Our Ref: 231012c001_Draft

Strategic Fire Consulting

PO Box 738
INGLEWOOD WA 6932
Email: darren@strategicfireconsulting.com.au
julie@strategicfireconsulting.com.au

By Email
DRAFT

7 May 2025

Ms J L Khaw
Built Environment Branch
Department of Fire & Emergency Services Authority

Dear Jia,

SWANCARE RICHARD CLEAVER LODGE, BENTLEY
PERFORMANCE BASED DESIGN BRIEF

Please find this correspondence providing a Performance Based Design Brief (PBDB) for the existing Swancare Richard Cleaver Lodge located at 34 Graham Crescent, Bentley. There are no works proposed for the existing building apart from voluntary upgrades to improve life safety levels of the building.

This Brief outline the proposed Performance Solutions and fire safety strategies to be adopted within the design to address non-compliances with the Deemed to Satisfy (DTS) Provisions of the National Construction Code (NCC 2022). Further to the Brief, engineering justifications will be provided within a Fire Safety Engineering Report (FSER), demonstrating compliance with the relevant Performance Requirements of the Building Code of Australia (BCA).

Key stakeholders that have been associated with the fire safety engineering process to date are noted in Table 1.

Table 1 PBDB Stakeholders

Company	Representative	Role
Swancare	Antonino Abad	Client Representative
Carleton Constructions	Peter Carleton	Builder
Jensen Hughes	Harley Parkes	Building Certifier
DFES	Alexandra Viale	Fire Brigade
Hydraulic Design Australia	Joseph Tilli	Hydraulic Engineer
Strategic Fire Consulting	Darren Wong	Fire Safety Engineer

The non-compliances that are proposed to be addressed via Performance Solution are summarised in Table 2.

Table 2 Summary of Performance Solutions

DTS Provisions	Description of Non-compliance	Performance Requirements to be addressed
D2D12	Performance based egress arrangements	D1P2, D1P5 & E2P2
AS2419.1	Performance based hydrant system	E1P3

A meeting was conducted on 15 April 2025 between Jia Ling Khaw & Shane Gobbee of the Department of Fire & Emergency Services (DFES) Authority of WA, Joseph Tilli of Hydraulic Design Australia and Darren Wong of Strategic Fire Consulting. The objective of the meeting was to introduce the project to DFES and to discuss concept fire safety strategies.

1.0 Building and Occupant Characteristics

1.1 Principal Building Characteristics

The subject project involves a voluntary upgrade of the fire safety issues in the existing Class 3 apartments, Class 4 caretaker apartment and Class 9b lawn bowls club to improve the life safety level of occupants to an acceptable level. The building has a rise in storey of 7 and an effective height of approximately 18.175 m. This is measured to the top floor level which is used as a Class 4 caretaker apartment although at the time of preparing this PBDB, the top floor is not occupied.

On the Ground Floor Level is a Class 9b lawn bowls club which will be fire separated from the Class 3 areas. There are also Class 3 apartments and a pottery room area for use by residents on the Ground Floor Level. The remainder of the building is used as Class 3 apartments. On each level, there is a washing machine and dryer room which will be fire separated from the remainder of the level by self-closing fire rated door.

The building was constructed in early 1970s and would have been required to comply with the Uniform Building By-Law (UBBL). It is understood that there has been no major upgrade works since the original building construction which would have warranted compliance with a later code. Notwithstanding, the proposed works to improve life safety levels will be undertaken against the requirements of the National Construction Code (NCC 2022).

The following figure shows the location of the existing building.

Figure 1 Site Plan

The building is located on a sloping site with Adie Court located to the North situated at a higher level than Graham Crescent located to the South. Given the sloping site, entry and exit direct to outside is available from Level 1. Alternatively, occupants can evacuate to open space on Graham Crescent on Ground Floor Level.

Egress Provisions

The building is provided with one fire isolated staircase to the South Western end of the building and discharges to outside although the point of discharge is exposed to a number of openings including the pottery room which has an external kiln. In addition, there is also an open staircase located to the North Eastern end of the building. Both staircases connect every level of the building.

As part of the proposed life safety upgrade works, the following fire safety strategies will be implemented:

1. The North Eastern staircase will be made fire isolated by enclosing it with fire rated bounding constructions and be protected from adjoining areas. Due to space limitations, some units will open directly into the staircase (Refer figure below).

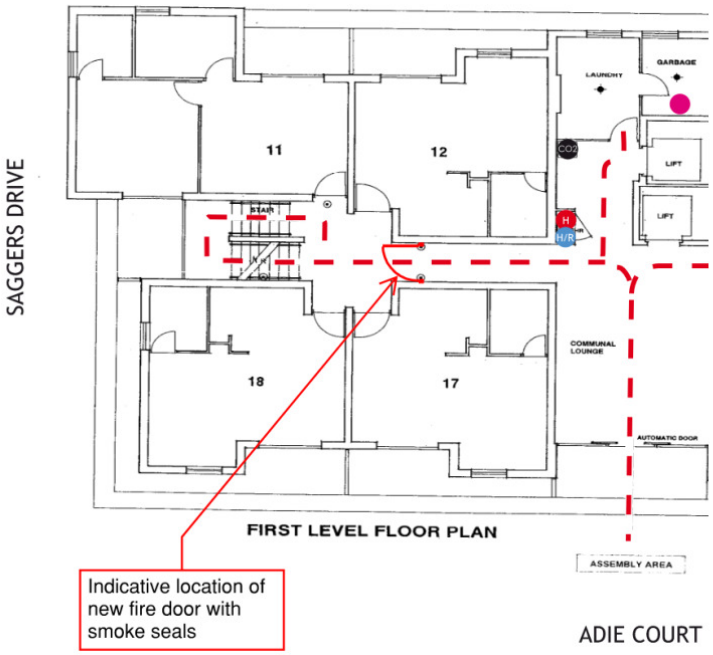


Figure 2 Proposed Fire Rated Bounding Enclosure

The risk associated with this will be discussed via a Performance Solution.

2. Depending on the egress direction, the door may swing against the direction of egress. This will be addressed via a Performance Solution.

3. The South Western fire isolated staircase discharges into a non-compliant area. It is intended to reconfigure the point of discharge to either be onto the Ground Floor Level or First Floor Level depending on fire location. This will be addressed via a Performance Solution.

Bounding Constructions

Each apartment and room opening into the public corridor will be fire protected using compliant bounding constructions with openings protected by self-closing fire doors. On each level, there is currently an opening to each apartment which is not fire protected. The opening will be sealed and protected as part of the current upgrade works.

The lawn bowls club on Ground Floor Level will also be fire separated from the remainder of the building via fire rated constructions. The location of fire wall separation between the lawn bowls club and the remainder of the building is shown on the plan attached to Appendix A.

On each level, there is a laundry and dryer room. Given the risks associated with these rooms and they open directly onto the path of egress, the existing doors which open onto the public corridor will be replaced with self-closing or automatic closing fire door with smoke seals.

Fire Services

The existing building is provided with the following fire safety systems:

1. Internal fire hydrants with a booster cabinet located along Graham Crescent which has no feed hydrant and is exposed to a bedroom opening;

2. Fire hydrants located outside fire isolated staircase in cabinet approximately 12 m from the fire isolated staircase;
3. Fire hose reels on each level;
4. Fire hose reels;
5. Detection and occupant warning system;
6. Exit and emergency lighting;
7. Passive fire protection.

As part of the proposed life safety upgrade works, the fire hydrant system will be addressed as far as practicable to ensure DFES operational useability. The list of upgrade works to the existing hydrant system is detailed below:

1. Booster cabinet will be made compliant with AS2419.1 with exposure to the booster addressed via a Performance Solution including protection of the existing opening behind the booster cabinet using fire rated shutter or appropriate passive methods.
2. Feed hydrants will be provided in the booster cabinet with water supply drawn from a new supply connected to the town mains on Adie Court.
3. There is a short portion of copper pipe located on the incoming side of the system on Ground Floor Level. This will be made compliant with either replacement of the pipe with stainless steel pipes or enclosing the copper pipe with fire rated materials.
4. A Performance Solutino will be provided to address the absence of pump and tank infrastructure to achieve fire-fighting performance.

The remainder of the hydrant system will remain as it is including the hydrant outlets which are outside the fire isolated staircase. With the proposed works described above, it is proposed that the system will be improved significantly to allow Fire Brigade to undertake intervention.

1.2 Dominant Occupant Characteristics

The following outlines the characteristics of occupants typically expected to be present within the building.

Distribution	Occupants will be located throughout the building. They will be of various ages and both male and female.
State	In the apartments, occupants could be awake asleep or intoxicated. Occupants in the lawn bowls club are expected to be awake.
Physical attributes	Occupants may be of various physical ability.
Mental attributes	It is expected that the majority of occupants will be able to interpret cues associated with an emergency and react accordingly.
Level of assistance required	The majority of occupants are not expected to require assistance to evacuate. Where assistance is required, it is assumed that this will be provided by others whom are present.
Emergency training	Occupants are not expected to have any formal training.
Activity at the outbreak of a fire	Occupants could be awake or asleep at the time of outbreak of a fire, depending on their location within the building.
Familiarity with the building	The majority of occupants are expected to be familiar with the building, it being their place of residence. Occupants located in the lawn bowl club are not likely to be familiar with the building.

2.0 PBDB Objectives and Limitations

2.1 Building Regulatory Objectives

The NCC sets out a number of Building Regulatory Objectives that are required to be met within any new building or extension project. Those that relate to fire safety, include the following:

- safeguard people from illness or injury due to a fire in a building;
- safeguard occupants from illness or injury while evacuating a building during a fire;
- facilitate the activities of emergency services personnel;
- avoid the spread of fire between buildings;
- protect other property from physical damage caused by structural failure of a building as a result of a fire;
- provide facilities for occupants and the fire brigade to undertake fire-fighting operations;
- prevent the spread of fire between buildings;
- safeguard occupants from illness or injury by warning them of a fire so that they may safely evacuate; and
- have adequate identification of exits and paths of travel to exits.

2.2 Compliance with the Performance Requirements

A building is deemed to meet the above objectives where compliance with the Performance Requirements of the NCC is achieved. Clause A2G1 states that *Performance Requirements are satisfied by one of the following*:

(1) Compliance with the NCC is achieved by complying with—

a) the Governing Requirements of the NCC; and
b) the Performance Requirements.

(2) Performance Requirements are satisfied by one of the following, as shown in Figure A2G1:

a) Performance Solution.
b) Deemed-to-Satisfy Solution.
c) A combination of (a) and (b).

The subject project is to achieve compliance through clause A2G1 option c), utilising both DTS measures and Performance Solutions. Clause A2G4 the requirements where compliance is via a combination of DTS and Performance Solution, the following applies:

(1) Performance Requirements may be satisfied by using a combination of Performance Solutions and Deemed-to-Satisfy Solutions.

(2) When using a combination of solutions, compliance can be shown through the following, as appropriate:
   a) A2G2 for assessment against the relevant Performance Requirements.
   b) A2G3 for assessment against the relevant Deemed-to-Satisfy Provisions.

(3) Where a Performance Requirement is satisfied by a Performance Solution in combination with a Deemed-to-Satisfy Solution, in order to comply with (1), the following method must be used to determine the Performance Requirement or Performance Requirements relevant to the Performance Solution:
   a) Identify the relevant Deemed-to-Satisfy Provisions of each Section or Part that are to be the subject of the Performance Solution.
   b) Identify the Performance Requirements from the same Sections or Parts that are relevant to the identified Deemed-to-Satisfy Provisions.

c) Identify Performance Requirements from other Sections or Parts that are relevant to any aspects of any Performance Solution proposed or that are affected by the application of the Deemed-to-Satisfy Provisions that are the subject of the Performance Solution.

2.3 Use of a Performance Solution

(1) A Performance Solution is achieved by demonstrating—

a) compliance with all relevant Performance Requirements; or

b) the solution is at least equivalent to the Deemed-to-Satisfy Provisions.

(2) A Performance Solution must be shown to comply with the relevant Performance Requirements through one or a combination of the following Assessment Methods:

a) Evidence of suitability in accordance with Part A5 that shows the use of a material, product, plumbing and drainage product, form of construction or design meets the relevant Performance Requirements.

b) A Verification Method including the following:

i. The Verification Methods provided in the NCC.

ii. Other Verification Methods, accepted by the appropriate authority that show compliance with the relevant Performance Requirements.

c) Expert Judgement.

d) Comparison with the Deemed-to-Satisfy Provisions.

(3) Where a Performance Requirement is satisfied entirely by a Performance Solution, in order to comply with (1) the following method must be used to determine the Performance Requirement or Performance Requirements relevant to the Performance Solution:

a) Identify the relevant Performance Requirements from the Section or Part to which the Performance Solution applies.

b) Identify Performance Requirements from other Sections or Parts that are relevant to any aspects of the Performance Solution proposed or that are affected by the application of the Performance Solution.

(4) Where a Performance Requirement is proposed to be satisfied by a Performance Solution, the following steps must be undertaken:

a) Prepare a performance-based design brief in consultation with relevant stakeholders.

b) Carry out analysis, as proposed by the performance-based design brief.

c) Evaluate results from (4)(b) against the acceptance criteria in the performance-based design brief.

d) Prepare a final report that includes—

i) all Performance Requirements and/or Deemed-to-Satisfy Provisions identified through A2G2(3) or A2G4(3) as applicable; and

ii) identification of all Assessment Methods used; and

iii) details of steps (4)(a) to (4)(c); and

iv) confirmation that the Performance Requirement has been met; and

v) details of conditions or limitations, if any exist, regarding the Performance Solution.

2.4 Limitations

The professional opinions set out in the Brief are based on our professional judgement, experience, and training. We have made all reasonable efforts to incorporate practical and advanced fire safety concepts into our advice. The extent to which our advice is carried out affects the probability of fire safety. Fire safety is not an exact science. No amount of advice can guarantee freedom from either ignition or fire damage.

Our investigations, analysis and advice are limited to the scope agreed in the Contract. We believe that our

opinions are reasonably supported by the investigations and analysis that have been conducted, and that those opinions have been developed according to the current professional standard of care for a fire safety engineer. That standard of care may change and new methods, practices and regulations regarding investigation, testing and analysis may develop in the future, which might produce different results.

The major fire protection features to be incorporated in the design with respect to occupant safety in the event of a fire are outlined in this report in principle. The scope of our analysis does not include property protection, business interruption, environmental protection or insurance requirements.

Any change in building, occupant or fuel conditions outside of those considered in this report, or any deviation in the implementation of the fire safety strategy outlined in this report, may result in outcomes not anticipated by the strategy, and should be reviewed by an appropriately qualified individual.

Strategic Fire Consulting accepts no liability for the implementation, commissioning or ongoing maintenance of the findings and recommendations contained in this report. It is the client's responsibility to engage professional consultants and contractors to undertake:

- development of drawings and specifications;
- the installation of hardware and construction systems; and
- the operation and maintenance of those systems.

2.5 Assumptions

The concepts outlined in this Brief assume a complete and operational building. Our scope of services does not address protection of the building during construction, renovation or demolition.

We may have relied upon information provided by the client and other third parties to prepare this document, some of which may not have been able to be verified by us. We have assumed that such information is accurate and applicable to the project. It is possible that additional investigation and analysis might produce different results and/or different opinions. Our professional opinions are subject to modification if additional information is obtained or provided.

A component of such information is the determination of non-compliances with the "Deemed-to-Satisfy" (**DTS**) provisions of the Building Code of Australia. We assume that a Project Certifier will undertake a complete compliance assessment of the building plans to confirm that all DTS requirements have been satisfied, or alternatively are adequately addressed on a performance basis. Unless otherwise specified in this Brief, we assume that fire safety requirements will be satisfied in the constructed works on a DTS basis.

3.0 Performance Solution 1 – Egress Provisions

3.1 DTS Non-compliance and Performance Requirements

Egress paths in a residential building are required to comply with various requirements outlined in the NCC to ensure occupants have a safe path of egress to exits. Existing egress provisions do not comply with the current NCC requirements. This includes open staircase connecting all levels and non-compliant point of discharge.

To minimise the risk to occupants during an evacuation, various fire safety strategies will be implemented. However, the final outcome will still not be fully compliant with all the relevant DTS Provisions due to site constraints. It is proposed that these issues can be sufficiently justified to demonstrate that the areas of departure from DTS Provisions will not detrimentally affect occupant life safety.

The Performance Solution will demonstrate compliance with Performance Requirements D1P2, D1P5 and E2P2.

3.2 Hazard Identification

The major fire hazard associated with the non-compliant egress provisions is that occupant evacuation may be hampered with prolonged exposure to effects from the fire. Where occupants are affected by the effects from the fire, this will exacerbate Fire Brigade intervention with greater resources required.

3.3 Proposed Fire Safety Strategy

As detailed previously, the existing egress provisions are significantly below the acceptable safety level as detailed in in the current NCC. These issues include:

1. One open staircase connecting through 7 levels; and
2. Non-compliant point of discharge with the open staircase discharging onto Ground Floor Level and the fire isolated staircase discharging past unprotected openings including a kiln associated with the pottery room.

3.3.1 Fire Isolated Staircase

The proposed strategy to address the unprotected open staircase is to construct fire rated bounding construction with a fire resistance level (FRL) of -/90/90 as noted in the following figure. The door into the staircase shall be a self-closing or automatic closing fire door held open on magnetic door holder. The door shall have a FRL of -/60/30.

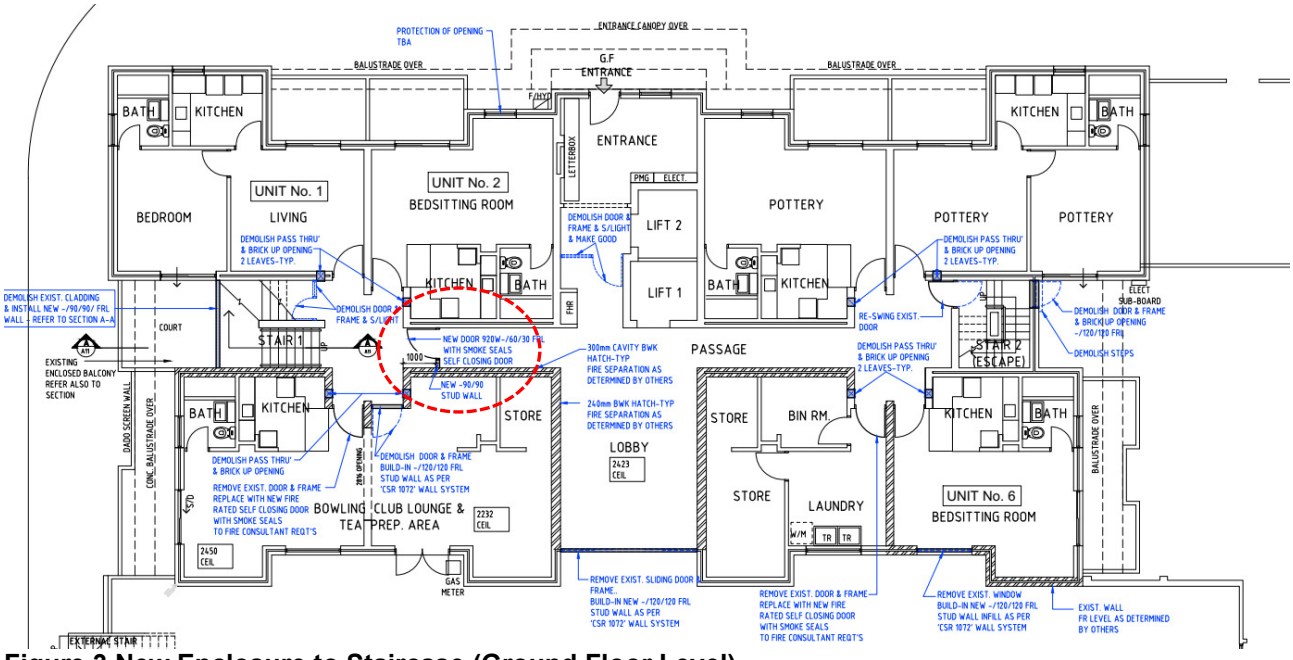


Figure 3 New Enclosure to Staircase (Ground Floor Level)

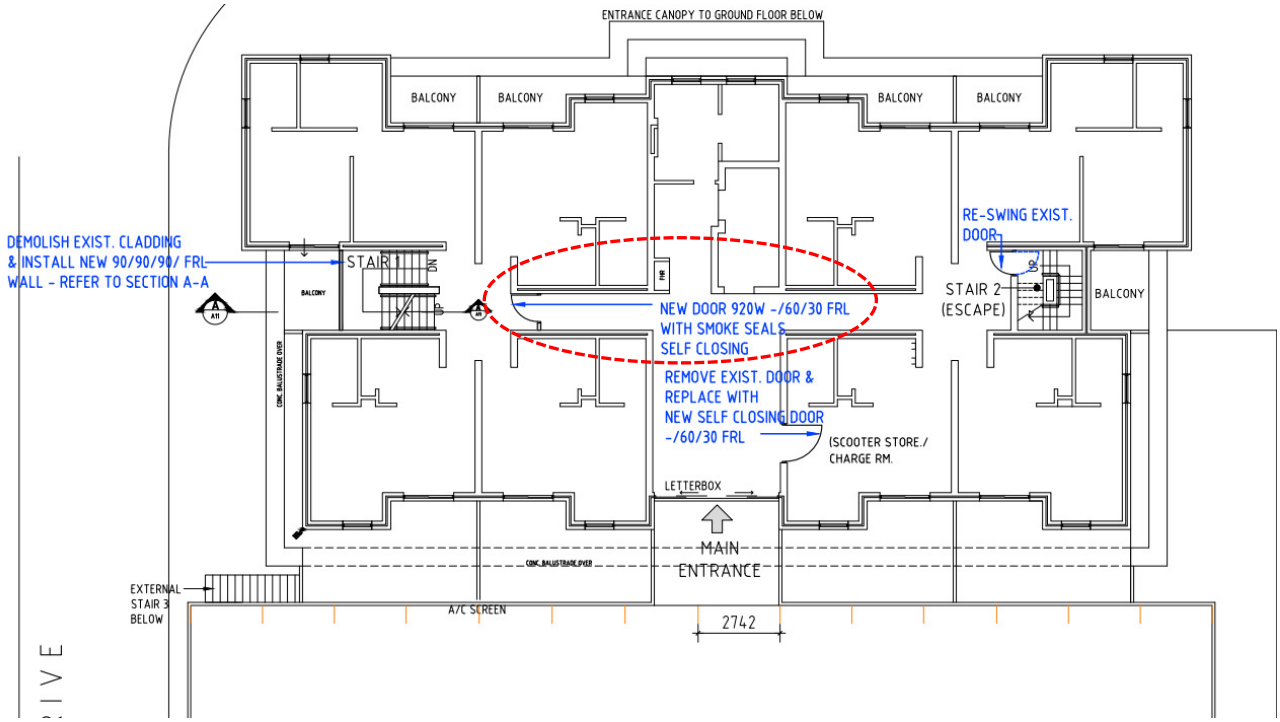


Figure 4 New Enclosure to Staircase (Level 1)

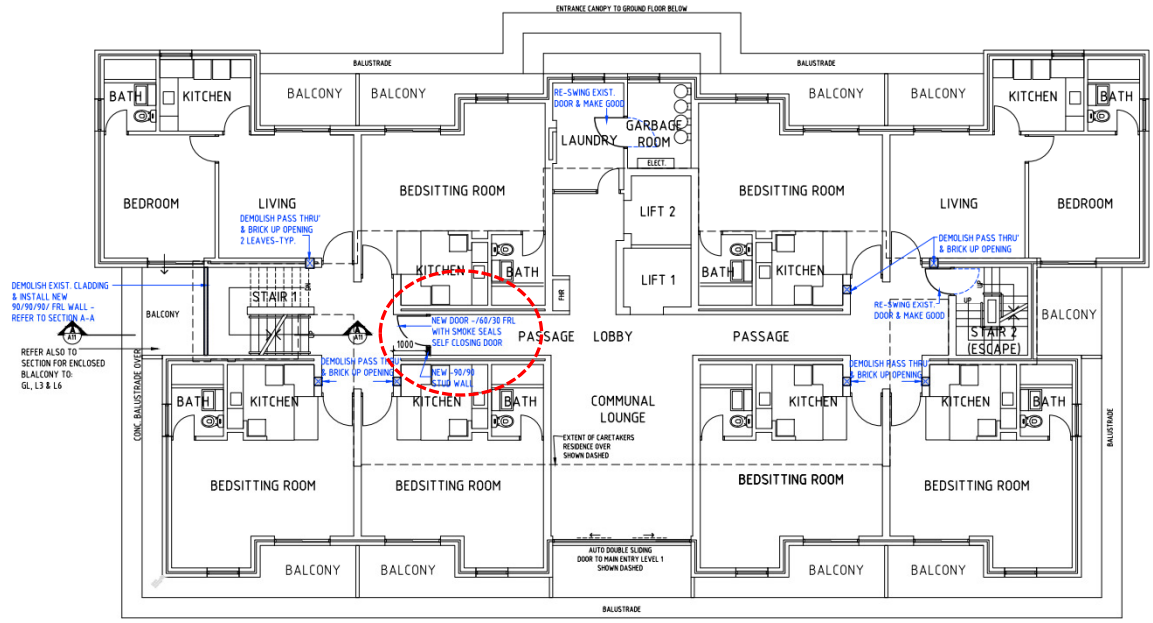


Figure 5 New Enclosure to Staircase (Typical Levels)

With the proposed bounding construction, the fire isolated staircase will still be non-compliant as a number of SOUs open directly into the staircase. Justifications for this non-compliance to be detailed in the FSER are as follows:

1. In the event that the staircase enclosure is smoke lodged, occupants can enter the public corridor past the new self-closing fire door within a short distance and they will be in a place of relative safety to use the South Western fire isolated staircase. In all cases, the new fire door is within 6 m of the SOU door. The outcome is similar to a DTS compliant building where occupants are permitted to evacuate up to 6 m from an exit where they may be exposed to effects from a fire if the door to the SOU of fire origin is held open.

In any case, the proposal will result in an outcome which is significantly better than the existing scenario where the entire public corridor on multiple levels could be smoke logged if the door to the unit of fire origin is held open.

3.3.2 Direction of Door Swing

In the event that the staircase is smoke logged, occupants will have to evacuate past the new fire door which swings against the direction of egress. However, as each level only has four SOUs which open into the enclosure, the number of occupants needing to evacuate past the door is minimal and there is no issue with the door needing to be pulled open. The risk is further reduced by the fact that anecdotally, occupants in a residential apartment do not evacuate at the same time as their pre-movement time will differ. Hence, the number of occupants entering the staircase enclosure and having to evacuate past the non-compliant door swing at the same time will be low.

3.3.3 Point of Discharge

The existing open staircase is currently designed to discharge onto the Ground Floor Level. The existing fire isolated staircase is currently designed to discharge to open space but there are numerous unprotected openings at the point of discharge and it is not practical to protect every opening. For the purpose of the fire safety strategy, it is proposed to configure the Ground Floor Level and Level 1 internal public corridor as the point of discharge, depending on the area of fire origin.

Proposed points of discharge depending on fire alarm location are as follows:

General Fire Alarm

- Both staircases to discharge via Ground Floor Level lobby to Graham Crescent
- Occupants on Level 1 to discharge in the Westerly direction to the car park or alternatively onto Ground Floor Level to Graham Crescent

Fire Alarm in Ground Floor Level Lobby

- Occupants on all levels to exit on Level 1 and discharge in the Westerly direction to the car park
- Occupants on Ground Floor Level has option to still evacuate to Graham Crescent or they can evacuate upwards to Level 1

The proposed egress path depending on fire location will be assisted via dynamic exit signage as outlined below.

Existing Open Staircase

	General Fire Alarm	Detector on Ground Floor Level Lobby Activated	Detector on Level 1 Lobby Activated	Detector within Staircase 1 Activated
Ground Floor Level Dynamic Exit Signage in Staircase 1	Exit	No Exit	Exit	Exit
Ground Floor Level Dynamic Exit Signage Outside Staircase 1	No Exit	Exit	No Exit	No Exit
Level 1 Dynamic Exit Signage in Staircase 1	No Exit	Exit	No Exit	Exit
Level 1 Dynamic Exit Signage Outside Staircase 1	Exit	No Exit	Exit	No Exit
Typical Level Dynamic Exit Signage in Staircase 1	No Exit	No Exit	No Exit	Exit
Typical Level Dynamic Exit Signage Outside Staircase 1	Exit	Exit	Exit	No Exit

Existing Fire Isolated Staircase

	General Fire Alarm	Detector on Ground Floor Level Lobby Activated	Detector on Level 1 Lobby Activated	Detector within Staircase 1 Activated
Ground Floor Level Dynamic Exit Signage in Staircase	Exit	No Exit	Exit	Exit
Ground Floor Level Dynamic Exit Signage Outside Staircase	No Exit	Exit	No Exit	No Exit
Level 1 Dynamic Exit Signage in Staircase	No Exit	Exit	No Exit	No Exit
Level 1 Dynamic Exit Signage Outside Staircase	Exit	No Exit	Exit	Exit

With an appropriate interface to the detection system zones, it is proposed that egress paths can be managed adequately to reduce risk of exposure to occupants. As part of the fire safety requirement for the building, evacuation training will also be required to familiarise occupants to the appropriate evacuation procedures.

3.3.4 Fire Brigade Intervention

Fire Brigade intervention in the existing building will be significantly improved by the proposed fire separation around the existing open staircase. By enclosing the open staircase, conditions for fire fighters will be improved as smoke and heat spread throughout the building will be restricted. Fire fighters can still enter either fire isolated staircase from Ground Floor Level or Level 1 to ascend the building and access the hydrants located outside the staircase. If the fire is on Ground Floor Level, fire fighters can set up using an external hydrant (e.g., feed hydrant in booster cabinet) to undertake intervention without having to enter the building.

The proposed departures from DTS Provisions in relation to the egress provision are not considered to detrimentally affect Fire Brigade intervention.

3.4 Summary

Within the FSER it will be demonstrated that occupant life safety and fire fighters will not be detrimentally affected by the performance-based egress provisions where one fire isolated staircase has SOUs opening directly into the enclosure, non-compliant door swing direction and non-compliant point of discharge onto either Ground Floor Level or Level 1.

The design will be shown to achieve compliance with Performance Requirements D1P2, D2P5 and E2P2 of the NCC.

4.0 Performance Solution 2 – Omission of Hydrant Pumps and Tanks

4.1 DTS Non-compliance and Performance Requirements

The existing internal hydrants are connected to a booster cabinet as a means of allowing fire fighters to establish fire-fighting performance. There is no onsite pumps and tanks as required under DTS Provisions. It is proposed that the subject setup is acceptable for Fire Brigade intervention.

To address this non-compliance, and demonstrate that Performance Requirement E1P3 is satisfied, it is intended that the analysis presented within the FSER will be qualitative with justification presented on an absolute basis.

EP1.3

A fire hydrant system must be provided to the degree necessary to facilitate the needs to fire brigade appropriate to -

a) fire-fighting operations; and

b) the floor area of the building; and

c) the fire hazard.

4.2 Hazard Identification

The major fire hazard associated with the absence pumps and tanks from the hydrant system is that the pressure and flow provided to the attack hydrants is solely reliant on the Fire Brigade appliance. The set-up time may result in a delay until when water can be applied onto the fire and as a result, there may be greater property damage or higher risk to fire fighter safety due to a larger fire developing before active intervention.

4.3 Proposed Fire Safety Strategy

The fire hydrant system is used by fire fighters to undertake fire-fighting operations to limit the spread of fire and to assist with search and rescue. The performance-based hydrant system consisting of internal hydrants and a booster cabinet must therefore ensure that the fire-fighting operation is not compromised. Performance Requirement E1P3 outlines the criteria which must be considered in order to achieve the required level of performance for the fire hydrant system.

Justification which will be presented in the Performance Solution against E1P3 is to be based on the following:

1. Of utmost important is that the first responding appliance must be able to source for water supply and energise the internal hydrants to allow fire fighters adequate flow and pressure for intervention. To ensure sufficient water supply, a new incoming main will be drawn from Adie Court to the booster feed hydrants. Water supply has been tested in 2024 and noted to provide 370 kPa at 20 /s. It is proposed that the first responding appliance will be able to utilise this water supply for boosting of the internal hydrants to achieve the code required 700 kPa at the most remote hydrant as the top most occupied level is less than 15 m above the booster cabinet. The existing caretaker's unit on the top most level is more than 15 m above the booster cabinet. However, this level is currently unoccupied and will not be used. In addition, any existing combustibles will also be removed. This will be managed by Swancare.

   Results of town mains flow and pressure capability will be appended to the FSER. This will address items (a), (b) and (c) of Performance Requirement EP1.3.

2. Given the bounding construction and proposed works to ensure bounding construction is achieved around each SOU, the maximum floor area of any fire compartments on the site will be limited to no more than 2,000 m^2. This strategy limits the extent of fire spread and enables fire fighters to consolidate fire-fighting resources to the compartment of fire origin. This will address items (a), (b) and (c) of Performance Requirement EP1.3.

3. In order to ensure that fire fighters are aware of the absence of an onsite pump and tank system, signage will be provided at the booster cabinet to alert the first attending crew that immediate boosting is necessary. This will reduce the risk of fire fighters entering the building without first establishing

adequate water supply for intervention. This will address items (a) and (c) of Performance Requirement EP1.3.

4. The location of the booster assembly is to be such that fire fighters are not at risk or impeded whilst they are undertaking set-up procedures. Whilst the existing booster cabinet is exposed to openings, they will be addressed as detailed in the next assessment to achieve a safe outcome for fire fighters. This will address items (a) and (c) of Performance Requirement EP1.3.

5. The system shall be tested and maintained in accordance with AS1851. Where there is a drop in town mains performance below 200 kPa, rectification works shall be undertaken. This may involve connection to existing pumps and tanks on a nearby property owned by Swancare or a space may be identified for future pumps and tanks. This will address items (c) of Performance Requirement EP1.3.

4.4 Summary

Within the FSER it will be demonstrated that fire fighters and occupant life safety will not be detrimentally impacted where pumps and tanks are omitted from the internal hydrants.

The justification presented for the Performance Solution will demonstrate compliance with Performance Requirement E1P3 of the NCC.

5.0 Performance Solution 3 – Booster Cabinet Exposure

5.1 DTS Non-compliance and Performance Requirements

DTS Provisions require the booster cabinet to be located such that fire fighters will not be unduly exposed to effects from a fire when they are setting up. The existing booster cabinet is located in a position which has a number of exposure issues with openings located within 2 m of the side of the booster cabinet.

To address this non-compliance, and demonstrate that Performance Requirement E1P3 is satisfied, it is intended that the analysis presented within the FSER will be quantitative with justification presented on an absolute basis.

EP1.3

A fire hydrant system must be provided to the degree necessary to facilitate the needs to fire brigade appropriate to -

d) fire-fighting operations; and

e) the floor area of the building; and

f) the fire hazard.

5.2 Hazard Identification

The major fire hazard associated with a non-compliantly located booster cabinet is that fire fighters may not be able to access the cabinet to set up for boosting. This risk is exacerbated by the fact that the hydrant system is not equipped with any pumps and tanks. Consequently, fire fighters will not be able to undertake intervention until setup at the booster cabinet is completed. In the worst-case scenario, fire fighters may be injured during set up due to exposure to the fire.

5.3 Proposed Fire Safety Strategy

The existing booster cabinet is located along Graham Crescent within sight of the main entrance. However, it is located within the minimum permitted distance of various openings as noted in the plan and photo below. Openings within 2 m of the booster cabinet are highlighted.

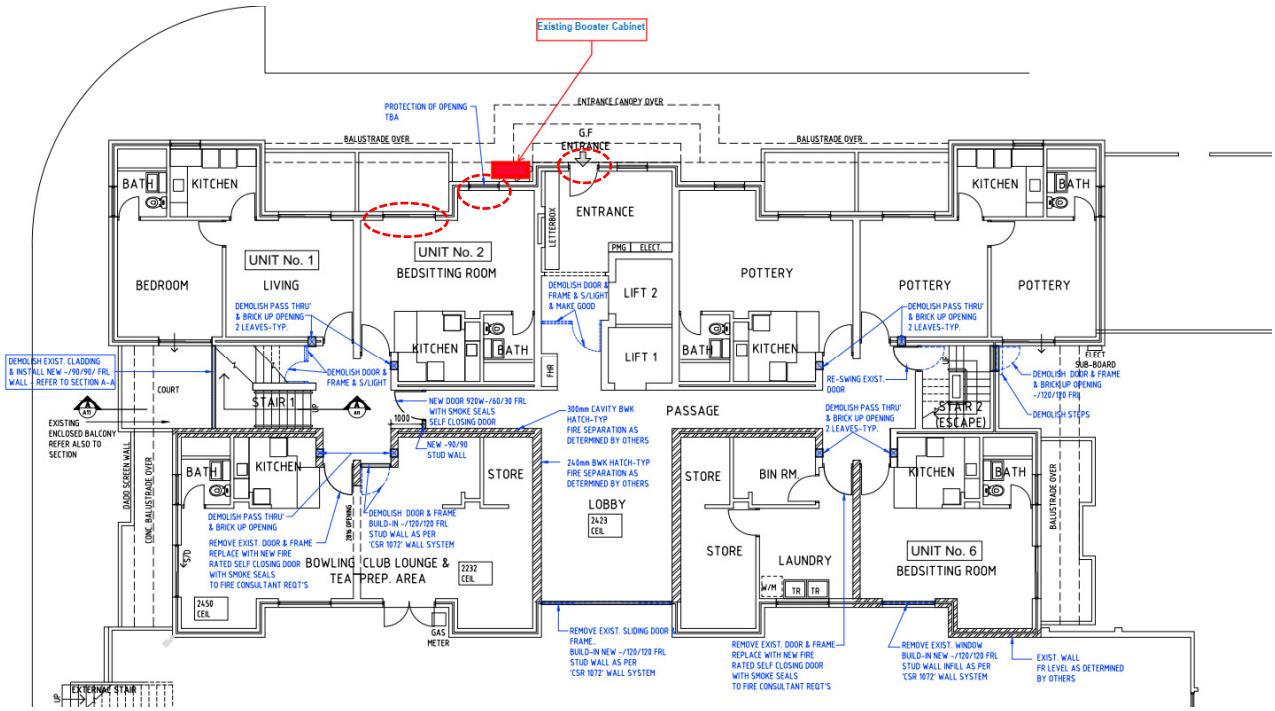


Figure 6 Exposure to Booster Cabinet Location

Photo 1 Openings with 2 m of Booster Cabinet

Justifications and fire safety strategies to address the exposure to the booster cabinet to be presented in the FSER are as follows:

1. The window opening located directly behind the booster cabinet will be protected with self-closing fire shutter. In the event of a fire within the bedroom, radiant heat will activate the fusible link of the shutter which will close. Whilst fire shutters typically do not have insulation fire rating, it will be demonstrated that this will not impair fire fighters from accessing the booster cabinet. Radiation assessment will be undertaken to demonstrate that radiation level at the booster cabinet will be less than 2.5 kW/m^2. In the worst case scenario, fire fighters can access a street hydrant located on Graham Crescent to undertake exposure protection if required.

2. The remaining openings on either side of the booster cabinet is not considered to present a risk. Given their locations which are either set back or protected by a wing wall (i.e., main entry door), it will be demonstrated by radiation assessment that the exposure to fire fighters at the booster cabinet will be below 2.5 kW/m^2.

The limiting radiation level of 2.5 kW/m^2 is based on the recommendations outlined in the Fire Engineering Guidelines (FCRC, 1996). This is considered to be a conservative criteria as this is the same tenability condition for normal occupants. Fire fighters on turnout are dressed in standard A26 tunics with overtrousers, firehoods, gloves, helmets, rubber boots and breathing apparatus. It is expected that they should be able to withstand a higher level of exposure but for the purpose of this assessment, the same limit for normal occupants will be used.

Radiation assessment discussed above will be calculated using the computer program FireWind, which is based on the following equation:

$$q" = \varepsilon \emptyset \sigma T_{rad}^4$$

where q” radiation (kW/m^2)

ε	emissivity (conservatively assumed to be 1)
$\emptyset$	configuration factor
Σ	Stephan-Boltzmann constant ($5.67*10^{-11} kW^2/m^2K^4$)
T_{rad}	temperature of the radiating body (K)

Within the calculation, the openings will be defined as the radiant heat panel radiating at 84 kW/m^2 as per the recommendations of Approved Document B for residential properties. The radiant panel size will be the size of the opening plus 25% in height to allow for any potential flame extension out of the opening.

Where it is assessed that the radiant heat flux measured at the booster cabinet is less than 2.5 kW/m^2, it is proposed that fire fighters will not be detrimentally affected by the openings.

5.4 Summary

Within the FSER it will be demonstrated that fire fighters and occupant life safety will not be detrimentally impacted where there are unprotected openings within 2 m either side of the booster cabinet.

The justification presented for the Performance Solution will demonstrate compliance with Performance Requirement E1P3 of the NCC.

6.0 Conclusion

This PBDB outlines the proposal to adopt a number of Performance Solutions to comply with the requirements of the NCC. Proposed method of justifications and strategies are also summarised in the following table.

Performance Solution	Method of Justification	Proposed Strategies/Justifications
Performance-based egress provisions involving the following: a) SOUs which open directly into the fire isolated staircase; b) Non-compliant door swing direction; c) Non-compliant point of discharge	Qualitative	• Existing open staircase to be made fire isolated with new walls and doors • Occupants only need to travel within short travel distance to reach a place of relative safety • Low occupant load accessing the non-compliant door swing • Dynamic Exit Signage to direct occupants to the correct level of discharge
Absence of onsite hydrant pumps and tanks	Qualitative	• Ensure sufficient flow and pressure to allow boosting • Most remote hydrant is within boosting capability of appliance • Fire fighter able to undertake boosting within minimal delay and risk • Topmost level designed as caretaker's unit will not be used and all combustibles to be removed. • Signage to alert fire fighters to undertake boosting immediately on arrival at the premises • Maximum fire compartment area limited to minimise fire intensity
Exposure to booster cabinet	Quantitative	• Fire shutter to protect window opening behind booster cabinet • Radiation assessment to confirm radiation level is below 2.5 kW/m^2 at the booster cabinet

Further justifications will be presented in the FSER upon receipt of comments from the various stakeholders regarding the strategies of the Solutions outlined in this PBDB. It is noted that as the design process is ongoing some modifications to the strategy presented may occur prior to submission of the FSER. Strategic Fire Consulting will endeavour to ensure that all key stakeholder parties are made aware of these modifications.

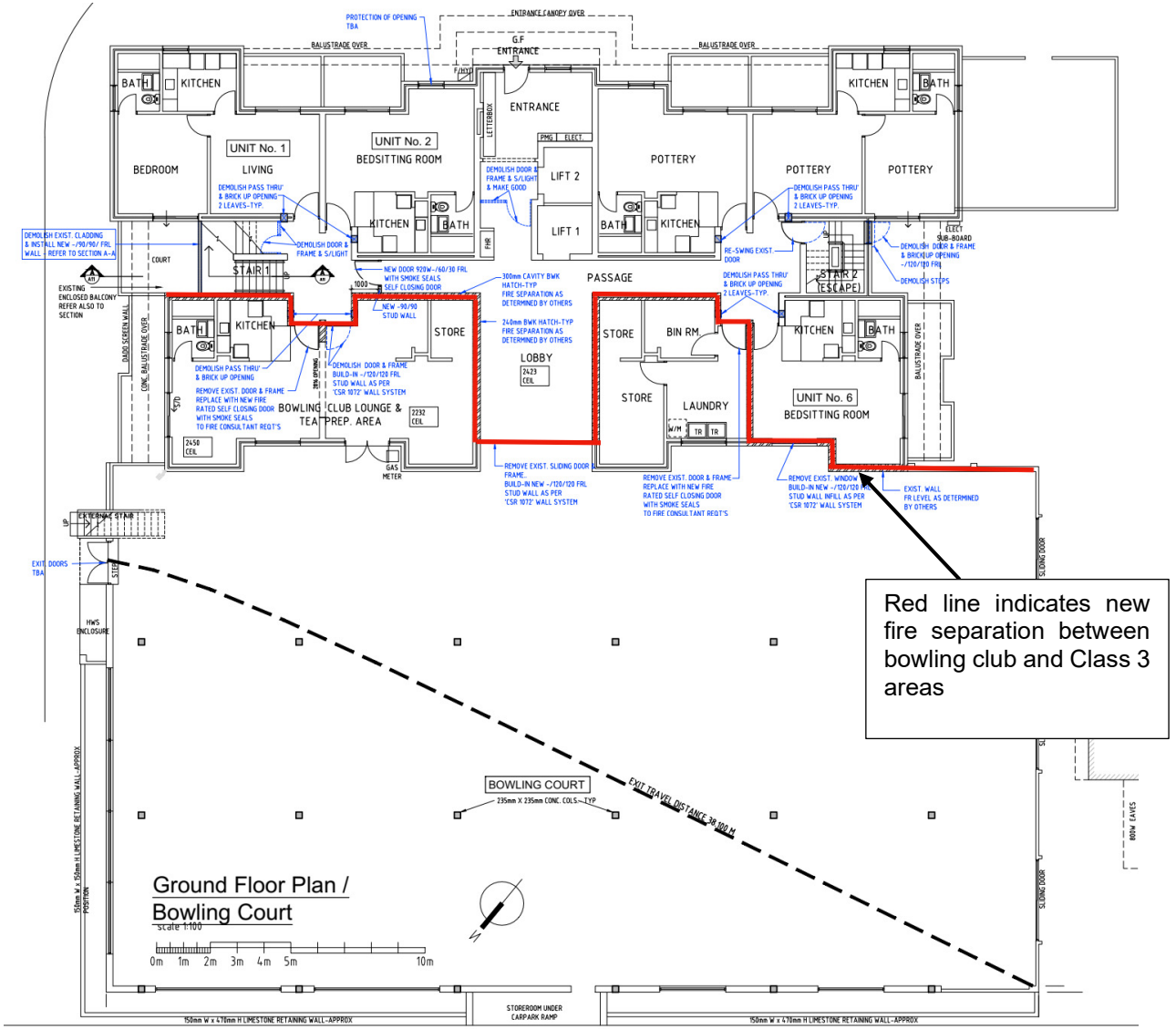
If you have any queries regarding the information presented within this PBDB please contact the undersigned on 0481 135 688.

Yours sincerely,

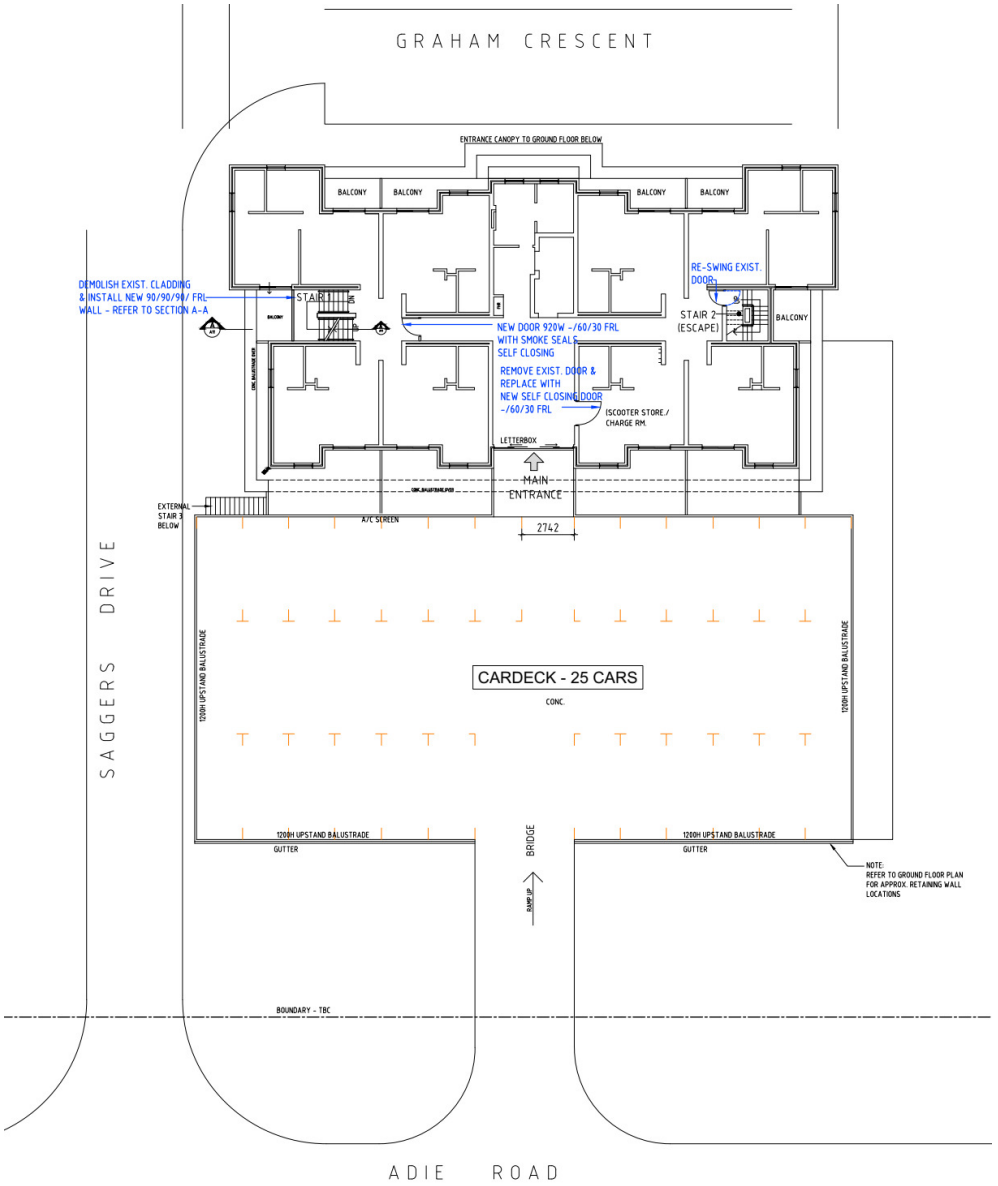
for
STRATEGIC FIRE CONSULTING
Darren Wong
Director/Fire Safety Engineer
B.E., Grad. Cert (Performance Based Eng.), PGCert (Fire Eng.)

APPENDIX A – PROPOSED LIFE SAFETY UPGRADE WORKS

Ground Floor Level



First Floor Level



Typical Levels