

# APPENDIX K FIRE ENGINEERING CONCEPT DESIGN STATEMENT

Minto Resource Recovery Facility Response to Submissions

15 DECEMBER 2017

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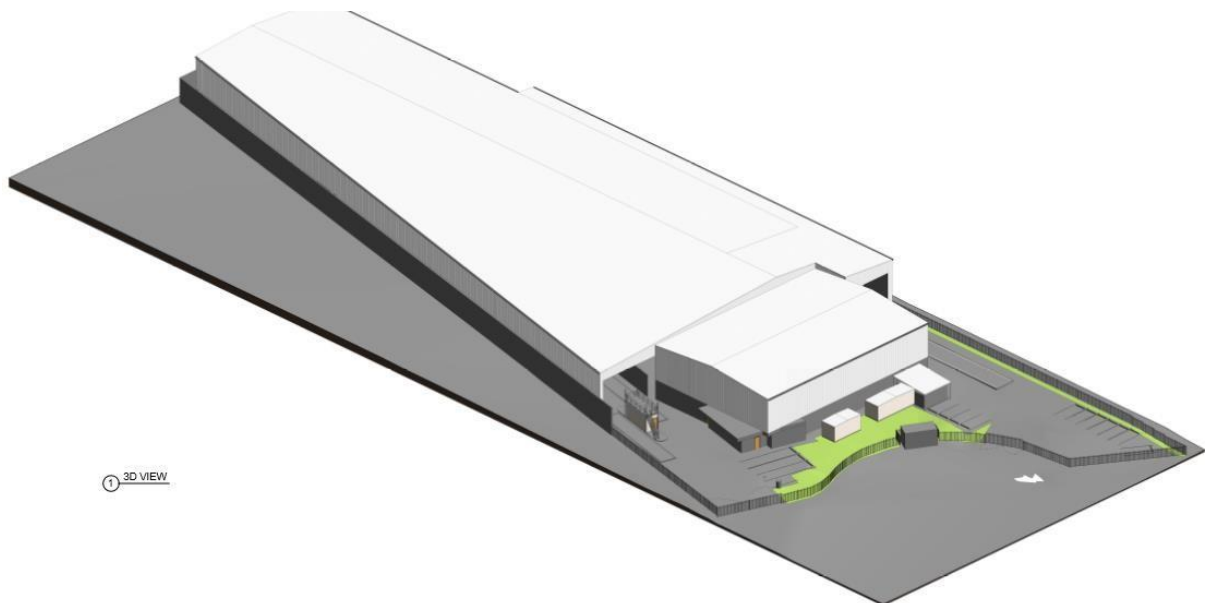
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## Draft Fire Engineering Concept Design Statement

<b>To:</b> Mr Brenden Cadden	<b>Date:</b> 04/12/2017
<b>Company:</b> Dewcape Pty Ltd	<b>Consultants Advice No:</b> 001
<b>Email:</b> <a href="mailto:Brendan.Cadden@dewcape.com.au">Brendan.Cadden@dewcape.com.au</a>	<b>File/Ref No:</b> 170089
<b>Subject:</b> FECDS	<b>Project Name:</b> 13 Pembury Road, Minto NSW
<b>Issued by:</b> Imran Shaikh	<b>Rev:</b> Final

### 1.0 Introduction

This document relates to the development of a Recycling Facility building at 13 Pembury Road, Minto NSW.



Austech Consulting, subject to our appointment will assess (subject to PCA assessment) the proposed Alternate Solutions identified in Section 4.0 of this report against the relevant National Construction Code (NCC) Building Code of Australia (BCA) 2015 Performance Requirements and prepare a Fire Engineering Concept Design Statement (FECDS) to accompany the Development Application (DA).

The scope of the FECDS is to develop a concept design to support a performance-based fire engineered design strategy for the building. This will be based on variations from the Deemed-to-Satisfy (DtS) provisions from the Building Code of Australia (BCA) as this will be identified by the Certifying Authority. The Fire Engineering Brief

(FEB) and Fire Engineering Report (FER) will be developed in the next phase of this project (i.e. Detailed Design). The FEB represents the formal consultation and approval process with the relevant Approval Authorities.

## 2.0 Project Stakeholders

The relevant project stakeholders that have been nominated by the Client for purposes of participating in the fire engineering process are outlined below.

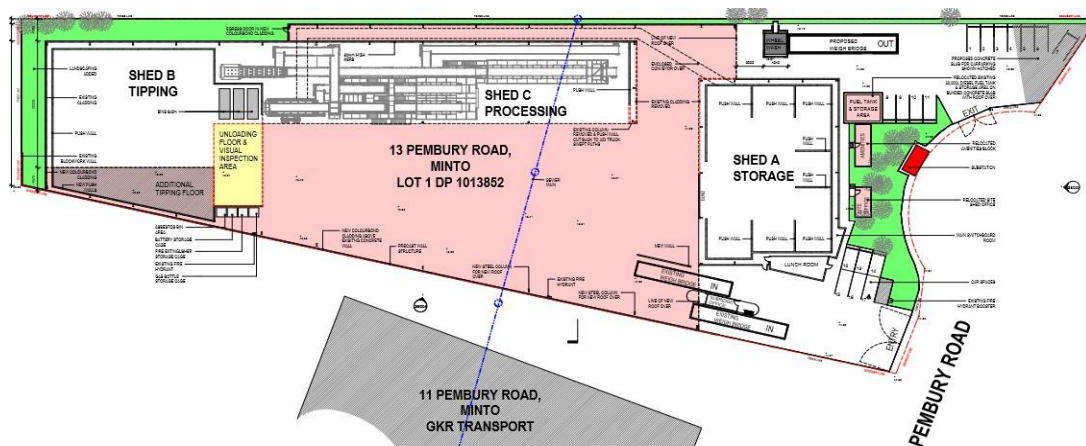
**Table 1 – Project Stakeholders**

Name	Company	Role
Mr Brenden Cadden	Dewcape Pty Ltd	Client
TBA	TBA	Certifying Authority
Mr Imran Shaikh	Austech Consulting	Fire Safety Engineer

## 3.0 Principal Building Characteristics

Key BCA DtS Criteria as identified by the Certifying Authority. **Table 2 – BCA Deemed-to-Satisfy (DtS) reference criteria**

	BCA Clause	Description or Requirement
A3.2	Classification	Class 8 (Factory) Class 5 (Office)
C1.2	Rise in Storeys	One (1)
C1.2	Effective Height	11.8 m
C1.3	Construction Type	Type A (SUBJECT TO PCA ADVICE)
C2.2	Floor Area Limitations	Class 8: 6,534 m <sup>2</sup>
C2.3	Large-Isolated Building	N/A



#### 4.0 Proposed Alternate Solutions

We anticipate the following items to be contrary to BCA subject to an assessment by the Certifying Authority (CA) for purposes of application for a Construction Certificate (CC) for this project.

Table 3 summarises the potential BCA DtS Variations, Proposed Alternative Solutions, relevant BCA Performance Requirements and BCA Assessment Methods. All fire other fire safety measures are to comply with BCA DtS Provisions and the FRNSW recommendations set out in their letter dated 4 July 2017 reference BFS17/1440 (8000000790).

**Table 3 – BCA DtS Variations, Proposed Alternative Solutions, relevant BCA Performance Requirements and Assessment Methods**

BCA Clause	BCA DtS Provisions	Performance Solution	Relevant Performance Requirement	Assessment Method / Acceptance Criteria
C2.2	Clause C2.2 states that for Type A Construction the maximum floor area permitted is 5,000 m <sup>2</sup> and the maximum volume is 30,000m <sup>3</sup> .	<b>Performance Solution #1</b>  It is proposed to permit the process facility to have a floor area of ~6,534 m <sup>2</sup> and a volume of 60,000m <sup>3</sup> which may exceed the maximum volume of permitted under C2.2 for Type A Construction.	CP2	Qualitative and Quantitative Analysis based on A0.3(b)(i) and A0.5(c) 'Other verification method'.
D1.4	BCA Clause D1.4 states that no point on a floor must be more than 20 m from an exit or point in which travel in different directions is possible in which case the maximum distance to one of those exits must not exceed 40 m.	<b>Performance Solution #2</b>  An extended travel will be proposed	DP4 and EP2.2	Qualitative Analysis based on A0.3(b)(i) and A0.5(c) 'Other verification method'.
E1.3	Clause E1.3 states that if the fire hydrant is in a position less than 10 m from the building façade, it requires radiant heat shields extending 3 m above the outlets and 2 m either side of the hydrant.	<b>Performance Solution #3</b>  It may be proposed to permit fire hydrants to be located within the external wall of the building without radiant heat shields as per AS 2419.	EP1.3	Qualitative Analysis based on A0.3(b)(i) and A0.5(c) 'Other verification method'.

E4.8	Clause E4.8 states that exit signs must be compliant with AS 2293 and must be visible at all times. It goes on to state that the exit sign must be mounted at a maximum height of 2.7 m above the floor.	<b>Performance Solution #4</b>  Due to the overall height of the building, exit signs are proposed to be located at a height greater than 2.7 m.	EP4.2	Qualitative Analysis based on A0.3(b)(i) and A0.5(c) 'Other verification method'
C3.2/4	Building wall and or window opening within 03m of the boundary.	<b>Performance Solution #5</b>  Subject to heat radiation transfer assessment	CP2	Qualitative Analysis based on A0.3(b)(i) and A0.5(c) 'Other verification method'

## 50 Trial Concept Design

The trial fire safety strategy for this building is based on a combination of fire safety measures arising from compliance with BCA DtS Provisions and other additional requirements resulting from assessing the BCA DtS variations as Alternative Solutions and FRNSW letter dated 4 July 2017. Accordingly, the schedule of works nominated by this report is in addition to the works which will be identified by the Certifying Authority for compliance with BCA DtS Provisions.

### 5.1 General

The following scope of works, but not limited to, will be proposed subject to PCA assessment to support the fire safety strategy for the building in relation to the proposed Alternative Solutions.

- 1) It is expected that all fire safety aspects are to comply with BCA DtS Provisions with the exception of the proposed Alternative Solutions.
- 2) The use and storage of Dangerous Goods in the facility shall be in accordance with the relevant dangerous goods legislation including AS 1940-2005.

### 5.2 Fire Resistance & Compartmentation

- 1) The building, subject to PCA advice may comply with Type A Construction under Section C of the BCA with the exception of Performance Solution #1.
- 2) In line with Performance Solution #1, the volume of the main shed is permitted to be in excess of 20,000 m<sup>3</sup> in lieu of 30,000 m<sup>3</sup>. The floor area is 6,534 m<sup>2</sup>.

### 5.3 Egress Provisions

- 1) The building shall comply with egress provisions under Section D of the BCA with the exception of Performance Solution #2.
- 2) In line with Performance Solution #2, extended travel distances to an exit will be permitted.

- 3) A dedicated 1 m wide egress pathway shall be provided from the sorting machine to respective exits. To assist in way-finding during evacuation, the egress paths are to be indicated by permanent floor markings in colour contrasting with the background.
- 4) Occupant characteristics and floor population are to be assessed as part of the Fire Engineering Design Brief. Due to the nature of the facility, the Client has advised that all plant operators will be physically fit and without mobility impairments.

#### **5.4 Fire Services**

This section summarises the fire safety services that are proposed within the building critical to the proposed Alternative Solutions within this report. Further information on the fire services can be found in the relevant services engineer's specifications and drawings.

#### **5.5 Fire Hydrants**

- 1) Fire hydrant system shall be provided in accordance BCA E1.3 and AS 2419.1-2005 with the exception of Performance Solution #3.
- 2) In line with Performance Solution #3, the external hydrants are permitted to be located within 2.1 m of openings in the building façade without fire rated construction.
- 3) All fire hydrant valves shall be fitted with Storz aluminium alloy delivery couplings manufactured and installed in accordance with Clauses 7.1 and 8.5.11.1 of AS 2419.1-2005. All hydrant valves shall have a forging symbol and manufacturers mark, and shall comply with Fire & Rescue NSW Guide Sheet No. 4.

#### **5.6 Fire Hose Reels**

- 1) Fire hose reels shall be provided in accordance with BCA E1.4 and AS 2441-2005 in throughout the building.

#### **5.7 Automatic Sprinkler System**

- 1) An automatic sprinkler system shall be installed throughout the building in accordance with BCA E1.5 and AS 2118.1-1999.
- 2) The sprinkler head properties shall be in accordance with the Fire Services Designer.

Sprinkler Type Hazard Category		RTI Activation Temperature
Tyco TY323	OH3 36 (m.s)1/2	68°C

#### **5.8 Portable Fire Extinguishers**

- 1) Portable fire extinguishers shall be provided in accordance with BCA E1.6 and AS 2444-2001 throughout the facility including the elevated platforms.
- 2) On-board manual fire suppression is to be provided on all maintenance vehicles (e.g. garbage trucks, loaders, scissor lifts) that will be used in the building in accordance with the relevant Australian Standards.

#### **5.9 Building Occupant Warning System**

- 1) A building occupant warning system shall be provided in accordance with BCA Specification E2.2a and AS 1670.1-2015.

- 2) The building occupant warning system shall be enhanced to incorporate a verbal directive, which instructs occupants to evacuate in the event of fire. The verbal directive shall be in clear and concise English that announces the following in the event of a fire alarm: 'Emergency' and 'Evacuate Now'.
- 3) Manual Call Points (MCP) in accordance with AS 1670.4-2015 are to be provided throughout the building to initiate the occupant warning system.
- 4) MCPs to be provided on the platform level, within the control room and besides all exits to the building.
- 5) MCPs are to be provided at 15 m intervals on the elevated platform and 30 m on the ground floor.
- 6) Strobe lights are to be provided in accordance with AS 1670.4-2015 at critical locations on the ground floor within the main building and the elevated platforms.

#### **5.10 Two-way Radio**

- 1) Two-way radio communication systems shall be provided to all staff within the facility to aid in emergency notification and evacuation.
- 2) The two-way radio communication system shall be designed as an essential service and listed on the annual fire safety statement. The two-way radio communication system is to be maintained as per AS 1851-2012 and the manufacturers specification.

#### **5.11 Emergency Lighting and Exit Signage**

- 1) With the exception of Performance Solution #4, emergency lighting and exit signs are to be installed throughout the subject development in accordance with BCA E4.4, E4.5, E4.6 and E4.8 and the relevant provisions of AS 2293.1-2005. All exit and directional exit signs are to be of the illuminated type.
- 2) In line with Performance Solution #4, jumbo exit signs shall be used in the subject development and are permitted to be mounted at a height of 3.5 m above ground.

#### **5.12 Smoke Vents**

- 1) A high-level ridge vent shall be provided on the roof.

#### **5.13 Process Control Points**

- 1) Process control points (i.e. emergency stops or the like) shall be provided at regular intervals along the elevated pathways to allow occupants to stop the machine if necessary.

#### **5.14 Minimum Commissioning and Maintenance Requirements**

The following items are to be included in the Management-in-Use Plans for the facility:

The maintenance of fire and other safety systems is a mandatory requirement for building owners under the provisions of the NSW Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000. All systems provided should be designed, detailed, commissioned and maintained in accordance with the relevant legislation and standards including AS 1851-2012.



### **5.15 Minimum Commissioning Requirements for Essential Fire Safety Measures at Occupation Certification Stage**

- 1) Fire hydrant system - Installation and commissioning records - Flow test and Visual spot check
- 2) Hose reel system - Installation and commissioning records - Flow test and Visual spot check
- 3) Fire sprinkler system - Installation and commissioning records - Flow test and Visual spot check
- 4) Fire extinguisher - Installation and commissioning records - Visual spot check
- 5) FIP and associated control equipment - Installation and commissioning record - Visual spot check
- 6) Emergency lighting and exit signage - Installation records - Visual spot check
- 7) Fire doors - Installation record and manufacturers certification - Visual spot check
- 8) Manual call points - Installation record and manufacturers certification - Visual spot check
- 9) Two-way radios - Manufacturers specification - Visual spot check
- 10) All systems must be fully operational under all circumstances. An interim fire strategy shall be developed by a Fire Safety Engineer for any temporary disconnections. Should any building works extend over a number of days, the system should be re-instated as far as practical at the end of each day.
- 11) Maintenance contracts shall be in place and supplemented by building management on a regular basis.
- 12) Electrical and process equipment subject to any statutory requirements for inspection and maintenance is to be undertaken by a Qualified Electrician.
- 13) The Fire Engineering Report shall form part of the Fire Safety Schedule for the subject development and shall be certified annually as part of the Annual Fire Safety Statement.

### **5.16 Emergency Control Procedures**

Emergency Control Organisation and Procedures in accordance with Clause 43 of the Work Health & Safety Regulation (2011) and AS 3745-2010 shall be developed and implemented incorporating the following:

- 1) Exit paths are to be kept clear of items that constitute a fire load or impede occupant egress.
- 2) Staff induction prior to undertaking work on the site.
- 3) Identify the procedures to be followed in the event of a fire including emergency evacuation drills.
- 4) The emergency evacuation drills are to be held on a regular basis.
- 5) Training is to include initial attack on a fire when safe to do so using portable fire extinguishers and/or fire hose reels.
- 6) Training on the use of MCPs and two-way radio communication systems during emergencies.
- 7) Occupants who have not been trained to use fire extinguishers and/or fire hose reels should evacuate the building immediately and notify the Fire Brigades.
- 8) Emergency evacuation plans and fire orders are to be prepared and displayed adjacent to each exit comprising the location of fire protection equipment.
- 9) Hot works permits are to be provided including Insurance notification forms.

### 5.17 Management-in-Use Procedures

- 1) Management-use-plans and emergency response plans are to be developed to address the fire risk mitigation measures.
- 2) Procedures are to be developed for overnight waste storage including minimisation of ignition sources, fire hazards and incident response during an emergency/alarm. This includes prohibiting overnight parking of fully-laden garbage trucks in the facility.
- 3) It is understood that Bingo has the above procedures in place for their existing operations, which are to be extended to this facility as well.

### 5.18 1.1.8 Fire Brigade Intervention

The following measures are to be provided to assist in fire brigade intervention:

- 1) Designated safe areas away from the building for appliance staging, breathing apparatus staging, rehabilitation, ambulance staging and evacuation assembly.
- 2) Emergency information box containing diagrams including a site map, building layout; diagrams, contact numbers and hazardous materials register adjoining the main Fire Indicator Panel and control room.
- 3) Emergency controls and stop switches for compactors and other automated processes;
- 4) Warning signs to alert fire brigade personnel of unfenced garbage pits with dangerous depths, maturation pads and other hazards.
- 5) Availability of heavy machinery such as front loaders that can be used by the fire brigade during an emergency.
- 6) Emergency procedures are to be developed in consultation with the local responding fire stations.



Nearest Fire Station 3min & 1.8km from subject building

## 6.0 Reference Information 6.1

### 6.1 Reference Legislation

This assessment is based on the following reference legislation: a)

NSW Environmental Planning and Assessment Act, 1979.

b) NSW Environmental Planning and Assessment Regulation, 2000.

c) Building Code of Australia 2015, Australian Building Codes Board, 2016.

### 6.2 Reference Codes and Guidelines

This assessment is based on the following reference codes and guidelines:

a) International Fire Engineering Guidelines, Australian Building Code Board, 2005.

b) Guide to the BCA, Australian Building Codes Board, 2015.

c) Engineers Australia, Society of Fire Safety, [Role of Registered Practitioners in Fire Safety Engineering](#), 2011.

### 6.3 Documents Considered

This assessment is based on the following documentation:

a) FRNSW recommendations set out in their letter dated 4 July 2017. Reference BFS17/1440 (8000000790).

b) Architectural Drawings provided by Dewcape Pty Ltd as listed in Table 4.

*Table 4 – Architectural Drawings*

Drawing No.	Title	Date/Issue
SSD00	Site Plan	20/07/2017 B16
SSD01	Ground floor plan	20/07/2017 B16
SSD02	Roof Plan	20/07/2017 B16
SSD03	North Elevation & Section A	20/07/2017 B16
SSD04	Elevation	20/07/2017 B16
SSD04A	West Elevation	20/07/2017 B16
SSD05	South Elevation	20/07/2017 B16
SSD06	3D View	20/07/2017 B16

## 7.0 Conclusions

The scope of the FECDS is to develop a concept design to support a performance-based fire engineered design strategy for the building. This will be based on variations from the Deemed-to-Satisfy (DtS) provisions from the Building Code of Australia (BCA) as identified by the Certifying Authority & FRNSW review letter dated 4 July 2017. The Fire Engineering Brief (FEB) and Fire Engineering Report (FER) will be developed in the next phase of this

project (i.e. Detailed Design). The FEB represents the formal consultation and approval process with the relevant Approval Authorities.

#### 8.0 Quality Information

Revision	Revision Date	Details	Document Details		
			Prepared	Reviewed	Authorised
Final	05/12/2017	For SSD Application	SI	SAM	Imran Shaikh C10

Note: For and on behalf of Austech Consulting Pty Ltd, this Fire Engineering Report is signed by an Accredited C10 Fire Safety Engineer, Mr Imran Shaikh in accordance with Clause 144A(1)(b) of the NSW Environmental Planning and Assessment Regulation (2000). It is noted that this Fire Engineering Report does not constitute a Part 4A Compliance Certificate under the NSW Environmental Planning and Assessment Act (1979).

28 February 2018



CONSULTING ENGINEERS  
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**Attention: Mr BRENDAN CADDEN**

DEWCAPE PTY LTD

GROUND FLOOR 33-35 SAUNDERS STREET  
PYRMONT NSW 2009

Dear Brendan,

**RE: BINGO – 13 PEMBURY ROAD, MINTO NSW**

Reference is made to FRNSW dated 09 February 2018, file ref. BFS18/154 (8000002525).

We herewith reiterate our advice provided in the Fire Engineering Concept Design Statement (FECDS) dated 04 December 2017.

The scope of the FECDS is to develop a concept design to support a performance-based fire engineered design strategy for the building. This will be based on variations from the Deemed-to-Satisfy (DtS) provisions from the Building Code of Australia (BCA) / National Construction Code (NCC) identified by the Private Certifying Authority (PCA).

The Fire Engineering Brief (FEB) and Fire Engineering Report (FER) will be developed in the next phase of this project (i.e. Detailed Design).

The FEBQ will represent the initial formal consultation and approval process with the relevant Approval Authority/s.

#### **ITEM 1.**

##### FRNSW COMMENTARY

*FRNSW recommends that prior to the commencement of construction, that the design of the development is finalised in conjunction with and to the satisfaction of FRNSW. This is recommended to include suitable additional provisions for special hazards by specifically addressing Clauses E1.10 and E2.3 of the NCC.*

##### AUSTECH ADVICE

In consideration with the Environmental Impact Assessment and fire load, suitable water supply and fire fighting systems will be proposed and the same confirmed in the FEBQ, ie.

1. Automatic fire sprinkler system (Appropriate to Hazard Classification)
2. Fire Hydrant system (Water reticulation via a ring main)
3. Fire Hose Reels (Site & Hazard coverage)
4. Portable Fire Extinguishers (Type and size for appropriate Hazard)

## ITEM 2

### FRNSW COMMENTARY

*Given the nature, type and quantity of the materials stored with the proposed building, FRNSW would be reticent to support a fire compartment of this size without the deemed to satisfy provisions of the NCC, applicable to a large isolated building being applied (ie, the relevant NCC deemed to satisfy provisions being those applicable to a large isolated building). Therefore, as a minimum FRNSW recommends that the proposed development attains compliance with the relevant NCC Performance Requirements by application of the relevant NCC's deemed to Satisfy provisions and applicable Australian Standards. The relevant provisions being those applicable to a fire compartment which exceeds the maximum floor area or volume as detailed within Table C2.2 of the NCC.*

### AUSTECH ADVICE

The DtS design requirements for Large-Isolated Building include but not limited to the provisions as outlined below:

- C2.4 – Perimeter vehicle access
- E1.3 – Ring main hydrant system
- C2.3 – Sprinkler system and smoke hazard management.

The Perimeter vehicle access is proposed to be addressed as part of an Alternate Solution with consideration to the building perimeter wall FRL in accordance with the Performance Requirements and the Fire Engineering Guidelines.

The fire hydrant reticulation is proposed to create a ring main to NCC Cl. E1.3 and AS2419.1.

The building is proposed to be provided with a sprinkler system with appropriate hazard classification in accordance with NCC Cl. E1.5 and AS2118.1.

The smoke hazard management system under BCA DtS Provisions is dependent on the floor area and volume. It is proposed to be addressed as part of an Alternate Solution (i.e. natural smoke ventilation) in accordance with the Performance Requirements and the Fire Engineering Guidelines.

### **Proposed Alternative Solutions:**

BCA Clause	Proposed Departure
C2.2 – Area and Volume Limitations	Permit a compartment exceeding Type A Area and Volume limitations
D1.4 – Travel Distances	Permit travel distances exceeding 40 m to point of choice or an exit.
E4.8 – Design and Operation of Exit Signs	Permit exit signs to be located heights greater than 2.7 m above the floor level.
E1.3 - Fire Hydrants	Radiant heat shields
C2.4 - Perimeter vehicle access	Permit omission of FRNSW perimeter vehicle access with Alternative Solution proposal to reduce building perimeter wall FRL of 240/240/240. The provision of the automatic fire sprinkler system will be considered as part of the assessment in addition to drenching of the subject walls and structure.

### ITEM 3

#### FRNSW COMMENTARY

*FRNSW recommends that the provisions for the containment of contaminated firewater for the proposed development should be justified given the increase in fire compartment size and fire load quantities. Provisions such as bunding of the proposed building and automatic isolation of the stormwater system in the event of a sprinkler and/or fire hydrant system activation at the proposed site, are recommended to be finalised in consultation with and to the satisfaction of the FRNSW.*

#### AUSTECH ADVICE

It is proposed that bunding will be designed to accommodate the firewater from the activation of the automatic fire sprinkler system and/or the fire hydrant system.

The design will calculate the discharge rate of the said systems and permit firewater retention for the same as part of the hydraulic design documentation.

### ITEM 4

#### FRNSW COMMENTARY

*To ensure our operational requirements are satisfied, the proponent and/or their nominated consultants, are recommended engage with FRNSW prior to finalising the design of the developments fire safety containment systems.*

#### AUSTECH ADVICE

It is proposed to make formal application to FRNSW to engage with FRNSW to ensure the proposed design documentation of ALL fire safety provisions satisfy FRNSW requirements.

It is also proposed to submit a formal 144 application and liaise with FRNSW as part of the FEBQ formal process.

### ITEM 7

#### FRNSW COMMENTARY

Additionally, given the maximum volume having been exceeded, provisions for a fire hydrant ring main in accordance with AS2419.1-2005 have not been provided at the existing site or addressed within the FER. FRNSW considers the requirements for both perimeter access and fire hydrant ring main provisions to be appropriate measures for a large isolated building.

#### AUSTECH ADVICE

It is proposed to provide a fire hydrant ring main in accordance with NCC Cl. E1.3 and AS 2419.1 – 2005.

It is proposed to address the perimeter access as part of an Alternative Solution given the site restraints in accordance with the Performance Requirements of the NCC and the Fire Engineering Guidelines.

Trust the above meets with your requirements however, should you wish to discuss this matter further please do not hesitate to contact me.

Yours faithfully

A handwritten signature in black ink, appearing to be 'Imran Shaikh', written over a horizontal line.

**Imran Shaikh**  
**Director**

**C-10 Accredited Fire & Life Safety Engineer**

