



## 5.0 Appendix E - Construction Fire safety Management Plan



**FUNCTION.**  
**FORM.**  
**FEARLESS.**

Cutaway Barangaroo

## **FIRE SAFETY STRATEGY FOR CONSTRUCTION**

# DOCUMENT CONTROL

|                   |                                   |
|-------------------|-----------------------------------|
| Project           | Cutaway Barangaroo                |
| Project Reference | 23196-FSS-001-B                   |
| Client            | FDC Construction & Fitout Pty Ltd |
| Client ABN        | 72 608 609 427                    |

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# TABLE OF CONTENTS

**DOCUMENT CONTROL.....3**

**TABLE OF CONTENTS .....3**

**1. INTRODUCTION.....5**

1.1 Purpose.....5

1.2 Project scope.....5

1.3 Intended outcome.....5

1.4 Relevant Stakeholders.....5

1.5 Documentation and guidance.....5

1.5.1 Project documentation.....5

1.5.2 Existing Fire Engineering Report.....6

1.5.3 Fire safety guidance.....6

1.6 Applicable legislation.....6

1.6.1 Building Code of Australia.....6

1.6.2 Work Health and Safety Regulation 2017.....6

**2. APPROACH & METHODOLOGY .....7**

2.1 Overview.....7

2.2 Process.....7

2.2.1 Step 1 – Confirmation of scope.....7

2.2.2 Step 2 – Preparation of fire safety strategy.....7

2.2.3 Step 3 – Implementation.....7

2.2.4 Step 4 – Monitor and review.....7

2.2.5 Step 5 – Closeout and decommissioning.....7

**3. BUILDING AND OCCUPANT CHARACTERISTICS.....8**

3.1 Building description.....8

3.2 Location.....9

3.3 BCA DtS Reference Criteria.....9

3.4 Exits.....9

3.5 Dominant occupant characteristics during the construction phase.....10

3.6 Fire Brigade access and equipment.....10

**4. CONSTRUCTION WORKS AND PHASING .....12**

4.1 Introduction.....12

4.2 Phasing and program.....12

4.2.1 Phase 1 – Demolition.....12

4.2.2 Phase 2a – Back of house.....12

4.2.3 Phase 2b – Front of house.....12

4.2.4 Program.....12

4.3 Work areas and hoardings.....12

4.4 Key construction requirements and objectives.....12

4.4.1 Phase 1 – Basement 02.....13

4.4.2 Phase 1 – Basement 01.....14

4.4.3 Phase 1 – Ground Floor.....15

4.4.4 Phase 1 – Level 02.....16

4.4.5 Phase 2 – Basement 01.....17

4.4.6 Phase 2 – Ground floor.....18

4.4.7 Phase 2 – Level 01.....19

4.4.8 Phase 2 – Level 02.....20

**5. FIRE SAFETY REVIEW .....21**

5.1 Overview.....21

5.2 Construction site risks and mitigation measures.....21

5.2.1 Fire hazards and risks.....21

5.2.2 Mitigation strategies.....22

5.3 Impact on existing Performance Solutions.....22

5.3.1 Existing Performance Solutions.....22

5.3.2 Car park – extended travel distances.....23

5.3.3 Travel via fire-isolated exits – Discharge of Stair 3 and Stair 4.....24

5.4 Occupant egress provisions.....25

5.4.1 Basement Level 2.....25

5.4.2 Basement Level 1.....25

5.4.3 Ground Floor.....25

5.4.4 Level 02.....25

5.4.5 General egress requirements.....25

5.5 Access and facilities for Fire & Rescue NSW.....25

5.6 Fire services strategy.....26

**6. FIRE SAFETY MEASURES .....27**

6.1 General.....27

6.2 Base-building Fire Engineering Report.....27

6.3 Egress.....27

|  |  |           |
|--|--|-----------|
| 6.3.1                                      | General .....  | 27        |
| 6.3.2                                      | Re-arrangement of egress routes .....                            | 27        |
| 6.3.3                                      | Distance between exits .....                                     | 27        |
| 6.3.4                                      | Width of exits and paths of travel to exits .....                | 27        |
| 6.3.5                                      | Operation of latch .....   | 27        |
| 6.3.6                                      | Door swing.....  | 27        |
| 6.3.7                                      | Number of occupants.....   | 27        |
| 6.4  | Services and equipment .....                                     | 28        |
| 6.4.1                                      | Fire hose reels .....  | 28        |
| 6.4.2                                      | Portable fire extinguishers.....                                 | 28        |
| 6.4.3                                      | Fire hydrants .....  | 28        |
| 6.4.4                                      | Automatic fire sprinklers .....                                  | 28        |
| 6.4.5                                      | Smoke detection and alarm .....                                  | 28        |
| 6.4.6                                      | System and Intercom System for Emergency Purposes (SSISEP) ..... | 29        |
| 6.4.7                                      | Plans and specifications.....                                    | 29        |
| 6.5  | Fire brigade intervention .....                                  | 29        |
| 6.5.1                                      | Fire brigade vehicle access.....                                 | 29        |
| 6.5.2                                      | Firefighter access .....   | 29        |
| 6.6  | Fire safety management .....                                     | 29        |
| 6.6.1                                      | Roles and responsibilities of stakeholders.....                  | 29        |
| 6.6.2                                      | Fire safety plan.....  | 29        |
| 6.6.3                                      | Emergency services information.....                              | 29        |
| 6.6.4                                      | Risk assessment and mitigation .....                             | 30        |
| <b>7.</b>                                  | <b>CONCLUSION .....</b>  | <b>31</b> |
| <b>8.</b>                                  | <b>LIABILITY AND LIMITATIONS.....</b>                            | <b>32</b> |
| 8.1  | Liability.....   | 32        |
| 8.2  | Limitations.....   | 32        |
| <b>APPENDIX A – HOARDING SKETCHES.....</b> |  | <b>33</b> |
| <b>APPENDIX B – AFSS .....</b>             |  | <b>34</b> |

# 1. INTRODUCTION

## 1.1 Purpose

The purpose of this report is to outline the high-level fire safety requirements that are required during the construction period of the Cutaway project.

The report outlines a fire safety plan for the following requirements:

- Any additional structural fire protection or compartmentation necessary to separate live and occupied area of the building
- Management of egress route throughout the construction period
- Fire safety systems required to be installed during the construction period
- Necessary facilities for Fire Brigade intervention
- Any additional items that should be incorporated into the emergency response procedures.

Note that FDC are defined as the person conducting a business and undertaking (PCBU) under work, health and safety legislation and will be required to provide and implement emergency response procedures typically expected during construction works. This report will outline any additional measures that shall be incorporated.

The report sets out the following:

- Application legislation and guidance relied upon to formula the fire safety strategy
- Scope of construction works and relevant project stakeholders
- Principal building and occupant characteristics during the construction phase
- Review of existing Fire Engineering Report and impact on any performance solution
- Provision of fire safety requirements that shall be implemented during the construction phase

## 1.2 Project scope

Minerva Group (NSW) Pty Ltd has been appointed by FDC Construction & Fitout Pty Ltd to develop fire safety strategy for the construction phase of the Cutaway project. In summary, the construction phase will involve the following – further detail is provided is Section 4.

- Single temporary work area on Basement 02 – with the rest of the car parking area remaining live and occupied.
- Three temporary work areas on Basement 01 -one of which results in a change to the egress arrangement of this level
- Main construction work through Ground Floor where the bulk of works takes place. These works require the introduction of hoarding, and the changes to the entry and egress route from the Ausgrid Substation
- Hoarding on Level 1 to manage access to the construction site

The scope of the Fire Safety Strategy is limited an assessment of the works on existing performance solutions and provision of a reasonable level of fire safety during the construction period.

The development of performance-based solutions does not form part of the scope of works.

Given the consistently transient nature of a construction site, we note that the Lead Contractor (person conducting a business or undertaking – PCBU) is ultimately responsible for managing the health and safety (including fire safety) through the construction phase of the works.

## 1.3 Intended outcome

This fire safety strategy will facilitate the following outcomes:

- Provision of a coherent and agreed plan for managing fire and life safety for occupants and fire-fighters during the construction period – with particular focus on the interface of existing areas and the construction site
- To minimise the likelihood and the consequence of a fire occurring during the transitional level of fire safety of a partially occupied building
- Facilitates the provision of adequate fire safety measures during the construction period by implementing reasonable fire safety measures that result in a reasonable cost benefit ratio

## 1.4 Relevant Stakeholders

The relevant project stakeholders are outlined in the table below.

Table 1 – Relevant Project Stakeholders

| Role                    | Organisation                | Name   | Responsibility  |
|-------------------------|-----------------------------|--|---|
| Lead Contractor (PCBU)  | FDC Fitout & Construction   | Emma Thomy<br>Peter Colak<br>Hilton Palmer<br>Jack Kibby | Implement and adjust emergency procedures to provide and health and safety in construction areas<br><br>Manage day-to-day activities during construction<br><br>Implement requirements of fire safety strategy and incorporate into existing procedures |
| Certifier – Fire Safety | Minerva Group (NSW) Pty Ltd | Eliot Reeves   | Review impact of construction works on existing building areas and provide fire safety requirements to be implemented during the construction phase to provide a reasonable level of fire and life safety   |
| Fire Safety Engineer    |                             | Wilfred Lau  |   |

## 1.5 Documentation and guidance

### 1.5.1 Project documentation

The development of the fire safety strategy for construction is based upon the following project documentation:

- Building Code of Australia – Volume 1 | 2022 | Australian Building Codes Board
- Annual Fire Safety Statement | 29-51 Hickson Road, Barangaroo, Sydney, NSW 2000
- As-built drawings for Barangaroo Headland Park Public Domain Works from Balderstone provided in Appendix A
- Mark-up of construction zone provided by FDC Construction & Fitout provided in Appendix A
- Phase 1 hoarding plans provided by FDC Construction & Fitout provided in Appendix A
- Phase 2 hoarding plans provided by FDC Construction & Fitout provided in Appendix A
- Annual fire safety statement – Appendix B

1.5.2 Existing Fire Engineering Report

The project current features the following Fire Engineering Brief and Report

- Raw Fire | Fire Engineering Report | s100616\_FER\_06 | 06 | 2 July 2015
- Red Fire | Fire Engineering Brief | JN22-00157 | Draft 03 | 14 April 2023

1.5.3 Fire safety guidance

The fire safety strategy is based upon the following fire safety guidance:

- Society of Fire Safety | Practice note for fire & life safety in existing building during construction | 1.0 | 08 March 2012
- Fire & Rescue NSW | Fire safety during construction work | 01 | 01 November 2019

1.6 Applicable legislation

1.6.1 Building Code of Australia

The following section of the BCA are applicable during construction works

Performance requirement E1P5 of the NCC states:

*‘Suitable means of fire-fighting must be installed to the degree necessary in a building under construction to allow initial fire attack by construction workers and for the fire brigade to undertake attack on the fire appropriate to –*

- a. the fire hazard; and*
- b. the height the building has reached during its construction.’*

Clause E1D16 of the NCC details the related deemed-to-satisfy (DtS) provision which satisfies performance requirement EP1.5, and states:

*‘In a building under construction –*

- a. not less than one fire extinguisher to suit Class A, B and C fires and electrical fires must be provided at all times on each storey adjacent to each required exit or temporary stairway or exit; and*
- b. after the building has reached an effective height of 12 m –*
  - i. the required fire hydrants and fire hose reels must be operational in at least every storey that is covered by the roof or the floor structure above, except the 2 uppermost storeys; and*
  - ii. any required booster connections must be installed.’*

1.6.2 Work Health and Safety Regulation 2017

The following WHS legislation is applicable

- Part 3.1 of the WHS Reg. requires the PCBU to identify hazards and manage risks to health and safety by implementing a hierarchy of control measures at the construction site. A fire safety plan is to be developed and implemented as part of the work health and safety management plan.
- Clause 39 of the WHS Reg. requires the PCBU to provide information, training and instruction to workers at the construction site on the risks identified and control measures implemented. Fire safety training is to be included in the information that is delivered.

- Clause 43 of the WHS Reg. requires the PCBU to provide an emergency plan for their workplace, detailing emergency response procedures for all occupants (including construction workers) in case of fire or other emergency incident.
- Part 6 of the WHS Reg. outlines specific work health and safety requirements applicable for all construction work.
- Clause 40 of the WHS Reg. requires the PCBU to ensure, as far as reasonably practicable, that the workplace allows persons to enter, work and exit without risk to health and safety including having sufficient space, surfaces, lighting and ventilation. This includes the provision for safe evacuation in case of fire or emergency incident.
- Section 274 of the Work Health and Safety Act 2011 allows the minister to approve a code of practice. SafeWork NSW has published a Construction Work Code of Practice which has been approved under this Act.

## 2. APPROACH & METHODOLOGY

### 2.1 Overview

The development of the fire safety strategy requires thorough consultation with all relevant stakeholders before construction begins. It is essential to involve and gain approval from these stakeholders, including regulatory authorities, when necessary, to ensure the system meets all required standards.

Once construction is underway, it is crucial to continuously monitor the implementation of the fire safety strategy to guarantee its effectiveness throughout the building phase. The fire safety strategy should be adaptable, functioning as a "living document" that can respond to changing circumstances on the construction site. After construction is complete, the IFSS must be decommissioned, allowing the permanent fire safety systems designed for the building to take over.

### 2.2 Process

The overall process for the development of the fire safety strategy is as follows:

Table 2 – Fire safety strategy process

| No     | Step                                |
|--------|-------------------------------------|
| Step 1 | Confirmation of scope               |
| Step 2 | Development of Fire Safety Strategy |
| Step 3 | Implementation                      |
| Step 4 | Monitoring and review               |
| Step 5 | Close and decommissioning           |

#### 2.2.1 Step 1 – Confirmation of scope

The initial step should clearly define the scope, identify the right individuals to develop the strategy, and begin analysing the proposals. This may require stakeholders to explore both regulatory compliance and potential non-compliances, as well as the capability of the building's active services to support construction operations.

The elements that form part of Step 1 are as follows:

- A. Building will be occupied during construction
- B. Identify relevant stakeholder
- C. Meet with project stakeholders
- D. Identify responsibilities
- E. Site visit

#### 2.2.2 Step 2 – Preparation of fire safety strategy

Step 2 should result in a draft fire safety strategy that aligns with the established fire safety objectives. This draft should include an analysis of the current or expected fire safety levels during occupation, examining factors such as occupant characteristics, both passive and active fire safety measures, egress and wayfinding, and the fire safety hazards associated with both construction and occupation. Additionally, it should consider firefighter intervention.

The elements that form part of Step 2 are as follows:

- A. Agree fire safety objectives
- B. Define pre-construction level of safety
- C. Review likely hazard that construction work presents
- D. Address hazard as part of fire safety strategy
- E. Prepare fire safety strategy

#### 2.2.3 Step 3 – Implementation

For more complex fire safety strategies, particularly in scenarios involving occupied and construction zones, Step 3 may require involving authorities such as the Authority Having Jurisdiction (AHJ) or Fire Brigades for their input before implementation.

The elements that form part of Step 3 are as follows:

- A. Draft fire safety strategy submitted for review
- B. Stakeholder agreement
- C. Seek regulatory acceptance – **not required in this case**
- D. Implementation of preventative and protective measures
- E. Review for compliance of implemented fire safety measures

#### 2.2.4 Step 4 – Monitor and review

Step 4 is relatively straight forward. The fire safety strategy should be managed and part of that management should be that as construction proceeds, the measures chosen to protect occupants should be maintained.

Responsibility needs to be delegated to ensure the IFSS remains consistent over time and where appropriate, maintenance is undertaken. Should circumstances change, a review of the strategy may be needed

The elements that form part of Step 4 are as follows:

- A. Review by fire safety engineer
- B. Ongoing supervision, maintenance and use – by PCBU
- C. If design changes or strategy is required to deviate – return to Step 1

#### 2.2.5 Step 5 – Closeout and decommissioning

Step 5 requires the PCBU to decommission any requirements of the fire safety strategy and ensure that the fire safety measures required post construction are commissioned etc.

- A. Secure agreement that fire safety strategy is no longer required
- B. Decommission relevant provisions
- C. Commission permanent fire safety measures.



### 3. BUILDING AND OCCUPANT CHARACTERISTICS

#### 3.1 Building description

The Cutaway is an existing cultural venue that sits below the eastern end of Barangaroo Reserve. The building contains two basement carpark levels and three upper levels with one being a large venue for cultural events.

The project will undergo a fitout and refurbishment to establish the Cutaway as an exhibition space. At present the Cutaway is a large sub-terranean concrete shell as shown in the figure below:

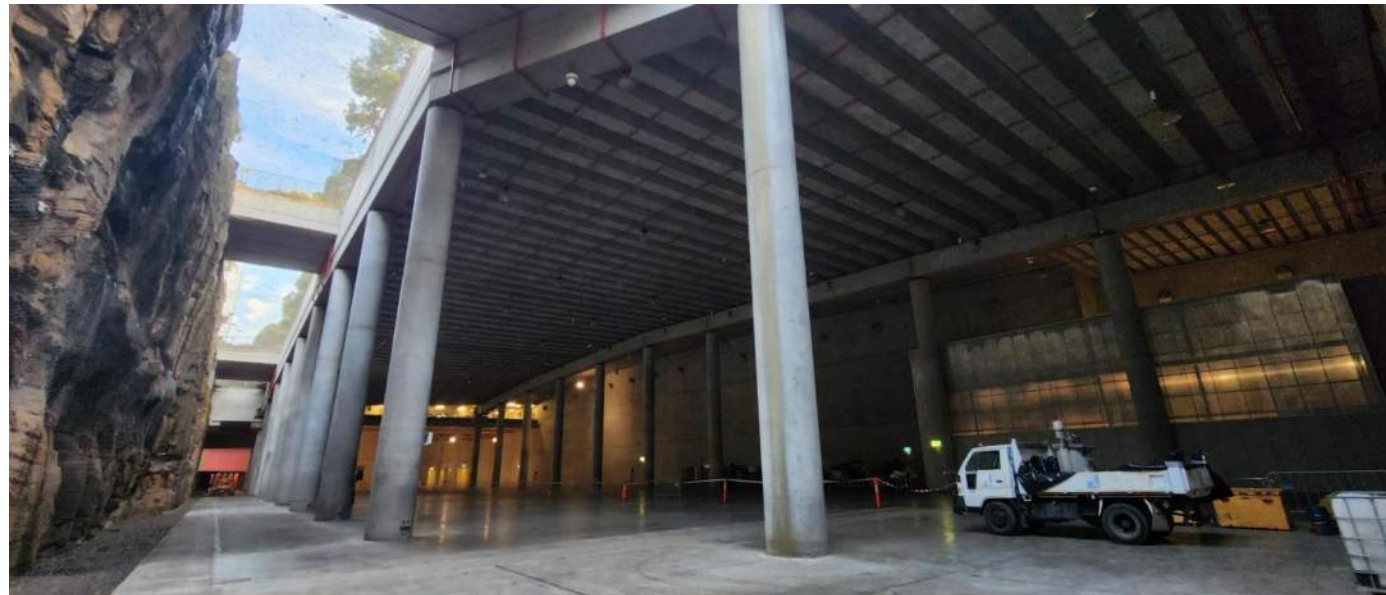


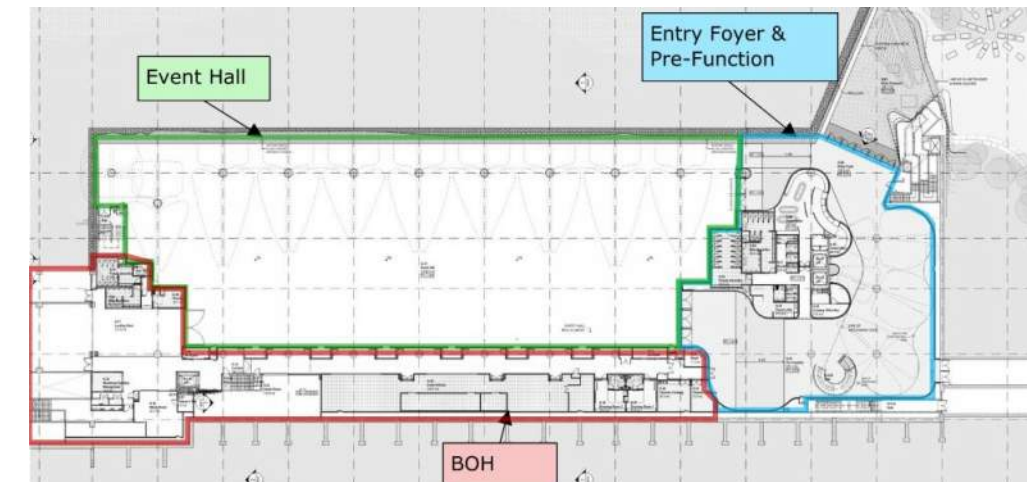
Figure 1 – Cutaway

On completion of the works the space will be transformed into a cultural venue and be provided with additional internal stories

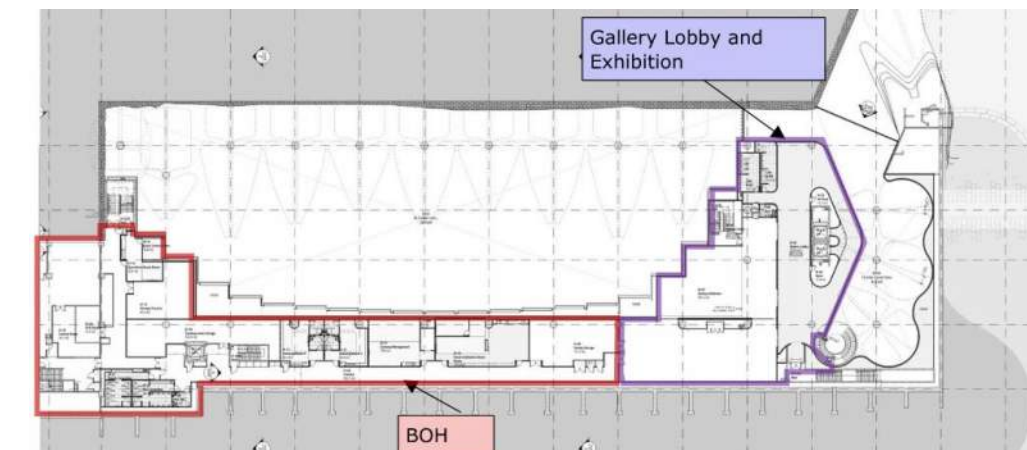


Figure 2 – Cutaway on completion of construction

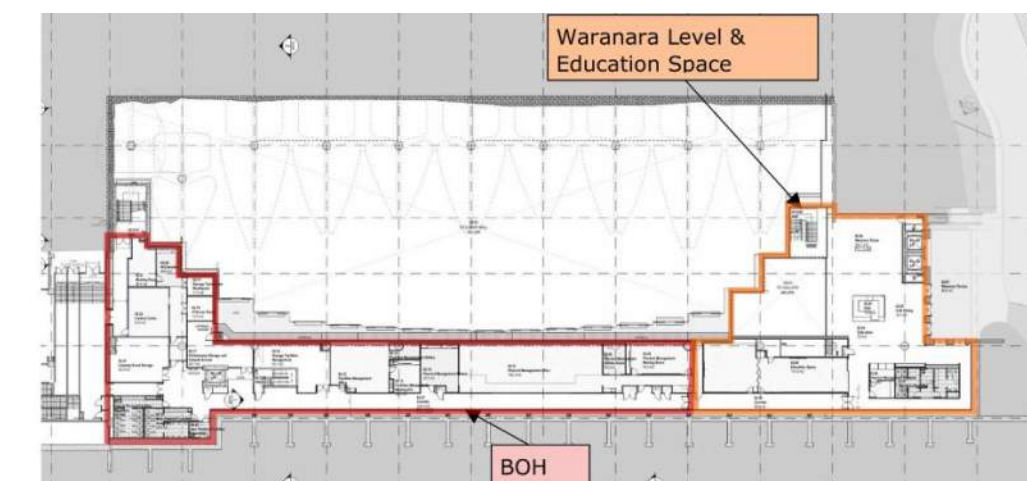
The car parking areas remain largely unchanged except for some works to facilitate the fitout of Ground Floor, Level 1 and Level 2. The fitout works are shown below:



Ground floor



Level 01



Level 02

Figure 3 – Cutaway fitout scope



3.2 Location

The building is located at 1 Merriman Street, Barangaroo as illustrated below.

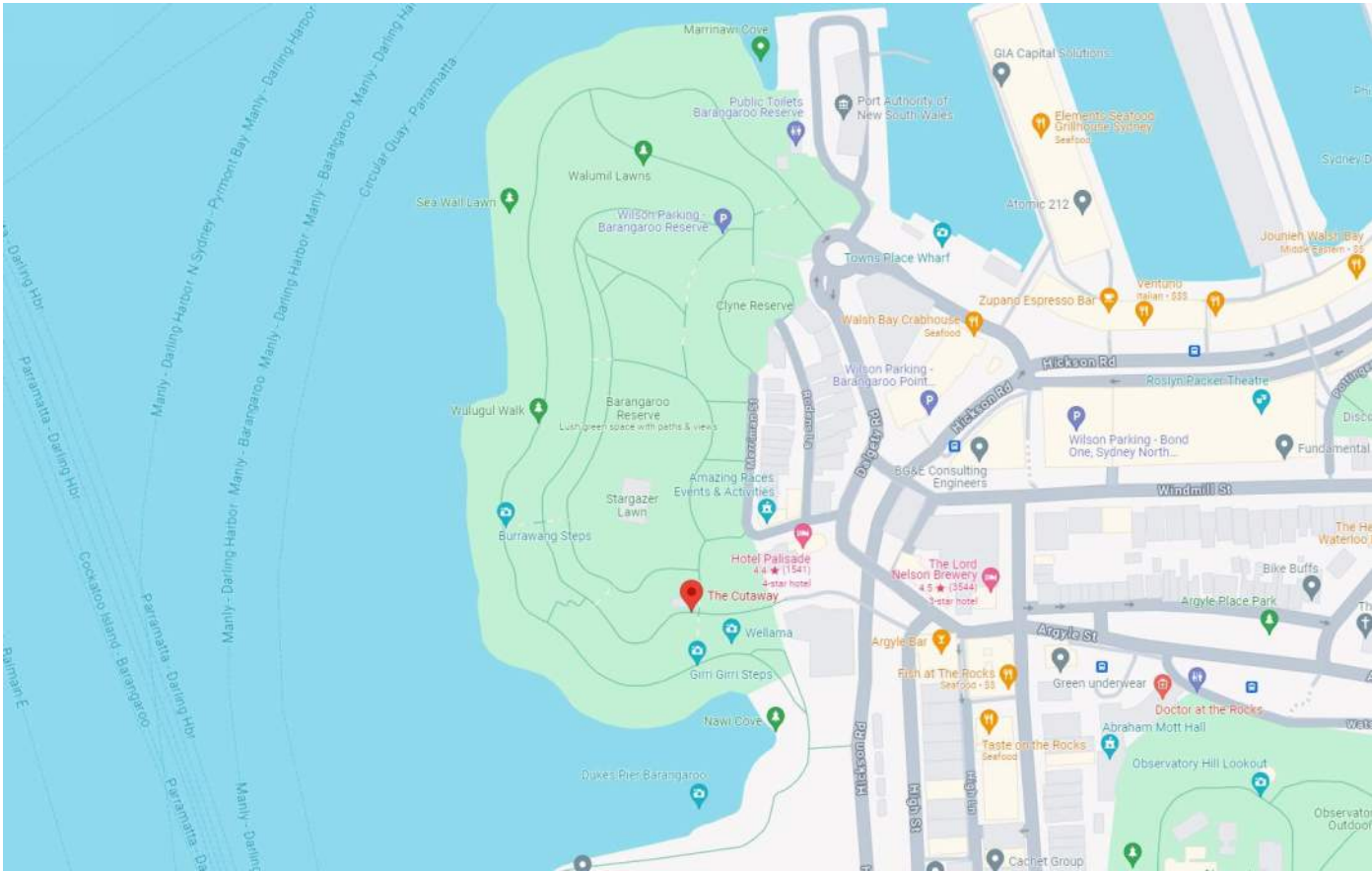


Figure 4 – Building location

3.3 BCA DtS Reference Criteria

The BCA DtS reference criteria which is applicable to the building is summarised in the table below.

Table 3 – BCA DtS Reference Criteria

| BCA Clause | Item              | Description or Requirements |
|------------|-------------------|-----------------------------|
| A6G1       | Classification    | 5, 6, 7a and 9b             |
| C2D2       | Construction Type | A                           |
| C2D3       | Rise in Storeys   | 4                           |
| -          | Effective Height  | 16.3m                       |

3.4 Exits

The building is provided with the following exits:

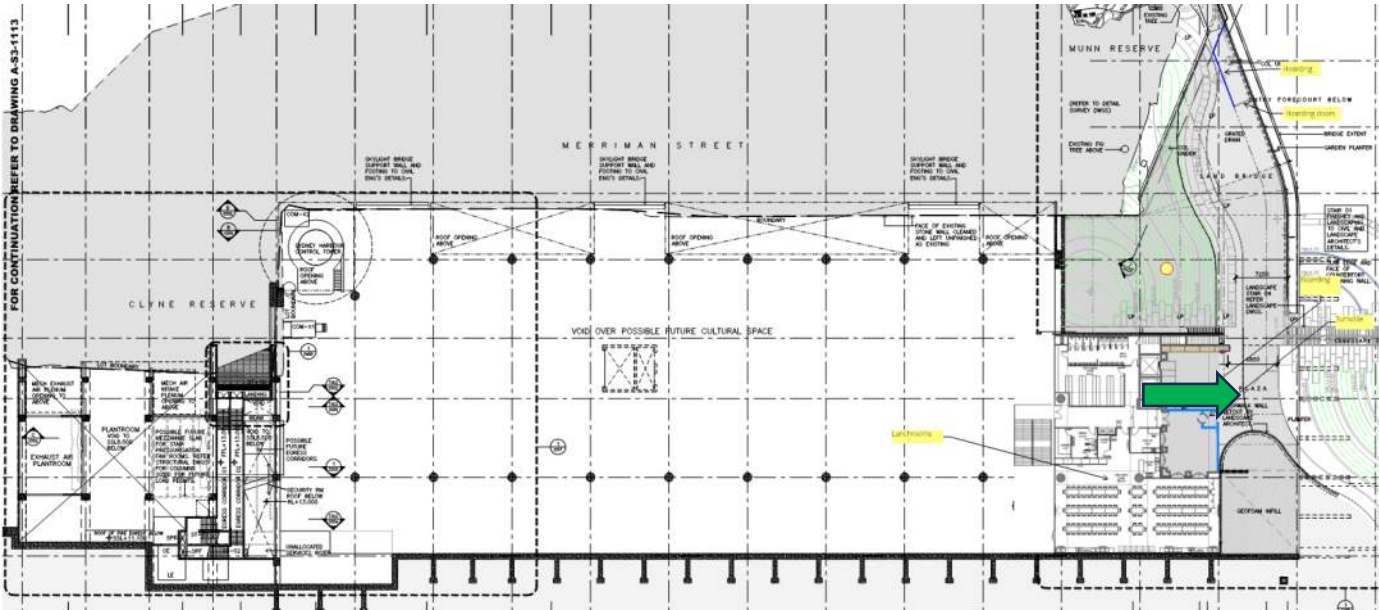


Figure 5 – Exits from Level 1

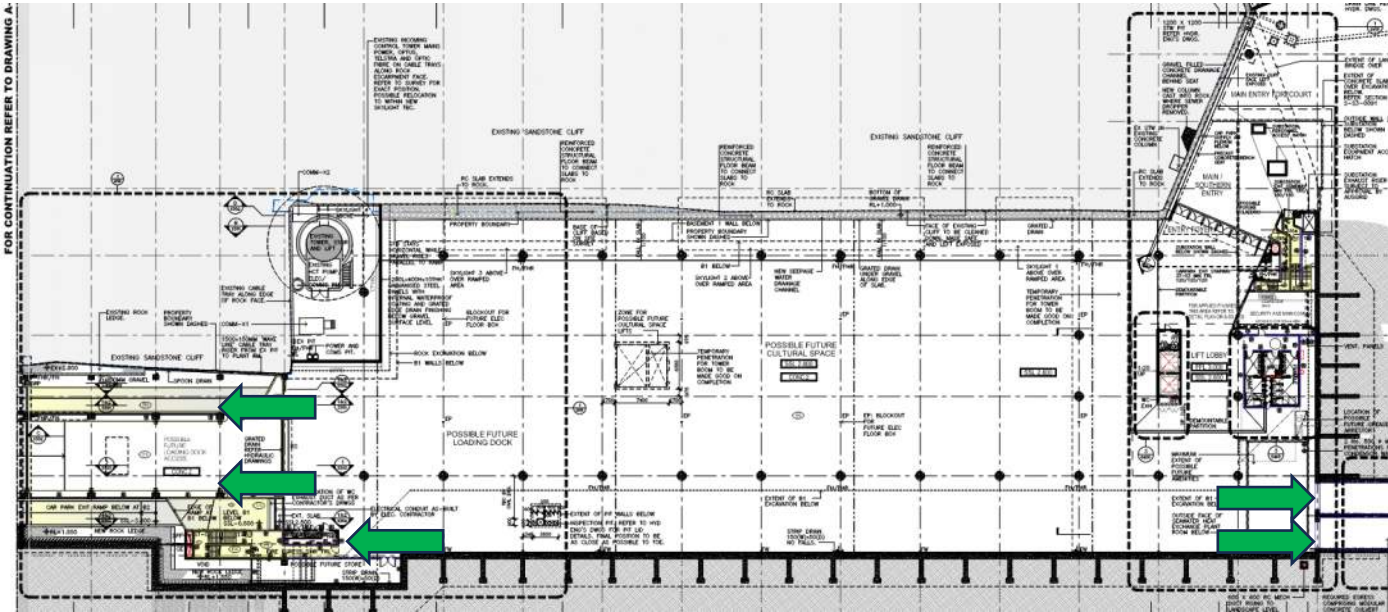


Figure 6 – Exits from Ground Floor

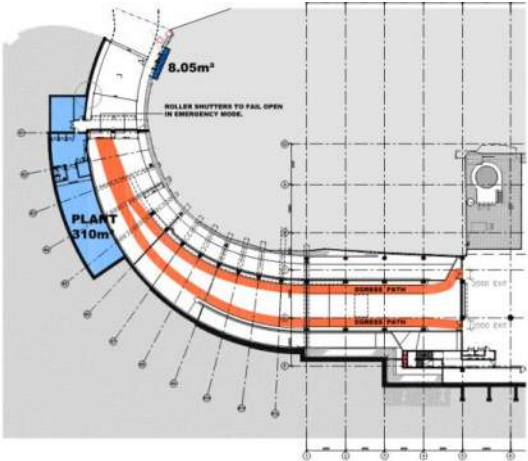


Figure 7 – Exits from Ground Floor to rear plant area



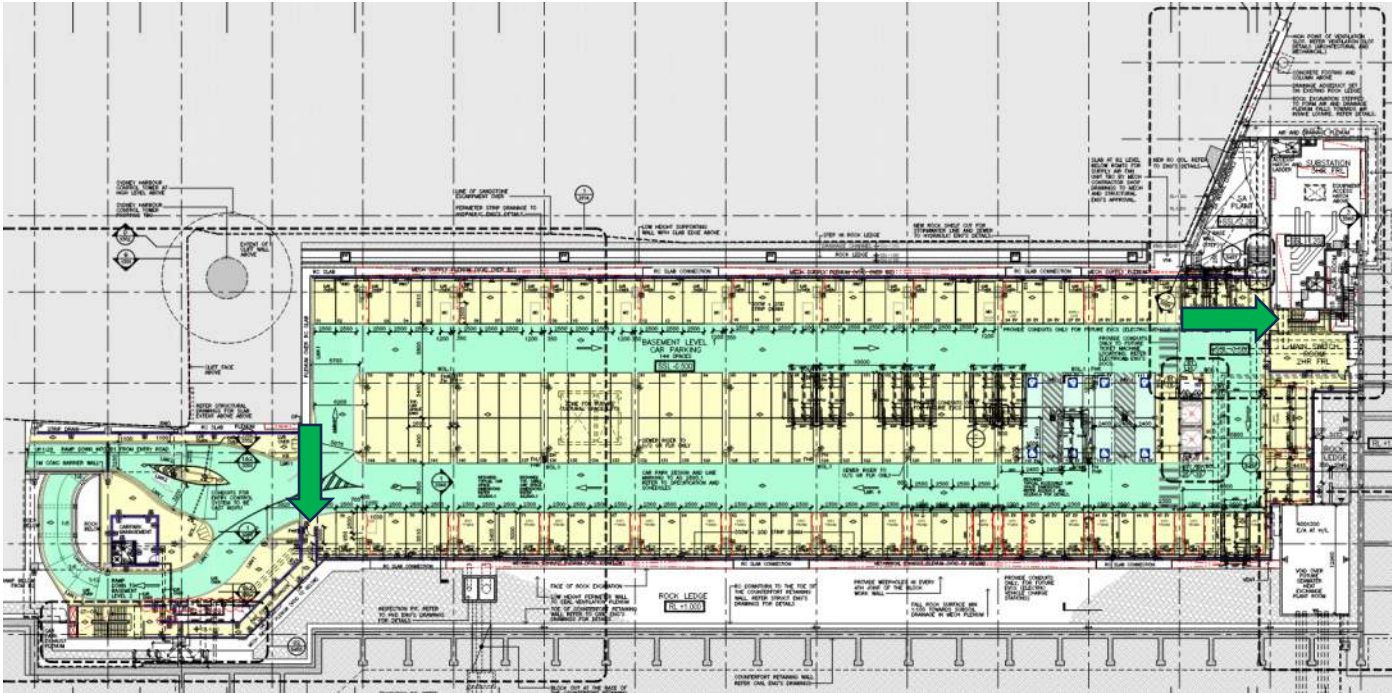


Figure 8 – Exits from Basement 01

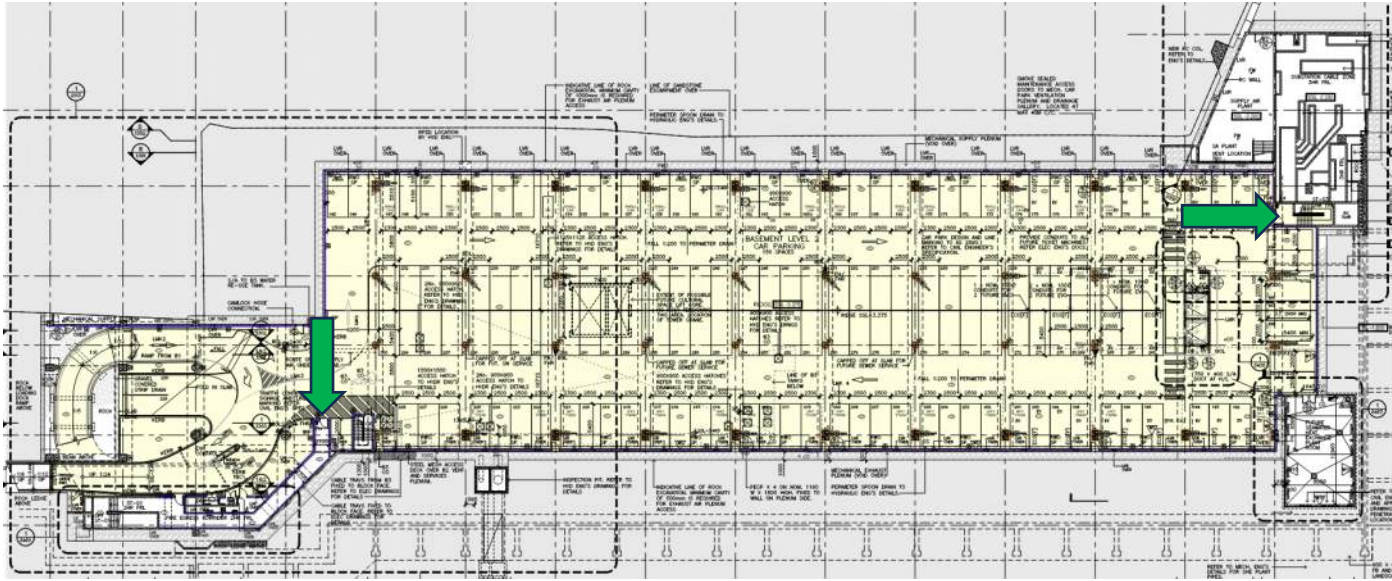


Figure 9 – Exits from Basement 02

### 3.5 Dominant occupant characteristics during the construction phase

Expected dominant occupants, characteristics throughout the construction phase are as follows:

Table 4 – Construction zone occupants

| Characteristic | Construction zone   |
|----------------|---|
| Occupant       | Lead contractor, sub-contractor   |
| State          | We expect construction zone workers and their visitors to be awake and familiar with the surrounding following site induction |

| Characteristic               | Construction zone   |
|------------------------------|---|
| Level of assistance required | Majority of occupants will not require assistance and will be mobile and thus be able to egress in an emergency.<br>Occupants requiring assistance to evacuate will be supported by caregivers, wardens, or emergency responders. Where required Personal Emergency Evacuation Plans (PEEPs) will be developed by the PBCU. |
| Emergency training           | Construction zone workers will be appropriately inducted and training in the action required during an emergency.   |
| Familiarity                  | Occupants will be familiar with surrounding on completion of their induction. Induction is required prior to allowing persons on site (unless accompanied by an inducted occupant).   |

Table 5 – Fire-fighters

| Characteristic               | Construction zone   |
|------------------------------|---|
| Occupant                     | Fire-fighters   |
| State                        | We expect fire-fighters to be awake and unfamiliar with the surroundings  |
| Level of assistance required | Fire-fighters will be provided with protective and special equipment and thus should not require assistance in navigating the building.   |
| Emergency training           | Fire-fighters will have advanced emergency training noting that this will not be site specific.   |
| Familiarity                  | Fire-fighters will not be familiar with the layout of the building. However, firefighters will be provided with directional guidance in terms of signage and block plans at key access point around the building. |

### 3.6 Fire Brigade access and equipment

The location of key fire brigade access and equipment applicable to this site are discussed below and illustrated in the following diagram.

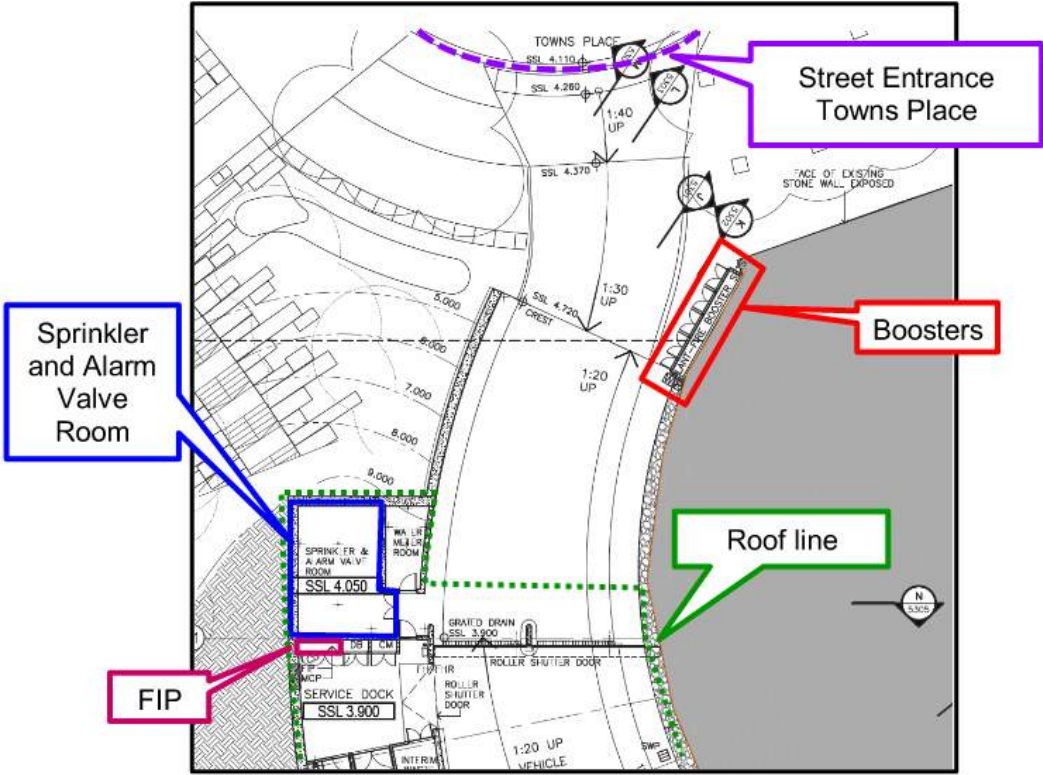


Figure 10 – Location of key fire services equipment



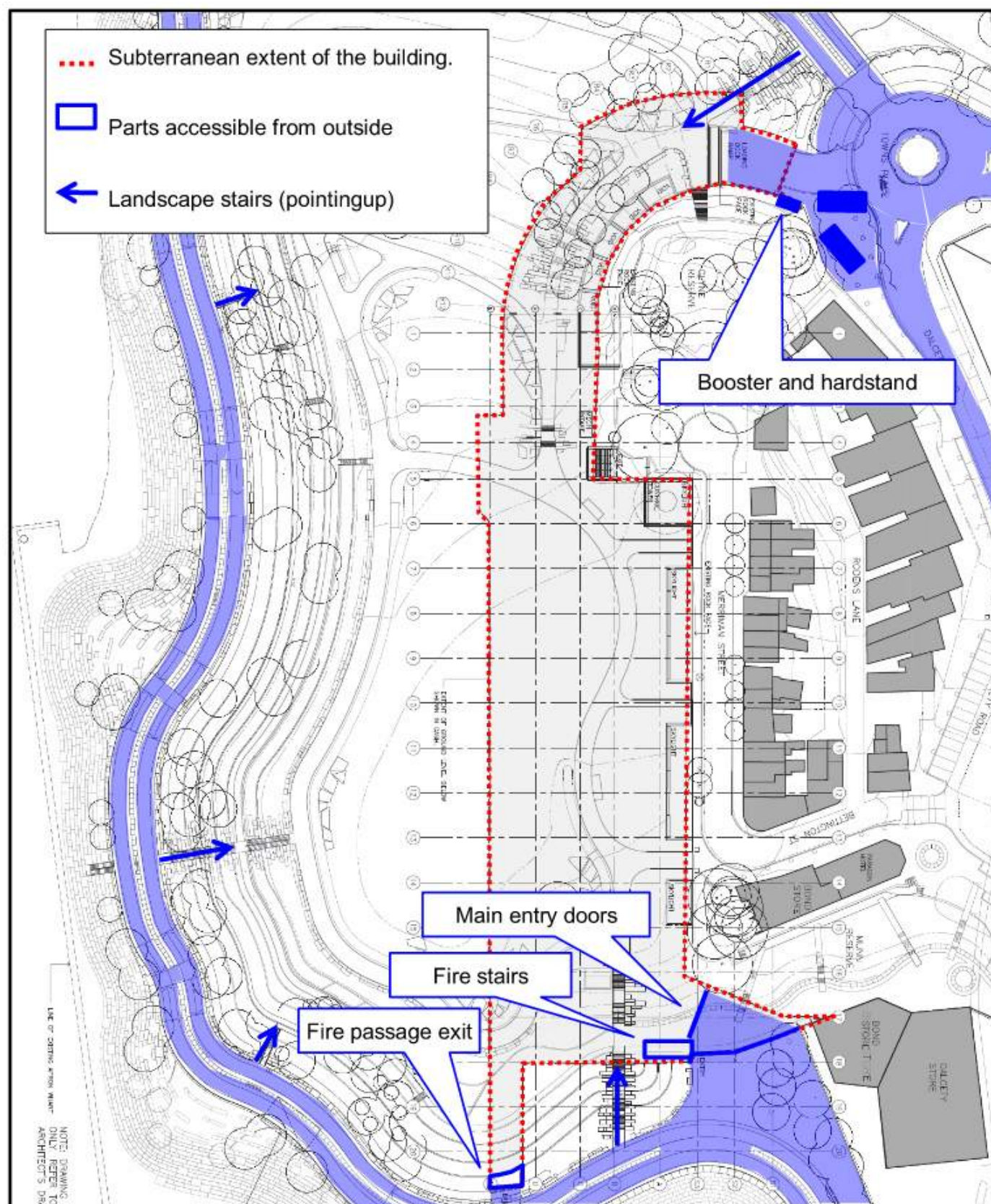


Figure 11 – Location of fire brigade vehicle access point



# 4. CONSTRUCTION WORKS AND PHASING

## 4.1 Introduction

This section provides an overview of the stages of construction, the works that will be undertaken, and the program. Analysis of the impact of the staging plans on occupant egress and Fire Brigade intervention is provided in the Section 5 – Fire Safety Review.

## 4.2 Phasing and program

Construction works will be broken down into three main phases:

### 4.2.1 Phase 1 – Demolition

- Relevant areas throughout the carpark and plant area on Ground Floor will be demolished.
- Structural steel will then be installed from the new Level 1 and Level 1
- The Level 1 and Level 2 concrete slabs are then installed

### 4.2.2 Phase 2a – Back of house

- Fit out the storage areas, event management and gallery spaces on Level 1
- Fit out of control centre, admin, management office and café on Level 2

### 4.2.3 Phase 2b – Front of house

- During this phase the fitout of the event and exhibition space will be completed

### 4.2.4 Program

The table below shows the high level program for the construction works:

Table 6 – Construction program

| Phase                     | Program                       |
|---------------------------|-------------------------------|
| Phase 1 – Demolition      | April – September 2024        |
| Phase 2a – Back of house  | September 2024 – January 2025 |
| Phase 2b – Front of house | January 2025 – July 2025      |

## 4.3 Work areas and hoardings

The following figures illustrate the work areas and hoarding arrangements for each phase.

## 4.4 Key construction requirements and objectives

Key elements of the current requirements of the construction strategy are as follows:

- A. Temporary Hoarding/Partition Plans - Includes pre and post refurbishment stages
- B. Essential Fire Services;
  - Hydrants and boosters will be maintained by leaving existing (or adding temporaries as required) in situ and performing cut overs as required to maintain compliance to the NCC and FRNSW requirements during construction.

- Sprinklers will be isolated/removed from all areas of refurbishment/construction for the duration of construction until a time the final system can be commissioned. All live/operational areas will be protected by sprinklers.
  - Thermal detectors will be installed to areas upon fitout commencement in given areas. Refurbishment works (steel and concrete) will not be monitored by thermal detectors due to the nature of works and relative low fuel source at that point in time.
- C. Fire Brigade Lift Key to be stored in the level 1 security office at 3 Munn Street - Directly adjacent to the south entry of The Cutaway.
  - D. Re-diversion of Ausgrid ventilation and access will be pre-agreed with Ausgrid. CO2 connection will be brought out the hoarding to allow for connection by the truck as per the current access pathways provided by Ausgrid.
  - E. Fire Brigade access paths will largely mimic the existing access paths during construction.
  - F. Existing FIP will be utilised for construction phase monitoring and notification as will exiting booster assembly located at the loading dock entry.

4.4.1 Phase 1 – Basement 02

Works areas and hoarding for Basement 02 are shown below:

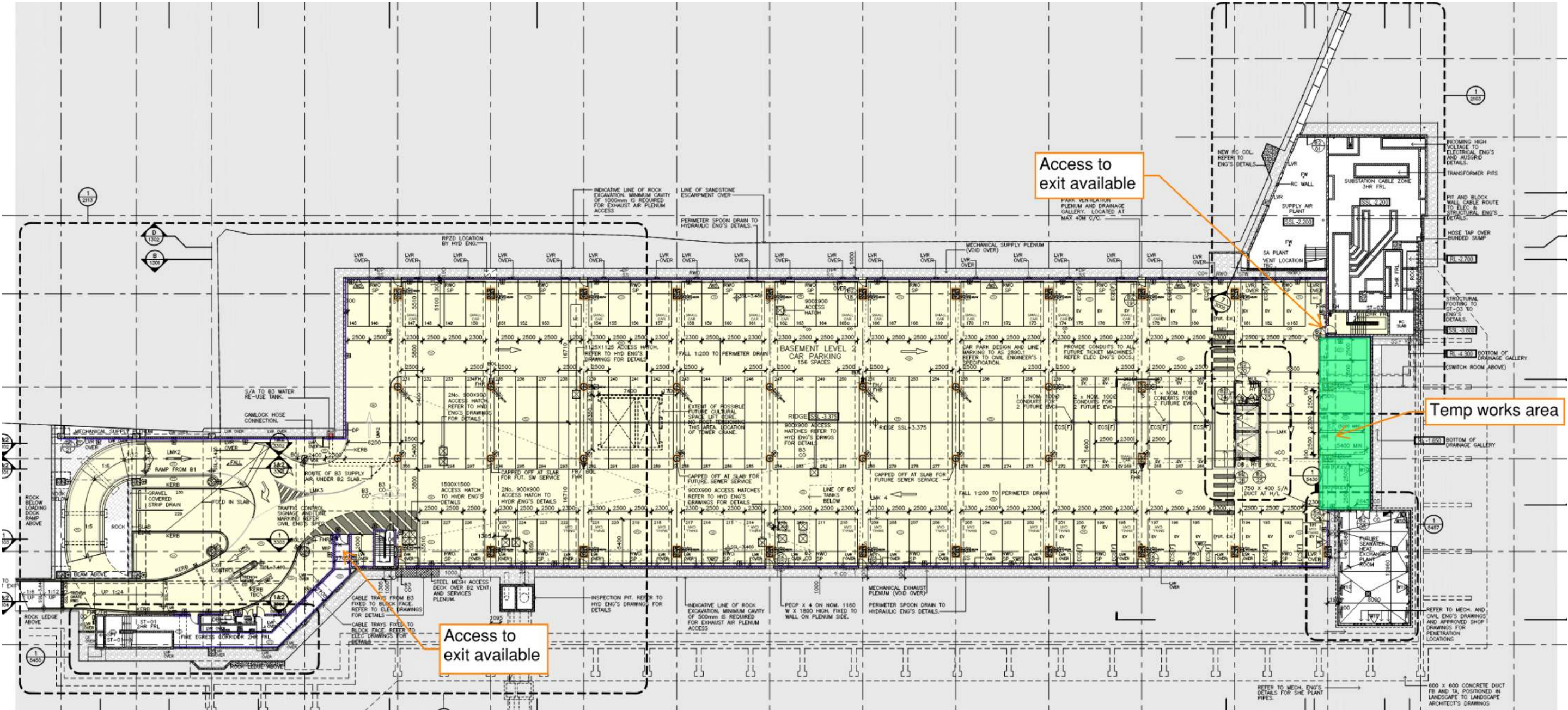


Figure 12 – Construction works on Basement 02

In summary:

- A temporary work zone is established below the substation on Basement 1 to allow for new incoming feeds.



#### 4.4.2 Phase 1 – Basement 01

Works areas and hoarding for Basement 02 are shown below:

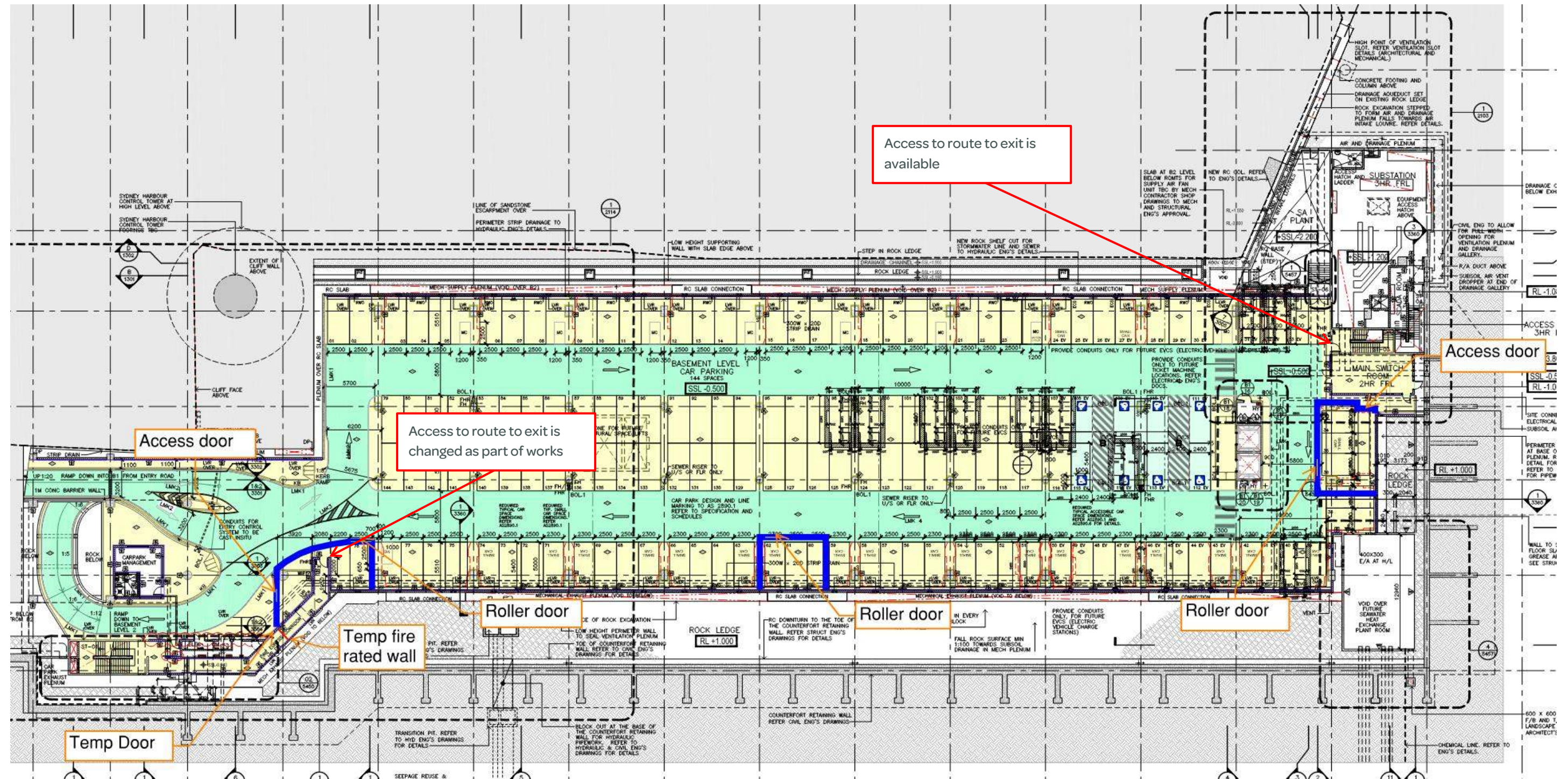


Figure 13 – Construction works on Basement 01

In summary:

- Three work zones are established on this level.
- All feature hoarding separating the construction zone from a live area
- The zone nearest the car park ramps requires the re-arrangement of the egress route in this location.



#### 4.4.3 Phase 1 – Ground Floor

Works areas and hoarding for Ground Floor are shown below:

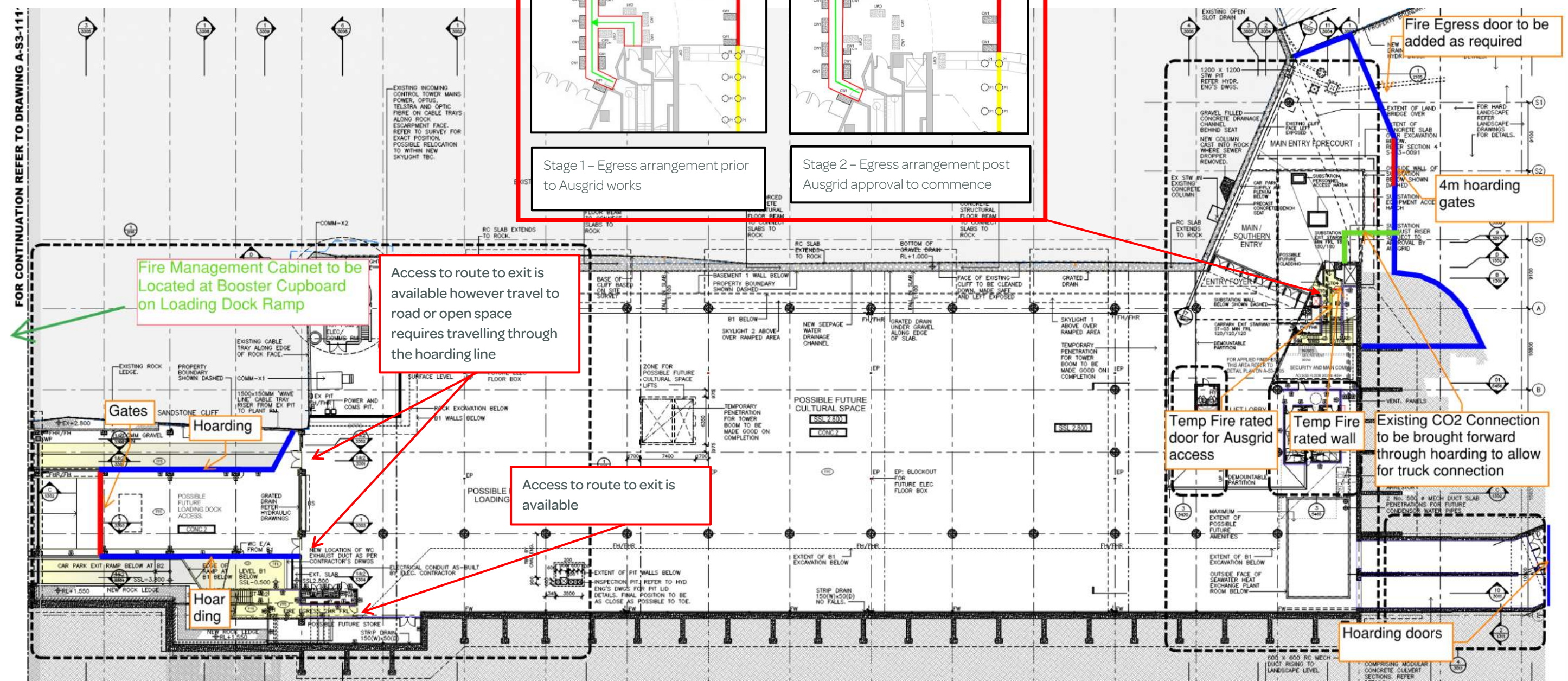


Figure 14 – Construction works on Ground Floor

In summary:

- The whole storey become a construction zone
- The vehicle entry area is provided with a hoarding and gates. Egress routes are available as per the existing arrangement except that the discharge arrangements are changed
- Egress through the main pedestrian entry is closed with hoarding. The main exit route is not available but the existing egress via the fire tunnels remains.
- Due to works on the substation, the exit route from the substation is temporarily diverted into the adjacent fire stair. Hoarding is constructed in two stages such that egress is available through the construction site to open space.
- Access into Stair 2 remains available



#### 4.4.4 Phase 1 – Level 02

Works areas and hoarding for Level 2 are shown below:

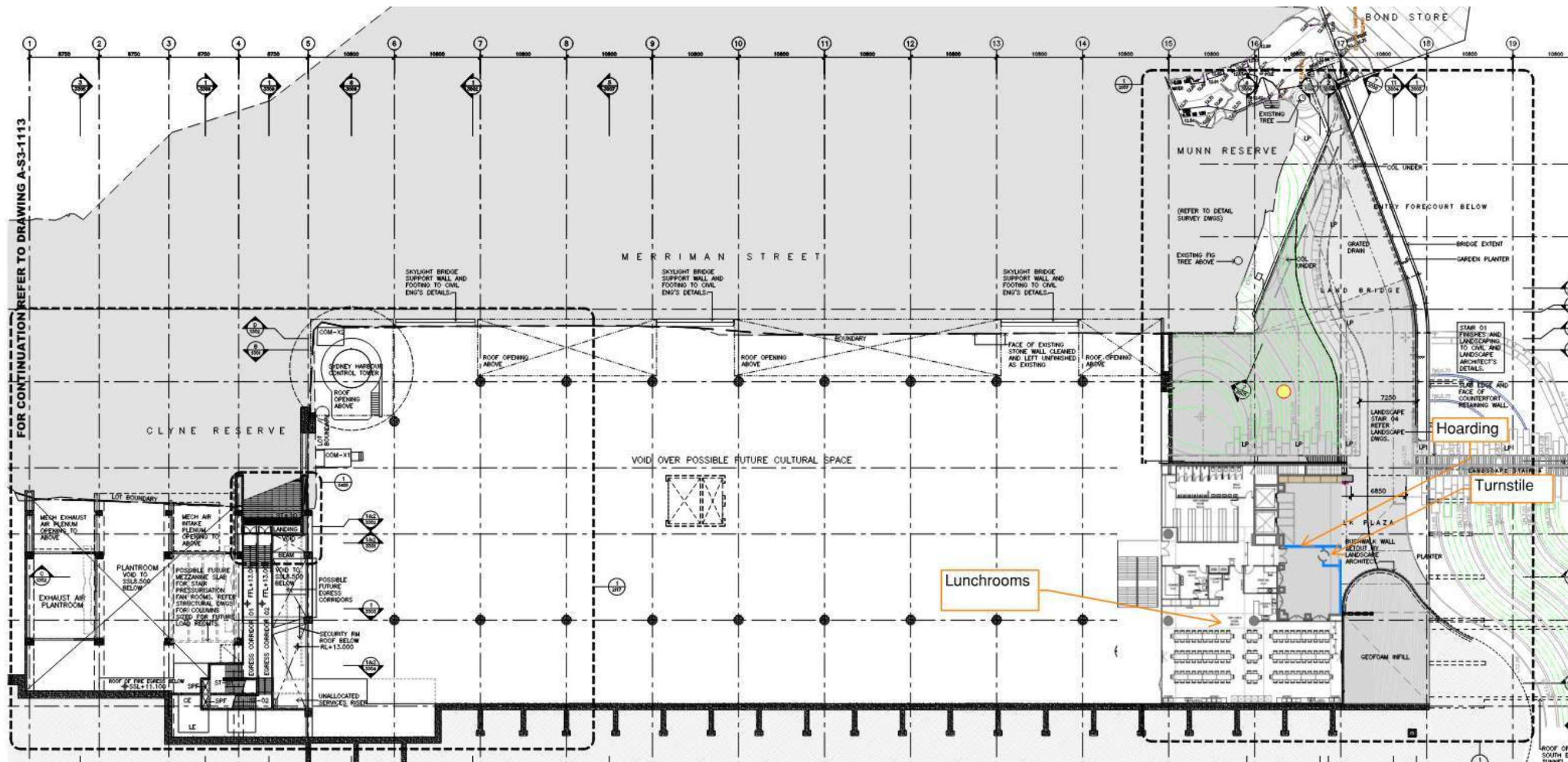


Figure 15 – Construction works on Level 02

In summary:

- The site office will be established at this level.
- The entry to this area will be controlled by turnstiles



#### 4.4.5 Phase 2 – Basement 01

Works areas and hoarding for Basement 01 are shown below:



**Figure 16 – Construction works on Basement 01**

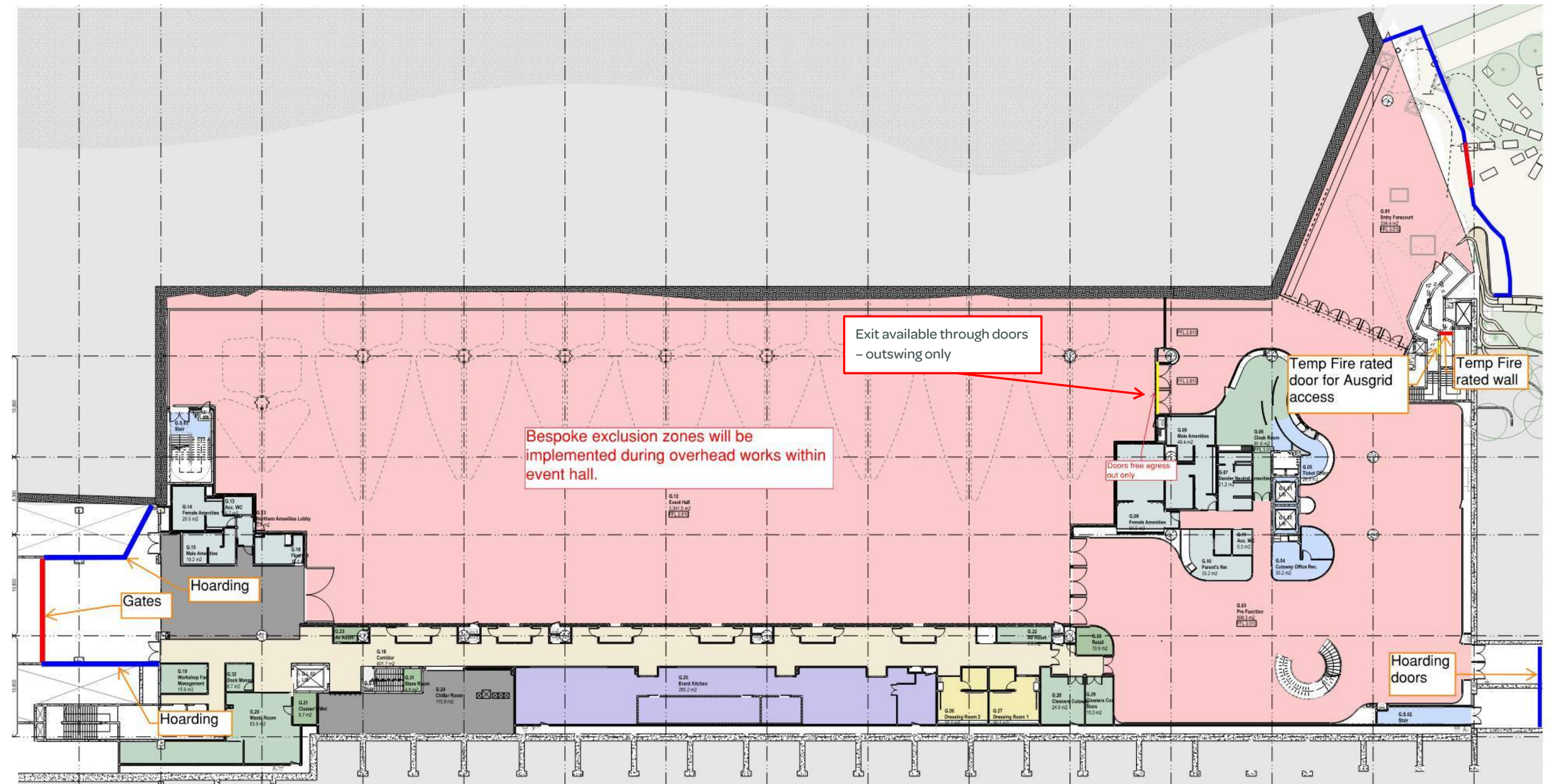
In summary:

- Construction of new grease arrestor, and substations is complete
- Hoarding around egress stair adjacent to the car park ramps remains in place – egress route still in temporary arrangement



#### 4.4.6 Phase 2 – Ground floor

Works areas and hoarding for Ground Floor are shown below:



**Figure 17 – Construction works on Ground Floor**

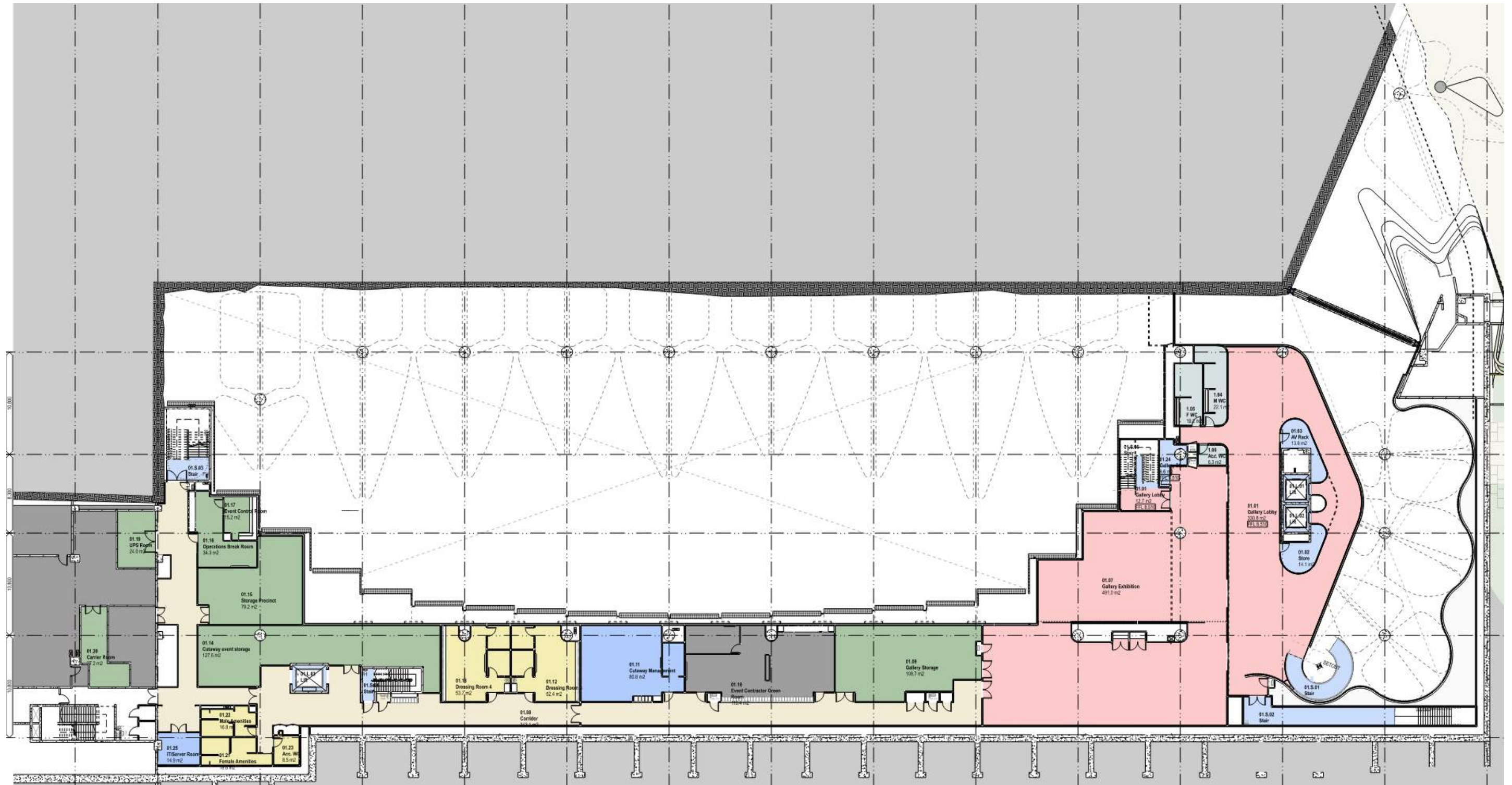
In summary:

- Back of house works are largely complete
- The vehicle entry area is provided with a hoarding and gates. Egress routes are available as per the existing arrangement except that the discharge arrangement are changed
- Egress through the main pedestrian entry is closed with hoarding. The main exit route is available but the existing egress route available is reduced to 4m



#### 4.4.7 Phase 2 – Level 01

Works areas and hoarding for Level 1 are shown below:

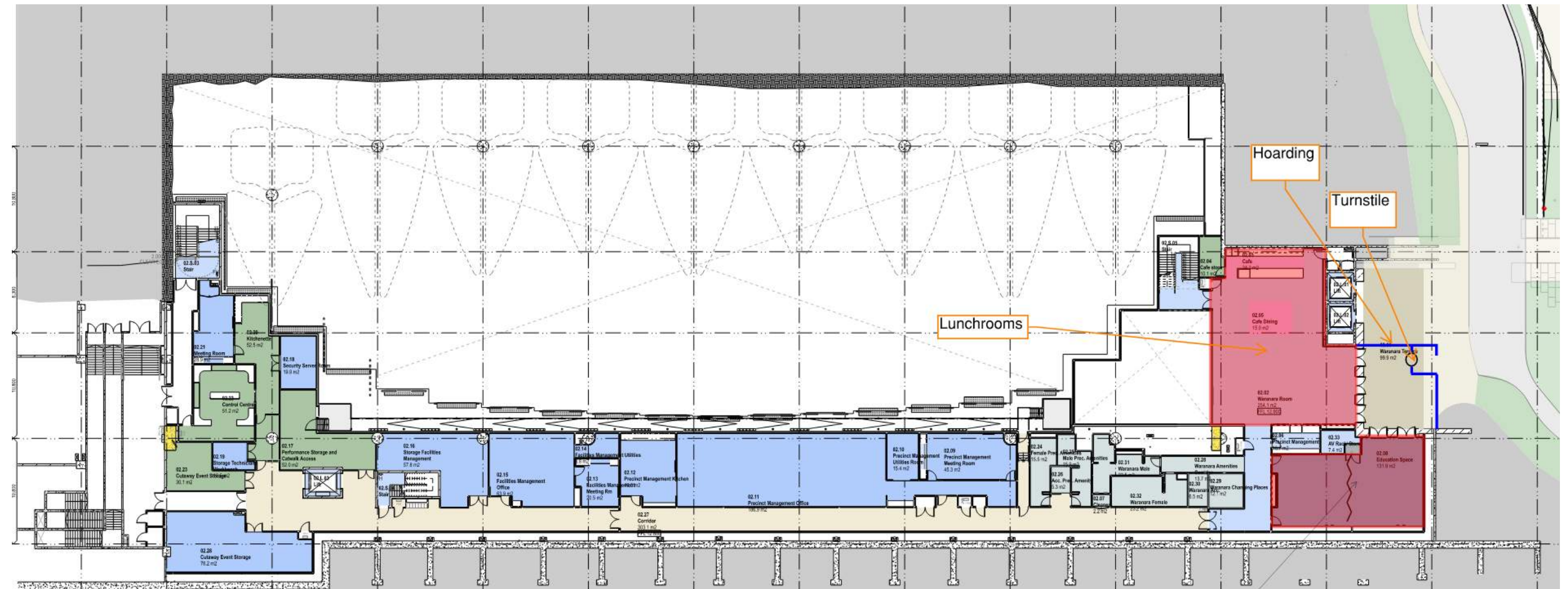


In summary, all of Level 1 is a construction site and there is no specific hoarding at this level.



#### 4.4.8 Phase 2 – Level 02

Works areas and hoarding for Level 2 are shown below:



In summary:

- Back of house works are largely complete
- Lunchroom area and access control to site provided with hoardings and turnstiles.

# 5. FIRE SAFETY REVIEW

## 5.1 Overview

This section provides an engineering review of the following:

- High level review of fire hazards in construction areas
- Impact of construction works on current performance solutions for existing building and live areas
- Review of egress required
- Review of Fire Brigade intervention and access requirements
- Fire services strategy

## 5.2 Construction site risks and mitigation measures

Construction sites are dynamic environments where the risk of fire is significantly heightened due to various activities and conditions prevalent during building processes. Understanding and mitigating these risks are crucial for the safety of workers and the protection of construction assets. This overview addresses common fire safety risks and hazards typically found on construction sites

### 5.2.1 Fire hazards and risks

#### Flammable and combustible materials

- **Storage of flammable liquids:** On many construction sites, flammable liquids such as paints, solvents, and fuels are used and stored. Improper storage—such as failing to keep these substances in fire-rated containers away from ignition sources—increases the risk of accidental ignition.
- **Combustible construction materials:** Wood, packaging materials, and other combustibles are often abundant on construction sites. These materials can easily catch fire from sparks, heat, or negligence, and once ignited, they can cause the fire to spread rapidly.
- **Insulation and finishing products:** Many modern insulation materials and finishes are petroleum-based, such as polystyrene and polyurethane foams, which can be highly flammable. Fires involving these materials can release toxic fumes and escalate quickly.

#### Hot work

- **Welding and cutting:** These are some of the most common sources of ignition on construction sites. Sparks and hot slag from welding and cutting can travel significant distances and remain hot enough to ignite materials long after the original work is completed.
- **Grinding and other frictional heat sources:** Equipment that generates friction can also pose a fire hazard, particularly in environments where there is an accumulation of dust and small debris, which can be highly combustible.

#### Electrical hazards

- **Temporary electrical installations.** These installations often lack the robustness of permanent wiring and can be susceptible to damage. Overloaded circuits, exposed wires, and the use of high-voltage equipment can lead to electrical fires.
- **Use of extension cords:** Over-reliance on extension cords and power strips can lead to overloading and overheating, which are common causes of electrical fires on construction sites.

#### Heating equipment

- **Space heaters:** Used to dry out building areas and materials, space heaters can ignite flammable materials if placed too close. The lack of proper monitoring and placement guidelines increases this risk.
- **Torches and heat guns:** These tools are often used for applications like roofing and plumbing. Improper use or failure to cool down properly before storage can lead to fires.

#### Environmental factors

- **Weather conditions:** Wind can carry embers to different parts of the construction site, igniting materials far from the original fire source. Dry conditions can exacerbate the flammability of materials, while high temperatures can increase the volatility of chemicals and fuels.
- **Dust accumulation:** Sawdust and metal shavings are highly combustible. In an environment where hot work is being performed, these materials pose a significant risk as they can catch fire from sparks or even accumulate in electrical equipment and ignite.

#### Human error and negligence

- **Lack of training:** Workers who are not properly trained on the risks associated with specific materials or tasks may inadvertently cause fires through improper handling or negligence.
- **Failure to follow procedures:** Bypassing safety protocols, such as not securing a hot work permit or failing to monitor the site after hot work is completed, significantly increases the risk of a fire breaking out.

#### Proximity risks

- **Congested sites:** In tightly packed construction sites, a fire in one area can quickly spread to other parts of the site or even to neighbouring buildings, especially if flammable materials are stored improperly or if there is inadequate separation between different work areas.
- **Multiple ignition sources:** Construction sites often have several potential ignition sources active at once, from machinery and equipment to smoking and cooking in unauthorized areas. This multiplicity of hazards increases the likelihood of accidental fires.

#### Chemical reactions

- **Mixing of chemicals:** Incorrect mixing of construction chemicals can lead to exothermic reactions that might ignite surrounding materials. This is particularly risky when workers handle materials they are not familiar with or when proper mixing instructions are not followed.

#### Temporary structures

- **Vulnerability of temporary constructions:** Temporary structures such as scaffolding, sheds, and formwork are often less secure and more susceptible to fire. They typically do not have fire-resistant features, making them vulnerable to quick damage and collapse in the event of a fire.

#### Waste management

- **Accumulation of rubbish:** Poor waste management can lead to piles of combustible debris such as timber, packaging, and discarded personal protective equipment, which can easily catch fire, particularly during hot work activities or when exposed to electrical faults.

5.2.2 Mitigation strategies

The above identified fire hazards and risks are typical of all construction sites and thus the PBCU will be required to manage these risks in accordance with current work health and safety practices and best practices – no specific additional requirements are required as part of this strategy which focuses on the interface of live and construction areas and the impacts on fire engineering report. However, we provide a summary table below of how these typical construction site risks can be managed and mitigated:

Table 7 – Mitigation measures available to PCBU

| Fire hazard category                | Specific hazards   | Mitigation strategies  |
|-------------------------------------|--|--|
| Flammable and combustible materials | Storage of flammable liquids, combustible construction materials, insulation and finishing products. | Secure storage, use of Material Safety Data Sheets (MSDS), control of combustible waste.                                   |
| Hot work                            | Welding and cutting, grinding and other frictional heat sources.                                     | Hot work permits, fire watch, designated hot work areas.   |
| Electrical hazards                  | Temporary electrical installations, use of extension cords.  | Regular inspections by electricians, use of circuit breakers, safe use guidelines.   |
| Heating equipment                   | Space heaters, torches and heat guns.  | Safe placement, regular maintenance.   |
| Environmental factors               | Weather conditions, dust accumulation.   | Weather monitoring, dust control measures.   |
| Human error                         | Lack of training, failure to follow procedures.  | Comprehensive training, supervision and enforcement, toolbox talks and risk assessments                                    |
| Proximity risks                     | Congested sites, multiple ignition sources.  | Site layout planning, emergency access routes.   |
| Chemical reactions                  | Mixing of chemicals.   | Controlled access to chemicals, proper labelling and storage, use of MSDS  |
| Temporary structures                | Vulnerability of temporary constructions.  | Use of fire-retardant materials if appropriate, consider location of temporary structure in proximity to ignitions sources |
| Waste management                    | Accumulation of rubbish.   | Regular disposal, secure waste containers.   |

5.3 Impact on existing Performance Solutions

5.3.1 Existing Performance Solutions

The base-building FER from RAW Fire features the following Performance Solutions:

| BCA DtS Variation                         | Description of non-compliance  | Impact on solution                                   |
|---|--|--|
| General floor area and volume limitations | <b>BCA DtS Provisions</b>  | <b>No impact – fire compartment sizes unaffected</b> |
|   | Clause C2.2 (Table C2.2) requires that the maximum fire compartment area and volume for a Type A, 9b building are 8,000m² and 48,000m³ respectively. |  |
|   | <b>Performance Requirement(s)</b>  |  |
|   | CP1, CP2   |  |
|   | <b>DtS Variation</b>   |  |
|   | The fire compartment has a floor area and volume of approximately 6,657m2 and 90,000m3 respectively.   |  |

| BCA DtS Variation                                | Description of non-compliance  | Impact on solution                    |
|--|--|---------------------------------------|
| Protection of openings                           | <b>BCA DtS Provisions</b><br>BCA DtS Provision C3.2 requires openings in external walls required an FRL to be protected in accordance with Clause C3.4 when exposed to a fire source feature that is less than – <ul style="list-style-type: none"><li>3m from a rear or side boundary of the allotment;</li><li>6m from the far boundary of a road, river lake or the like adjoining the allotment;</li><li>6m from another building on the allotment that is not a Class 10 structure.</li></ul> | No impact – openings not affected     |
| Cultural Space                                   | <b>BCA DtS Provisions</b> <ul style="list-style-type: none"><li>Clause D1.4 states that no point must be more than 20m from a sole exit or from a point at which travel in different directions to two alternative exits is available, in which case the total distance must not exceed 40m.</li></ul>   | No impact – area is construction zone |
| Exit travel distances                            | <ul style="list-style-type: none"><li>Clause D1.5 states the distance between alternative exits must be no greater than 60m.</li></ul>   |                                       |
| Distance between alternative exits               | <ul style="list-style-type: none"><li>Clause D1.6 (including NSW variations) requires 2m unobstructed aggregate exit width for the first 200 occupants and 0.5m for each additional 50 persons.</li><li>Clause D1.10 states that where an exit discharges to open space, the path of travel to the road must have an unobstructed width not less than the minimum width of the required exit.</li></ul>  |                                       |
| Dimensions of exits and paths of travel to exits | <ul style="list-style-type: none"><li>Clause E2.2 in conjunction with Table E2.2b requires an automatic smoke exhaust system complying with Specification E2.2b or automatic smoke and heat vents complying with Specification E2.2c.</li></ul> <b>Performance Requirement(s)</b><br>DP4, DP6, EP2.2   |                                       |
| Discharge from exits                             | <b>DtS Variation</b> <ul style="list-style-type: none"><li>The travel distance in the Cultural Space on ground floor is up to 60m to the nearest exit and 120m between alternative exits.</li></ul>  |                                       |
| Smoke hazard management                          | <ul style="list-style-type: none"><li>The ground level is provided with 22.8m of unobstructed exit width in lieu of the 25m required by the DtS provisions for a population of 2,500 persons. The southern and northern exits from the ground floor have an aggregate clear width of 17.5m and 5.3m respectively.</li><li>In lieu of automatic smoke exhaust to the main public space, the enclosure is provided with natural venting via the roof lights.</li></ul>                               |                                       |



| BCA DtS Variation                                       | Description of non-compliance   | Impact on solution   |
|---|---|--|
| Carpark and plant areas                                 | <p><b>BCA DtS Provisions</b></p> <ul style="list-style-type: none"><li>Clause D1.4 states that no point must be more than 20m from a sole exit or from a point at which travel in different directions to two alternative exits is available, in which case the total distance must not exceed 40m.</li><li>Clause D1.5 states the distance between alternative exits must be no greater than 60m.</li></ul> <p><b>Performance Requirement(s)</b></p> <p>DP4, EP2.2</p> <p><b>DtS Variation</b></p> <ul style="list-style-type: none"><li>Travel distances in the carparking levels are up to 60m to the nearest exit and 120m between alternative exits.</li><li>In the plant room at the north end (north of grid line 1), the travel distance is permitted to be up to 30m to a single exit.</li><li>In the park maintenance plant room near the vehicle ramp entrance, the travel distance is up to 27m to the nearest point of choice.</li><li>On the vehicle ramp to Towns Place, travel distance is up to 55m to the nearest exit in lieu of 40m and 109m between alternative exits.</li></ul> | Impact – travel distances change in car park, discharge of exits through construction period will vary |
| Exit travel distances                                   |   |  |
| Distance between alternative exits                      |   |  |
| Travel via fire isolated exits                          | <p><b>BCA DtS Provisions</b></p> <p>Clause D1.7 requires a fire isolated stairway to discharge either directly or by way of its own fire isolated passageway to a road or open space, a ventilated area within the building with 2/3 open perimeter or a covered area open for 1/3 of its perimeter, adjoining a road or open space and with an unobstructed height throughout of not less than 3m.</p> <p><b>Performance Requirement(s)</b></p> <p>DP4, DP5</p> <p><b>DtS Variation</b></p> <ul style="list-style-type: none"><li>The covered area of discharge from fire stairs ST03 and ST04 is open for less than 1/3 of its perimeter.</li><li>The fire-isolated stair from the Harbour Control Tower discharges into the Cultural space in lieu of a road or open space</li></ul>   | Impact – discharge of exits will change due to hoardings   |
| Travel via fire non-isolated exits                      | <p><b>BCA DtS Provisions</b></p> <p>Clause D1.9 states that the travel distance via a required non-fire-isolated stairway must not exceed 80m and that discharge from a non-fire-isolated exit must be to the level at which egress to a road or open space is available.</p> <p><b>Performance Requirement(s)</b></p> <p>DP4</p> <p><b>DtS Variation</b></p> <ul style="list-style-type: none"><li>The non-fire isolated stair serving the pumphoom below basement level 2 discharges into Basement level 2 in lieu of a level with direct egress to a road or open space.</li></ul>   | No impact  |
| Sound System and Intercom System for Emergency Purposes | <p><b>BCA DtS Provisions</b></p> <p>Clause E4.9 requires a Sound System and Intercom System for Emergency Purposes (SSISEP) for a Class 9b building, which must comply with AS1670.4, including the voice message intelligibility.</p> <p><b>Performance Requirement(s)</b></p> <p>EP4.3</p> <p><b>DtS Variation</b></p> <p>The voice message intelligibility requirements of AS1670.4 shall not be achieved.</p>   | No impact  |

| BCA DtS Variation | Description of non-compliance   | Impact on solution |
|-------------------|---|--------------------|
| Sprinkler System  | <p><b>BCA DtS Provisions</b></p> <p>Clause E1.5 (Specification E1.5) requires that a sprinkler system be installed in accordance with AS2118.1:1999.</p> <p><b>Performance Requirement(s)</b></p> <p>EP1.4</p> <p><b>DTS Variation</b></p> <p>The sprinkler system shall conform to AS2118.1:1999 throughout all areas except for below the pre-cast element structures in the ground floor cultural centre and on the northern approach. In this area sprinkler head spacing shall be in accordance with NFPA 13:2013 - Clause 8.6.4.1.2(5).</p> | No impact          |

5.3.2 Car park – extended travel distances

The existing base-building Fire Engineering Report permits the following extended travel distances in the car park level

- Travel distance to an exit of 60m in lieu of 40m.
- Travel distance between exits of 120m in lieu of 60m.

The hoarding arrangement on Basement Level 01 increases the travel distance from approximately 116m to 131m – see diagram below:

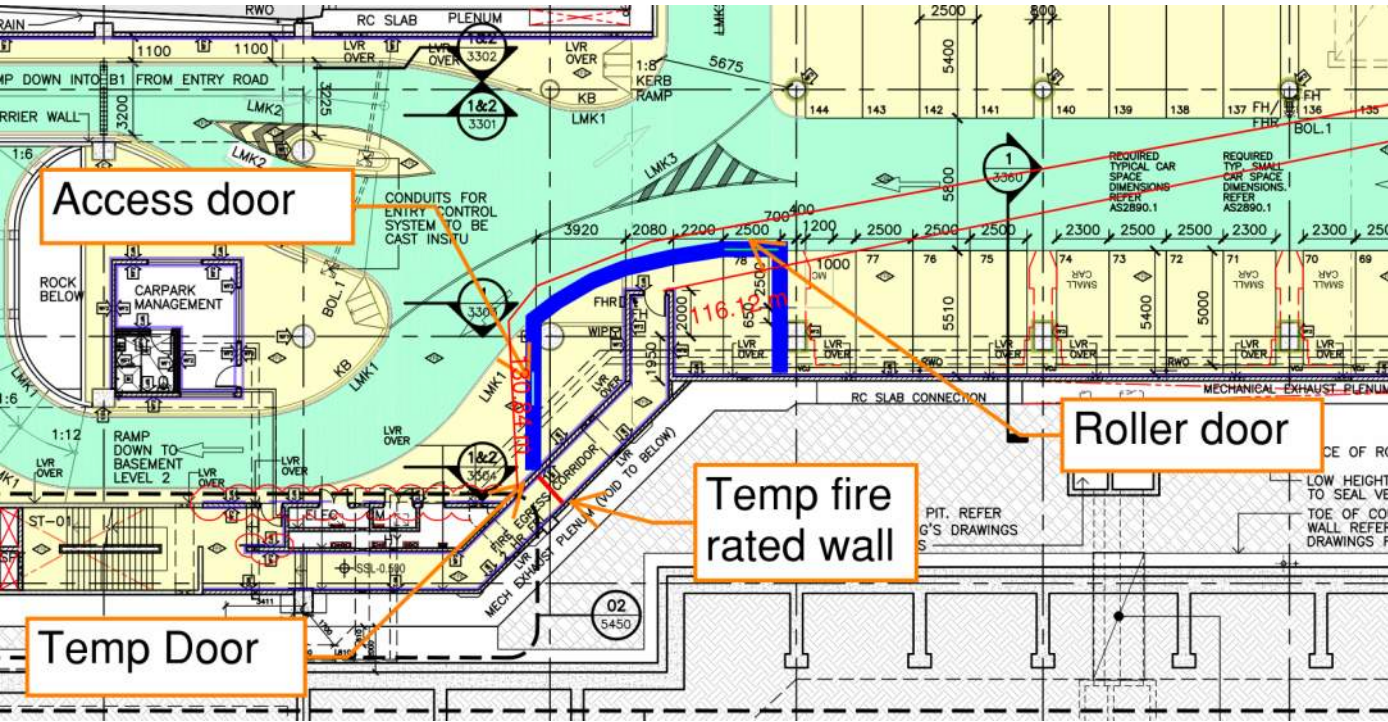


Figure 18 – Change in egress distance on Basement 02

The assessment provided by Raw Fire relies upon the reduced detection time of fast response sprinklers over standard response sprinkler heads to justify the extended travel distance.

- Detection time with fast response heads – 195s
- Detection time with standard response heads – 257s

Based upon the RAW Fire input of walking speed of 1m/s, occupants are required to travel an additional 60m and thus the travel time increases by 60s.



Based upon the fast response sprinkler heads, the detection time is reduced by 62s and thus occupants are able to evacuate 2 seconds more quickly in the performance based design.

Now that the travel distance has increased to 131m, the additional occupant travel time will increase to 71 seconds. Thus in the new design occupants in the temporary design will evacuate. As such, there will be an increase of 9 seconds and the base-building performance solution is not met. As a result, additional fire safety measures are required to offset this additional travel time.

To offset the additional travel distance, temporary smoke detection will be provided through the car park as follows:

- Smoke detection to be provided in roadway areas and circulation spaces only
- Spacing to be on a 30m x 30m grid
- Smoke detectors are not required on the car park ramps

The smoke detector activation time is calculated below:

| INPUT  |                          |
|--|--------------------------|
| Design fire  |                          |
| Growth time*   | 220 s                    |
| Convective fraction  | 0.70                     |
| Geometry   |                          |
| Ceiling height   | 2.4 m                    |
| Fuel height  | 0 m                      |
| Detector spacing   | 30.0 x 30.0 m            |
| Use 2nd row Detector?  | <input type="checkbox"/> |
| Smoke Detector   |                          |
| Room temperature   | 21 °C                    |
| Activation temperature   | 34 °C                    |
| * time for fire to grow to 1055 kW<br>slow - 600 s ; medium - 300 s; fast - 150 s; ultra-fast - 75 s |                          |
| RESULTS  |                          |
| Time at detector activation  | 117 s                    |
| Fire size at detector activation   | 298 kW                   |

Figure 19 – Smoke detection time

The additional smoke detection results in a detection time of 117s which is 78s less than the activation time for the fast responses sprinklers of 195s and is sufficient to offset the additional 11m travel distance during the temporary solution.

5.3.3 Travel via fire-isolated exits – Discharge of Stair 3 and Stair 4

The base-building Fire Engineering Report justifies the internal discharge into an internal area of Fire Stairs 3 and 4 into an internal area that is not sufficiently open around the perimeter which is illustrated in the diagram below:

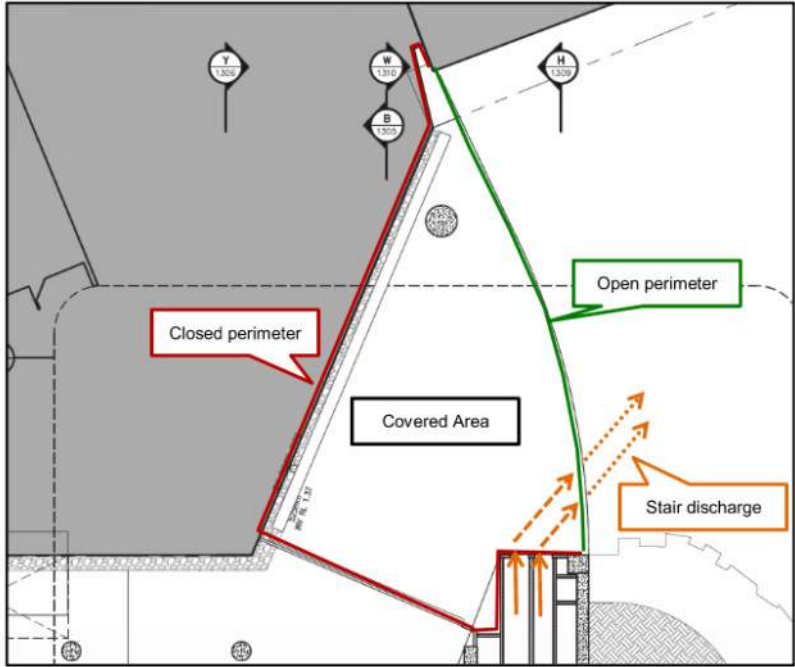
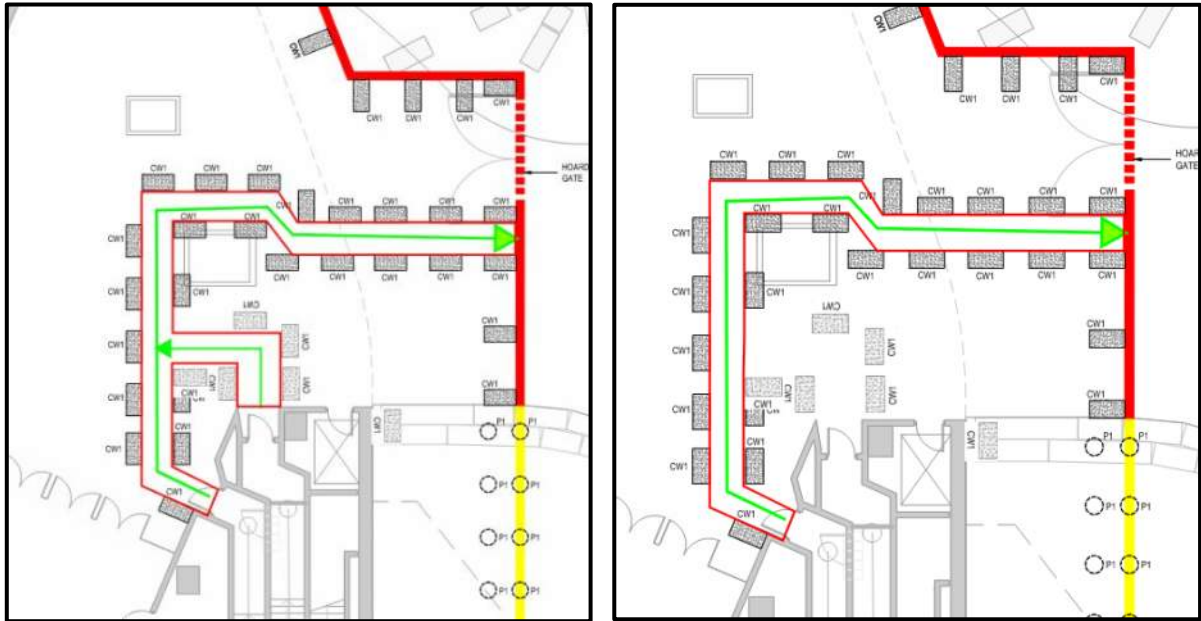


Figure 20 – Internal discharge of stairs

In the temporary arrangement during construction the following arrangement is provided:



Stage 1 – Pre-Ausgrid works approval

Stage 2 – Post ausgrid works approval

Figure 21 – Temporary discharge arrangement

During the construction period the egress route from ST04 (from Ausgrid Substation) will be diverted into ST03. As a result, occupant exiting from the substation will need to travel further undercover then in the current arrangement. The egress routes will not be covered.

Based upon the original engineering analysis in the base-building Fire Engineering Report which relies upon the large ventilation opening formed at the entry opening the current arrangement is considered acceptable as the ventilation achieved far exceeds that which could be achieved in a DtS design.



## 5.4 Occupant egress provisions

### 5.4.1 Basement Level 2

The occupant egress arrangements remain unchanged on this level

### 5.4.2 Basement Level 1

Additional smoke detection will be provided such that safe egress for occupants can be provided

### 5.4.3 Ground Floor

The entire Ground Floor will be a construction site and will be enclosed by hoarding and access gates at each end of the site. A total of 9 metres of egress width will be provided from this level being

- 4m through the fire tunnels
- 5m of egress width provided at the loading dock side of the level

Based upon the BCA D2D9 – Width of exits and paths of travel to exits, an egress width of 9m is sufficient to cater for an occupancy of 1250 persons. The total occupancy of the construction site shall not exceed 1,250 persons.

### 5.4.4 Level 02

Level 02 is provided with two exits and thus the occupancy shall not exceed 200 persons.

### 5.4.5 General egress requirements

- All egress routes shall provide sufficient width to accommodate the intended occupants i.e. at least 1m clear path
- All exit points through hoarding shall be fitted with panic bars or free handle access that can be operated from the side on one single motion
- All secure exits doors shall release upon fire trip.

## 5.5 Access and facilities for Fire & Rescue NSW

During the construction works the location of key pieces of Fire Brigade infrastructure will remain in the current locations as illustrated in the diagrams below:

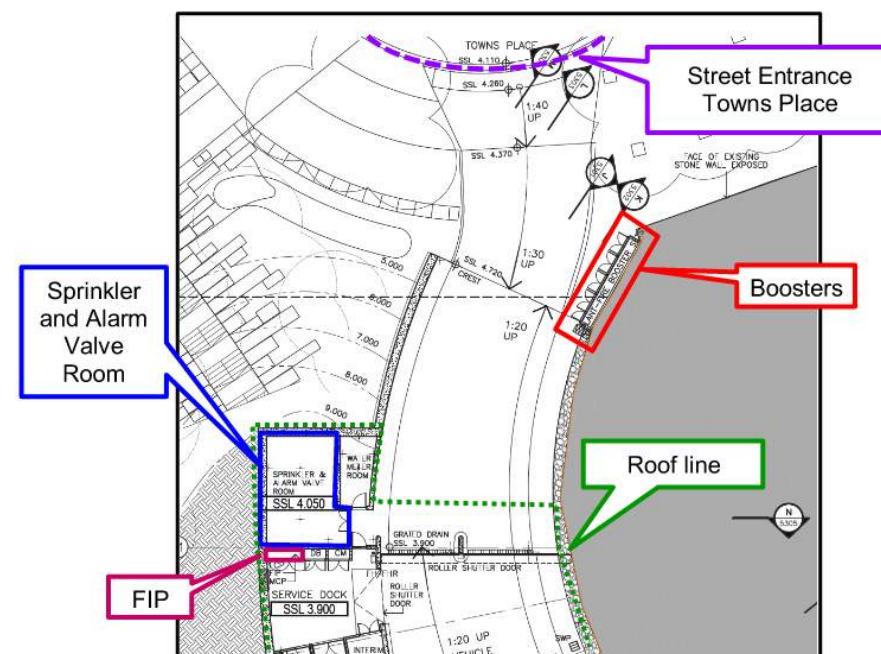


Figure 22 – Location of key fire services equipment

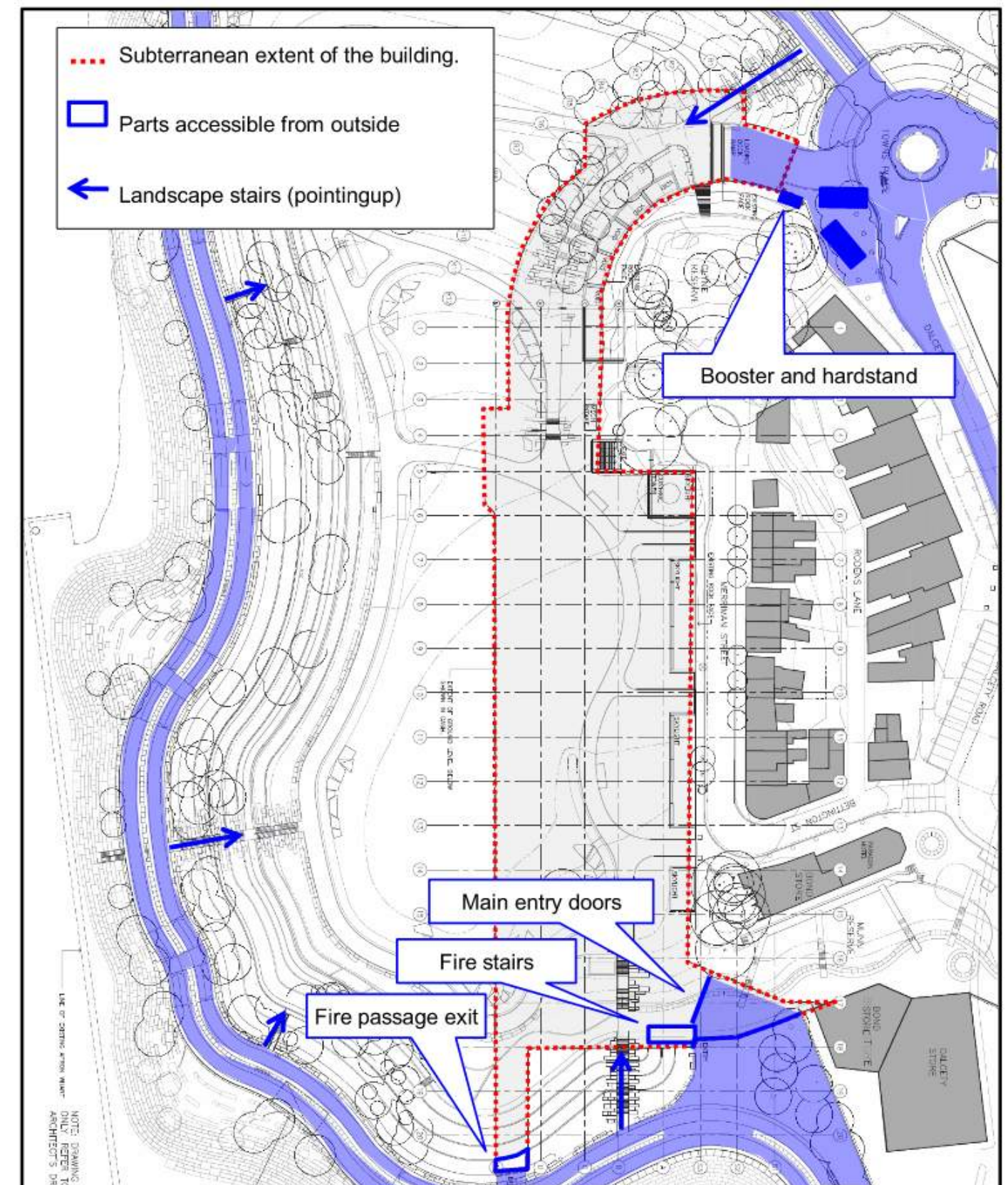


Figure 23 – Location of fire brigade vehicle access point

During construction the fire hydrant system shall remain live – with additional temporary outlets provided as required. Full fire hydrant coverage shall be provided to all areas of the construction works.

We note that the existing CO2 connection that provides suppression to the substation will be relocated and brought forward to the hoarding lien such that it is accessible to Fire Brigade appliances.



Should access be required into the substation from the Ground Floor, weatherproof signage will be provided for firefighters in prominent locations such that it is clear that access is now provided by Fire Stair ST03 and not ST04.

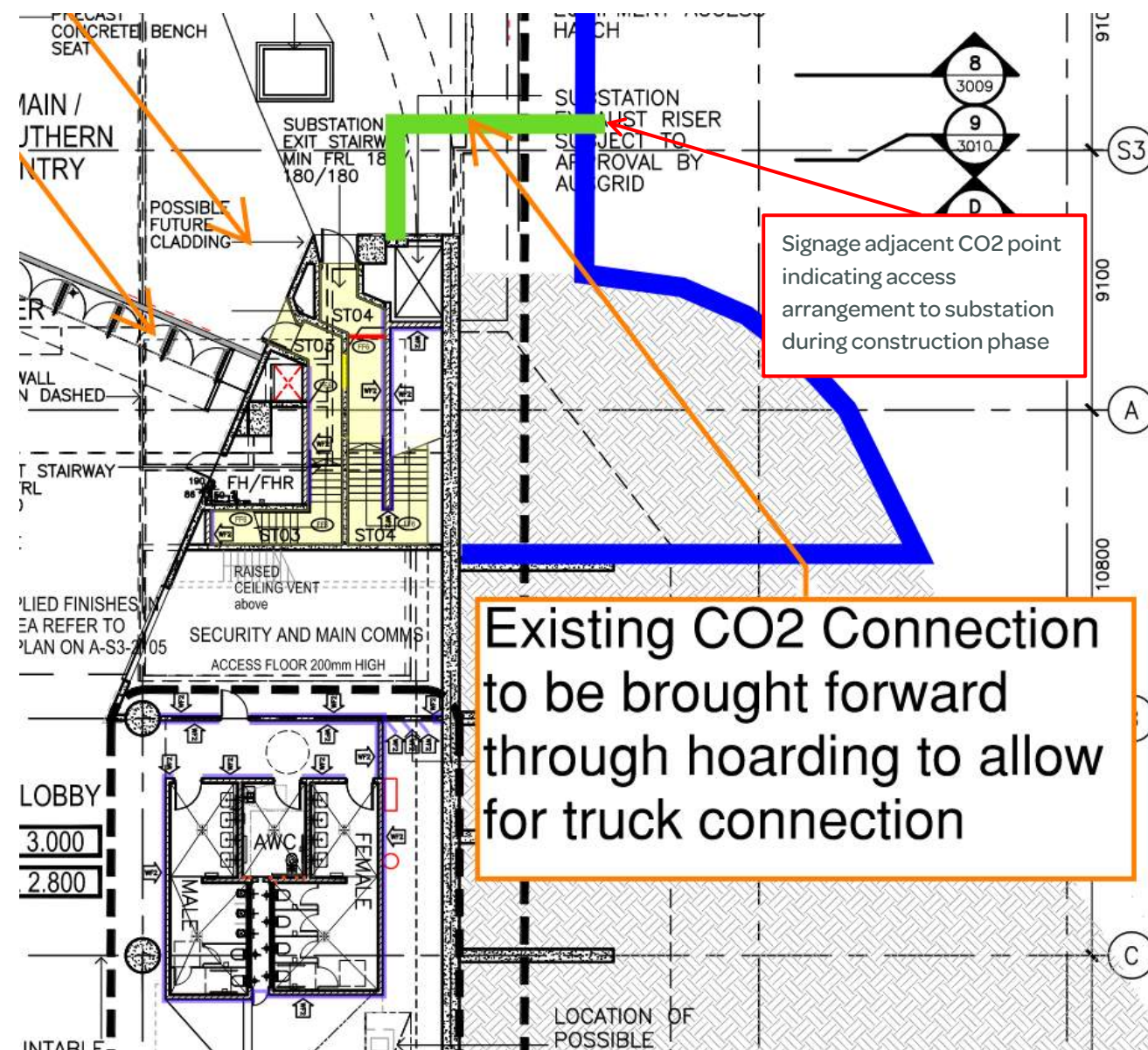


Figure 24 – Relocation of CO2 suppression point

## 5.6 Fire services strategy

As a minimum requirement *BCA E1D16 – Fire precautions during construction* will be complied with. As a result, suitably fire extinguishers will be situated throughout the construction zones – given the size of the event hall, portable fire extinguishers should be installed such that no point on the floor is more than 30m from a fire extinguisher.

Since the building has an effective height of more than 12m, the fire hydrant system will remain live throughout the works. And additional temporary outlets shall be provided as required.

At present, fire sprinklers are provided throughout the building. As part of the fitout work the existing system must be demolished and is replaced to suit the new arrangement. As the sprinkler system is installed, it will be commissioned where possible such that some suppression can be provided in the event of a fire.

However, fire sprinklers will not be provided to the event hall until towards the end of the construction period due to the sequencing of installation and the intricate detailing of the ceiling. Where this occurs, it is typically best practice to provide a

thermal detection system throughout affected areas. Whilst the thermal detection system will provide no suppression, it allows for fire detection.

We note that thermal detection cannot be provided over the event hall space since the ceiling height is greater than 12m and would likely pose a safety in design risk. Furthermore, given the height of the event hall there may be a significant delay in the activation of a thermal detection system.

An alternative would be to install the VESDA system that forms part of the final design solution. However, this is challenging since the pipework is wrapped around the ‘trees’ in the final design.

In lieu of the thermal detection system the following fire detection systems are recommended:

- Installation of beam detection over the event space. This system will be brought online overnight when the construction zone is not occupied.
- Installation of manual call points to align with the location go fire extinguishers requirements i.e. such that no point on a floors more than 30m from a manual call point.

Statutory signage shall be provided to all firefighters equipment such that it can be readily identified by occupants in an emergency.



## 6. FIRE SAFETY MEASURES

### 6.1 General

This section presents the fire safety measures that must be implemented as part of the fire safety management strategy for the construction phase of the Cutaway project

We note that the PCBU is responsible for developing the overall emergency management procedures for the construction phase of the project. This Fire Safety Strategy can be used to inform the emergency management procedures and plan.

### 6.2 Base-building Fire Engineering Report.

The existing RAW Fire Safety Engineering Report shall be applicable to all live and non-construction zone parts of the building throughout the construction process

This Fire Safety Strategy deals with the interface issues and between construction zone and live building areas. If there is a conflict between the requirements of this document and the base-building Fire Engineering Report within the scope of works outlined in this report – this Fire Safety Strategy shall take precedence.

### 6.3 Egress

#### 6.3.1 General

- All egress routes shall provide sufficient width to accommodate the intended occupants i.e. at least 1m clear path
- All exit points through hoarding shall be fitted with panic bars or free handle access that can be operated from the side on one single motion
- All secure exits doors shall release upon fire trip.

#### 6.3.2 Re-arrangement of egress routes

The following changes to egress routes are permitted:

- Egress from Basement 1 in ST01
- Egress from Ausgrid Substation via fire stairs ST03 and ST04 – alterations to the discharge paths are also acceptable.

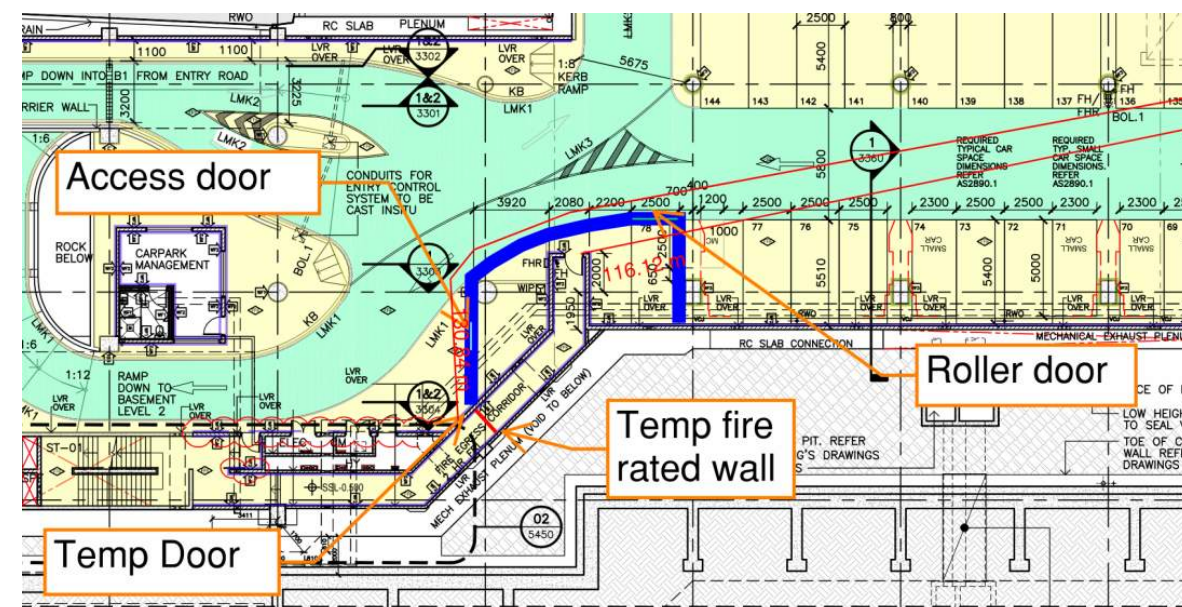
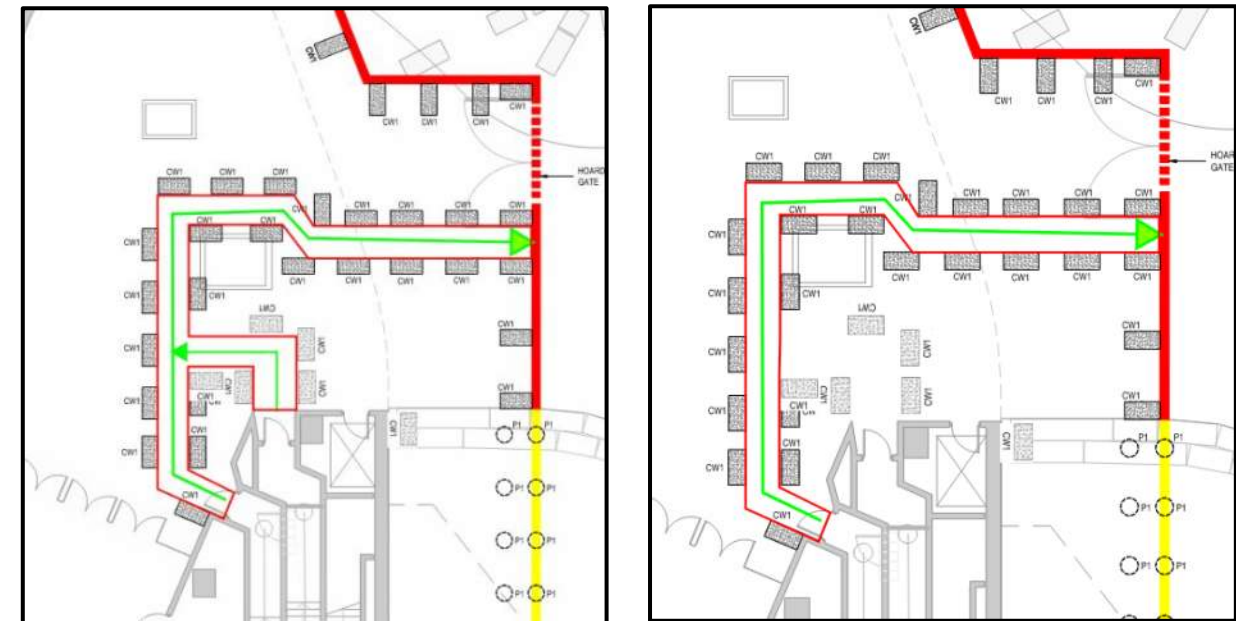


Figure 25 – Change in egress distance on Basement 02



Stage 1 – Pre-Ausgrid works approval

Stage 2 – Post ausgrid works approval

Figure 26 – Temporary discharge arrangement

#### 6.3.3 Distance between exits

The following additional travel distance will be provided in Basement 1 to support the temporary work zone around the exit.

- Travel distance between exits of up to 131m.
- Additional smoke detection shall be provided – see Section 6.4.5 for further detail.

#### 6.3.4 Width of exits and paths of travel to exits

The following minimum egress widths shall be provided:

- The existing egress width shall be maintained on Basement 01 and 02
- 9m of egress width shall be provided from Ground Floor
- 2m of egress width shall be provided from the Level 02 lunchroom area

#### 6.3.5 Operation of latch

Doors in required exit, or forming part of a required exit, or in the path of travel to an exit shall be readily openable in accordance with BCA Clause D2D26. All doors required for egress will unlock in fire mode.

#### 6.3.6 Door swing

Doors in required exit, forming part of a required exit, or in the path of travel to an exit, shall swing in the direction of egress

#### 6.3.7 Number of occupants

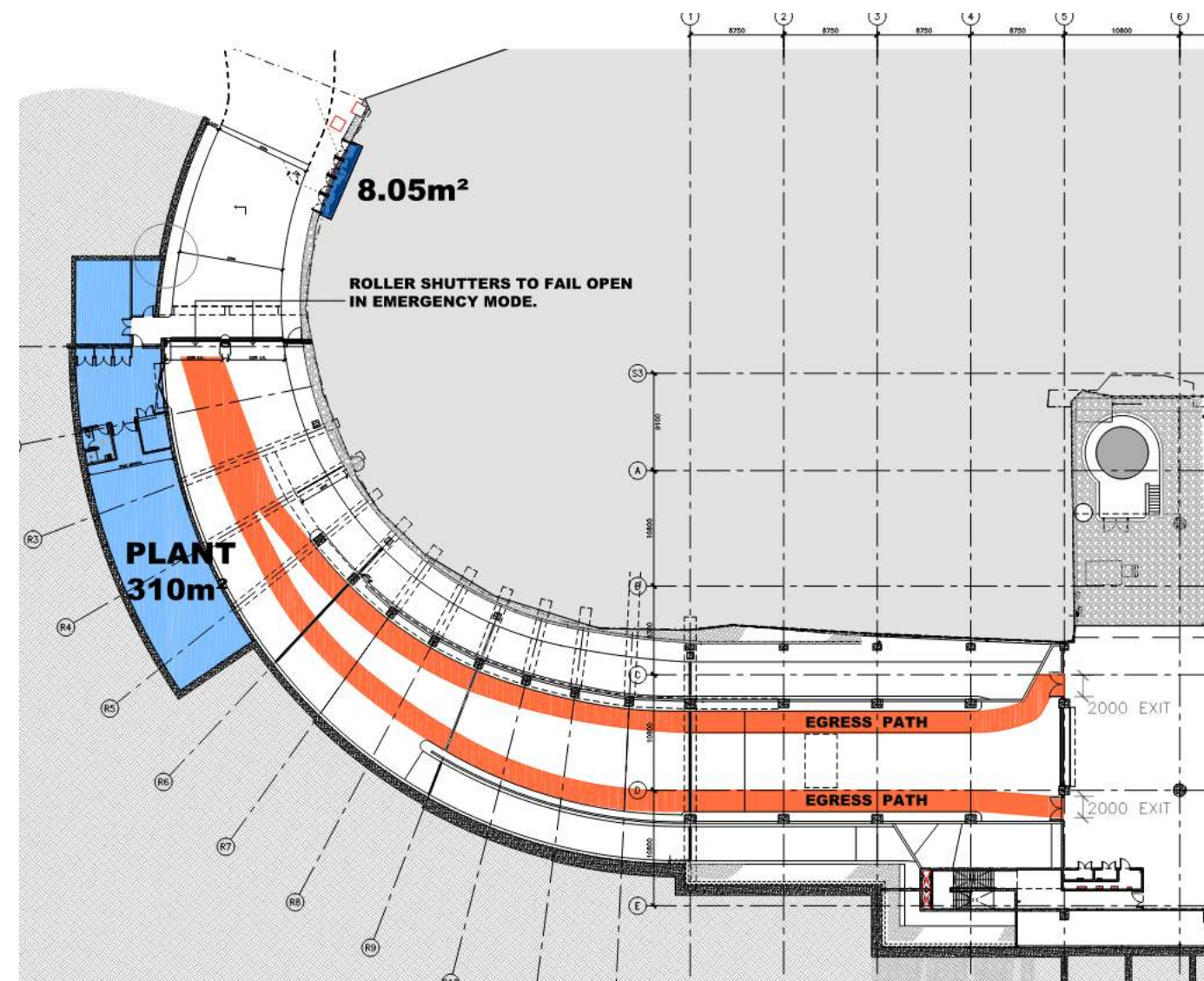
The building population shall be as follows:

- Basement 2 – 200 persons
- Basement 1 – 200 persons
- Ground floor – 1,250 persons
- Level 2 – 200 persons



All egress routes required to pass through construction areas shall be at least 1m wide and keep clear at all times. Where there is a risk of materials being stored on the egress route, the egress route shall be delineated on the ground such that it is visible to evacuating occupants

The existing egress routes through the drive as shown below shall be maintained during the construction works as shown in the figure below.



**Figure 27 – Existing egress route to street shall be maintained**

## 6.4 Services and equipment

### 6.4.1 Fire hose reels

- Where practicable existing fire hose reels shall remain operational throughout the construction zone
- Fire hose reels are to be connected to closed pipework with the hose reel service isolating valve opened so they are ready for operational use at any time.
- Fire hose reels are to be connected to a pressurised water supply capable of providing the minimum flow and pressures required by AS 2441
- The use of fire hose reels by workers on-site should be included within the emergency response procedures and by persons trained in their use.

### 6.4.2 Portable fire extinguishers

- ABE dry-chemical powder portable fire extinguishers is to be provided to meet the requirements of the BCA.
- Additional ABE extinguishers shall be provided such that occupants are no more than 30m from an extinguisher located in construction areas
- Each fire extinguisher should be installed in a manner which allows it to be readily visible and accessible by workers (e.g. appropriate location, signage, mounting).
- Additional fire extinguishers should be provided to cover any specific fire risks and hazards on the storey (e.g. water, CO2, foam fire extinguishers).
- The condition and contents of each fire extinguisher should be checked at regular intervals to ensure they remain suitable for use in the event of fire.

### 6.4.3 Fire hydrants

- The existing fire hydrant system shall remain operational through all areas of the construction works
- Additional temporary outlets shall be provided as required to ensure complying fire hydrant coverage is provided.
- When isolating the fire hydrant system for building works, valves must be reopened as soon as works are complete.
- All inlets, outlets and valves of the fire brigade booster assembly are to be clearly identified by weather resistant signage, temporary or permanent, when the fire hydrant system is operational during construction
- Existing fire hydrant infrastructure shall remain operational through the construction works.

### 6.4.4 Automatic fire sprinklers

- The existing sprinkler systems are to be maintained where practicable.
- The installation of the automatic fire sprinkler system should be managed so that a partly-installed, or modified system, can be made operational in the event of fire.
- During construction, partly installed sprinkler system with isolation valves to completed areas being open can be boosted by a fire appliance to assist with firefighting operations – this should be achieved where practicable.
- The fire sprinkler system is to incorporate a fire brigade booster so that the system can be boosted by a fire appliance.
- The fire brigade booster is to be connected to riser pipework which is a closed pipe system ready for operational use at any time (i.e. riser pipe capped, isolation valves kept open, pipework pressure sealed).

### 6.4.5 Smoke detection and alarm

Smoke detection in lives shall be maintained operational through the construction works

A thermal detection system shall be provided to all areas of the construction zone where practicable

In lieu of the thermal detection system the following fire detection systems are recommended:

- Installation of beam detection over the event space. This system will be brought online overnight when the construction zone is not occupied.
- Installation of manual call points (break glass) to align with the location go fire extinguishers requirements i.e. such that no point on a floors is more than 30m from a manual call point.

#### 6.4.6 System and Intercom System for Emergency Purposes (SSISEP)

A SSISEP is provided throughout the building. This shall be maintained through construction areas and interfaced appropriately with live areas.

#### 6.4.7 Plans and specifications

- The EP&A Reg. requires the PCBU to keep the most recently endorsed copy of the plans and specifications of any relevant fire safety system on the construction site, and to make them available for inspection by the fire brigade.
- If an interim design of a relevant fire safety system is being adopted for the duration of construction, including for staged development, the plans and specifications relating to the interim design are to be provided.
- The PCBU is to keep the plans and specifications in a temporary 'emergency information' container

### 6.5 Fire brigade intervention

#### 6.5.1 Fire brigade vehicle access

- Fire brigade vehicle access to the construction site, fire brigade booster and fire hydrants shall be maintained as existing.
- The primary vehicle access point for the site (i.e. door/gate) is to be readily identifiable and accessible at all times, including after-hours when workers have left.
- When carriageways are not available (e.g. the space is being used as a construction workspace), temporary access and hardstand areas shall be provided including potential use of adjacent public roads.
- Perimeter roads around buildings which provide fire brigade vehicle access to operational fire hydrant valves should be negotiable by a fire appliance even if the road is not finished (i.e. minimum clearance and have formed loadbearing surface).
- Required access and hardstand areas are to be kept clear and accessible at all times, including not being used for private parking (by workers), delivery drop-off, building material storage, waste storage, placement of plant and equipment.

#### 6.5.2 Firefighter access

- Firefighter access to fire hydrant valves and the fire brigade booster are to be kept clear and accessible at all times, including not being obstructed by parked vehicles, building materials, waste, plant and equipment, vegetation etc.
- If hoarding is being used for building security, building access points are to be readily identifiable and accessible, including after-hours when workers have left.
- Stairs and corridors providing safe evacuation routes for persons also be kept clear and fully accessible to provide safe access for firefighters.
- Exit points should be identified by signage, temporary or permanent, if accessible parts of the building provided by each doorway cannot be readily determined

### 6.6 Fire safety management

#### 6.6.1 Roles and responsibilities of stakeholders

- The builder is the principal contractor engaged by the owner to undertake building works and is the PCBU responsible for providing a work health and safety management plan for the construction site.
- The PCBU is responsible for ensuring all persons at a construction site (e.g. sub-contractors, owner/tenants, visitors etc.) are appropriately inducted, trained and supervised on workplace fire safety (see section 12).
- Any sub-contractor, whether engaged directly by the owner or by the builder, is also responsible for undertaking risks assessments on the work they are engaged to undertake.

- Sub-contractors are responsible for adhering to the work health and safety management plan of the construction site, and if any conflicts in procedures arise, bring the issue to the immediate attention of the PCBU.
- A fire safety plan may often change to align with construction stages. The builder and sub-contractors must regularly communicate on such changes.

#### 6.6.2 Fire safety plan

- The PCBU is to undertake comprehensive risk assessment of fire safety and develop mitigation strategies into the schedule of building works, including activation of fire safety systems appropriate to each completed construction stage.
- A fire safety plan shall be developed, approved and implemented prior to commencing building works to which it relates.
- The PCBU is to develop a fire safety plan commensurate to the complexity of the site/building work being undertaken, which is to consider the following:
  - reducing possible ignition sources
  - reducing potential fuel sources
  - fire safety measures/systems, and
  - emergency response procedures.
- The fire safety plan is to be reviewed regularly and in conjunction with planned construction stages and communicated to all persons at the construction site.
- The fire safety plan is to identify required fire safety systems (e.g. fire hydrant system) and recommended measures to be implemented, such as interim measures for when an existing system is being isolated during the construction period.
- The fire safety plan is to identify emergency response procedures to be implemented for the construction site in the event of fire
- The fire safety plan is to identify the emergency response procedures for the workplace (i.e. construction site) in the event of fire, which includes:
  - activation of emergency warning sounders to alert persons on-site (e.g. air-horn)
  - first attack firefighting by persons (e.g. use of fire extinguishers, hose reels)
  - specific instructions relating to high-risk construction or combustible materials
  - an evacuation plan which identifies safe egress routes and assembly area/s
  - assisting isolated persons (e.g. crane driver, harnessed operator at height), and
  - alerting and evacuating adjacent occupied buildings, including within the same building, any moveable building or from the deck of any Type B hoarding.
- The PCBU is to ensure all persons receive appropriate training on the emergency response procedures including activating emergency warning sounders, safe evacuation, use of firefighting equipment.

#### 6.6.3 Emergency services information

The PCBU is to provide information specifically relevant to emergency services in the event of a fire or other emergency incident during the construction period.

Emergency services information is to include:

- a general layout drawing of the current as-built building and/or construction site, which clearly identifies occupied areas and construction zones
- the most recent endorsed copy of plans and specifications of any relevant fire safety system
- the current evacuation plan applicable to the construction site



- the emergency plan applicable to an existing occupied building
- any fire impairment notice applicable to any existing fire safety system serving an existing occupied building, and
- any hazardous chemicals manifest or safety data sheets applicable.

The relevant fire safety system plans are to identify the state of installation and whether fully operational or part-operable, including identifying the actual locations of installed fire hydrant valves, fire hose reels, fire brigade boosters, isolation valves, fire pumps and water supplies, and whether being permanent or temporary.

A copy of the emergency services information is to be kept within a weatherproof 'emergency information' container prominently located at the designated site or building entry point and/or adjacent to the fire brigade booster.

The 'emergency information' container is to be secured with a 003 lock to prevent unauthorised access (i.e. the container is a locked box).

The 'emergency information' container is to be coloured red with white 'Emergency Information' lettering, minimum 40mm height, on the front

#### 6.6.4 Risk assessment and mitigation

- The PCBU is to implement a hierarchy of control measures for the construction site including providing fire safety information, training and instruction appropriate to the fire safety plan that is developed.
- The PCBU is to implement site management procedures for general safety including induction, equipment use, equipment checks, safety inspections, clean site (i.e. rubbish removal), material storage, communications/reporting, drills etc.
- The PCBU is to ensure all 'hot-works' is undertaken in accordance with Australian Standard AS 1674.1-1997 (R2016).
- The PCBU is to implement procedures to control potential ignition sources, such as:
  - o naked flames – ensure clear space around gas burners/heaters or open- flame equipment, ensure no incineration occurs on-site
  - o hot-works – ensure permit and safe working practice when undertaking hot- works, locate fire extinguishers near the works
  - o smokers' materials – prohibit smoking via display of 'no smoking' signage, allocate a designated smoking area away from site or combustible materials
  - o plant and equipment – refuel in a safe area, ensure hot exhaust clearance, use in ventilated areas only
  - o electrical – use safe electrical equipment (i.e. tagged), do not overload power-boards or circuits, do not bunch cables
  - o other heat sources – keep lamps, heaters and dryers clear from combustible materials, deter arson by securing the site, and
  - o external threats – minimise exposure to adjacent potential fire sources (e.g. building, grass) by reducing on-site materials storage and/or install hoardings or non-combustible (metal) sheeting as a barrier.
  - o open structure – minimise exposure of combustible materials in an open building structure (e.g. lack of fire compartmentation)
  - o hoarding and formwork – consider fire spread, provide fire barriers or other forms of protection
  - o stored products – minimise volume and separate piles, consider collapse hazard risks during a fire through appropriate methods of storage
  - o scaffold netting – use fire-resistant sheeting or low-flammability netting, do not use domestic shade-cloth
  - o waste and rubbish – remove waste daily and do not allow to pile; dispose of packaging and protective coverings immediately, especially foam and plastic

- o flammable liquid or gas – quarantine in a safe and well-ventilated area and keep clear from heat and ignition sources, do not allow smoking/naked flames near flammables
- o finishes, fixtures and furnishings – store and install in safe manner, keep clear from potential ignition sources, dispose of packaging material, and
- o fall arrest bags – use fire resistant air cushions/bags (i.e. no polystyrene).
- The PCBU is to implement appropriate security arrangements (e.g. fencing with locked gate). Alarm system, video surveillance, 24/7 security should also be considered to restrict unauthorised access and deter arson, particularly after-hours when workers have left the site.
- The security should not prohibit firefighter access (e.g. use non-hardened metal chain and lock which can be forced open using bolt-cutters if needed).
- The PCBU should nominate a person responsible for overseeing the implementation of the fire safety plan, including checking fire extinguishers, ensuring clear access to fire safety systems, and keeping evacuation routes clear and free of obstructions.
- All fire services should be as full operational as possible at all times and restored to full capability at the end of the workday.

## 7. CONCLUSION

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This fire safety strategy has assessed the proposal for the construction strategy provided by FDC Construction & Fitout for the Cutaway project.

Provided the FDC implement the appropriate for safety management procedures, that incorporate the recommendations of this report) and fulfill their requirements under health and safety legislation, then sufficient fire safety measures to provide for reasonable safety of occupants and fire fighters shall be in place during construction works.



## 8. LIABILITY AND LIMITATIONS

### 8.1 Liability

This Fire Engineering Report is applicable to the scope of works for construction of the Cutaway only. It should be recognised that this report does not provide a guarantee that a fire will not occur with potential to cause casualties or damage.

Minerva Group (NSW) Pty Ltd cannot be held liable for any loss or damage resulting from any defect of the building or its services or equipment or for any non-compliance of the building or its services or equipment with any legislative or operational requirement, whether or not such defect or non-compliance is referred to or reported upon in this report, unless such defect or non-compliance should have been apparent to a competent engineer undertaking the assessment of the type undertaken for the purpose of preparation of this report.

The fire safety assessment and recommendations have been based on the building architectural layouts and the information provided. Any change in this information to suit future building works or re-organisation will require further analysis to confirm compliance with the regulations and our reports.

### 8.2 Limitations

This report does not provide guidance in respect of areas, which are used for bulk storage, processing of flammable liquids, explosive materials, multiple fire ignitions or sabotage of existing fire safety systems.

Minerva Group (NSW) Pty Ltd has compiled this report based on the information provided. Note that this report is based upon information provided by the client – some of which may not have been verified.

Potential incendiary risks are limited in the scope of engineering design. Conventional building design can only provide limited protection against malicious attack; for example, large scale incendiary and multiple ignition sources can potentially overwhelm some fire safety systems.

Strategies such as security, housekeeping and other management procedures may be more effective than additional fire protection measures in addressing arson events.