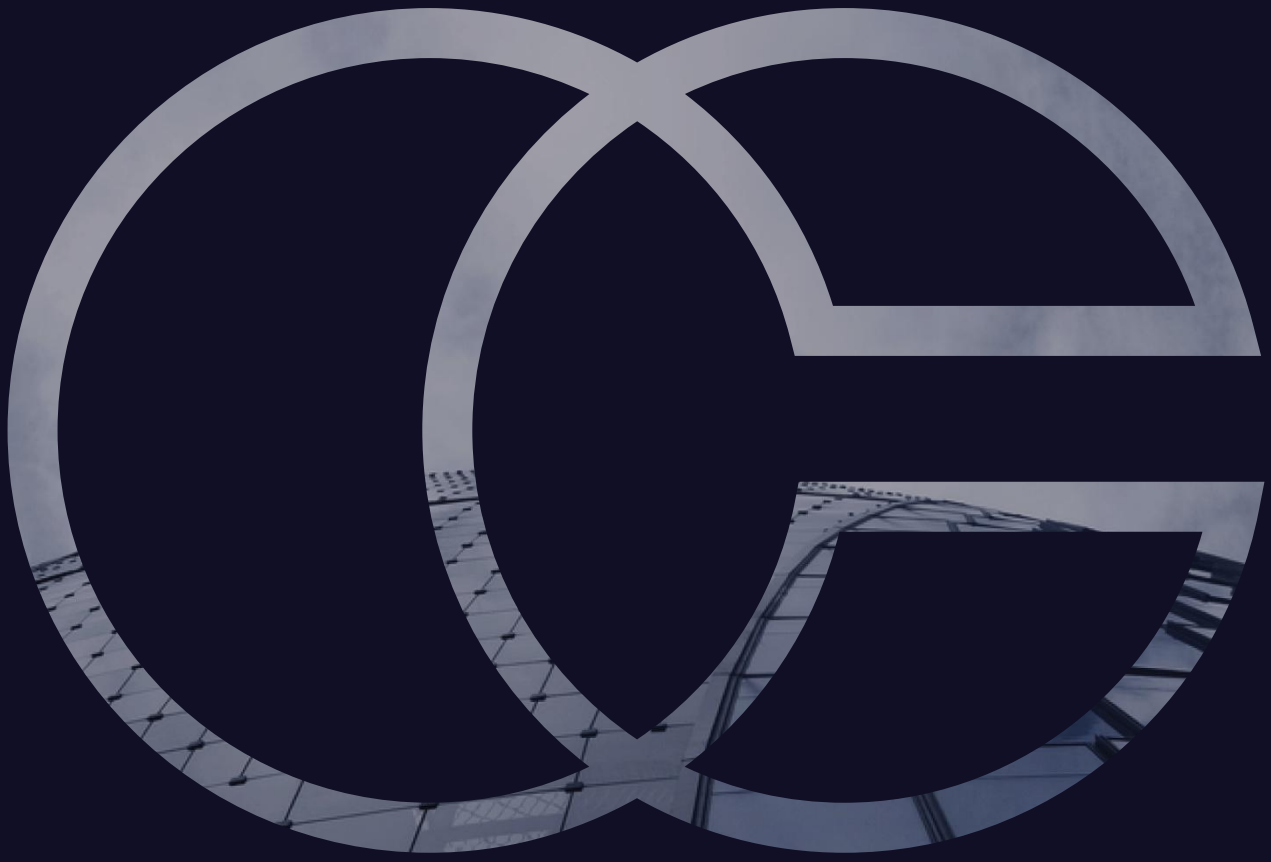

Leading the way with fire safety

Fire Safety Concept Strategy

Kogarah Golf Club Redevelopment
13-19A Marsh St, Arncliffe NSW

Client: Stockland

28 April 2026
Report No. F202444_FSCS_04

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1. Executive Summary

CORE Engineering Group has been engaged by Stockland to prepare a Fire Safety Concept Strategy for the Kogarah Golf Club Redevelopment located at 13-19A Marsh St, Arncliffe NSW. The project encompasses an estate with logistics and mixed-use development schemes.

The purpose of this report is to document the proposed holistic fire safety strategy for the building including the likely fire engineering trial design which has been established based on review of the proposed documentation, consultation with the client and relevant stakeholders and CORE Engineering Group's previous experience.

Due to the complexity of the building design, a fully prescriptive approach of complying with the National Construction Code, Volume 1 2022 Amendment 2 (NCC) Deemed-to-Satisfy (DtS) Provisions for occupant egress, fire resisting construction, fire services, and fire brigade intervention would not satisfy the desired architectural, operational and client aspirations.

The fire safety strategy presented herein is considered capable of meeting the Performance Requirements of the NCC, subject to validation and verification of any assumptions made through detailed fire engineering analysis.

Through ongoing design development, the strategy proposed herein shall be amended and adapted based on consultation with the design team to develop the scope for the Performance Based Design Brief, and ultimately for the Fire Engineering Report for Construction.

Contents

2. Introduction

2.1 Overview

CORE Engineering Group has been engaged by Stockland to prepare a Fire Safety Concept Strategy for the Kogarah Golf Club Redevelopment located at 13-19A Marsh St, Arncliffe NSW. The project encompasses an estate with logistics and mixed-use development schemes.

2.2 Scope

The purpose of this report is to document the proposed holistic fire safety strategy for the building including the likely fire engineering trial design which has been established based on review of the proposed documentation, consultation with the client and relevant stakeholders and CORE Engineering Group's previous experience.

Due to the complexity of the building design, a fully prescriptive approach of complying with the National Construction Code, Volume 1 2022 Amendment 2 (NCC) Deemed-to-Satisfy (DtS) Provisions for occupant egress, fire resisting construction, fire services, and fire brigade intervention would not satisfy the desired architectural, operational and client aspirations.

As such, Performance Solutions to satisfy the Performance Requirements of the NCC have been proposed to account for the identified departures from the DtS Provisions.

2.3 Sources of Information

This following sources of information have been relied upon to develop this FSCS:

- National Construction Code, Volume 1 (2022 Amendment 2).
- Architectural drawing set prepared by Grimshaw Architects dated up to 21/11/2025.
- BCA advice provided via markups prepared by BM+G as transmitted to CORE on 17/11/2025.
- Teams meeting held with FRNSW on 16/04/2026, to discuss brigade intervention opportunities.
- Design meetings held to date.

2.4 Limitations, Assumptions and Exclusions

- This document represents the opinions of CORE Engineering Group based on the information known at the time of preparation of this document. Opinions, findings, and recommendations detailed in this document are based on our understanding and interpretation of current statutory and regulatory obligations and standards and should not be construed as legal opinions.
- This document has been prepared for guidance only, and any parties relying on this should be cognisant that the recommendations are preliminary and subject to detailed analysis and authority approvals.
- This report does not constitute a fire engineering report (FER) that addresses the Performance Requirements of the BCA.

3. Building Description

3.1 Site Context

The development site is located in the suburb of Arncliffe, approximately 13 km south-west of Sydney CBD.
The site is bounded by Cooks River and Sydney International Airport to the east, Marsh Street and a TfNSW site to the west, and a riparian area as well as the M5 motorway to the south – as shown in Figure 3-1. Principal pedestrian and vehicular access is from Marsh St with internal vehicle circulation to facilitate the movement of trucks.

Figure 3-1: Development Site Context (Nearmap)

3.2 Building Description

The proposed site consists of a number of buildings at the development site at 13-19A Marsh St, Arncliffe NSW, and proposes two main schemes (logistics and mixed-use), noting that the final arrangement may incorporate components of each such that there are more than 2 potential outcomes for the built form in its final state.

Logistics Scheme: (refer to Figure 3-2)

- Building 3A: a multi-storey industrial building with 6 industrial storeys, consisting of a shared central hardstand with ancillary offices (2 per warehouse storey), for a total rise in storeys of 12.
- Building 3B: a multi-storey industrial building with 6 industrial storeys, consisting of a shared central hardstand with ancillary offices (2 per warehouse storey), for a total rise in storeys of 12. This building may also incorporate a potential staging split.
- Building 3C: a multi-storey industrial building with 4 industrial storeys, consisting of a shared central hardstand with ancillary offices (2 per warehouse storey), for a total rise in storeys of 9.
- A minor retail building is also allocated to support the estate.

Mixed-Use Scheme: (refer to Figure 3-3)

- Building 3A: *unchanged per logistics scheme*.
- Building 3B: floorplate extent is reduced compared to the logistics scheme, to create space for 3 additional buildings:
  - 2 of these building incorporate retail components at ground level, with carparking and hotel storeys above.
  - 1 of these buildings incorporates a retail component at ground level, with carparking and commercial storeys above.
- Building 3C: a 5-storey data centre building is proposed instead, with ancillary offices (2 per storey), for a total rise in storeys of 10.

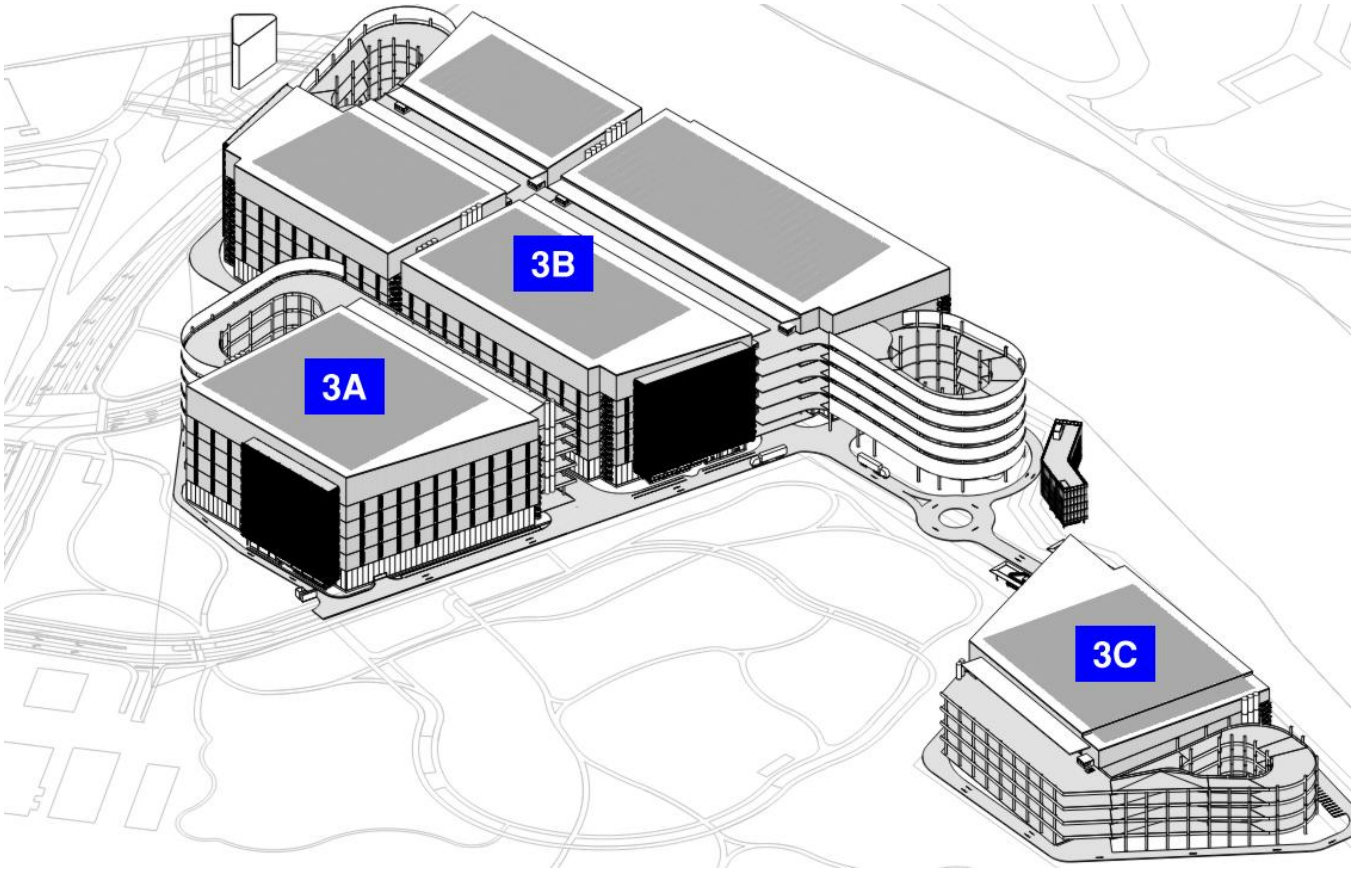

Figure 3-2: Logistics Scheme

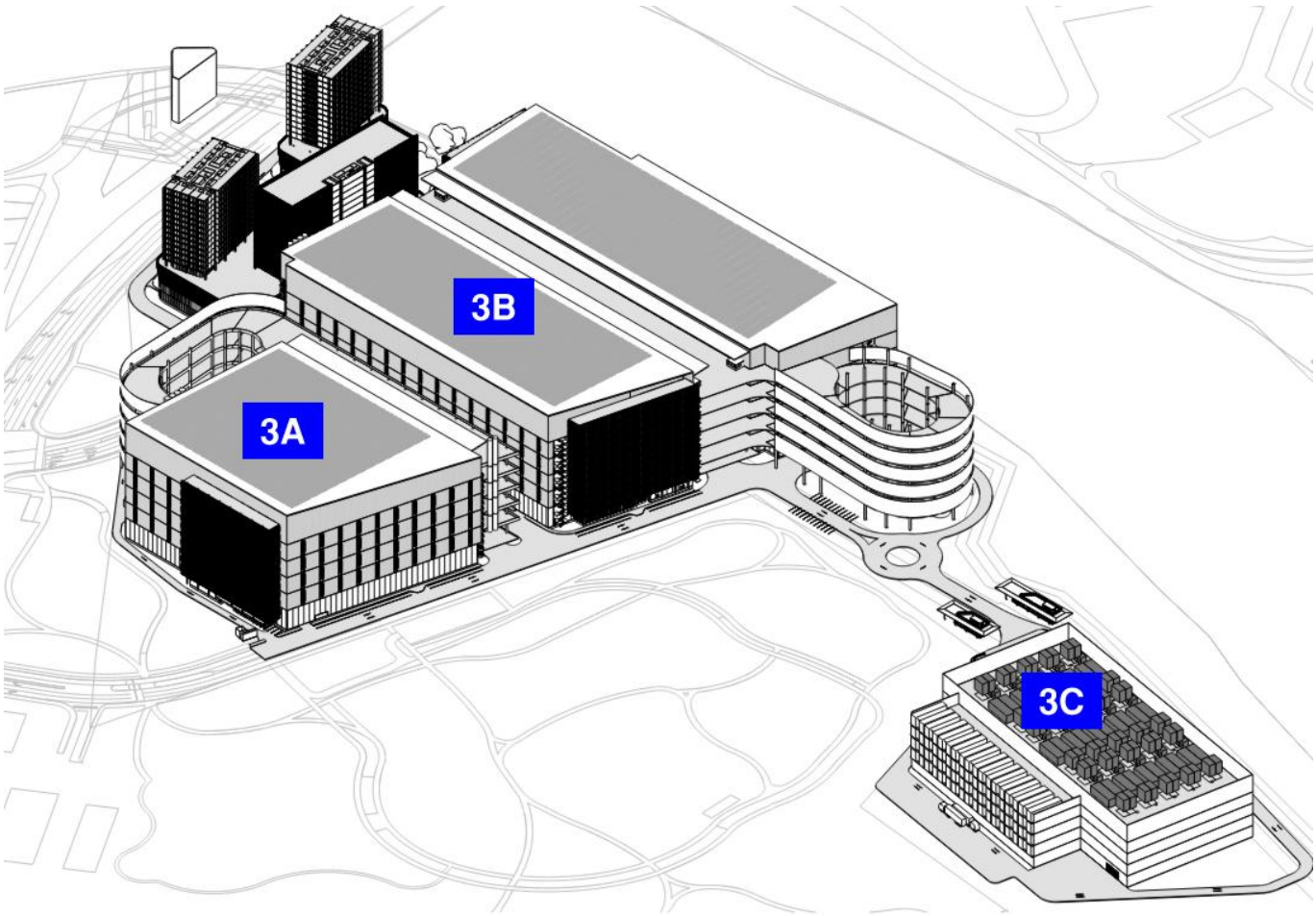

Figure 3-3: Mixed-Use Scheme

At the current time, it is understood that infrastructure is proposed to be shared amongst all buildings within the estate. Access to this infrastructure is critical with respect to the overall intervention strategy, as is the provision of hardstands for appliances to connect to the hydrant and sprinkler boosters and the associated spatial allowance. A suitable location for this consolidated infrastructure will need to be nominated.

3.3 Proposed Building NCC Characteristics

The NCC characteristics of the building influence the fire safety strategy and requirements. These characteristics are summarised in Table 3-1 and Table 3-2 based on the BCA advice. Floor-to-floor building internal clear heights for the logistics buildings are approximately 10 m.

Table 3-1: NCC Building Characteristics – Logistics Scheme

NCC Characteristic	Subject Building
Classification(s)	Class 7b (storage), Class 5 (office), Class 7a (carpark)
Number of storeys contained	3A/3B: Twelve (12) 3C: Ten (10)
Rise in storeys	3A/3B: Twelve (12) 3C: Ten (10)

NCC Characteristic	Subject Building
Type of Construction	3A/3/3C : Type A Large-Isolated Building
Effective height	3A/3B: Greater than 50m 3C: Greater than 25 m
Maximum Fire Compartment Area	>5,000 m^2
Maximum Fire Compartment Volume	>30,000 m^3

Table 3-2: NCC Building Characteristics – Mixed-Use Scheme

NCC Characteristic	Subject Building
Classification(s)	Class 7b (storage), Class 5 (office), Class 7a (carpark)
Number of storeys contained	3A/3B: Twelve (12) 3C: Nine (9)
Rise in storeys	3A/3B: Twelve (12) 3C: Ten (10)
Type of Construction	3A/3B/3C : Type A (Large-Isolated Building for logistics buildings)
Effective height	3A/3B: Greater than 50m 3C: Greater than 25 m
Maximum Fire Compartment Area	5,000 m^2
Maximum Fire Compartment Volume	30,000 m^3

* It is noted that the parameters noted in the above table are subject to change following further development of the mixed-use scheme.

3A

F&B / SHOPS	119 m²
OFFICE DOCK	175 m²
OFFICE LOBBY	28 m²
WAREHOUSE	62091 m²
WAREHOUSE OFFICE	4622 m²
WC DDA	161 m²
WC F	303 m²
WC M	262 m²
	67761 m²

3B

F&B / SHOPS	481 m²
OFFICE DOCK	1316 m²
OFFICE LOBBY	110 m²
WAREHOUSE	186051 m²
WAREHOUSE OFFICE	18890 m²
WC DDA	484 m²
WC F	937 m²
WC M	758 m²
	209027 m²

3C

F&B / SHOPS	117 m²
OFFICE DOCK	286 m²
OFFICE LOBBY	28 m²
WAREHOUSE	56904 m²
WAREHOUSE OFFICE	3082 m²
WC DDA	121 m²
WC F	235 m²
WC M	189 m²
	60962 m²

Figure 3-4: Indicative Floor areas for Logistics Scheme

3A

F&B / SHOPS	119.08 m²
OFFICE DOCK	174.90 m²
OFFICE LOBBY	27.56 m²
WAREHOUSE	62090.76 m²
WAREHOUSE OFFICE	4622.30 m²
WC DDA	161.28 m²
WC F	303.06 m²
WC M	261.94 m²
	67760.90 m²

3B

F&B / SHOPS	454.60 m²
OFFICE DOCK	686.40 m²
OFFICE LOBBY	82.68 m²
WAREHOUSE	144290.16 m²
WAREHOUSE OFFICE	14369.90 m²
WC DDA	322.56 m²
WC F	624.12 m²
WC M	505.93 m²
	161336.35 m²

3C

DATA CENTRE	9667.67 m²
DATA CENTRE OFFICE	4317.54 m²
DATA HALL	11378.82 m²
	25364.04 m²

Figure 3-5: Indicative Floor areas for Mixed-Use Scheme

3.4 Potential Fire Hazards Relevant to the Development

The development is likely to contain a number of fire hazards which will influence the fire safety strategy and measures required. These are documented below with the expected requirements to suitably mitigate the hazard. Addressing these hazards is not a Performance Solution however shall form part of the fire safety strategy to be agreed and accepted by the relevant stakeholders. At this preliminary stage the hazards on the following sections are expected, to be further developed through the further stages of the fire engineering approval.

3.4.1 Substation

The location of substations serving the site shall maintain a minimum separation distance of 10 m from all fire brigade infrastructure (e.g. fire hydrants, boosters). The substation shall be constructed in accordance with the requirements of the relevant supply authority.

3.4.2 Dangerous Goods

Dangerous Goods may be present within the facility, noting the design is only speculative at this point and therefore does not take into account any tenant-specific requirements. Nonetheless, Dangerous Goods across the estate shall be stored and managed in accordance with the relevant SafeWork NSW Regulations.

3.4.3 PV Cells

PV cells are expected to be proposed to the roof of the buildings. The following general design guidance is provided in order to limit electrical exposure to evacuating occupants or attending fire fighters:

- The panels shall be installed in compliance with AS/NZS 5033:2012.
- Solar panel / inverter isolation switches should be accessible from Ground Floor.
- A diagram of the solar installation shall be provided at the FDCIE showing the locations and key infrastructure and confirming whether they do or do not isolate on fire trip.
- Where insulation is proposed below the solar panels, it is recommended to be non-combustible.
- Recommended that panels are located no closer than 1 m from a roof light or other combustible portion of the roof.

3.4.4 External Electric Vehicle Charging

A number of electric vehicle chargers are anticipated to serve the facility, likely within the building footprint due to the multi-storey carparking facilities that are proposed. EVs can pose unique challenges to firefighting and evacuation. Mitigating measures are recommended for these installations, with consideration of industry guidance including ABCB's Advisory Note on EV charging, FRNSW position statement, and AFAC's Position Statement Document entitled "Electric Vehicles and EV Charging Equipment in the Built Environment".

- Where practical, charging bays shall be located greater than 6 m from the building, including any awnings.
- At a minimum, charging bays must be positioned greater than 3 m from building exit points.
- Charging bays must be positioned no closer than 10 m to fire brigade or electrical infrastructure including fire hydrants and substations.
- Charging bays should be within 70 m of the nearest fire hydrant(s) to enable fire brigade intervention.
- Where charging bays are proposed within 6 m of the building, the chargers shall be configured to automatically shut down upon fire detection within the building (e.g. activation of sprinklers or smoke detection system as applicable).
- Chargers shall be installed in accordance with AS3000, shall have RCM tick compliance, and where practical, smart charging shall be incorporated.
- The EV charger(s) should have a manual isolation switch, and the distribution board serving them should also have a shutdown switch, to be indicated on a block plan.
- A block plan clearly identifying the location of each charger on site shall be provided adjacent to the FDCIE.

3.4.5 Internal Material Handling Equipment (MHE) Charging

Forklifts within the building may be powered by Li-Ion batteries, in which case, the guidance relevant to the external EV chargers is also generally applicable, with the following considering the internal location of these:

- Charging bays shall be positioned such that they are not located on any dead-end travel paths, and are greater than 3 m from building exit points.
- Charging bays should be located greater than 6 m from DG storage, BESS, solar panel inverters, gas pipework and the like.
- The chargers shall be configured to automatically shut down upon fire detection within the building (e.g. activation of sprinklers or smoke detection system as applicable).
- The proposed charging bays should be located in an area served by an automatic smoke exhaust system.
- Chargers shall be installed in accordance with AS3000, shall have RCM tick compliance, and where practical, smart charging shall be incorporated.
- If multiple chargers are proposed in close proximity to each other, a master isolation switch should be provided in an easily identifiable location, remote from the chargers.
- A block plan clearly identifying the location of each charger on site shall be provided adjacent to each fire panel as relevant. This plan should also show the location of master isolation switch and summarise shutdown procedures.

3.4.6 Hazards Associated with Data Centres

Should a data centre be proposed for the 3C site, it is expected it will exceed the SSDA threshold of 15 MW and therefore will require an industry-specific SEARS. Based on this, FRNSW will recommend to the planning department that a Fire Safety Study be required for the site which will subsequently form part of the conditions of consent.
Further, it is noted that hazards associated with the site will need to be addressed as hazards (i.e. diesel storage, HV transformer oil, and lithium-ion batteries).

Diesel
Any subsequent Fire Safety Study will need to address the bulk storage of diesel storage for generators by complying with AS1940, AS1692 and AS4041.

HV Transformer Oil
Any subsequent Fire Safety Study will need to consider the potential impacts to the site due to an explosion/fire/spill of the HV transformer insulating oil.

Lithium-Ion Batteries
Where lithium-ion batteries are proposed to be utilised within the data centre facility (i.e. within UPS battery rooms and Power Train Units), the primary hazard associated with lithium-ion batteries is the potential for thermal runaway of the battery cells, leading to ignition of a fire and emission of flammable lithium-ion fluid. This can also lead to emission of toxic and hazardous gases such as HF. Lithium-ion batteries, if subjected to adverse conditions such as excessive heat, over charging or mechanical damage, can suffer from thermal runaway and cell rupture.
To address the hazards associated with the presence of li-ion batteries, the following considerations should be reviewed:

- Review of capacities, configurations and chemistries of battery on-site.
- Consideration of compliance requirements of FM 5-32 as this is likely to form part of the conditions of consent.
- Fire separation requirements for battery rooms and data halls that contain lithium-ion batteries, including potential impacts on the wider building structure.
- Determination of required variations to sprinkler performance above AS2118.1:2017 requirements for areas containing lithium-ion batteries (i.e. data halls and battery rooms) in accordance relevant international standards.
- Evacuation of mitigating controls for off-gas detection and associated automatic mechanical ventilation, noting this is likely to drive the requirement for a multi-point aspirating smoke detection system in lieu of a traditional point-type system.
- Allowance for contaminated water run-off from sprinkler activation and brigade hydrant operation.
- Considerations of potential customer requirements for storage of new and/or used batteries.

4. Proposed Fire Engineering Design Requirements

The below summarises the proposed fire engineering requirements likely to satisfy the Performance Requirements of the NCC. Where not specifically identified or noted, the remainder of the building elements is assumed to comply with the DtS Provisions of the NCC.

4.1 Fire Resistance

4.1.1 Structure

Type A construction is prescriptively required for all buildings on the site, which in turn requires fire ratings to external walls, external columns, internal columns, and floor slabs.

- Via a Performance Solution, it may be possible to rationalise the construction of external and internal columns of the upper storey of each of the warehouse buildings, noting that this is subject to FRNSW review and presents an approval risk.
- A Performance Solution may also be feasible to rationalise fire protection to secondary beams, subject to a review of the proposed structural design, if this is raised as a prescriptive non-compliance by the certifier.
- Vehicular ramps may be rationalised to a 120 FRL (in lieu of a 240 FRL) on the basis that they are transient spaces and open to the atmosphere, noting this may be an approval risk and is subject to endorsement by FRNSW.

4.1.2 Compartmentation

Logistics buildings shall be treated as large-isolated buildings and as such, there are no restrictions on compartment floor areas and volumes. However, compartmentation shall be afforded to each building between storeys in accordance with the DtS Provisions.

The protection of penetrations through floors and risers may be rationalised via a Performance Solution, subject to a case-by-case review of each penetration location and type.

4.1.3 Combustibility of External Walls

Where buildings are to be provided with Type A construction, combustible cladding materials are not prescriptively permitted to be incorporated within the external façade, notwithstanding the global scrutiny on the use of combustible façade materials.

Should the use of illuminated signage with an acrylic face or the like be proposed, a Performance Solution may be feasible subject to a review of the relevant components of the sign, and ensuring that signage is not located above exits or fire services infrastructure.

4.1.4 Perimeter Vehicular Access

During the Teams meeting held with FRNSW on 16/04/2026, FRNSW articulated that their current doctrine would not seek the utilisation of vehicular ramps for brigade appliances.
Notwithstanding, a perimeter vehicular access pathway is to be provided around each building, constructed with an all-weather surface capable of supporting all FRNSW appliances in accordance with NCC Provision C3D4 and the FRNSW Fire Safety Guideline "*Access for fire brigade vehicles and firefighters*". The pathway must be at least 6 m wide and located within 18 m of the building on all sides, and provide continuous travel in a forward direction around the building, noting that:

- Areas exist where the path may exceed 18 m from the building.
- Portions of the path are beneath the building footprint.
- Pinch-points may be located along the path.

The following measures should be provided as part of the design and layout of the perimeter access pathway:

- The pathway shall have sufficient width, swept paths and loadbearing capacity to support the specialist brigade appliances to appropriately stage, as per FRNSW's Guideline Clause 7 "Vehicle access requirements" and 9 "Weight and

loads", noting that a minimum 7.5 m turning circle radius is required per Clause 7.1.5 of FRNSW's guideline. Pathways must have a gradient not greater than 1:8, and afford a minimum 4.5 m height clearance.

- The foreshore path is a critical component of the overall strategy for the perimeter vehicular path, and staging setdown areas are to be provided within regular intervals (i.e. minimum every 100 m) to facilitate the staging of specialist appliances clear of any foliage as a result of the tree canopy.
  - Areas where the pathway is greater than 18 m from the building shall present limited obstructions to readily facilitate visibility of and access to each building.
- Brigade appliances shall be provided with a dedicated bay to connect to the available sprinkler tank (and hydrant tank if applicable) suction connections and otherwise set up their appliances, such that the circulation of other emergency vehicles is not hindered by the connected appliance. Line marking areas shall be provided for these designated spaces to ensure that they are not otherwise occupied.
- Gates in the perimeter access path to be on loose chain openable by 003 key, auto unlatch on fire trip, or copies of keys and swipes provided to the two local fire brigade stations.
- Staging opportunities greater than 6 m wide and within 18 m of the building to be provided at all four corners of the building and along the foreshore.

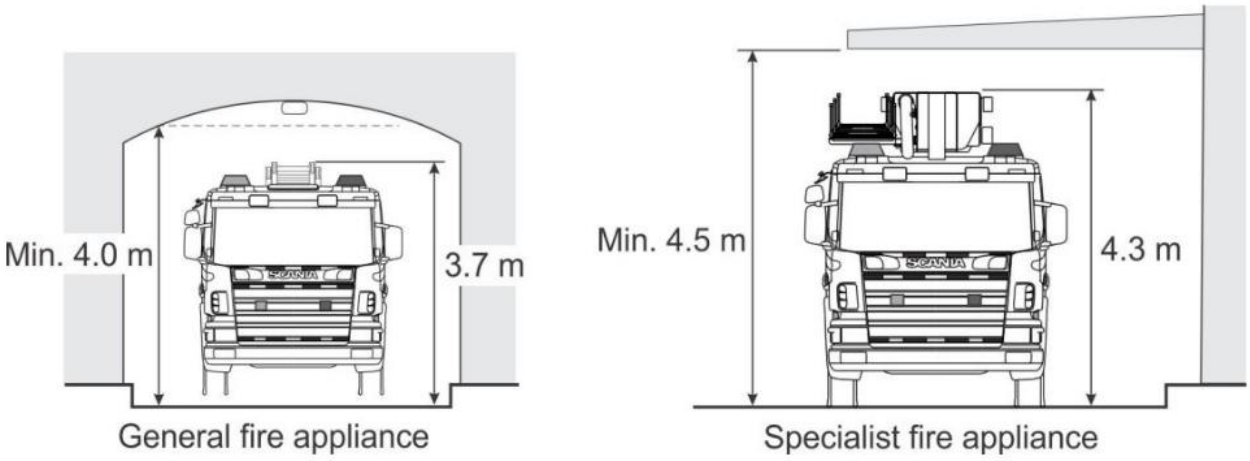

Figure 4-1: Minimum clear height for brigade appliances

4.2 Egress

4.2.1 Egress Strategy

All upper levels shall be served by stairways that are pressurised and fire-isolated from the remainder of the building. Stairways shall be evenly distributed around the perimeter of each building to minimise travel distances.

Upon initiation of the smoke detection / sprinkler systems, the EWIS shall activate throughout all areas of the fire-affected building (i.e. single evacuation zone).

4.2.2 Travel Distances (warehouse)

Due to the size of the warehouse, travel distances exceed the DtS limitations of 40 m to the nearest exit and 60 m between alternative exits, both within warehouse tenancies and upon the shared hardstands (and is based upon the indicative racking layouts provided as outlined within the architectural drawings).

- A Performance Solution is proposed, reliant on the large enclosure volume, automatic smoke exhaust system and sprinkler system present to demonstrate despite the extended distances that occupants are provided with tenable conditions for evacuation.

- More specifically, the Performance Solution shall aim to demonstrate that covered hardstands can be treated as a temporary safe refuge for the purposes of occupant evacuation (based on smoke exhaust and storage sprinklers to the hardstand areas), such that the effective travel distances can be reduced to those within the warehouse enclosures.

Precedent with FRNSW as well as commentary within AS2419.1:2021 outlines that FRNSW cannot support greatly extended distances across a floorplate – and thus they have nominated a maximum limit 100 m from any location on the floorplate to a place of safety. It should be noted that this upper limit cannot be exceeded by any fire engineering justification (quantitative or otherwise), as advised by FRNSW.

- A place of safety is deemed to be an area that is outside of the building envelope, or in a fire-protected space that leads to open space (i.e. fire-isolated stair and associated passageway, or external stairway).
- Exits are to be distributed across the floorplate to facilitate this limitation.

4.2.3 Travel Distances (other spaces)

Travel distances are anticipated to be extended in excess of the DtS Provisions within areas such as carparks and commercial spaces. Generally, these can be assessed on the basis of providing reduced detection spacing

It should be noted that travel distances to a point of choice in these areas cannot exceed 30 m (in lieu of 20 m) in order for a Performance Solution to be feasible – stair cores are to be located appropriately with due consideration of the proposed fit-out to achieve this.

For hotel corridors, travel distances in excess of 6 m to a point of choice can be assessed via a Performance Solution, reliant on the provision of medium temperature smoke seals to SOU entry doors.

4.2.4 External Stairs and Fire-Isolated Stairs

In order to facilitate the fire safety strategy, all levels located above ground shall be served by stairways that are fire-separated from the remainder of the building. Due to the effective height of each building, these stairs are required to be provided with stair pressurisation in accordance with AS1668.1:2015.

- A Performance Solution is proposed to address the instance where tenancies open directly into fire stairs.

Where stair shafts descend in a central location on the floorplate (i.e. not on the edge of the building footprint with direct egress to outside), they are to be provided with a continuous fire-isolated passageway (including exit pressurisation) leading direct to outside.

- A Performance Solution is anticipated to address stairs that discharge beneath covered areas/ramps, reliant on the ability to demonstrate that these areas are effectively open and able to readily vent smoke to atmosphere.

A Performance Solution may also be feasible to utilise external stairs in lieu of fire-isolated stairs for those that are located on the edge of the building footprint. This would be on the basis of the following:

- The external stairs being fire-separated from the building, and provided with medium-temperature smoke seals to minimise the potential for smoke to spread through the doors leading into these stairs. Where external stairs do not discharge direct to outside (i.e. in the corridor between Stage 1 and 2 of Building 3B), fire separation (minimum 3 m height) is to be provided for the full extent until occupants have evacuated clear of the building envelope.
- Provision of louvres to minimise the impact of the vertigo due to the heights of the stairs.

4.3 Fire Fighting Equipment

4.3.1 Fire Hydrant System

A fire hydrant system must be provided to serve all buildings on the site in accordance with NCC Provision E1D2 and AS2419.1:2021. As the buildings each exceeds 108,000 m^3, they are not prescriptively within the scope of AS2419.1:2021 and are therefore subject to a Performance Solution.

Wherever possible, the hydrant system should comprise external hydrant points. However, due to the size of the building, internal fire hydrants are also required. These internal hydrants are located more than 4 m from an exit and therefore do not

prescriptively comply with Clause 3.6.2 of AS2419.1:2021. Notwithstanding this, this hydrant layout shall facilitate the progressive movement of firefighters towards the central parts of the building.

- The travel distance from an external hydrant or internal hydrant located within a fire-isolated stair to the first internal hydrant on the general floorplate shall not exceed 70 m.
- The travel distance from each internal hydrant to the next internal hydrant shall not exceed 40 m of coverage.

Additional requirements for the design of the fire hydrant system include the following:

- External hydrants must have a travel path to the road, hardstand, or carriageway of less than 50 m.
- Hydrant coverage of warehouse handstands and tenancies will need to consider the potential for (progressive) hydrant coverage to be achieved via 'internal hydrant' coverage parameters – in line the Teams meeting held with FRNSW on 16/04/2026.
  - Additional stair cores are expected to be required in the design to facilitate achieving hydrant coverage within these parameters.
  - Hydrants shall be located at either ends of the hardstand on each storey, within fire stairs and external stairs. Progressive coverage shall then be afforded by locating hydrants along the walls separating the warehouse tenancies and the hardstand, and within the warehouse tenancies.
- The system should incorporate a ring main with isolation valves that are external to the building and within fire-isolated stairs or external stairs, and shall be numbered with the corresponding numbers indicated on the block plan at the booster assembly and building-specific FDCIE.
- All hose connections in the system are to be fitted in accordance with FRNSW Technical information sheet – FRNSW compatible hose connections (available at firesafety.fire.nsw.gov.au). These couplings should be tested as part of the system when the commissioning tests are undertaken.
- The hydrant booster assembly is proposed to be located within the consolidated services infrastructure zone, and shall be located greater than 10 m away from (electrical) hazards. The location of this infrastructure is subject to FRNSW approval, noting the indicative location shall be within the exclusion zone of the building (1.5 x the height of the building).
- Appendix C of AS2419.1:2021 shall be considered and implemented in the hydrant design. This shall include full duty pumps.
- AS2419.1:2021 requires 3 hydrants operating simultaneously (i.e. 30 L/s) at a minimum for industrial facilities as per Appendix C of AS2419.1:2021. However, given the extent of the floorplate and stored commodities, number of storeys, and the provision of numerous hydrants within each fire compartment across each building, a conservative approach should be taken to reduce approval risk with FRNSW, noting that the holistic hydrant design of the site shall be presented as a Performance Solution. As such, the design should allow for 5 hydrants operating simultaneously.
  - The provision for extended duration of water supply and retention provisions in exceed of the DtS requirements is to be considered in the design, following the Teams meeting held with FRNSW on 16/04/2026 where this intent was expressed. The extent of this will be subject to detailed fire engineering analysis and fire brigade intervention modelling. Potential implications include the increased spatial allocation of additional tanks, pumps, booster connections and hardstands.

4.3.2 Fire Hose Reels

Fire hose reel shall be provided throughout the building in accordance with DtS Provision E1D3 of the NCC and AS2441:2005. If desired, a Performance Solution may be feasible to permit the use of 50 m long fire hose reels, in lieu of 36 m to provide greater flexibility in the design. This would rely on:

- Only the FHRs located within 4 m of an exit shall be 50 m. Where additional on floor FHRs required for coverage, they shall be standard 36 m lengths.
- 50 m fire hose reels must be tested and certified according to AS2441:2005 and Provision E1D3 of the NCC.
- The pressure and flow at the nozzle of the 50 m hose reel are to be achieved based on the requirement of AS2441:2005.
- Coverage using 50 m hose reels is to be achieved with no more than two bends in the hose to reduce friction and snagging.
- Occupant training in the use of the 50 m length fire hose reels is to occur at least every 12 months to maintain occupant familiarity with the increased weight and length of the extended hose reels.

4.3.3 Fire Sprinkler System

A fire sprinkler system shall be provided throughout the building in accordance with the DtS Provisions and AS2118.1:2017 with the following considerations:

- The warehouse tenancies and shared hardstands shall be served by a storage sprinkler system in accordance with AS2118.1:2017.
- Sprinkler activation temperature in the warehouse and beneath shared hardstands must be no greater than 101°C and have a Response Time Index (RTI) of less than 50 $m^{1/2}s^{1/2}$ (i.e. fast response type).
- Sprinklers within carparking areas shall have a response Time Index (RTI) of less than 50 $m^{1/2}s^{1/2}$ (i.e. fast response type).
- Upon sprinkler activation the building occupant warning alarm shall be initiated throughout the affected building and the direct brigade notification activated.
- The location of the sprinkler booster assembly has been identified as a DtS departure noting that the sprinkler infrastructure is proposed to be shared across the estate.
- The provision for extended duration of water supply and retention provisions in exceed of the DtS requirements is to be considered in the design, following the Teams meeting held with FRNSW on 16/04/2026 where this intent was expressed. The extent of this will be subject to detailed fire engineering analysis and fire brigade intervention modelling. Potential implications include the increased spatial allocation of additional tanks, pumps, booster connections and hardstands.

A Performance Solution is expected to be feasible to support the location of the sprinkler booster, reliant on:

- The fixed suction criteria being met, as set out in Clause 4.4 of AS2419.1:2021.
- The fire sprinkler booster and the dedicated hardstand for fire brigade appliances being located as depicted in Figure 4-2. As per FRNSW's Guideline "*Access for fire brigade vehicles and firefighters*", the hardstand should be designed to be 18 m long by 6 m wide, whilst allowing other fire brigade appliances to pass. The hardstand area serving a suction-connection outlet is to be positioned at an angle not greater than 45 degrees from the outlet's longitudinal direction.
- The location of sprinkler booster and FDCIE, shall be indicated on all fire hydrant and fire sprinkler block plans.

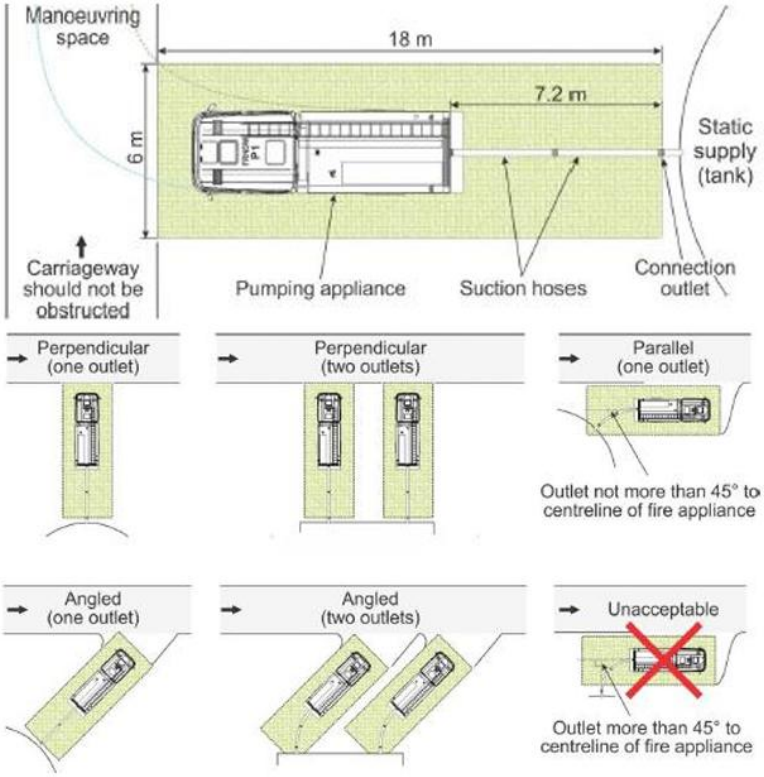

Figure 4-2: Extract from FRNSW Guideline – Rigid Suction Connection Hardstand

4.3.4 Portable Fire Extinguishers

Portable fire extinguishers are to be provided in the building in accordance with Provision E1D14 of the NCC and selected, located, and distributed in accordance with AS2444:2001.

4.3.5 Control & Indicating Equipment

The site shall be provided with a fire control centre adjacent to the estate pump room at the consolidated infrastructure location (noting that the FDCIE shall be acoustically separated from the pump room).

This panel shall be networked to the building-specific FDCIE panels that are located within the main entry of offices that are accessed off the encircling perimeter access path. Specifically, Building 3B accommodates multiple tenancies across a large floorplate, and it is therefore appropriate that this building is served by multiple FDCIE panels at the relevant entries.

- Where the effective heights of these buildings exceeds 50 m, a Fire Control Room (with the relevant clearances and spatial provisions) is to be provided at these building-specific main entries.

Smoke exhaust fan controls shall be provided at the FDCIE panel serving the relevant building. If a separate fire fan control panel is provided it shall include a display to indicate the operation or otherwise of the fans.

4.4 Smoke Hazard Management

4.4.1 Smoke Detection System

A smoke detection system for smoke control shall be provided to serve the warehouse buildings in accordance with AS1670.1:2018.

- Depending on the structural arrangement below the slab (i.e. beam depths), the location of the detectors may be dictated on a performance-basis. For example, the structural grids may create ceiling pockets with a depth that requires a detector within every grid for strict compliance with AS1670.1. However, it is not expected that detection will be required at this reduced interval and can be subject to a holistic fire engineering assessment. Initiation shall activate the EWIS for the relevant building, and the automatic smoke exhaust system for the fire-affected storey.
- Within ancillary office spaces, detection shall be provided beneath ceilings.

Where extended travel distances are present within commercial areas, a reduction in detection spacing may be required to substantiate a Performance Solution.

4.4.2 Smoke Exhaust System

An automatic smoke exhaust system shall be provided to the warehouse areas and the covered hardstands for each warehouse building, complying with Specification 21 of the NCC and AS1668.1:2015, with the following requirements:

- System capacity will be bespoke to this facility and shall be subject to detailed fire engineering analysis (noting a minimum of 1 enclosure air change per hour).
- Any mechanical boards or switchboards serving the mechanical exhaust system are to be protected by construction achieving an FRL of 120/120/120 if located within the building.
- Adequate make-up air should be provided at a low level to facilitate the exhaust system's designed operational capacity. The make-up air should be provided (at a low level) by a combination of louvres in the façade and/or via perforated roller shutters serving the hardstand (noting that make-up air requirements will need to consider all tenancies on a fire-affected floor simultaneously requiring exhaust, against the cross-sectional free area at the ends of the hardstands).
  - All motors and cables to automatic louvres, exhaust vents or supply fans must be fire-rated to operate at 200°C for a period of 60 minutes.
- The smoke exhaust system be activated throughout the fire-affected storey of the relevant building upon initiation of the sprinkler system or ceiling-level smoke detection system.

Note1: *Smoke exhaust is not required to the offices or other ancillary areas*.
Note2 : *There are significant extended travel distances along the covered hardstands. The provision of jet fans can significantly reduce the potential for these extended distances to be assessed, in comparison to a traditional ducted exhaust system. Additional measures such as an aspirated smoke detection (ASD) system would likely be required down-stream of jet fans to enable their prompt shutdown, if they were to be utilised in the mechanical design*.

4.4.3 Zone Pressurisation System

Zone pressurisation systems are prescriptively required where buildings exceed an effective height of 25 m. A Performance Solution may be feasible to omit this from industrial buildings as follows:

- Warehouse tenancies – on the basis of automatic smoke exhaust being provided
- Commercial spaces – on the basis of being smoke-separated from industrial spaces, with further investigation required into the potential to provide smoke separation to lift lobbies and the like.

4.5 Visibility in an Emergency, Exit Signs & Warning Systems

4.5.1 Emergency Lighting and Exit Signage

Emergency lighting is to be provided throughout the building in accordance with DtS Provisions E4D2 and E4D4 of the NCC 2022 and AS2293.1:2018.

Exit signage is to be provided throughout the building in accordance with the DtS Provisions E4D5, E4D6, E4D8 of the NCC 2022 and AS2293.1:2018.

Whether through adjudication by the authority having jurisdiction (AHJ) or via a Performance Solution, it is anticipated that the directional signage at the end of the racking aisles and above block storage areas can be installed at a height greater than 2.7 m. Should a Performance Solution be desired, it shall consider the following:

- Exit signs and directional signs shall be “Jumbo size” to increase the visibility to occupants.
- The final height and location of the directional exit signs shall be determined through the fire engineering analysis.

4.5.2 EWIS

Due to the buildings having an effective height of more than 25 m, an Emergency Warning & Intercom System is to be provided throughout all parts of each building. The system should be in accordance with the prescriptive requirements of DtS Provision E4D9 of the NCC and AS1670.4:2018.

4.6 Building Management Requirements

- The fire safety systems should be tested and maintained in accordance with Australian Standard AS1851.
- An emergency management plan should be developed for the site in accordance with AS3745:2010.
- Ongoing training in 50 m hose reels as required by the Performance Solution

5. Consultation with FRNSW

A concept meeting via Teams was held with FRNSW on 16/04/2026, with attendees from FRNSW, Stockland and CORE being present. Key takeaways from this meeting were as follows, noting that the meeting was conceptual in nature, and thus no explicit approval was provided by FRNSW:

- FRNSW advised that the provision of a 4-hour structure is their 'gold standard', noting their concerns of structural failure for multi-storey buildings and the associated impact on fire brigade intervention and adjacent allotments.
- FRNSW advised that their current doctrine would not seek the utilisation of vehicular ramps for brigade appliances. This doctrine may yet be revisited via internal discussions within FRNSW's policy unit. Notwithstanding, the provision of a perimeter vehicular access path around each building must be maintained, along with the introduction of additional stair cores as outlined below.
- FRNSW outlined concerns with respect to prolonged brigade intervention activities for buildings of this scale and vertical height, especially when considering that potential tenant fitouts that may seek to implement an additional level of complexity (i.e. automation) which would further complicate and delay the ability to confirm/achieve final extinguishment.
- FRNSW outlined that hydrant coverage achieved from stairs and hardstands would need to be investigated further in the detailed design – in particular, whether it is appropriate for such hydrants to be treated as internal or external for the purposes of achieving hydrant coverage.
  - Additional stair cores are expected to be required in the design to facilitate achieving hydrant coverage when utilising 'internal hydrant' coverage parameters.
- FRNSW requested further consideration for water supply and containment provisions, in the context of the likely fire brigade intervention period. This may have implications on the spatial provision of fire services infrastructure to serve the site.

The above considerations are to be recognised by the design team, noting that commentary on these considerations with respect to the general building design has been incorporated within Section 4, as appropriate.

6. Conclusion

This Fire Safety Concept Strategy provides a holistic summary of the fire and life safety measures anticipated to be necessary in developing the above listed Performance Solutions. These measures include passive and active fire protection systems, egress provisions, occupant first aid firefighting, fire brigade intervention, and future building management provisions.

The fire safety strategy presented herein is considered capable of meeting the Performance Requirements of the NCC, subject to validation and verification of any assumptions made through detailed fire engineering analysis.

Through ongoing design development, the strategy proposed herein shall be amended and adapted based on consultation with the design team to develop the scope for the Performance Based Design Brief, and ultimately for the Fire Engineering Report for Construction.

Author:	Reviewer:
	
Dean Watt Senior Fire Safety Engineer	Sandro Razzi Managing Director *CPEng 2180287; Registered Certifier – Fire Safety BDC0501*

Appendix A Strategy Markups

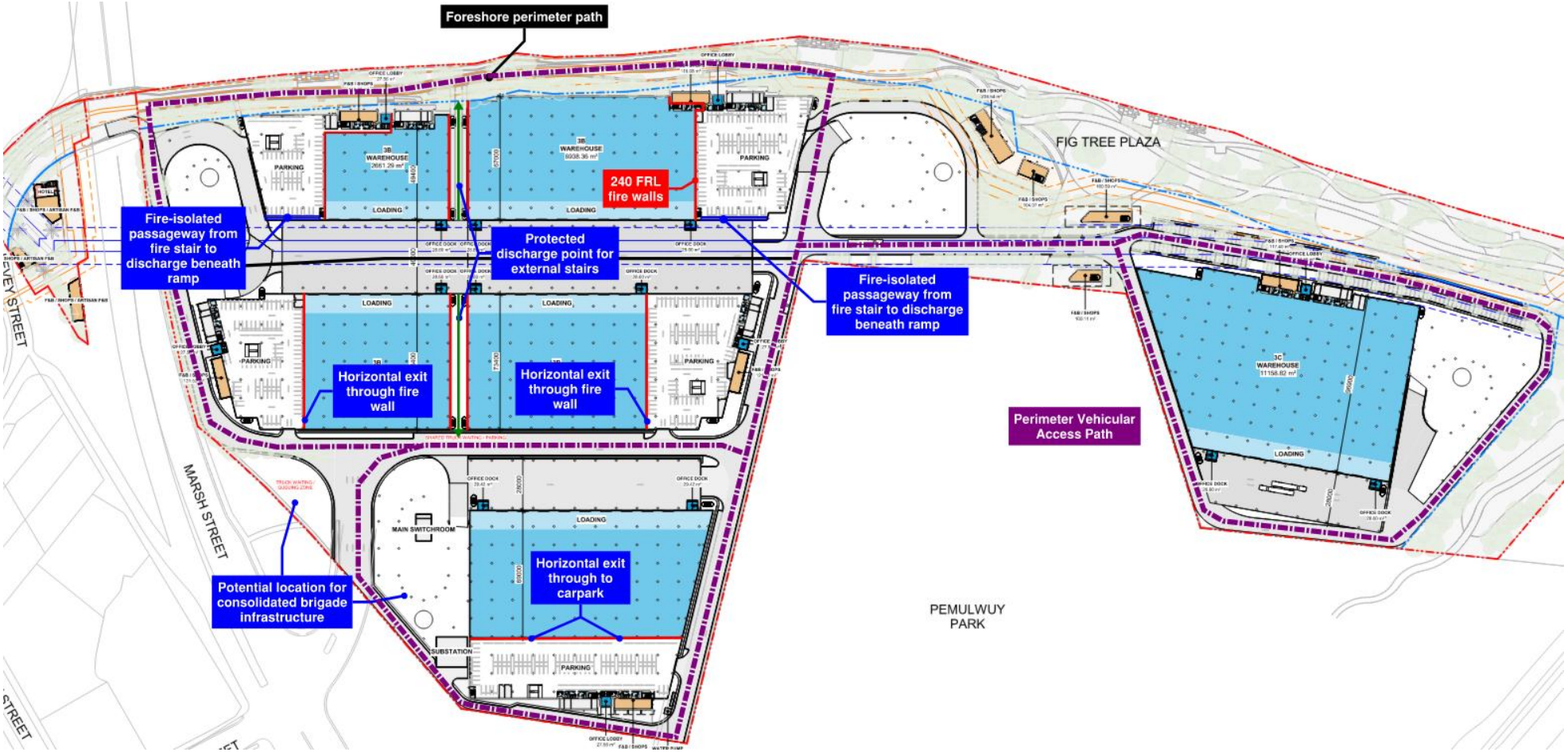

Figure A-1: Logistics – Ground Level Plan

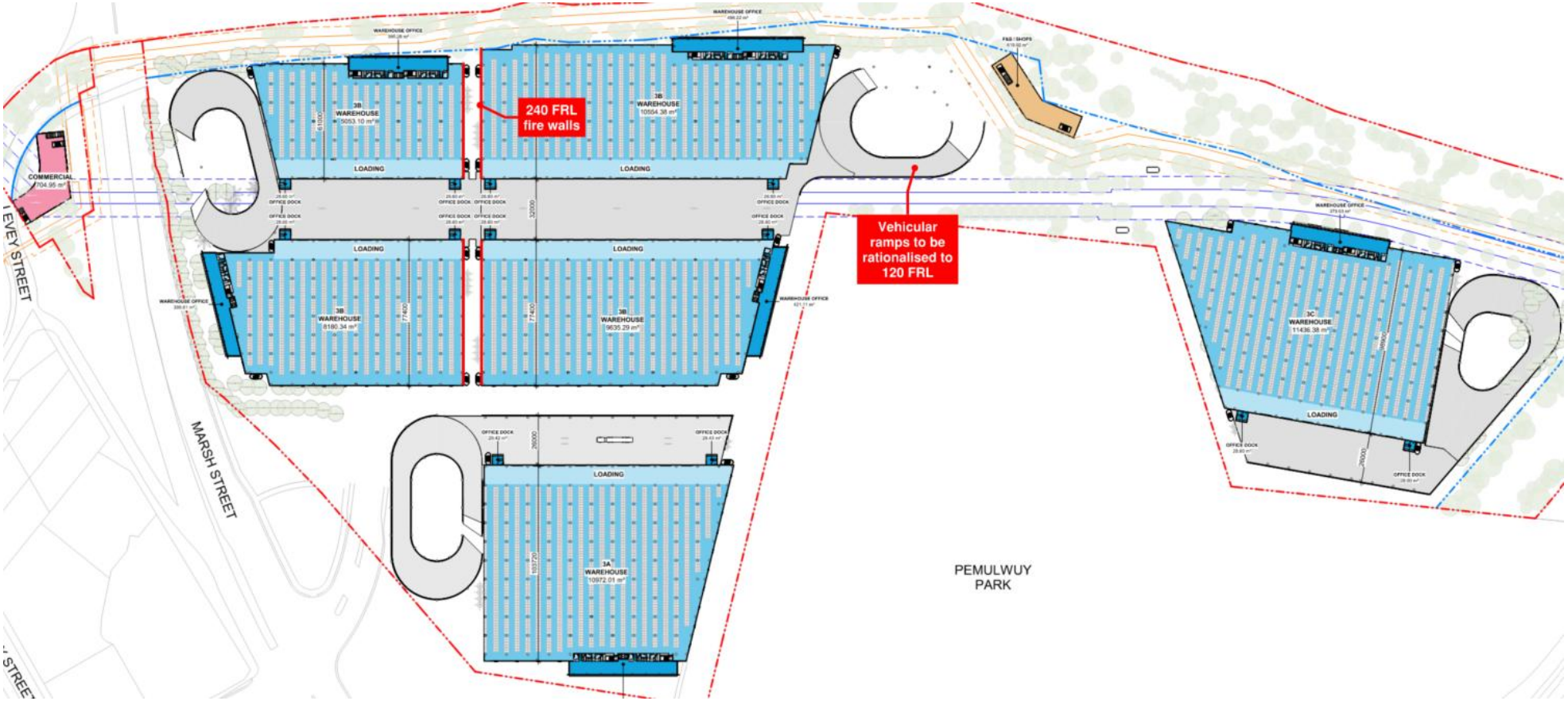

Figure A-2: Logistics – Level 01-05 Plan

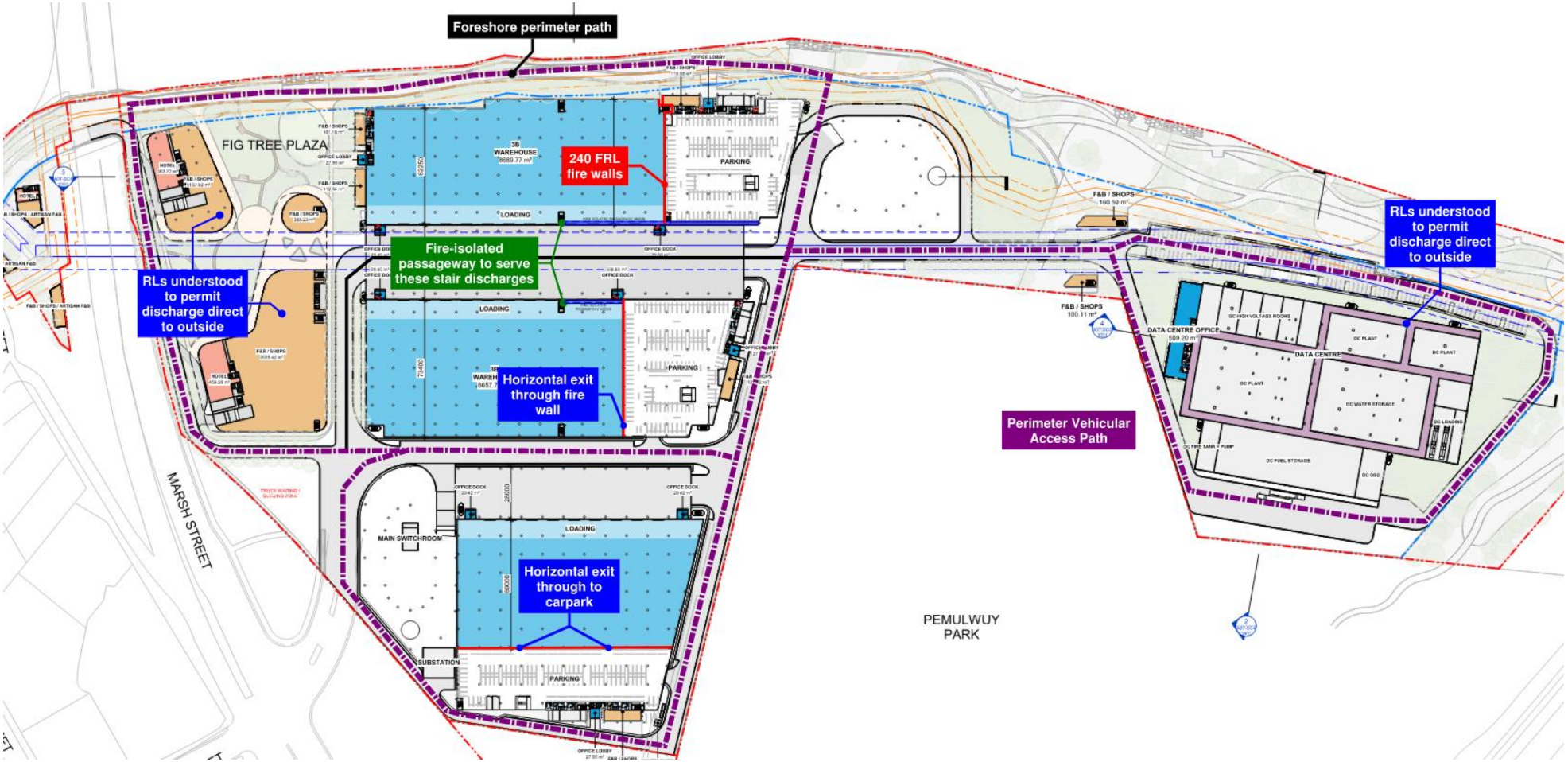

Figure A-3: Mixed-Use – Ground Level Plan

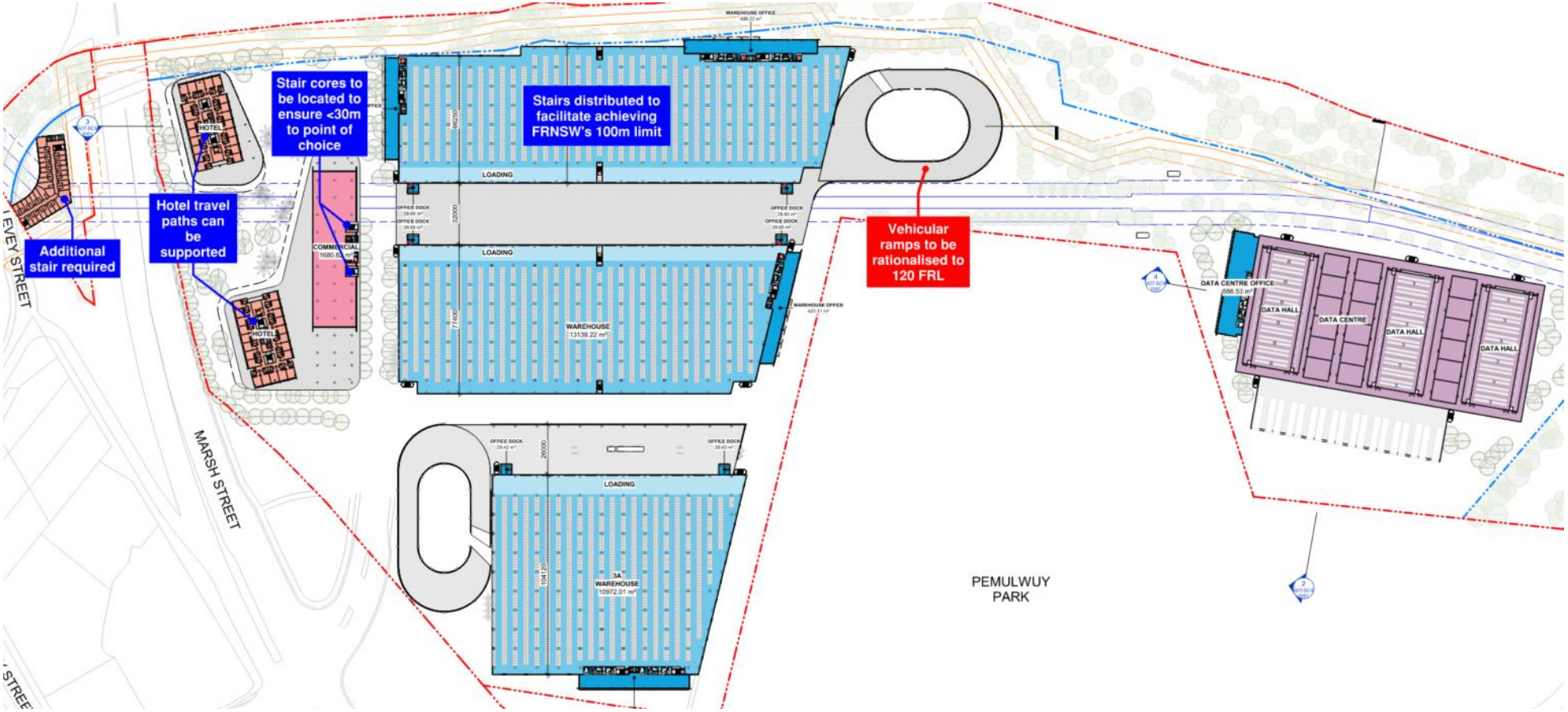

Figure A-4: Mixed Use – Levels 01-05 Plan

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