to the degree necessary, for fire brigade vehicles and personnel to facilitate fire brigade intervention appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the function or use of the building; and</i> <i>(b) the fire load; and</i> <i>(c) the potential fire intensity; and</i> <i>(d) the fire hazard; and</i> <i>(e) any active fire safety systems installed in the building; and</i> <i>(f) the size of any fire compartment.</i> |

| Performance Requirement | Description |
|-------------------------|--|
| <p>DP2</p> | <p><i>So that people can move safely to and within a building, it must have—</i></p> <ul style="list-style-type: none"> <i>(a) walking surfaces with safe gradients; and</i> <i>(b) any doors installed to avoid the risk of occupants—</i> <ul style="list-style-type: none"> <i>(i) having their egress impeded; or</i> <i>(ii) being trapped in the building.</i> |
| <p>DP4</p> | <p><i>Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the travel distance; and</i> <i>(b) the number, mobility and other characteristics of occupants; and</i> <i>(c) the function or use of the building; and</i> <i>(d) the height of the building; and</i> <i>(e) whether the exit is from above or below ground level.</i> |
| <p>DP5</p> | <p><i>So that occupants can safely evacuate the building, paths of travel to exits must have dimensions appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the number, mobility and other characteristics of occupants; and</i> <i>(b) the function or use of the building.</i> |
| <p>DP6</p> | <p><i>To protect evacuating occupants from a fire in the building exits must be fire isolated, to the degree necessary, appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the number of storeys connected by the exits; and</i> <i>(b) the fire safety systems installed in the building; and</i> <i>(c) the function or use of the building; and</i> <i>(d) the number of storeys passed through by the exits; and</i> <i>(e) fire brigade intervention.</i> |
| <p>EP1.3</p> | <p><i>A fire hydrant system must be provided to the degree necessary to facilitate the needs of the fire brigade appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) fire-fighting operations; and</i> <i>(b) the floor area of the building; and</i> <i>(c) the fire hazard.</i> |
| <p>EP1.4</p> | <p><i>An automatic fire suppression system must be installed to the degree necessary to control the development of fire spread appropriate to—</i></p> <ul style="list-style-type: none"> <i>(a) the size of the fire compartment; and</i> <i>(b) the function or use of the building; and</i> <i>(c) the fire hazard; and</i> <p><i>the height of the building.</i></p> |
| <p>EP2.2</p> | <ul style="list-style-type: none"> <i>(a) In the event of a fire in a building the conditions in any evacuation route must be maintained for the period of time occupants take to evacuate the part of the building so that—</i> <ul style="list-style-type: none"> <i>(i) the temperature will not endanger human life; and</i> <i>(ii) the level of visibility will enable the evacuation route to be determined; and</i> <i>(iii) the level of toxicity will not endanger human life.</i> <i>(b) The period of time occupants take to evacuate referred to in (a) must be appropriate to—</i> <ul style="list-style-type: none"> <i>(i) the number, mobility and other characteristics of the occupants; and</i> <i>(ii) the function or use of the building; and</i> <i>(iii) the travel distance and other characteristics of the building; and</i> <i>(iv) the fire load; and</i> |

| Performance Requirement | Description |
|-------------------------|--|
| | <p>(v) the potential fire intensity; and (vi) the fire hazard; and (vii) any active fire safety systems installed in the building; and (viii) fire brigade intervention.</p> |
| EP4.2 | <p>To facilitate evacuation suitable signs or other means of identification must to the degree necessary—</p> <p>(a) be provided to identify the location of the exits; and (b) guide occupants to the exits; and (c) be clearly visible to occupants; and (d) operate in the event of a power failure of the main lighting system for sufficient time for occupants to safely evacuate..</p> |

Table 10.1: Relevant Performance Requirements

11. SIGNIFICANT FIRE SAFETY SYSTEM IMPLICATIONS

The significant fire safety system requirements for the Stage 2 Redevelopment at Warringah Mall are considered to be as follows:

GENERAL REQUIREMENTS

1. All existing non refurbished portions of the building (i.e. all areas except for those proposed to form part of new works associated with the Stage 2 Redevelopment) shall comply with the approved fire engineering strategy requirements for the Westfield Warringah Mall building as documented in the following fire engineering reports (note – this list does not contain any tenancy specific reports for Warringah Mall):
 - a. Scientific Services Laboratory - **Warringah Mall Shopping Centre Fire Safety Engineering Assessment** (Report Number XR0074) dated August 1997.
 - b. Scientific Fire Services, Bovis Lendlease and Michael Wynn-Jones and Associates – **Warringah Mall Essential Fire Safety Measures Protocols document** – dated 6 September 2007.
 - c. AE & D - **Alternative Solution & Performance Verification Report Developed Under the Performance Requirements of the BCA: Mounting of Fire Hose Reels** – Warringah Mall dated March 2007.
 - d. AE & D - **Alternative Solution & Performance Verification Report Developed in Accordance with the Performance Requirements of the BCA: Deletion of Break Glass Alarms from Anchor Carpark** – Warringah Shopping Centre (Report Number 1386) dated August 2010.
 - e. Olsson Fire & Risk – **Westfield Warringah Mall: Stage 1, Old Pittwater Rd, Brookvale, NSW 2100, Fire Engineering Report** – Document No. S13047, Revision FER8.0 dated 07 October 2016.
2. The building works required for the Stage 2 redevelopment of Warringah Mall building shall comply with the DTS Provisions of the BCA except where specifically identified by Steve Watson & Partners; and
3. The requirements listed in this Section are to form Essential Services and shall be identified as requiring maintenance and certification at appropriate intervals as per AS1851-2012 and the EP&A Regulation 2000

11.1 FIRE RESISTANCE AND COMPARTMENTATION

4. Westfield Warringah Mall has been assessed as a large isolated building which is required to comply with the DTS Provision of BCA 2016 for a building of 'Type A' construction. It is proposed to construct the new retail portions of the extension to the building to comply with the DTS Provision of BCA 2016 for a building of Type A construction, with the exception that where structural elements are required to achieve a minimum FRL of (180)/180/180 under BCA DTS provisions, this can be reduced to (120)/120/120; and
5. All doors which open into fire isolated exits that serve portions of the building subject to the Stage 2 redevelopment works and all doors opening into non-pressurised exits shall be provided with self-closing fire doors that achieve FRL --/120/30, and must be fitted with fire and smoke seals tested to both AS1530.4 and AS1530.7. Doors shall be fitted with Reed Switch alarms, which activate to cause a clearly audible local alarm, if the door remains in the open position for more than 2 minutes; and

6. Fire rated air locks shall be provided where doors open from storerooms, switchrooms and plantrooms into fire-isolated stairways and/or fire-isolated passageways. These plant / store or switch rooms may open into a fire isolated passage, providing this passage does not exceed 10m in length and is fire separated from the stair and it only serves the single level on which the plant / switchroom is situated (i.e. does not have stairs discharging into it). These air locks / short fire isolated passageways must be protected with self-closing fire doors that achieve FRL --/120/30, and must be fitted with fire and smoke seals tested to both AS1530.4 and AS1530.7. Doors opening from the air lock into the exit shall be fitted with Reed Switch alarms, which activate to cause a local alarm, if the door remains in the open position for more than 3 minutes; and
7. Storage areas shall not be permitted to open directly into fire isolated exits and must be separated from the exit by an air lock or smoke lobby; and
8. All air locks and smoke lobbies are required to achieve the same FRL as the fire isolated passage or fire stair into which they discharge; and
9. Only those areas specifically assessed and supported in this report as being permitted to open directly into fire isolated exits are permitted to open into these exits. Non-mechanically exhausted areas without smoke lobbies / air locks are not permitted to open directly into fire isolated exits unless they are permitted to do so under BCA DTS provisions; and
10. Self-closing --/120/30 smoke doors shall be provided at the entry point into each fire isolated stair including at the entry point from each fire passage into a fire isolated stair. Where necessary these doors may be held open with a magnetic hold open device providing a local smoke detector is provided on the passage side of the stair to cause door closure upon activation and these doors also close on general fire trip; and
11. The existing and proposed carpark areas adjacent to the retail portions of the building forming part of Stage 2 redevelopment are proposed to be used for horizontal egress. To help achieve effective separation between the retail and carpark areas 120/120/120 fire separation shall be provided. All openings in fire separation acting as horizontal exits shall be protected in accordance with BCA DTS provisions OR if glazing separation is used then the entire glazing (including glazed doors) shall be provided protection on the retail side of the glazing by a certified wall wetting sprinkler system as nominated in **Item 36** of this section; and
12. All pedestrian entry doors between naturally ventilated carpark areas and the new retail mall and tenancy areas shall auto-open on fire trip to allow make-up air entry and egress. One thermal detector shall be located centrally within 1m of the entry opening on both the carpark and retail sides. Activation of one of these local thermal detectors shall cause the respective fire door to close. This method of control shall maximise the potential for these pedestrian entry / egress paths to remain open for both egress and make-up air entry in fire mode, whilst ensuring fire separation is achieved if the fire is within the proximity of the opening. A mushroom style push button is to be provided on the retail side of the doors. Activation of the push button is to cause the doors to open and remain open for a period of 15s after which the doors automatically close and remain closed
13. The reconfigured major tenancy (Target) and mini-major tenancies (MM01, MM02 and MM03 on Ground Level; MM-01 and MM-02 on Level 1; MM2-01, MM02 and MM2-03 on Level 2; MM3-01 and MM3-02 on Level 3) shall be designed to act as a separate smoke zones to the mall smoke zone, with the provision of an independent mechanical

smoke exhaust to each tenancy and high level smoke separation in the form of baffles / bulkheads to separate each smoke zone from adjacent smoke zones; and

14. All openings into the tenancies which form independent smoke zones shall be situated not greater than the nominated height to the bottom of the smoke baffle except for suitably protected openings which prevent passage of smoke in the event of a fire.

FIRE SAFETY SYSTEMS

11.2 EMERGENCY EGRESS PROVISIONS

15. **Travel distances** throughout the proposed areas forming part of the Stage 2 redevelopment including the mall, tenancy areas and associated back of house and other ancillary spaces at Westfield Warringah Mall shall comply with the DTS provisions of BCA 2016 except for the following:
 - a. travel distances to the nearest of the alternative exits may be increased to a maximum of 70m, and distances between alternative exits, when measured through the point of choice, may be increased to a maximum of 120m where the extended portion of the travel path is through a mechanically exhausted tenancy or mall area.
16. **Aggregate emergency egress** width from the proposed areas forming part of the Stage 2 redevelopment including the mall, tenancy areas and associated back of house and other ancillary spaces at Westfield Warringah Mall shall comply with the DTS provisions of BCA 2016.
17. Auto-opening doors forming horizontal exits into the carpark shall be fed from the essential services supply with fire rated power and control cabling, or alternatively may be supplied from the normal supply and provided with local battery back-up power so that the door operates on normal power failure; and
18. Scentre Group shall satisfy themselves in respect to the ability of the design to satisfy any special needs for persons with disabilities which are not covered under current BCA 2016 fire safety provisions, including compliance with the Disability Discrimination Act 1992 etc.; and
19. Scentre Group shall be responsible for ensuring the safety and protection of occupants when passing through, or evacuating through parts of buildings where moving vehicles may be present (i.e. exits passing through carpark, loading dock, driveway areas, etc.). This shall take into account that these areas form major evacuation travel paths in the event of a fire emergency, and shall include the provisions of suitable safety features, warning devices, signage, crossings, barriers, etc.
20. **Security shutters** at the shopfront of mini-major tenancies which form path of travel to an exit shall auto open in the event of a fire being detected within the respective tenancy.
21. Each **roller shutter** shall have '**OPERATE SWITCH (OR BUTTON AS APPROPRIATE) TO OPEN SHUTTER**' written in large lettering (minimum 30mm) below the shutter operation switch (which does not require key operation) or a push button clearly visible by occupants and provided at the side of the shutter which opens the shutter for a person approaching the shutter from inside the tenancy; and

22. A **sign** shall be located adjacent to the closing switch (or button) of each roller shutter stating 'WARNING – THIS SHUTTER MUST NOT BE CLOSED WHEN MEMBERS OF PUBLIC REMAIN WITHIN THE TENANCY'
23. The **roller shutters** are to be provided with essential services power supply or be provided with a battery back-up. If a battery back-up stand by power supply is provided then it is to become part of annual certification of fire safety systems in the building.
24. The **roller shutters** are to form a part of the essential services of the building and is required to be locked in the open position at all times when the store is occupied by any members of the public. In the event that there is a failure of the shutter to operate correctly, it must be locked in the open position at all times when any person is in the tenancy (staff or public) or removed from the opening altogether until it has been repaired and is capable of operating in accordance with the requirements set out in this report.
25. **Doorways** from tenancy areas that open directly into any fire-isolated exits must be protected with self-closing fire doors installed in accordance with the DTS provisions of Clause C3.8 of BCA 2016 and AS1905.1-2005. Furthermore, these doors must be fitted with fire and **smoke seals** tested to both AS1530.4 and AS1530.7 and must have **reed switch alarms** which activate a local alarm if these doors remain in the open position for more than 3 minutes; and
26. Clearly visible **signage** positioned at eye level (between 1500mm and 1800mm), which states 'DOOR IS ALARMED – PLEASE ENSURE DOOR REMAINS CLOSED WHEN NOT IN USE' written in large (minimum 50mm) capital letters on a colour contrasting background at the centre of those doors from the tenancy areas which open directly into fire isolated exits.

11.3 SERVICES

27. The portion of the hydrant system serving the new areas of the building shall comply fully with AS 2419.1 2005 with the exception that the hydrants may in certain locations (subject to FRNSW approval) be located outside of fire isolated exits (i.e. the new portion of the shopping centre shall be on a ring main circuit; shall achieve the flow and pressure requirements of AS2419.1 2005; shall have compliant pipe sizes, shall have compliant pressure drop between the booster and the most remote hydrant (150KPa max) etc.; and
28. The fully compliant fire hydrant booster assembly, which is located on Pittwater Road, shall serve the new proposed portions forming part of the Stage 2 redevelopment of the building. This booster assembly shall comply with current BCA DTS and AS 2419.1 2005 requirements with the exception that the booster assembly is not located within sight of the main building entry; and
29. All **fire hydrants** proposed to serve the Stage 2 redevelopment including any tenancy, mall, carpark and ancillary areas shall be fitted with Storz hose couplings which comply with Clause 7.1 of AS2419.1-2005. This Clause states in part: "hose couplings shall be compatible with those used by the fire brigade serving the area". Storz hermaphrodite fire hose couplings must be fitted to all fire hydrants and fire hydrant booster assembly connections as required by Appendix E of AS2419.1-2005. The Storz fittings must be manufactured to DIN 14303, aluminium alloy delivery couplings, in accordance with Appendix A of AS2419.2-1994. Blank caps must be provided in accordance with Clause 2.8 of AS2419.2-1994; and

30. Hydrant location plans shall be installed at each landing in every new and existing fire-isolated exits within the new construction areas (and any fire isolated stairs in the adjoining mall areas) clearly indicating the location of internal fire hydrants in the proximity of the exit. The location where the hydrant location plan is installed must be marked on the plan with a sign: “**You are here**”.
31. The **automatic sprinkler system** shall be provided throughout Stage 2 redevelopment areas in accordance with Clause E1.5 of BCA 2016 and AS2118.1-1999. The Sprinkler system shall comply fully with BCA DTS provisions; and
32. All **sprinkler heads** throughout the reconfigured major tenancy and mini-major tenancies forming part of the Stage 2 redevelopment including all tenancy areas must be “fast response” type with a temperature rating of 68°C, a maximum RTI of 50ms^{-1/2} and a maximum C-factor of 1ms^{-1/2}; and
33. **Flush mounted concealed sprinkler heads** are only permitted in the areas forming part of the Stage 2 Development where the sprinkler heads are “fast response” type with a maximum RTI of 50ms^{-1/2} and a temperature rating of 68 °C. These areas are to be adequately separated i.e. by way of baffles; bulkheads or the like from existing areas protected with a different RTI of the sprinkler assembly; and
34. The mall and skylight areas forming part of the Stage 2 redevelopment shall be fed from a **separate monitored sprinkler isolation valve** to that serving tenancy areas, such that in the event of a tenancy fit out the sprinkler protection to mall and skylight areas is not adversely affected; and
35. Each new or refurbished major and mini major tenancy shall be fed from a **separate monitored sprinkler isolation valve** to that serving the specialty tenancy areas. These control valves shall enable sprinkler protection to be maintained to serve the major and mini-major tenancies when the system serving specialty tenancies is isolated for fit-out; and
36. The glazing (including auto doors) forming part of the horizontal exits between the retail malls (including any tenancies) and the car-parks forming part of the Stage 2 redevelopment must be provided with a **fire resisting wetted glazing system** provided in accordance with the following:
 - a. Wetted fixed toughened glazed construction must be capable of achieving 2 hours fire resistance in respect to integrity when exposed to a time temperature curve identified in either AS1530.4-2005 or ASTM E119. Protection to the glazed construction must be provided on the retail side of the glazing as per the Tyco data sheet TFP620 or an equivalent system which has been tested to ASTM E119 (or equivalent) and has been shown to achieve a minimum integrity fire rating of 2 hours; and
 - b. Doorways in this glazed bounding construction separating carpark areas from retail areas shall be provided with self-closing or automatic closing doors protected with the same wall wetting system as required for the fixed glazing. The doorways forming part of the glazed bounding construction are required to close upon activation of a local thermal detector adjacent to that door. In the event of fire trip occurring as a result of sprinkler or smoke detector activation within the building and without local thermal detector activation, these doors are required to auto-open to permit make-up air into the centre from the carpark and to permit occupant egress; and

- c. The glazing system shall be installed, certified and maintained in accordance with Tyco specified requirements (or approved equal). Tyco (or approved equal) shall provide Scentre Design & Construction Pty Ltd with all specified design criteria for their wetted glazing system (mullion / glazing constraints / allowance for glazing expansion, minimum distance of any obstructions from glazing, etc.) prior to construction; and
 - d. The fire services designer and installer shall be responsible for certifying the complete wetted glazing system upon completion of the work as being in accordance with the prototype system tested and found to be capable of achieving 2 hours integrity when subjected to the time temperature curve identified in either AS1530.4-2005 or ASTM E119 with the exception that these doors are operable in lieu of being fixed glass panels. Tyco (or approved equivalent) shall provide a complete list of all requirements associated with the correct maintenance, inspection and certification of the wetted glazing system to maintain this required level of fire resisting performance. These requirements / recommendations for the glazing system shall be included in a management in use plan for the building; and
 - e. The fire services designer and installer shall be responsible for certifying that the water supply to the sprinkler system takes into account the additional demand of wetted glazing systems within the building and shall be adequate to supply simultaneously all wall wetting sprinklers on one side of the glazing at any one exposure location in addition to any maximum sprinkler demand within that portion of the building.
37. A fully addressable **fire detection and alarm system** shall be provided throughout the areas forming part of the construction of Stage 2 redevelopment areas in accordance with Clause 5 of Specification E2.2a of BCA 2016; and
38. **Smoke detectors** throughout the new construction shall be clearly labelled and this labelling shall be consistent with that identified on block plan drawings and at the FIP; and
39. The **sound and intercom system** shall comply with Clause E4.9 of BCA DTS provisions and AS1670.4 – 2015. The sound and intercom system shall be capable of providing pre-recorded evacuation messaging and allowing for live directives to be broadcast from the fire panel and at a point within the security office. Activation of either the fire detection and alarm or sprinkler systems shall activate the sound and intercom system; and
40. One **local thermal detector** shall be provided on both the carpark and retail sides of all doorways separating carpark from retail areas which are held open on magnetic hold open devices or auto-open on fire trip to allow make-up air entry. Activation of these local thermal detectors shall cause closure of the respective doorways adjacent to these detectors. If the local thermal detector on the carpark side of the fire door first activates, this shall cause an alarm throughout the carpark and an alarm at the security and Centre Management offices. If this is not isolated within three minutes, the alarm shall cascade to the retail areas.
41. The **automatic fire sprinkler and fire detection and alarm systems** serving all areas of the shopping centre shall be interfaced with the Fire Indicator Panel (FIP) and shall be linked to a 24 hour Monitoring Station via Alarm Signalling Equipment (ASE).

42. **Block Plans** for all primary fire services serving the Stage 2 redevelopment including but not limited to fire hydrant system, automatic sprinkler system, smoke detection and EWIS system and smoke exhaust system shall be updated to include the new construction and any other modifications and provided within the Fire Control Centre, Sprinkler Valve Room, Hydrant and Sprinkler Pump Rooms, Hydrant and Sprinkler boosters.
43. **CCTV camera coverage** is to be provided within the mall areas throughout each level of the shopping centre portion of the building viewable from screens at the security office.

11.4 SMOKE HAZARD MANAGEMENT

44. Mechanical smoke exhaust shall be provided within: Reconfigured major tenancy (Target) and each new mini major tenancy (as identified in Item 13 above). This smoke exhaust shall be provided in accordance with the DTS provisions of Clause E2.2 and Specification E2.2(b) of BCA 2016 with the exception of the following:
 - a. Reconfigured major tenancy (Target) and mini major tenancy trading floors shall not be provided with BCA DTS compliant smoke baffles, which may result in the smoke reservoir exceeding 2,000m² in area; and
 - b. Smoke baffles shall be rationalised (omitted where possible) in the retail mall areas of the new extension, which may result in smoke reservoirs exceeding 60m in length; and
 - c. Smoke exhaust system fan capacity for Reconfigured major tenancy (Target), new mini majors (as identified in Item 13 above) and enclosed mall areas and in the new / refurbished retail mall areas shall be determined on a performance basis through FDS modelling in lieu of compliance with Specification E2.2b of the BCA; and
45. Smoke exhaust inlets shall be provided with mechanical smoke extraction generally being located at the highest points in the respective smoke zones except where specifically stated otherwise. These smoke exhaust locations shall be designed to minimise plug-holing. A maximum velocity at evenly distributed exhaust grills of 2.5m/s shall be achieved throughout all smoke exhaust locations except for exhausts located in the new and existing skylights which may have a higher velocity (up to 5m/s); and
46. Smoke baffles shall be provided at the tenancy shopfronts of the major and mini-major tenancies in the form of bulkheads and drop down shutters. The depth of the baffles shall be determined from detailed smoke modelling using Zone and/or CFD modelling techniques; and
47. Smoke extraction may in some areas (including major and mini-major tenancies) rely on ceiling plenums, providing these plenums have the necessary rigidity, air-tightness, unobstructed air path dimensions and are appropriately constructed to achieve the required exhaust rates from the identified exhaust locations when operating at elevated smoke temperatures. All areas acting as a plenum shall be provided with a smoke sealed air lock within the plenum ceiling that prevents smoke exhausting from areas not served by the plenum; and
48. A diagrammatic touch screen panel shall be located within the Fire Control Room to provide Fire & Rescue NSW with simple clear indication of activated smoke detector

location upon fire detection. All smoke exhaust fans and required new make-up air fans shall be controllable from a location within the Fire Control Centre; and

49. The activation of the smoke exhaust systems in the major and mini-major tenancy areas shall be triggered by the activation of the fire detection system installed throughout the relevant smoke zone. Sprinkler system shall be designed to activate the smoke management systems where it is zoned appropriately to activate a dedicated zone; and
50. Should the fire / smoke spread from the zone of fire origin to an abutting existing zone this shall trigger smoke exhaust operation (where provided) within the adjoining zone as per the existing fire safety strategy of the building; and
51. Make-up air for the mechanical smoke extraction shall be provided from the main entry/exit doors to the malls/tenancies/car-park or natural openings. The location and size of each respective make up air opening shall be designed to ensure that the make-up-air velocity does not exceed 2.5m/s under maximum design smoke exhaust operation. The main entry doors required for make-up shall auto-open upon fire trip and power failure. Any security shutters provided across openings required for make-up air shall maintain the required free area such that the make-up-air velocity does not exceed 2.5m/s under maximum design smoke exhaust operation; and
52. Make up air to all major and mini major stores greater than 1,000m² GFA shall be provided at low level i.e. based on a minimum baffle depth of 800mm; and
53. All air handling systems shall comply with the DTS provisions of Part E2.2 of BCA 2016 with the make-up air systems serving the new major and mini-major tenancies shall be provided with essential power. All air handling systems within fire affected zones and all fans not required to operate during a fire shall be controlled to shut down in the event of a fire; and
54. All smoke exhaust fans serving the new areas and those nominated in Section 11.4 above shall be controllable and provide status indication at the Fire Fan Control Panel.

11.5 MANAGEMENT PROCEDURES

55. The 'Essential Services Protocols Document' for the Westfield Warringah Mall building shall be updated to incorporate the modifications due to the construction of the Stage 2 redevelopment and associated areas. This document shall be implemented and audited on a regular basis to maximise the effectiveness of the fire safety systems provided in the new areas associated with the construction of the Stage 2 redevelopment and the rest of the building.
56. The emergency management plan for the building should minimise the potential for shut-down of fire safety systems during trading hours and should detail the exact location of all fire safety measures in and around the buildings. As a minimum, the plan is to include:
 - a. Procedures to minimise the extent and duration of shut-down of any part of the sprinkler system when the shopping centre is trading. An approved Red Tag system shall be instigated for each shut down, which requires written permission from management before isolation can take place and a statement as to the length of isolation.

- b. Documented procedures which ensure that prior to sprinkler isolation for tenancy fit out, all merchandise is removed from any tenancy subject to fit out; and
 - c. Documented procedures which ensure that prior to any authorised isolation of the ASE the Grade 1 Monitoring Company is notified of the extent and duration of any proposed isolation and is advised as soon as the shut-down has been completed; and
 - d. Procedures shall be implemented to minimise any potential for the simultaneous isolation of the sprinkler and smoke detection systems; and
 - e. Fire wardens in the shopping centre shall be trained to direct occupants away from the location of the fire horizontally before directing the occupants to the fire-isolated exits (i.e. occupants should not be directed to queue at exits that are in close proximity to the fire or smoke plume as there is an increased risk of these exits becoming untenable whilst occupants are queuing at these exits
 - f. Westfield shall require that mini-major and major tenancies forming part of the Stage 2 redevelopment shall be responsible for developing suitable emergency evacuation procedures for the tenancy and for training fire wardens within their tenancy to initiate and assist with the effective evacuation of their tenancy in the event of a fire emergency in the building. These training and evacuation procedures shall take into account the evacuation procedures for the tenancy and the building, its fire safety systems and available exits serving those areas. These procedures shall ensure that in the event that a fire occurs outside of tenancies, occupants are encouraged to evacuate via available exits located within the tenancy (where safe to do so) rather than exiting into the mall, which may become fire affected.
 - g. All full time Centre Management and Security staff shall be trained as fire wardens and shall be inducted in the tenancy emergency evacuation procedures; and
 - h. Westfield Centre Management shall be responsible for ensuring that adequate safety measures are implemented to assist persons with disabilities to evacuate in the event of an emergency, including fire emergency ; and
57. The requirements listed in this Section are Essential Services and, as all fire safety systems, should be identified as requiring maintenance and certification at appropriate intervals as per AS1851-2012 and the EP&A Regulation 2000; and
58. Should a change in use or building alterations and/or additions occur in the future, a reassessment will be needed to verify consistency with the analysis contained within this report.

12. APPENDIX A – DOCUMENTATION

The following drawings were examined during the production of this report:

| Drawing Description | Drawing No. | Revision | Drawn | Date |
|---|-------------|----------|--|------------|
| Proposed Ground Level Warringah Mall Stage 02 Scheme 14F | 01.5201 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |
| Proposed Level 1 Warringah Mall Stage 02 Scheme 14F | 01.5203 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |
| Proposed Level 1 Mezzanine Warringah Mall Stage 02 Scheme 14F | 01.5204 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |
| Proposed Level 2 Warringah Mall Stage 02 Scheme 14F | 01.5205 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |
| Proposed Level 3 Warringah Mall Stage 02 Scheme 14F | 01.5206 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |
| Proposed Roof Plan Warringah Mall Stage 02 Scheme 14F | 01.5208 | 0 | Scentre Design & Construction Pty Limited | 06/07/2018 |