# Chullora Materials Recycling Facility

## Environmental Impact Statement (SSD-10401)

### Appendix G Fire Safety Strategy

innova services
Fire Safety Engineering
Fire Protection Engineering
ABN 14 162 610 568

# Fire Safety Strategy

## Chullora Materials Recovery Facility
### 21 Muir Road, Chullora NSW

Prepared For:

**SUEZ Recycling & Recovery Pty Ltd**
**C/- Concise Certification Pty Ltd**

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# QUALITY SYSTEM

**Report Register**

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# 1.0 EXECUTIVE SUMMARY

This Fire Safety Strategy has been prepared by Innova Services Pty Ltd for SUEZ Recycling & Recovery Pty Ltd C/- Concise Certification Pty Ltd, and relates to a proposed Chullora Materials Recovery Facility to be located at 21 Muir Road, Chullora NSW.

Innova Services Pty Ltd has been commissioned to conduct a Fire Engineering Analysis of proposed Performance Solutions to the Deemed to Satisfy (DtS) provisions of the Building Code of Australia 2019 (BCA) relating to the subject development.

Table 1 summarises the identified Variations to the BCA DtS Provisions, the relevant BCA Performance Requirements, the Assessment Methods, the Methods of Analysis, and the Acceptance Criteria that are proposed to be used in the future Fire Engineering Assessment for the proposed development.

**Table 1: Summary of Proposed Performance Solutions**

| Performance Solution | BCA DTS Provisions | Variations to BCA DTS Provisions | BCA Performance Requirements |
|---|---|---|---|
| 1 | **Clause C2.4**<br>Perimeter Vehicular Access | To permit the perimeter vehicular access around the subject development to comprise of a restriction associated with traversing around the weigh bridge structures, secure entry points, and to pass beneath an awning and overhead walkway.<br>Furthermore it is proposed to permit the furthest part of the perimeter access road to be greater than 18m from the external wall of the building, being up to 30m due to loading areas. | **CP9** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Access for Fire Brigade Vehicles and Firefighters*".<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*" | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that fire brigade access to and around the subject building and site is facilitated to enable fire brigade personnel to undertake fire brigade intervention activities. | |
| 2 | **Clause D1.4**<br>Exit Travel Distance | To permit extended travel to the nearest exit within the office mezzanine that exceeds that permitted in BCA Clause D1.4. | **DP4, EP2.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ The provision of automatic sprinkler throughout in accordance with BCA Specification E1.5, AS 2118.1-2017 and FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*"<br>▪ Provision of a smoke detection and alarm system throughout the office areas.<br>▪ Provision of an enhanced building occupant warning system featuring verbal messaging. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(b) and A2.2(2)(d)**, Comparative Assessment, Quantitative and Qualitative Analysis. | |

| Performance Solution | BCA DTS Provisions | Variations to BCA DTS Provisions | BCA Performance Requirements |
|---|---|---|---|
| | Acceptance Criteria | A Quantitative Analysis will be undertaken to assess whether occupants will be permitted to evacuate safely and in conditions at least equivalent to the DtS provisions of the BCA. It is proposed to demonstrate that the Required Safe Evacuation Time (RSET) for the Performance Solution is at least equivalent to a DtS Compliant Design.<br>$RSET_{PS} \leq RSET_{DtS}$ | |
| 3 | **Clause D1.4**<br>Exit Travel Distance<br>**Clause D1.5**<br>Distance between Alternative Exits<br>**Clause D1.9**<br>Travel by non-fire-isolated stairways | To permit extended travel to a point of choice, nearest exit and between alternative exits within the warehouse areas of the building that exceed that permitted in BCA Clauses D1.4 and D1.5.<br>To permit the internal non-fire-isolated stairs to discharge at locations that do not have egress available in opposite directions and have a total travel distance exceeding 40m. | **DP4, EP2.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ The provision of automatic sprinkler throughout in accordance with BCA Specification E1.5, AS 2118.1-2017 and FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*"<br>▪ Provision of a performance based automatic smoke exhaust system. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Quantitative Analysis.<br>**A2.2(1)(b) and A2.2(2)(d)**, Comparative Assessment, Quantitative and Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that occupants are able to evacuate from the subject building safety prior to the onset of untenable conditions.<br>This shall be deemed met when it is demonstrated that the Available Safe Egress Time (ASET) exceeds the Required Safe Egress Time (RSET) by a factor of safety of 1.5.<br>$ASET \geq 1.5\ RSET$ | |
| 4 | **Clause D1.6, D2.13, D2.14, D2.15, D2.16, D2.17, D2.18**<br>Elevated Walkways and Platforms | To permit the elevated walkways and platforms within the building to be designed in accordance with AS 1657-2013, in lieu of the relevant DtS requirements. | **DP2, DP3, DP4, DP6, EP2.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ The nature of the occupants within the subject areas, being trained staff members and maintenance personnel.<br>▪ The provision of automatic sprinkler throughout in accordance with BCA Specification E1.5, AS 2118.1-2017 and FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*"<br>▪ Provision of a performance based automatic smoke exhaust system.<br>▪ Reference to the Society of Fire Protection Engineers (SFPE) Handbook to Fire Engineering. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that occupants within the subject elevated walkways | |

| Performance Solution | BCA DTS Provisions | Variations to BCA DTS Provisions | BCA Performance Requirements |
|---|---|---|---|
| | | and platforms are able to egress the building without the path of travel being impeded by the dimensions of the walkways and platforms. | |
| 5 | **Clause E1.3**<br>Fire Hydrants<br>**Specification E1.5**<br>Sprinklers | To permit the site wide fire hydrant and sprinkler system fire brigade booster assemblies to not be located within sight of the main entrance to the building, not located at the site boundary, and not located adjacent to the principal vehicular access to the site. | **EP1.3, EP1.4** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ The provision of Visual Warning Devices in accordance with AS 2419.1-2017 Clause 7.3.2 to identify the booster assembly locations.<br>▪ Provision of permanent block plans located in prominent positions at the FIP/FBP and the fire hydrant and sprinkler booster assemblies identifying the locations of all fire fighting services within the site.<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Access for Fire Brigade Vehicles and Firefighters"*.<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*".<br>▪ Provision of plans and documentation in accordance with FRNSW Fire Safety Guideline "*Emergency Services Information Package and Tactical Fire Plans*". | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that fire brigade access to the fire hydrant and sprinkler booster assemblies is facilitated to enable fire brigade personnel to undertake fire brigade intervention activities. | |
| 6 | **Clause E1.10**<br>Provision for Special Hazards | To provide a performance-based fire hydrant and automatic sprinkler system, in lieu of systems strictly in accordance with AS 2419.1-2005 and AS 2118.1-2017 | **CP2, CP9, EP1.3, EP1.4** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*".<br>▪ Consideration of the layout and stockpile sizes proposed within the subject development.<br>▪ Assessment of Fire Brigade Intervention Times in accordance with the Fire Brigade Intervention Model (FBIM).<br>▪ Provision of plans and documentation in accordance with FRNSW Fire Safety Guideline "*Emergency Services Information Package and Tactical Fire Plans*". | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that fire brigade access to the subject building is facilitated and installed fire-fighting systems are installed to enable fire brigade personnel to undertake fire brigade intervention activities, appropriate to the hazard associated with the subject facility. | |

| Performance Solution | BCA DTS Provisions | Variations to BCA DTS Provisions | BCA Performance Requirements |
|---|---|---|---|
| 7 | **Clause E2.2**<br>**Specification E2.2b**<br>Smoke Hazard Management<br>**Clause E2.3**<br>Provision for Special Hazards | To permit a performance based automatic smoke exhaust system in lieu of a system in accordance with Specification E2.2b of the BCA. | **CP9, EP2.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Reference to and assessment against FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*".<br>▪ Consideration of the layout and stockpile sizes proposed within the subject development.<br>▪ Assessment of Fire Brigade Intervention Times in accordance with the Fire Brigade Intervention Model (FBIM).<br>▪ Provision of plans and documentation in accordance with FRNSW Fire Safety Guideline "*Emergency Services Information Package and Tactical Fire Plans*".<br>▪ Quantitative analysis of the smoke hazard management design using computational fluid dynamics (CFD) modelling to demonstrate the proposed design meets the specified acceptance criteria. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Quantitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that fire brigade access to the subject building is facilitated to enable fire brigade personnel to undertake fire brigade intervention activities.<br>It is intended to refine the acceptance criteria to specifically account for stockpile sizing such that the smoke layer within the subject building for the design fire scenario remains at or above the level of the top of the stockpiles, or 4m as per FRNSW Guideline for Waste Facilities, whichever is less, for the time for fire brigade intervention. | |
| 8 | **Clause E4.5, E4.6**<br>Exit Signs | To permit exit signage to be located at high level, in lieu of not greater than 2.7m. | **EP4.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Quantitative analysis of the smoke hazard management design using computational fluid dynamics (CFD) modelling to demonstrate the proposed design meets the specified acceptance criteria.<br>That is, the analysis is to assess the smoke layer properties, including visibility, to demonstrate that visibility of exit signs is maintained. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Quantitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that the proposed exits signs, being located at high level, are visible to occupants to the degree necessary to facilitate evacuation. | |
| 9 | **Specification E1.5**<br>Sprinklers | To permit sprinklers to be omitted from the high voltage switch room exceeding floor area of 200m$^2$ | **EP1.4** |

| Performance Solution | BCA DTS Provisions | Variations to BCA DTS Provisions | BCA Performance Requirements |
|---|---|---|---|
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Reference to Clause 3.1.3 of AS 2118.1-2017 where a concession is provided for sprinklers to be omitted from high-voltage, normally unoccupied areas such as rooms used for no purposes other than to contain transformers, electrical switch or control gear (non-oil filled), bounded by walls or other barriers to resist the spread of fire, and fitted with detection and alarm system installed in accordance with the requirements of AS 1670.1.<br>▪ Provision of fire-separation from the remainder of the building achieving an FRL not less than 120/120/120.<br>▪ Provision of smoke and heat detection in accordance with AS 1670.1-2018 within the subject room. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that the omission of sprinklers from the subject high-voltage room does not result in fire spread appropriate to the nature of the equipment within the room. | |
| **10** | **Clause E2.2**<br>**Specification E2.2a**<br>Smoke Detection | To omit point-type smoke detection within the warehouse and processing floor areas and provide an alternative fire detection surveillance system (Pyroview Fire Detection System or SigniFire or equivalent) | **EP2.2** |
| | Summary of Fire Safety Strategy | The preliminary fire safety strategy is based on:<br>▪ Reference to FRNSW Fire Safety Guideline "*Fire Safety in Waste Facilities*" in which it is recommended that temperature monitoring should be implemented for stockpile management.<br>▪ The provision of a fire detection surveillance system interlinked with the fire detection control and indicating equipment (FDCIE) to activate the building occupant warning system and automatic smoke exhaust system.<br>▪ Reference to AS 1670.1-2018 Appendix M.8 for guidance on the selection of flame detectors. | |
| | BCA Compliance and Assessment Method | **A2.2(1)(a) and A2.2(2)(b)(ii)**, Absolute Assessment, Qualitative Analysis. | |
| | Acceptance Criteria | The Performance Requirements are considered satisfied when it is demonstrated that adequate provisions are provided to active the building occupant warning system and automatic smoke exhaust system appropriate to the nature of the facility and associated fire hazard. | |

It is the opinion of Innova Services Pty Ltd that Performance Solutions can be developed to the DtS provisions of the BCA to ensure the proposed development can achieve compliance with the relevant Performance Requirements of the BCA CP2, CP9, DP2, DP3, DP4, DP6, EP1.3, EP1.4, EP2.2 and EP4.2, subject to the implementation of the Fire Safety Requirements nominated in Section 2 ***(Summary of Fire Safety Requirements)*** of this Report, and the future Fire Engineering Report.

# 2.0 INTRODUCTION

## 2.1 PURPOSE OF REPORT

The purpose of this Report is to present a Fire Engineering Strategy to address departures from the Deemed to Satisfy (DtS) provisions of the Building Code of Australia 2019 relating to a proposed Chullora Materials Recovery Facility to be located at 21 Muir Road, Chullora NSW.

## 2.2 BASIS OF REPORT

The content of this Report is based on the following Legislation:

- The Building Code of Australia 2019 (BCA).
- NSW Environmental Planning & Assessment Act 1979.
- NSW Environmental Planning & Assessment Regulation 2000.

The content of this Report is based on the following texts and references:

- International Fire Engineering Guidelines, 2005 Edition.
- Guide to the BCA, ABCB 2019.

The content of this Report is based on the following Documentation:

- Architectural plans of the subject development prepared by Envision Group Pty Ltd.
- Fire Services Sketches for the subject development prepared by Sparks + Partners Pty Ltd.
- Preliminary BCA Assessment for the subject development prepared by Concise Certification Pty Ltd confirming the identified variations to the DtS provisions of the BCA.

## 2.3 EXCLUSIONS

This Report does NOT cover the following:

- A detailed BCA assessment of the subject development.
- Access for people with disabilities (Part D3 of the BCA).
- System or engineering design of any part of the subject development.
- Operational checks of fire safety equipment, verification of construction techniques, fire resistance levels or the witnessing of fire drills.
- Compliance or conformance audit for any fire safety system inside the subject development.
- Arson (other than as a source of initial ignition), multiple ignition sources, acts of terrorism.
- Protection of property (other than adjoining property).
- Business interruption or losses or personal or moral obligations of the owner / occupier.
- Occupational Health and Safety, and Work Cover Authority Regulations.

## 2.4 ASSUMPTIONS

It is assumed that apart from the identified variations presented in **Error! Reference source not found.** of the Executive Summary, all other fire safety aspects associated with the subject development will comply with the relevant DtS provisions of the BCA.

## 2.5 REGULATORY FRAMEWORK

Compliance with the BCA is achieved by satisfying the Performance Requirements. Clause A2.1 of the BCA states that the Performance Requirements can be satisfied by:

1. *Performance Solution; or*
2. *Deemed-to-Satisfy Solution; or*

3. *a combination of (1) and (2).*

Clause A2.2(1) of the BCA states that 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,*

Clause A2.2(2) of the BCA states that 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 in the NCC; or*

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

*(c) Expert judgment.*

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

## 2.6 PROJECT STAKEHOLDERS

The relevant project stakeholders for the subject development is listed in Table 2.

**Table 2: Project Stakeholders**

| Name | Company | Role |
|---|---|---|
| Matthew Acton | SUEZ Pty Ltd | Client |
| Joseph Toth | Envision Group Pty Ltd | Architect |
| Paul De Las Alas | Sparks + Partners Consulting Engineers | Fire Services Engineer |
| Steven Rodriguez | Concise Certification Pty Ltd | Principal Certifying Authority |
| Ben Hamilton<br>Jason Powell | Innova Services Pty Ltd | Fire Safety Engineer |

# 3.0 DEVELOPMENT DESCRIPTION

## 3.1 GENERAL LAYOUT AND CONSTRUCTION

***General***

The subject development relates to the construction of a Waste Management Facility to be located at 21 Muir Road, Chullora NSW. The development will involve the construction of a two (2) storey warehouse with an approximate floor area of 10,000 $m^2$ which is proposed to be utilised as a Material Recycling Facility (MRF) comprising recycling and sorting equipment, conveyors, tumblers and a mezzanine structure used as administrations and amenities.

The site is bounded by existing adjoining industrial developments and shall be accessible from Muir Road to the north.

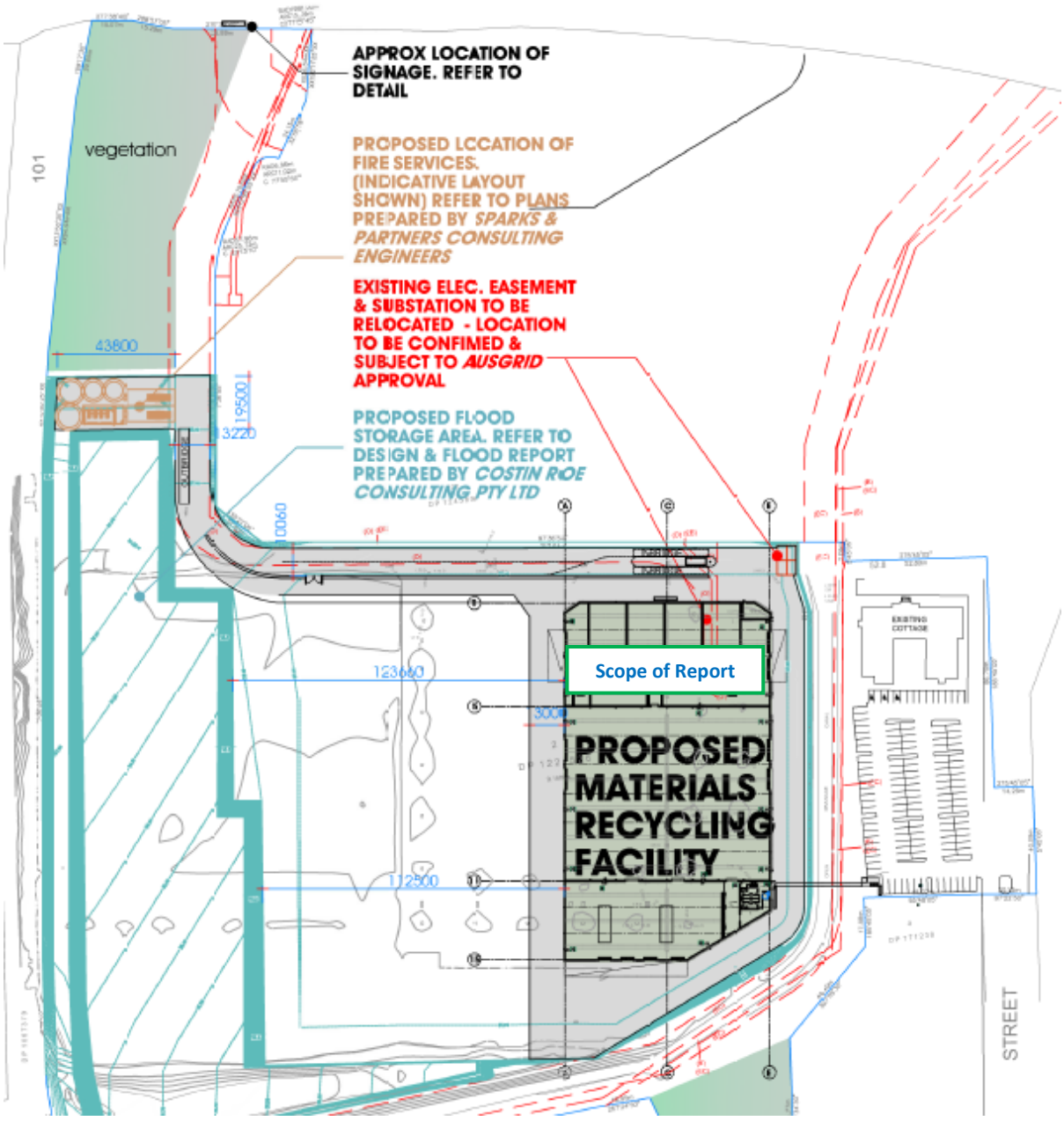


**Figure 1: Site Staging Plan**

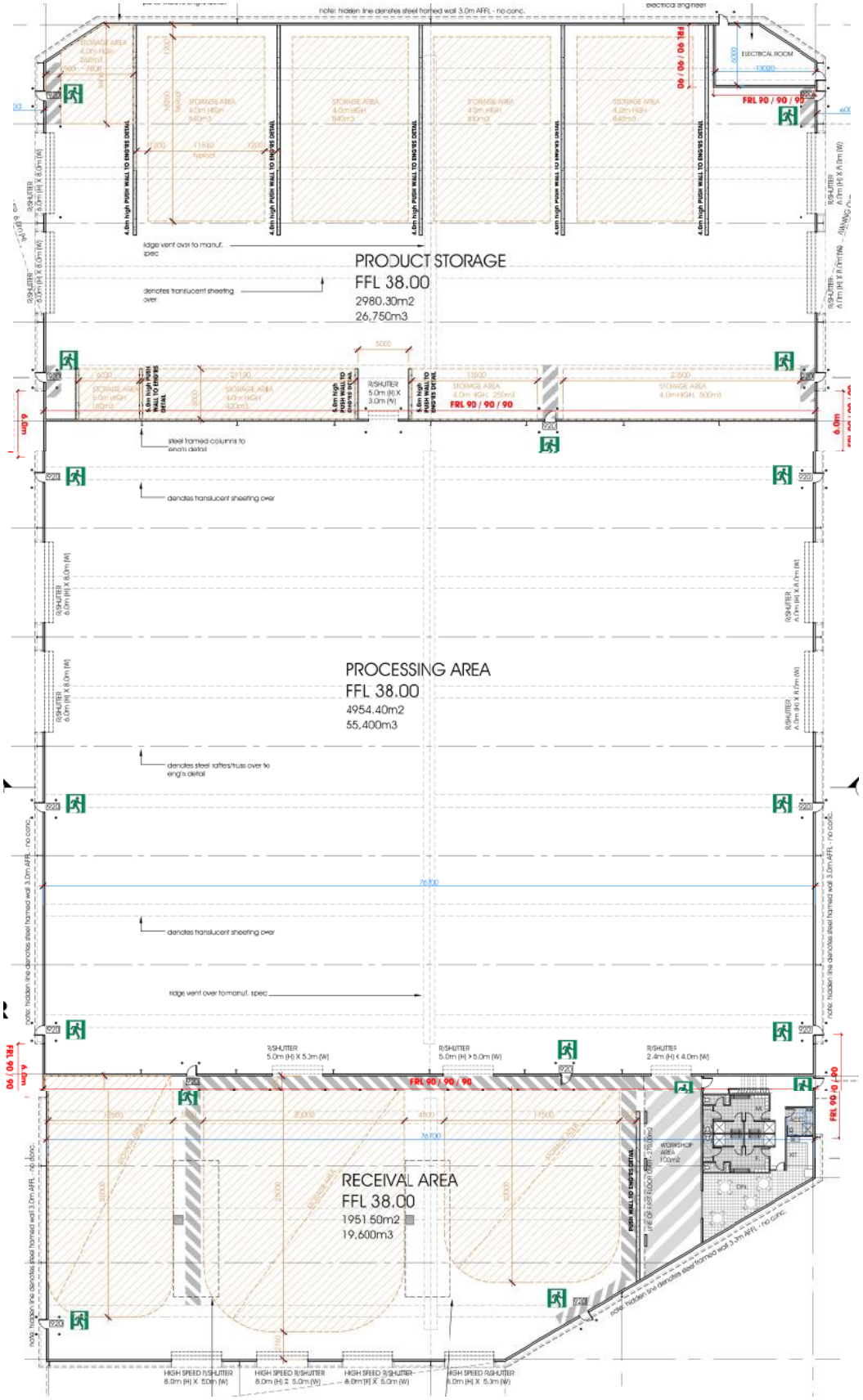


**Figure 2: Building Layout**

***Egress Provisions***

The provisions of egress for the subject development are summarised as follows:

- Direct egress to open space via egress doors within the building façade
- Horizontal exits through internal fire-walls. Note that the these are 'quasi' horizontal exits due to the fire walls not being fully in accordance with the requirements of BCA Clause C2.7 for separation by fire walls.
- Egress internally via non-fire-isolated stairs that shall be subject to a Performance Solution within the future Fire Engineering Report.

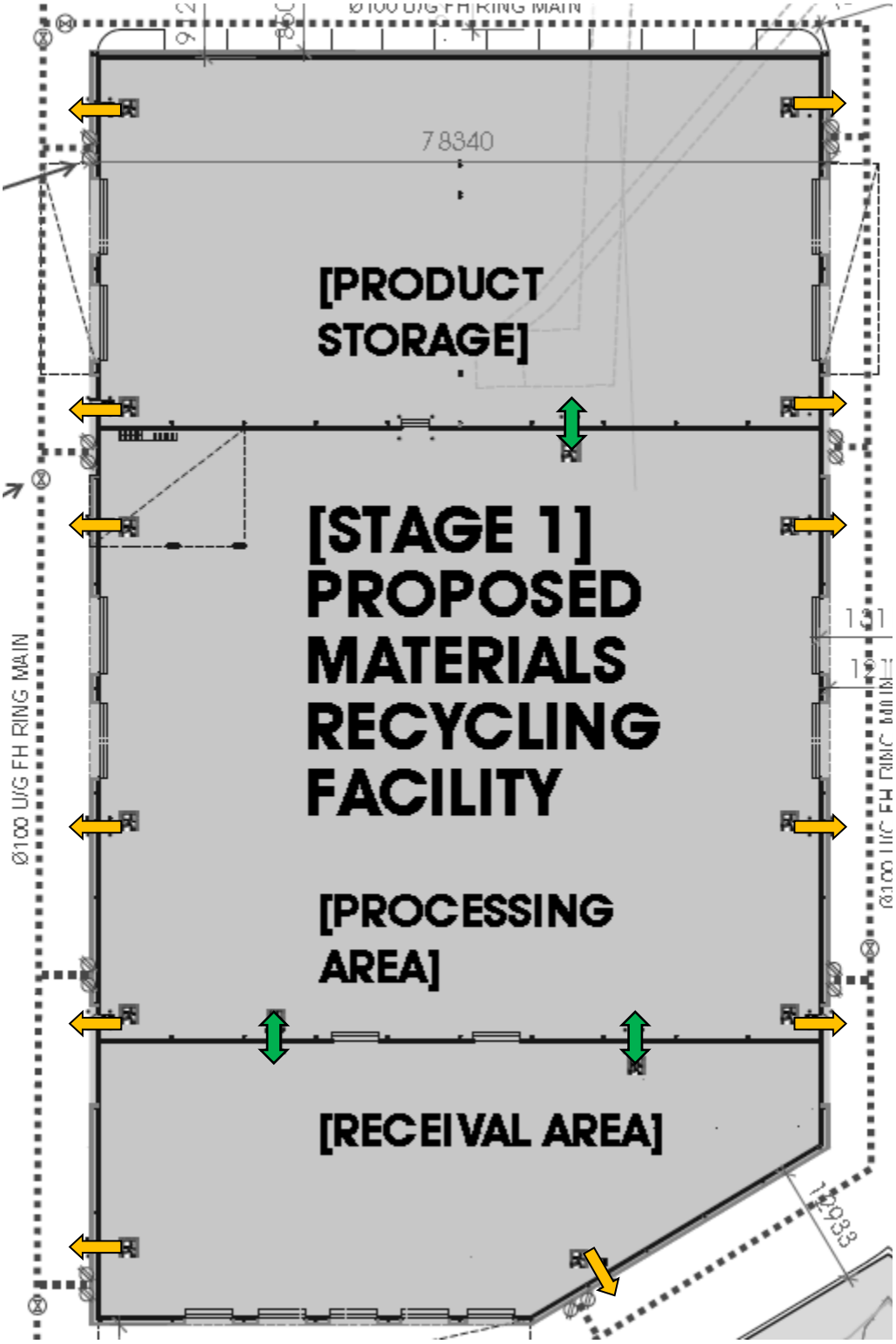


**Figure 3: Proposed Building Plan**

## 3.2 BCA Assessment Data

The relevant BCA Assessment Data for the subject development is summarised in Table 3.

**Table 3: Relevant BCA Assessment Data**

| BCA Reference | BCA Assessment |
|---|---|
| Classification | Class 5 (administration)<br>Class 7b (product storage)<br>Class 8 (Waste Recycling Facility) |
| Rise in Storeys | 2 |
| No. of Levels Contained | 2 (including mezzanine) |
| Minimum Type of Construction Required | Type C |
| Effective Height | Less than 12m (approx. 3.5m to Mezzanine) |
| Maximum Fire Compartment Size | Greater than 5,000m$^2$ and 30,000m$^3$<br>(Large Isolated Building) |

## 3.3 Provisions for Fire Brigade Intervention

***Fire Station Locations***

The two nearest fire stations to the subject development are:

- Bankstown Fire Station (Permanent Staff) - approximately 4.1 km (by road)
- Lidcombe Fire Station (Permanent Staff) - approximately 4.5 km (by road)

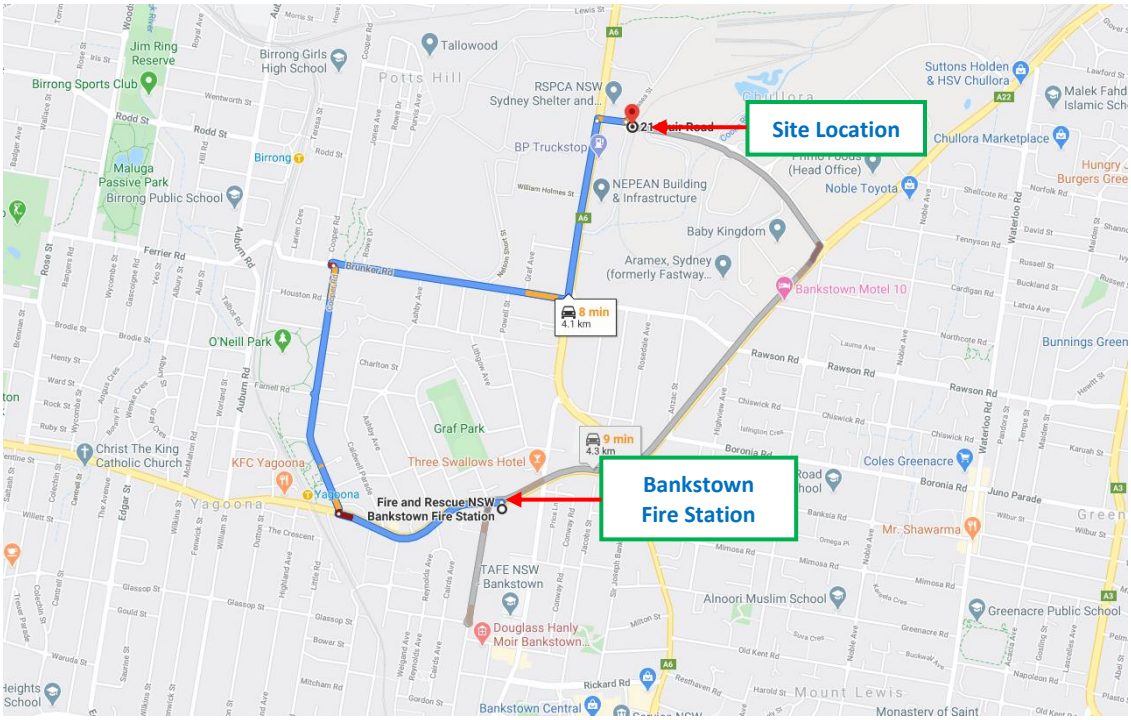


**Figure 4: Fire Station Location (Bankstown Fire Station)**

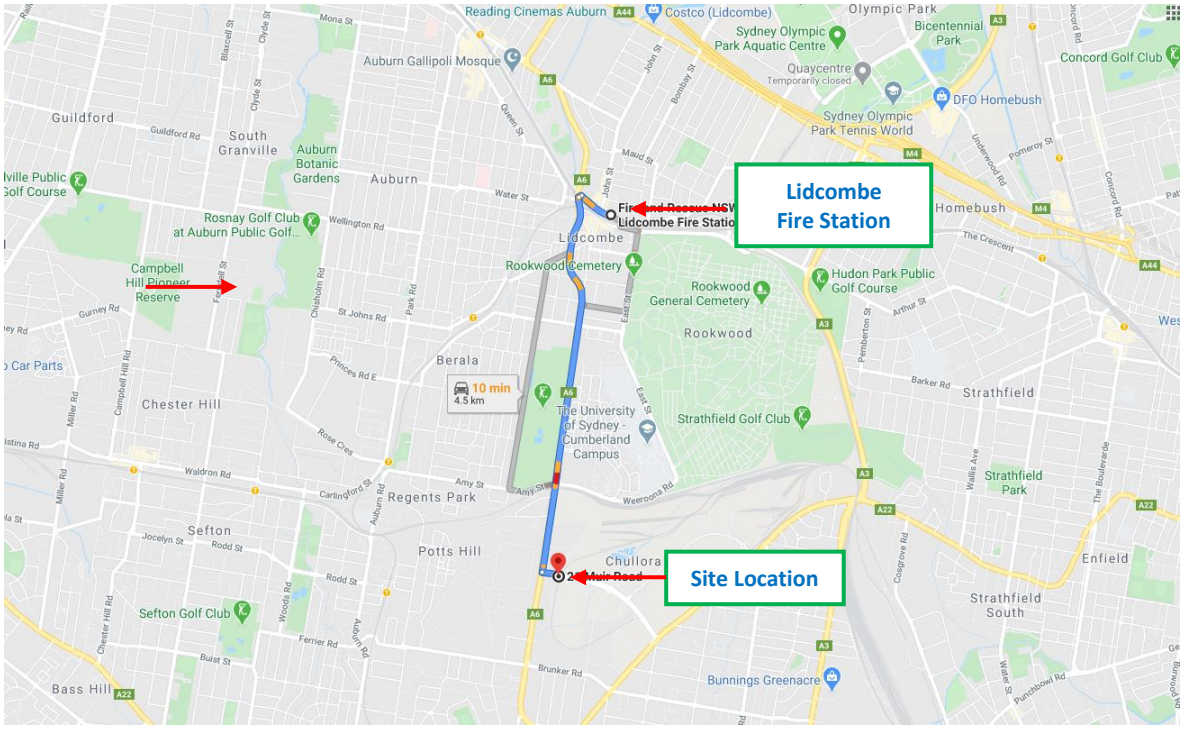


**Figure 5: Fire Station Location (Lidcombe Fire Station)**

***Emergency Services Access***

Emergency services vehicular access to the site will be via the internal road connecting off Muir Road to the north of the site.

***Fire Hydrant and Sprinkler Pumps and Booster Assemblies***

The fire hydrant booster assembly, pump room, water supply and associated infrastructure is proposed to be located along the North-Western side of the site, accessed from Muir Road and will be an 'Industrial Estate Wide' installation which will be serving all proposed and future buildings.

The fire hydrant booster assembly is proposed to be located in a designated area within the confines of the site an approximately 140m away from the main street entrance and approximately 50m from the nearest building (Warehouse Building B) or any external stockpiles.

The fire hydrant and sprinkler booster assemblies shall be co-located and designed in accordance with the relevant provisions of AS 2419.1, AS 2118.1 and FRNSW Guideline "*Fire Safety in Waste Facilities*" as outlined in Section 4 of this report.

***Fire Control Centre***

The Fire Control Centre (FCC) serving the site, including the main Fire Indicator Panel (FIP), shall be located within a dedicated room adjacent to the site wide fire services (boosters and pump enclosures), as shown in Figure 6 and Figure 7 below.

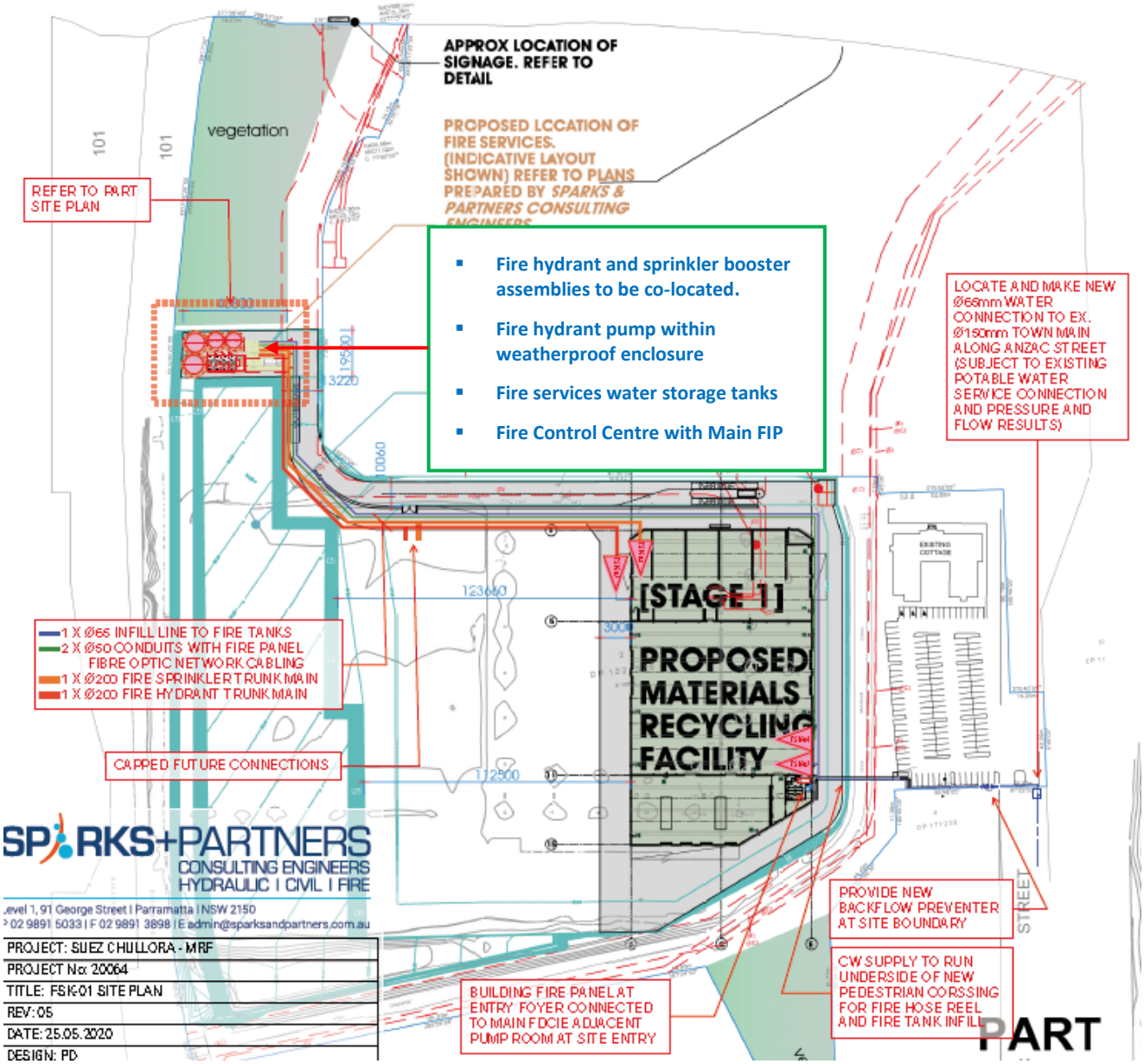


**Figure 6: Fire Services Site Plan**

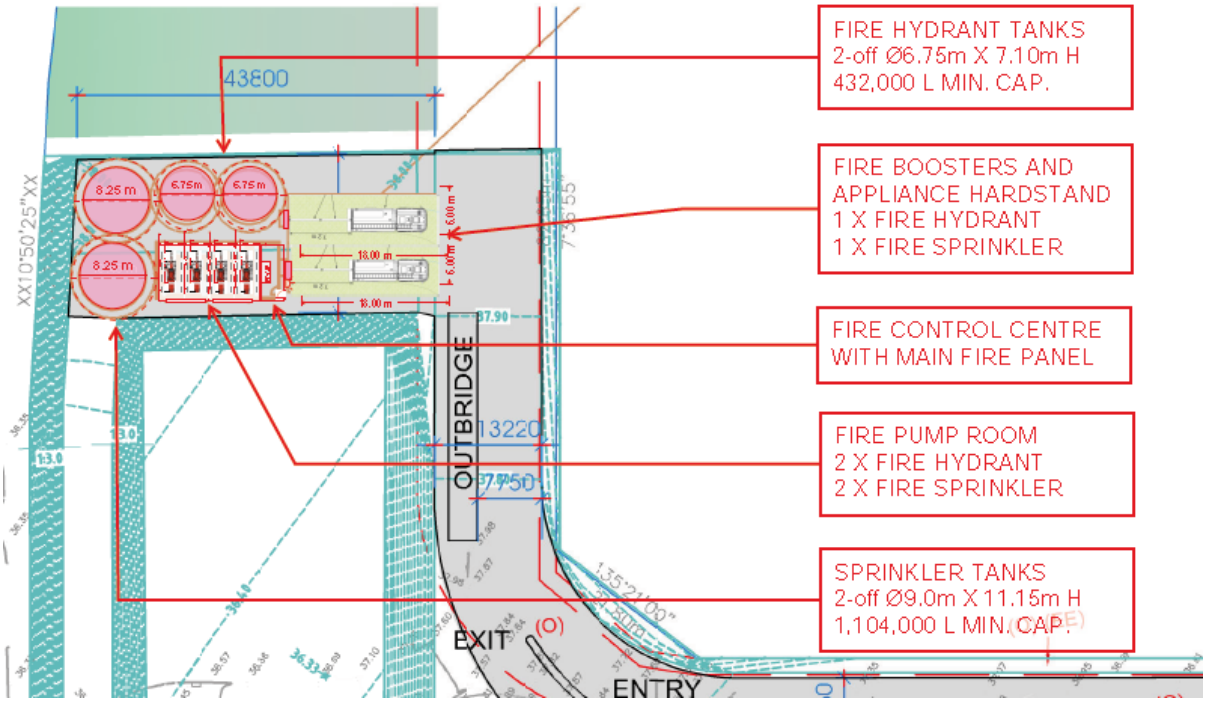


**Figure 7: Fire Services Infrastructure**

# 4.0 SUMMARY OF FIRE SAFETY REQUIREMENTS

## 4.1 GENERAL

All building works associated with the subject development shall comply with the relevant DtS provisions of Sections C, D and E of the BCA, except for the permitted variations within the future Fire Engineering Report.

## 4.2 SPECIFIC REQUIREMENTS

Specific fire engineering requirements that are applicable to the subject development, which vary from or exceed, the DtS provisions of the BCA have been summarised below.

***Fire Separation for Asset Protection***

1. The receival, processing and storage area within the building shall be fire-separated by full-height fire walls achieving an FRL not less than 90/90/90.
    - Doorways within the separating walls shall be fitted with self-closing fire doors achieving an FRL not less than -/90/30.
    - Openings for plant and forklift movement shall be fitted with automatic closing fire-shutters achieving FRL -/90/30 or -/90/- with wall-wetting sprinklers. The fire-shutters shall be activated by the activation of the automatic sprinkler system and manual call points.
    - Visual alarm devices (VADs) shall be installed on both sides adjacent to the automatic closing fire-shutters that shall provide warning to occupants of the closing shutters. Signage shall be installed adjacent to the VAD stating “WARNING FIRE SHUTTER CLOSING”.
    - Additional sprinkler heads shall be installed directly above (not less than 0.5m or greater than 1.0m) openings for conveyors where the conveyors extend through the separating wall.
    - Structural columns supporting the roof structure shall be located within the product processing compartment, with roof truss penetrations to be sealed with fire-rated mastic.

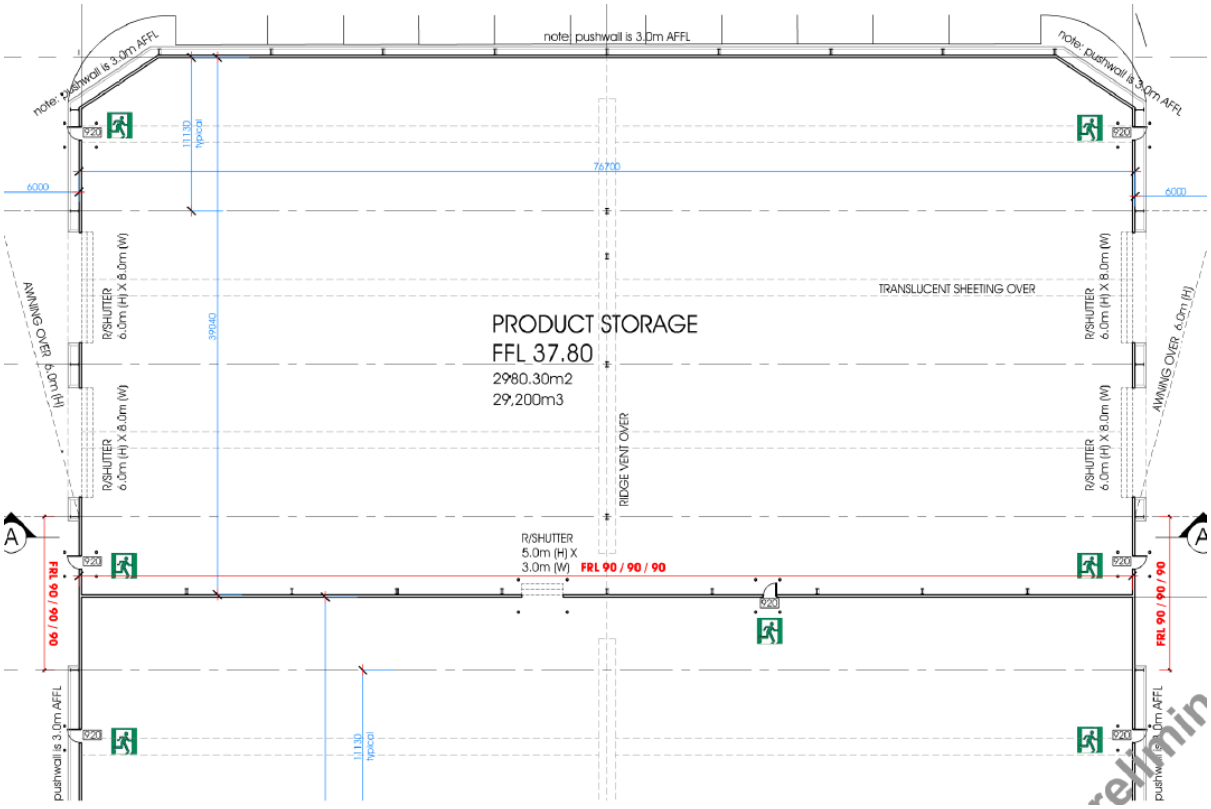


**Figure 8: Part Plan - Fire Separation**

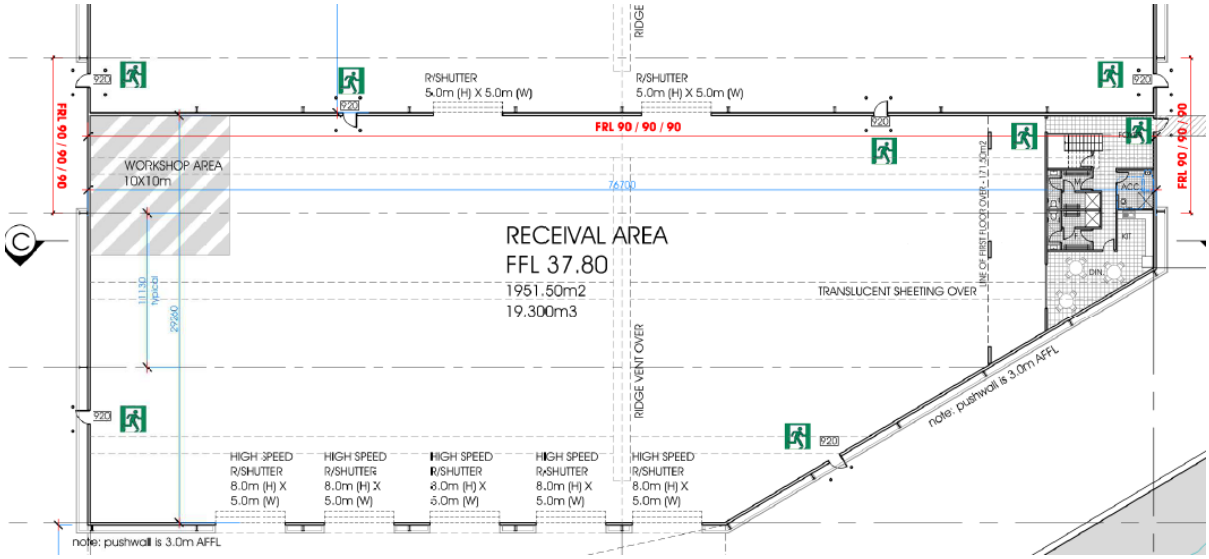


**Figure 9: Part Plan - Fire Separation**

***Vehicular Perimeter Access***

2. Vehicular perimeter in accordance with BCA Clauses C2.3 and C2.4 shall be provided around the subject building and development, except where varied by Performance Solution in the future FER.
3. The perimeter access road/carriageway shall not be obstructed by permanent or temporary stockpiles, with a minimum 6m width maintained in areas used for external stockpile storage.
4. It is permitted for the perimeter vehicular access to comprise the following:
    - Width restrictions to a minimum 3.2m (approx.) associated with passing secure entry points and traversing the weigh entry and out-bridges.
    - Height restrictions to a minimum 4.5m associated with passing beneath awning structures and elevated walkways. The overhead clearances shall be in accordance with Clause 7.5 of FRNSW Guideline "*Access for Fire Brigade Vehicles and Firefighters*" for specialist fire appliance access.
    - The furthest part of the perimeter access road to be greater than 18m from the external wall of the building, being up to 30m due to loading areas.
5. The grade of carriageways or ramps shall be no steeper than 1:6, or 1:8 for curved or circular paths measures along the centreline.
6. Gates, barriers and bollards installed that may inhibit FRNSW vehicle access to and within the site shall be removable, retractable or foldable so that access can be facilitated during an emergency incident, including after hours.
7. All locks fitted to vehicle access gates and security devices are to be keyed alike, with a copy of the key deposited with the two nearest FRNSW stations. All electrically operated vehicle access gates shall incorporate a mechanical override, fail-safe open, or activation by site security to facilitate FRNSW access to and within the site.
8. All carriageways within the site forming part of the vehicle perimeter access shall have design load capacities in accordance with the requirements of Clause 9 of FRNSW Guideline "*Access for Fire Brigade Vehicles and Firefighters*" for aerial appliances.

***High-Voltage Main Switch Room***

9. The high-voltage switch room within Building A shall be fully fire-separated from the remainder of the building by fire-resisting construction achieving an FRL not less than 120/120/120.
10. Doorways to the main switch room shall be protected with a self-closing fire door having an FRL of not less than –/120/30

## 4.3 FIRE SAFETY SYSTEMS

The required fire safety systems that are applicable to the subject development have been summarised below, including additional provisions where noted that exceed the minimum DtS provisions of the BCA.

*Note: Reference shall also be made to the Fire Safety Schedule for the subject development for the list of required fire safety systems and measures and the relevant Standards of Performance.*

***Fire Hydrants***

1. A fire hydrant system shall be installed throughout the subject development in accordance with Clause E1.3 of the BCA, and the relevant provisions of AS 2419.1-2005, except as where varied in this Report and future Fire Engineering Report.
2. Fire hydrant coverage within the building and site shall be achieved by the provision of external fire hydrants in the first instance, with internal fire hydrants provided to supplement coverage.
    - Internal fire hydrants shall be located such that the first internal hydrant is not greater than 50m from the nearest external fire hydrant, with subsequent internal fire hydrants located at 25m spacing.
3. Where external fire hydrants are located adjacent to or within 10m of external walls of the building they shall be protected by safeguarding construction in accordance with AS 2419.1-2005 Clause 3.2.2.2(e)
    - having an FRL of not less than 90/90/90;
    - extending 2 m each side of the fire hydrant outlet; and
    - extending not less than 3 m above the ground adjacent to the fire hydrant or the height of the building, whichever is the lesser.

    Fallback fire hydrants located greater than 10m from the subject building shall be provided.

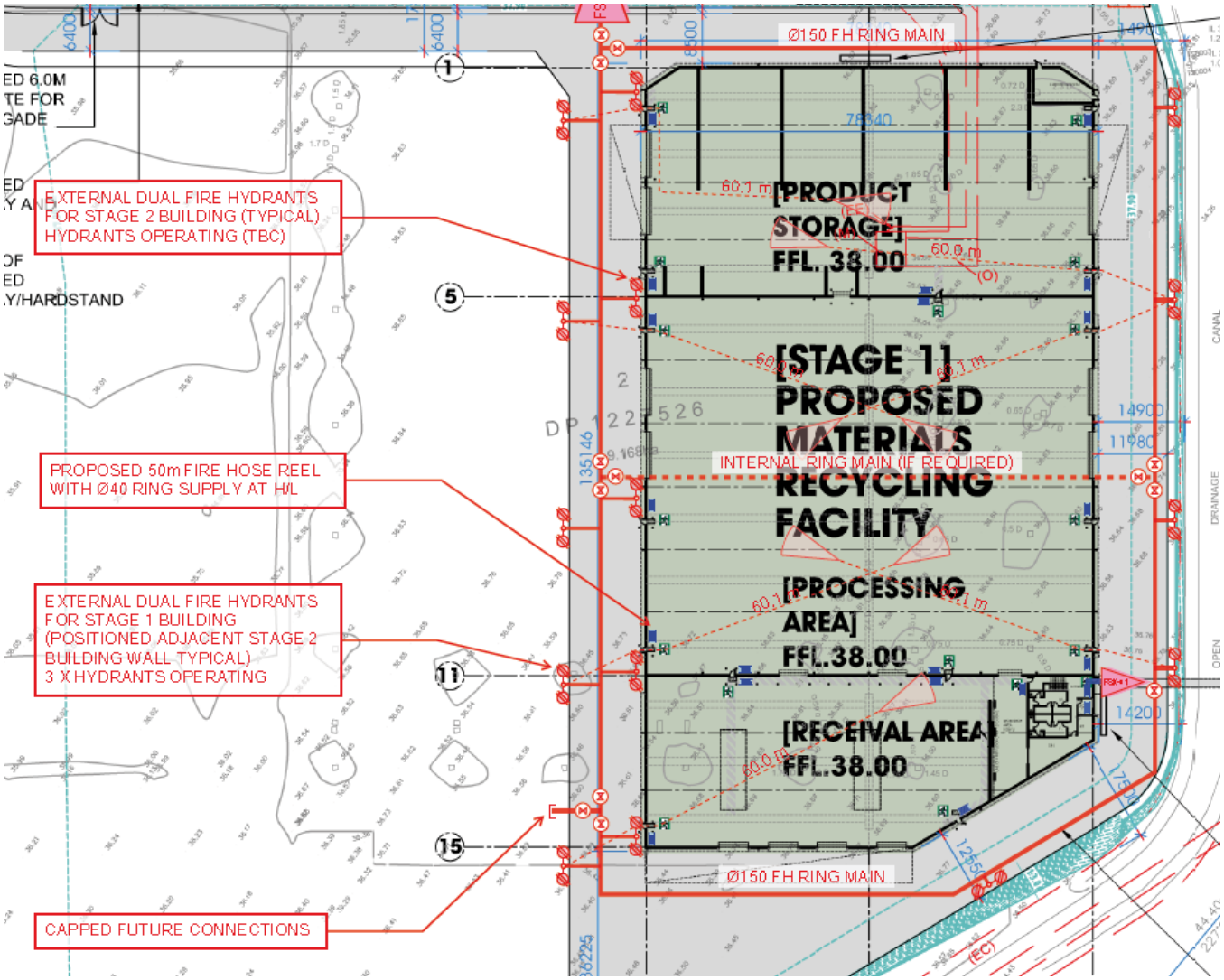


**Figure 10: External Fire Hydrant Locations**

4. External stockpiles are not proposed for the subject development.

   However, where external stockpiles are present, fire hydrants shall not be located within 10m of stockpiled storage and shall be accessible to firefighters from the pedestrian and vehicular perimeter access pathways.

   The fire hydrant system performance shall be enhanced for open yard storage (external stockpiles) in accordance with FRNSW Guideline "*Fire Safety in Waste Facilities*".

5. A fire hydrant ring main shall be installed in accordance with Clause 8.6.2.2 of AS 2419.1-2017.

6. The fire hydrant system shall have a minimum water supply capacity to supply the maximum hydraulic demand of the system (flow rate) for a duration of not less than 4 hours. This shall consider simultaneous flow demands of the automatic sprinkler system where shared water supplies are proposed.

7. A visual warning device (red strobe) in accordance with AS 2419.1-2017 Clause 7.3.2 shall be provided at the fire hydrant booster assembly to assist the fire brigades to readily identify the location of the booster assembly upon arrival to the site. The strobe light shall be:

   - Visible from the designated site entry point and visible prior to reaching the fire hydrant booster assembly when travelling from the main site vehicular entrance.

- Activated by an alarm signal from the fire detection control and indicating equipment connected to the automatic smoke detection and automatic sprinkler systems within the building.

8. The fire hydrant booster assembly arrangement shall be in accordance with Clause 7.5.3 of AS 2419.1-2017 for connection to towns mains and Clause 7.5.7 of AS 2419.1-2017 for connection to tank suction from on-site water storage tank(s).
9. The connection to the on-site water storage tank(s) shall be in accordance with Clause 4.3.3 and H4.3 of AS 2419.1-2017.
10. A designated hardstand area shall be provided adjacent to the fire hydrant booster assembly and static water supply suction connection outlet(s) as applicable in accordance with Section 8 of FRNSW Fire Safety Guideline "*Access for Fire Brigade Vehicles and Firefighters*". Refer to Appendix B.

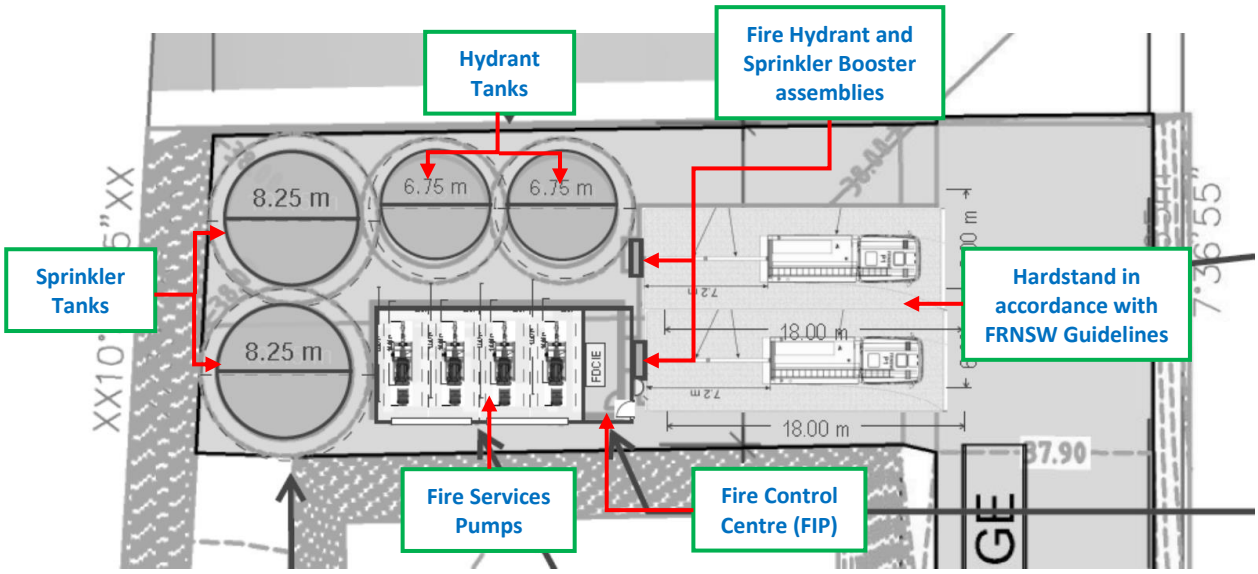


**Figure 11: Fire Services Facilities**

11. A Block Plan shall be provided at the new fire hydrant booster assembly, in the correct orientation, clearly identifying the overall layout of the site and the location of each building with respect to the fire hydrant booster. The Block Plan shall also identify the location of the fire hydrant pump room (if provided) and all external and / or internal fire hydrants. The Block Plan shall comply in all respects with the relevant provisions of AS 2419.1-2005. A copy of the fire hydrant Block Plan shall be displayed within a prominent position within the entry lobby of the building, and adjacent to each Fire Indicator Panel (FIP).
12. The fire hydrant booster assembly connections and 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 possess a forging symbol and manufacturers mark and shall comply with Fire & Rescue NSW Fire Safety Guideline Technical Information (D15/45534).
13. The suction and booster valves to the fire hydrant booster assembly shall be orientated to directly face the street frontage.
14. Fire water containment run off shall be designed in accordance with Section 7.9 of the FRNSW Guideline "*Fire Safety in Waste Facilities*".

***Fire Hose Reels***

15. A fire hose reel system shall be installed throughout the non-residential use areas of the subject development in accordance with Clause E1.4 of the BCA, and the relevant provisions of AS 2441-2005.

***Sprinklers***

16. An automatic fire sprinkler system shall be installed throughout the subject development in accordance with Specification E1.5 of the BCA, and the relevant provisions of AS 2118.1-2017.
17. The sprinkler system shall be designed to High Hazard occupancy class.
18. The sprinkler system shall have a minimum water supply and capacity to provide the maximum hydraulic demand for not less than 2 hours. This shall consider simultaneous flow demands of the fire hydrant system where shared water supplies are proposed.
19. The sprinkler booster assembly shall be installed in accordance with Clause 4.14 of AS 2118.1-2017 and Clause 7.5.3 of AS 2419.1-2017 for connection to towns mains and Clause 7.5.7 of AS 2419.1-2017 for connection to tank suction from on-site water storage tank(s).
20. The connection to the on-site water storage tank(s) shall be in accordance with Clause 4.3.3 and H4.3 of AS 2419.1-2017.
21. The sprinkler booster assemblies shall be co-located with the fire hydrant booster assemblies in accordance with Clause 7.6.5 of FRNSW Guideline "*Fire Safety in Waste Facilities*". Refer to Figure 11 above.
22. All sprinkler heads shall be of the fast response type, with a Response Time Index (RTI) of not greater than 50(m.s)$^{1/2}$.
    - Early suppression fast response (ESFR) sprinklers with activation temperature no greater than 101°C (below the ceiling) shall be installed within the processing and storage areas.
23. Extended coverage sprinklers shall not be utilised within the subject building.
24. The fire sprinkler system shall be connected to a fire station dispatch centre in accordance with AS 1670.3-2018.
25. A Block Plan of the fire sprinkler system shall be provided at the fire brigade booster assemblies in accordance with AS 2118.1. A copy of the Block Plan shall also be located at the FIP. The Block Plans shall be designed and mounted to be in the correct orientation to the reader.
26. Fire water containment run off shall be designed in accordance with Section 7.9 of the FRNSW Guideline "*Fire Safety in Waste Facilities*".

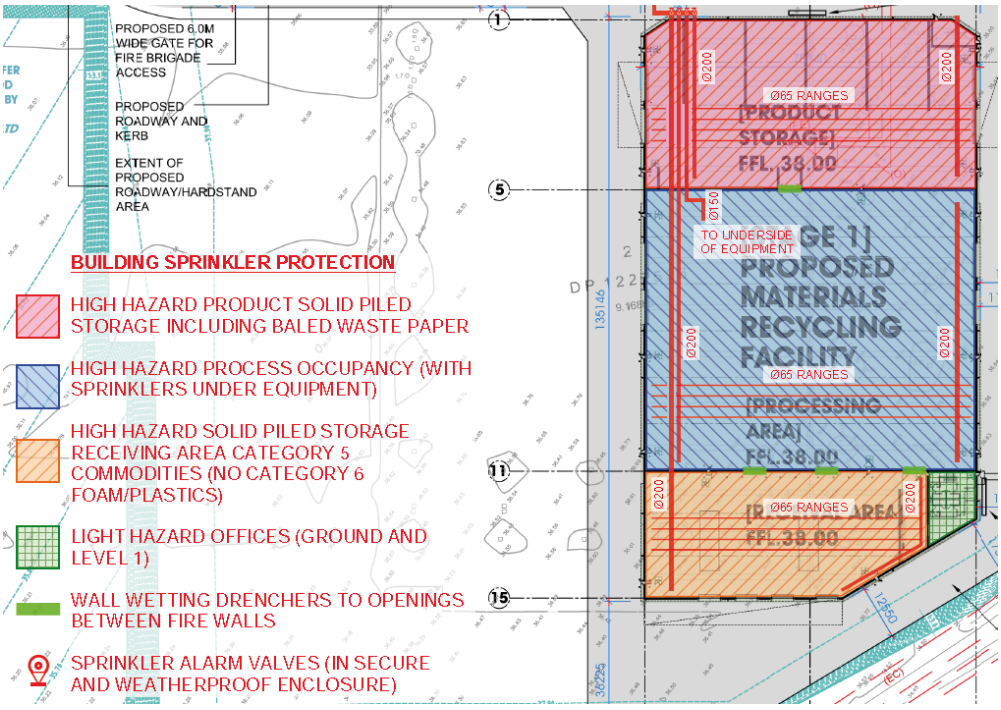


**Figure 12: Sprinkler Protection**

***Portable Fire Extinguishers***

27. Portable fire extinguishers shall be provided throughout the subject development in accordance with Clause E1.6 of the BCA, and the relevant provisions of AS 2444-2001.

***Fire Control Centre***

28. A fire control centre shall be provided for the subject development in accordance with Specification E1.8 of the BCA.

29. The fire control centre shall be within a dedicated room co-located with to the fire services pump rooms and booster assemblies. Refer to Figure 11 above.

***Automatic Smoke Detection and Alarm System***

30. Automatic Smoke detection shall be provided within the office areas in accordance with Specification E2.2a (Clause 5) and the relevant provisions of AS 1670.1-2018.

31. It is proposed to omit point-type smoke detection within the warehouse and processing floor areas to mitigate the risk of ongoing false alarms and the automatic callout of fire services through the alarm monitoring facility. The following alternative detection system shall be installed within the building.

    - A fire detection surveillance system (Pyroview Fire Detection System or SigniFire or equivalent)
    - Aspirating smoke detection (VESDA)

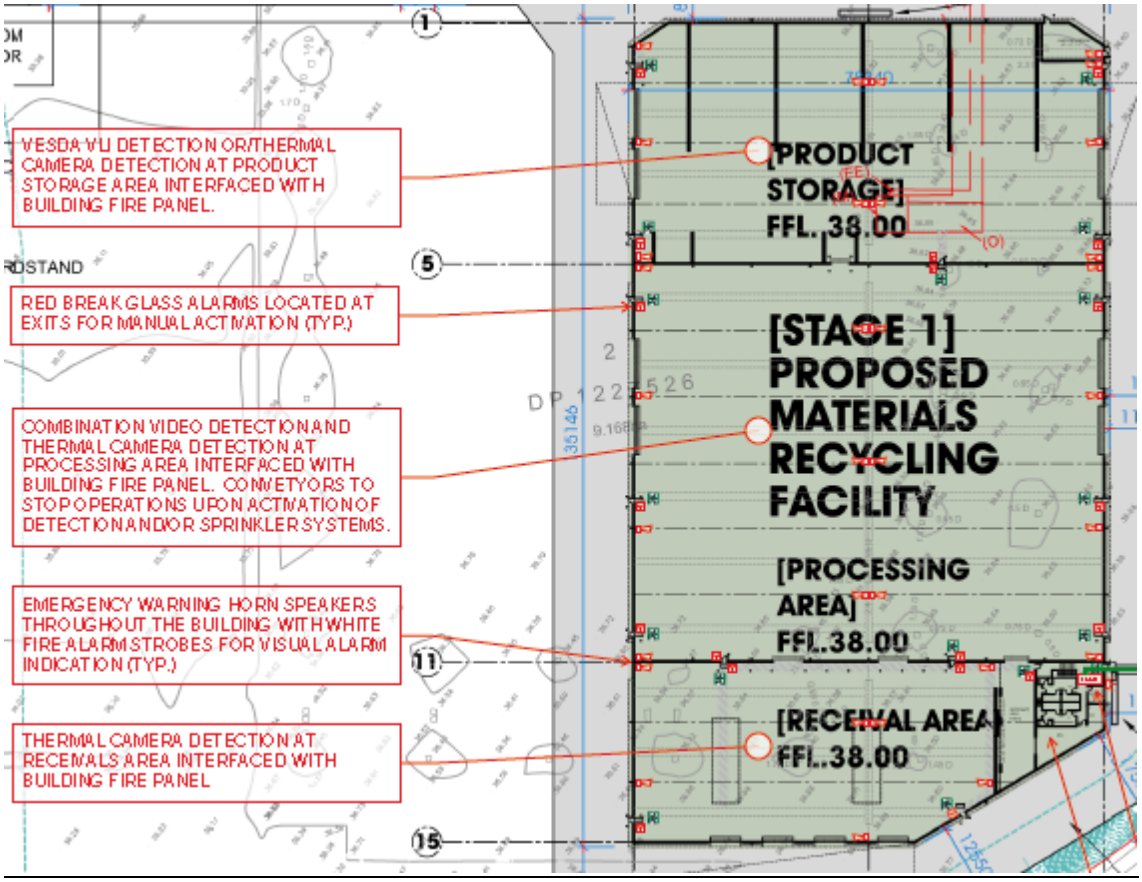


**Figure 13: Warehouse Detection Systems**

**<u>Fire Detection Surveillance System</u>**

32. A fire detection surveillance system (Pyroview Fire Detection System or SigniFire or equivalent) shall be installed within the facility to provide field of view coverage to all stockpile, processing and storage areas within the building. Refer to Appendix D for Product Specifications.

    - The fire detection surveillance system shall be interfaced to a fire alarm control panel that shall activate a fire alarm condition at the FDCIE.

- A fire alarm condition triggered by the fire detection surveillance system shall activate the building occupant warning system and automatic smoke exhaust system. The fire detection surveillance system shall be zoned to align with the smoke hazard management zones, being independent zones for the 3 compartments of the building.
- The Analogue Addressable Input / Output (I/O) modules shall be located not greater than 1m from the infrared flame cameras to mitigate the risk of signal loss from the camera due to mechanical damage.
- The transmission paths between the I/O modules and the FDCIE shall be installed, supervised and protected in accordance with the requirements for connectable devices specified in AS 1670.1-2018.
- The fire detection surveillance system shall use power supply equipment (PSE) in accordance with AS 1670.1-2018 Clause 3.15.


**Figure 14: Fire Detection Surveillance System Supervision (Typical)**

33. All plant and machinery within the subject building shall automatically shut down on the activation of the smoke detection system.
34. The automatic smoke detection system shall be connected to a fire station dispatch centre in accordance with AS 1670.3-2018.

***Building Occupant Warning System***

35. A building occupant warning system shall be installed throughout the subject development in accordance with Specification E2.2a of the BCA (Clause 6), and the relevant provisions of AS 1670.1-2018.

36. 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** "

    *Notes:*

    - *The performance of the verbal messaging shall comply with Clause 4.8 AS 1670.4-2018.*

37. Visual alarm devices (VADs) shall be installed within the building in accordance with the requirements of Clause 3.22.4 of AS 1670.1-2018, including the following locations where:

    - The average A-weighted sound pressure level of the background noise is higher than 85 dB; and
    - The wearing of hearing protection devices is required.

38. The building occupant warning system shall automatically activate upon operation of the automatic smoke detection and alarm system serving the building and / or the fire sprinkler system.

***Manual Call Points***

39. Manual call points shall be installed throughout the building in accordance with AS 1670.1-2018.

40. All points within the subject building shall be not less than 30m from a manual call point.

41. The activation of a manual call point shall automatically activate the building occupant warning system and the automatic smoke exhaust system.

    - The manual call points shall be zoned to align with the smoke hazard management zones, being independent zones for the 3 compartments of the building.

***Emergency Lighting and Exit Signs***

42. Emergency lighting and exit signs shall be installed in accordance with Clauses E4.2, E4.4, E4.5, E4.6 and E4.8 of the BCA, and the relevant provisions of AS 2293.1-2018 with the exception that directional exit signs may be mounted greater than 2.7 m AFFL.

43. Where exit signs are located above 2.7 m they are to be "jumbo" sized i.e. ~600 mm x 300 mm.

44. Emergency lighting is to be installed in accordance with Clauses E4.2 and E4.4 of the BCA, and the relevant provisions of AS 2293.1-2018.

***Smoke Hazard Management***

45. An automatic smoke exhaust system shall be installed in the subject building in accordance with the relevant requirements of AS 1668.1-2015.

46. The smoke exhaust system shall be designed to maintain a hot smoke layer height not less than the height of the top of the stockpiles for at least 90% of the floor area.

47. Natural low-level openings, either permanent or operable, shall be provided within the external walls of the building on not less than 2 opposite sides.

48. The smoke exhaust system shall be capable of continuous operation for not less than 2 hours.

49. The smoke exhaust system shall be automatically activated by the activation of the smoke detection system, automatic sprinkler system and the activation of a manual call point.

50. Fire fan controls shall be installed within the site wide fire control centre/room.

# 5.0 CONCLUSION

A Fire Engineering Analysis of Performance Solutions to the DtS provisions of the BCA is to be undertaken in the future Fire Engineering Report for the proposed Chullora Materials Recovery Facility to be located at 21 Muir Road, Chullora NSW. The Performance Solutions relate to variations to the following DtS provisions of the BCA:

- *Perimeter Vehicular Access – BCA Clause C2.4*
- *Exit travel distances and Distance between Alternative Exits – BCA Clause D1.4, D1.5*
- *Travel via Non-Fire-Isolated Stairways – BCA Clause D1.9*
- *Elevated Walkways and Platforms – BCA Clause D1.6, D2.13, D2.14, D2.15, D2.16, D2.17, D2.18*
- *Fire Hydrants – BCA Clause E1.3*
- *Sprinklers – BCA Clause E1.5, Specification E1.5*
- *Provision for Special Hazards – BCA Clause E1.10, E2.3*
- *Smoke Hazard Management – BCA Clause E2.2*
- *Exit and Directional Signs – BCA Clause E4.5, E4.6*
- *Smoke Detection – BCA Clause E2.2, Specification E2.2a*

It is the opinion of Innova Services Pty Ltd that Performance Solutions can be developed to the DtS provisions of the BCA to ensure the proposed Chullora Materials Recovery Facility can achieve compliance with the relevant Performance Requirements of the BCA CP2, CP9, DP2, DP3, DP4, DP6, EP1.3, EP1.4, EP2.2 and EP4.2, subject to the implementation of the Fire Safety Requirements nominated in Section 2 ***(Summary of Fire Safety Requirements)*** of this Report, and the future Fire Engineering Report.

# APPENDIX A – FRNSW GUIDELINE – FIRE SAFETY IN WASTE FACILITIES

Fire safety guideline

# Fire safety in waste facilities

Version 02.02
Issued 27 February 2020

Fire Safety Branch
Community Safety Directorate

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# Contents

# 1 Purpose

The purpose of this document is to provide guidance on fire safety in waste facilities that receive combustible waste material, including adequate provision for fire safety and facilitate safe fire brigade intervention to protect life, property and the environment.

# 2 Scope

This guideline details the requirements of Fire and Rescue NSW (FRNSW) for:

a) consideration of fire safety during all stages of a waste facility including site selection, planning, design, assessment and operation

b) fire safety systems to be adequate to the special hazards identified within a waste facility and which also meet the operational needs of firefighters

c) safe storage and stockpiling of combustible waste material based on expected combustibility and maximum pile size, and

d) workplace fire safety and fire safety planning, including procedures for the event of fire or emergency incident.

When this guideline is followed the likelihood and severity of fire should be reduced, assisting with firefighting intervention and protecting life, property and environment from fire.

# 3 Application

This guideline applies to any waste facility within NSW involved in the storage, processing or resource recovery of combustible waste material.

This guideline applies to any proposed development of a waste facility that involves a change of building use or building work that intends to meet the National Construction Code (NCC).

This guideline does not apply to any waste facility, or areas of, that are being used for:

a) landfill (but, may apply to a waste facility on the landfill site)

b) composting, including in-vessel, green waste and anaerobic digestion

c) liquid waste treatment

d) hazardous chemicals or special waste treatment (e.g. waste tyres), or

e) less than 50 $m^3$ of combustible waste material.

**Note:** Fire safety requirements still apply to waste facilities not covered by this guideline.

This guideline does not overrule any other requirement that specifically relates to the business or undertaking (e.g. guidelines for rubber tyre storage, dangerous goods code), nor does this guideline overrule any other specific condition that has been imposed on the waste facility.

This guideline is intended to be used by any person conducting a business or undertaking (PCBU), owner, development proponent (e.g. builder, fire engineer), planning/environmental consultant, regulatory authority, consent authority or certifier.

This guideline is not a statutory document and should be given due consideration by each stakeholder as it relates to their role and responsibility in operating, managing, planning, designing, consulting, assessing or determining the case of any applicable waste facility.

This guideline is developed in the public interest and should be taken into consideration by any consent authority when determining a development application for a waste facility (refer to *Section 4.15(1)(e)* of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*).

**Note:** Under *Section 4.17* of the *EP&A Act*, the consent authority may impose requirements from this guideline (in part or full) as a condition on the development consent.

Where appropriate, it is recommended that an external consultant be engaged to provide specialist advice and services on the application of this guideline to any given waste facility.

# 4 Definitions

The following definitions apply in this guideline:

**acceptable solution** – means a prescriptive solution as defined in Appendix A.

**certifier** – means a council or an accredited certifier who holds a certificate of accreditation as an accredited certifier under the *Building Professionals Act 2005.*

**consent authority** – means the same as in *Section 4.5* of the *EP&A Act*.

**combustible waste material** – means any solid waste material that can readily ignite and burn under normal conditions, which includes:

- paper and cardboard
- wood and wood-based products
- plastic
- rubber
- textiles
- waste derived fuels such as refuse derived fuels (RDF), solid recovered fuels (SRF) and processed engineered fuels (PEF)
- metal with combustible contaminants, and
- any other waste material which may pose a notable fire risk like above.

**Department Planning, Industry and Environment (DPIE)** – means the consent authority responsible for State Significant Development under *Division 4.7* of the *EP&A Act*.

**emergency plan** – means a written plan which details the actions required to be undertaken by occupants of a premises during a fire or other emergency incident.

**emergency response procedures** – means written procedures outlining the response to an emergency, such as evacuation and/or activation of the emergency response team etc.

**emergency services information package (ESIP)** – means a folder containing concise information necessary to allow emergency services to commence operations and develop effective strategies and tactics to manage a fire or other emergency incident.

**fire brigade** – means a statutory authority constituted under an Act of Parliament having as one of its functions, protect life and property from fire and other emergencies.

**fire brigade booster assembly** – means a connecting device enabling the fire brigade to pressurise or pump water into a fire hydrant or fire sprinkler system.

**fire brigade station** – means a state government operated premises which is a station for a *fire brigade* (i.e. a FRNSW or NSW Rural Fire Service fire brigade station).

**fire brigade vehicle** – means any vehicle that forms part of the equipment of a fire brigade and that is equipped with an audible warning device and flashing lights.

**fire compartment** – means the same as in the *NCC*.

**fire hydrant** – means an assembly installed on a mains water or private water pipeline, which provides a valved outlet to permit a supply of water to be taken for firefighting.

**fire safety system** – means an active and/or passive system which warns people of an emergency, provides safe evacuation, restricts or extinguishes fire.

**fire-source feature** – means:

a) the far boundary of a road, river, lake or the like adjoining the premises; or

b) a side or rear boundary of the premises; or

c) an external wall of another building which is not a Class 10 building.

**fire water run-off** – means residual water used in fighting the fire, which is contaminated with the products of combustion and unburnt materials washed off fire debris.

**hazardous materials** – means anything that, when produced, stored, moved, used or otherwise dealt with without adequate safeguards to prevent it from escaping, may cause injury or death or damage to property.

**Note:** Hazardous materials include hazardous chemicals under the *Globally Harmonised System* (*GHS*) and dangerous goods under *Australian Dangerous Goods Code*.

**National Construction Code (*NCC*)** – means the *National Construction Code (NCC) 2019, Building Code of Australia Volume One,* as amended.

**NSW Environment Protection Authority (EPA)** – means the regulatory authority responsible for protecting the environment within NSW.

**performance solution** – means a method of complying with the performance requirements of the *NCC* other than by a 'deemed-to-satisfy' solution.

**person conducting a business or undertaking (PCBU)** – means the person or company who owns and manages the waste facility business.

**premises** – means any applicable building, facility or site (land) comprising a waste facility.

**owner** – means the person or company who owns the premises being used as a waste facility.

**regulatory authority** – means an authority having the statutory responsibility to administer and enforce related legislative provisions as prescribed.

**SafeWork NSW** – means the regulatory authority of workplace health and safety in NSW.

**stockpile** – means any piled storage of waste material or processed waste product, whether loose, baled, sorted, and irrespective of storage duration (e.g. temporary or long-term).

**waste** – means the same as in the *Protection of the Environment Operations Act 1997.*

**waste facility** – means any premises used for the storage, treatment, processing, sorting or disposal of waste material, and includes both waste facilities that hold an environment protection licence and waste facilities that are unlicenced sites.

# 5 Background

Historically, fire brigades have attended numerous fires at waste facilities in NSW. These fires are often quite large and have a detrimental impact on firefighting intervention, the environment, local community and the waste industry itself. The potential fire size correlates with the nature of the combustible waste material being processed, stockpile arrangements, on-site fire safety systems and emergency procedures specific to each facility.

Examples of a waste facility include:

- recycling centres
- resource recovery
- materials recovery facility
- energy recovery centre, and
- transfer stations.

Processes undertaken at waste facilities have higher risks than for other industries and can result in greater frequency and severity of fires. A fire involving bulk storage of mixed, loose combustible waste material presents a high and volatile fire load and causes significant challenges for firefighting intervention.

Waste fires in NSW have demanded significant fire brigade resources and intervention over multiple days to extinguish the fire. The largest and longest-lasting fires often involve large stockpiles of unsorted waste with inadequate separation, where physical removal, separation and extinguishment is required. These fires also result in major pollution impact on the community, especially from smoke, which is unable to be contained.

Combustible waste therefore generally presents *'special problems of firefighting'* that warrant classification and consideration of 'special hazards' provisions under Clause E1.10 and E2.3 of the *NCC*. Fires in waste facilities present specific issues for firefighting, including:

a) the physical nature of combustible waste and waste by-products, including fire properties and ignition potential of both unsorted and sorted materials

b) unsuitable storage method, stockpile size, separation distances and accessibility

c) mechanised waste handling, sorting and processing systems, including vehicles

d) poor fire brigade vehicle and/or firefighter access for firefighting intervention

e) facilities having an inadequate or no fire hydrant system, including water capacity

f) facilities having an inadequate automatic fire suppression system installed

g) buildings having an inadequate smoke hazard management system installed, and

h) facilities having inadequate provision to contain fire water run-off.

Guidance on fire safety for waste facilities is generally limited due to the case-by-case considerations of the special hazards unique to each facility. It is the intention of this guideline to assist the responsible person to plan, manage, advise, assess or determine the risks and measures applicable to any given facility in the absence of any other requirements.

Specific requirements may be imposed on the waste facility, or any processes undertaken (e.g. storage, processing, transportation), by the relevant regulatory authority, such as local council, DPIE, NSW EPA or SafeWork NSW.

**Note:** A regulatory authority may impose requirements from this guideline on the waste facility as either a condition of consent, licensing or Development Control Order.

# 6 Legislated requirements

## 6.1 Protection of the Environment Operations Act 1997

A waste facility operator must hold an environment protection licence issued by NSW EPA when storing, processing or recovering waste above the licensing thresholds specified in *Schedule 1* of the *Protection of the Environment Operations Act 1997* (*POEO Act*).

NSW EPA have published a *Guide to licensing - Under the Protection of the Environment Operations Act 1997*, which outlines the requirements for an Environment Protection Licence for the PCBU of a waste facility.

Waste is classified using *Schedule 1* of the *POEO Act*. NSW EPA have published a *Waste Classification Guidelines - Part 1: Classifying waste* to assist the PCBU to classify waste.

**Note:** Waste is classified as either liquid, restricted solid, general solid (putrescible or non-putrescible), special or hazardous. These classifications only consider groups which pose similar environmental and health risks, and do not consider fire risks.

Any fire involving a waste facility can produce a pollution incident which may cause injury or death or result in damage to property or the environment. FRNSW will enact a hazardous materials response to any waste fire (e.g. to contain fire water run-off) and will notify NSW EPA as per agreement of the joint memorandum of understanding.

**Note:** A licenced waste facility must prepare a pollution incident response management plan that complies with *Part 5.7A* of the *POEO Act*.

## 6.2 Environmental Planning and Assessment Act 1979

Any development of a waste facility, new or existing, must be carried out in accordance with the legislated framework of the *EP&A Act* and corresponding regulations.

Environmental planning instruments (EPIs) are made under *Part 3* of the *EP&A Act,* and determine whether consent for the activity is required or not, the appropriate consent authority, and the assessment and approval process to be followed.

**Note:** An EPI can include either State environmental planning policy (SEPP) or Local environmental plans (LEPs).

The regulations and EPI will assist the planning authority determine if an Environmental Assessment, Environmental Impact Statement or a Statement of Environmental Effects is required, and whether development will be Designated Development, Integrated Development, State Significant Development or State Significant Infrastructure.

When assessing development, whether during the planning or approval stage, the relevant approval authority may require consultation with the fire brigade.

**Note:** The relevant approval authority, including the consent authority such as DPIE, may seek advice from the fire brigade and consider any recommendations provided when making their determination.

When reviewing any proposed development, the fire brigade will assess the 'special hazards' that impact on life, property and the environment during fire and may recommend additional provisions under Clause E1.10 and E2.3 of the *NCC*.

### 6.3 Work Health and Safety Act 2011

Any place of work has the legislated responsibility to ensure health and safety is maintained at the workplace at all times under the *Work Health and Safety Act 2011* (*WHS Act*) and corresponding *Work Health and Safety Regulation 2017* (*WHS Reg.*).

The *WHS Reg.* requires the PCBU to identify hazards and manage risks to health and safety by implementing a hierarchy of control measures at their facility. The PCBU must provide information, instruction and training to employees and other persons as necessary to ensure their health and safety.

**Note:** Refer to *Managing the work environment and facilities* by SafeWork NSW.

The PCBU should assess the nature of combustible waste material, and processes used, to determine the fire risks and potential fire load. Unprocessed mixed waste or processed renewable material and by-product may present risks similar to dangerous goods, and require consideration of specific controls as per *Part 7.1 Division 5* of the *WHS Reg*.

*Clause 43* of the *WHS Reg*. requires the PCBU to provide an emergency plan for their workplace, detailing emergency procedures for staff and occupants of the premises.

**Note:** Refer to *AS 3745–2010 Planning for emergencies in facilities* for guidance on developing emergency plans and procedures.

### 6.4 National Construction Code

The *Environmental Planning and Assessment Regulation 2000* (*EP&A Reg.*) requires development to comply with the *Building Code of Australia* (i.e. *NCC*) in force at the time of application.

Deemed-to-Satisfy (DtS) provisions of the *NCC* are often applied to the waste facility. A waste facility is to be designed, constructed or adapted for use as a class 8 building. A warehouse (i.e. class 7 building) with standard fire safety systems may be ineffective and overwhelmed from fire involving stockpiles of combustible waste material.

Due to waste facilities presenting ‘special problems of firefighting’, Clause E1.10 and E2.3 of the *NCC* should be considered and additional provision for special hazards made for the development. Consent authorities and certifiers are often reluctant to impose Clause E1.10 and E2.3 due to lack of familiarity or expertise with such special hazards.

**Note:** The *NCC* does not specify any prescriptive DtS provisions for special hazards.

The lack of prescriptive requirements means development should be assessed holistically on a case-by-case basis, ensuring performance requirements are met. The provisions should be based on an assessment of fire risks, fire safety systems, intended operations, and made in consultation with the fire brigade to identify potential problems for fire brigade intervention.

## 7 Development and planning

### 7.1 General

7.1.1 This whole section, being ‘*Development and planning*’, applies to new development of any waste facility that is being determined by the relevant consent authority or certifier, such as DPIE or the local Council.

**Note:** Development includes any application for land use or building works involving demolition, erection, rebuilding, alteration, enlargement or extension.

7.1.2 This whole section may apply to an existing waste facility that is subject to a development control order issued by the relevant regulatory authority (e.g. Council fire safety order if the facility does not have adequate provision for fire safety).

7.1.3 This whole section takes guidance from the documents *Reducing fire risk at waste management sites* and *Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.

7.1.4 This whole section addresses the *NCC* and its performance requirements to be determined by the relevant certifier, including Clause E1.10 and E2.3.

7.1.5 This whole section may be addressed by a performance solution under the *NCC*; the proposed performance solution may need to be referred to FRNSW under *Clause 144* of the *EP&A Reg.*

**Note:** FRNSW will provide comments to the certifier for consideration when determining development. The proponent is encouraged to consult with FRNSW when the performance-based design brief is developed.

7.1.6 The owner and/or PCBU should attain development and planning approval through the most appropriate pathway for their given circumstance (see Figure 1).

**Note:** Any leased premises must be fit for the intended use and have provision for fire safety appropriate to the business or undertaking.

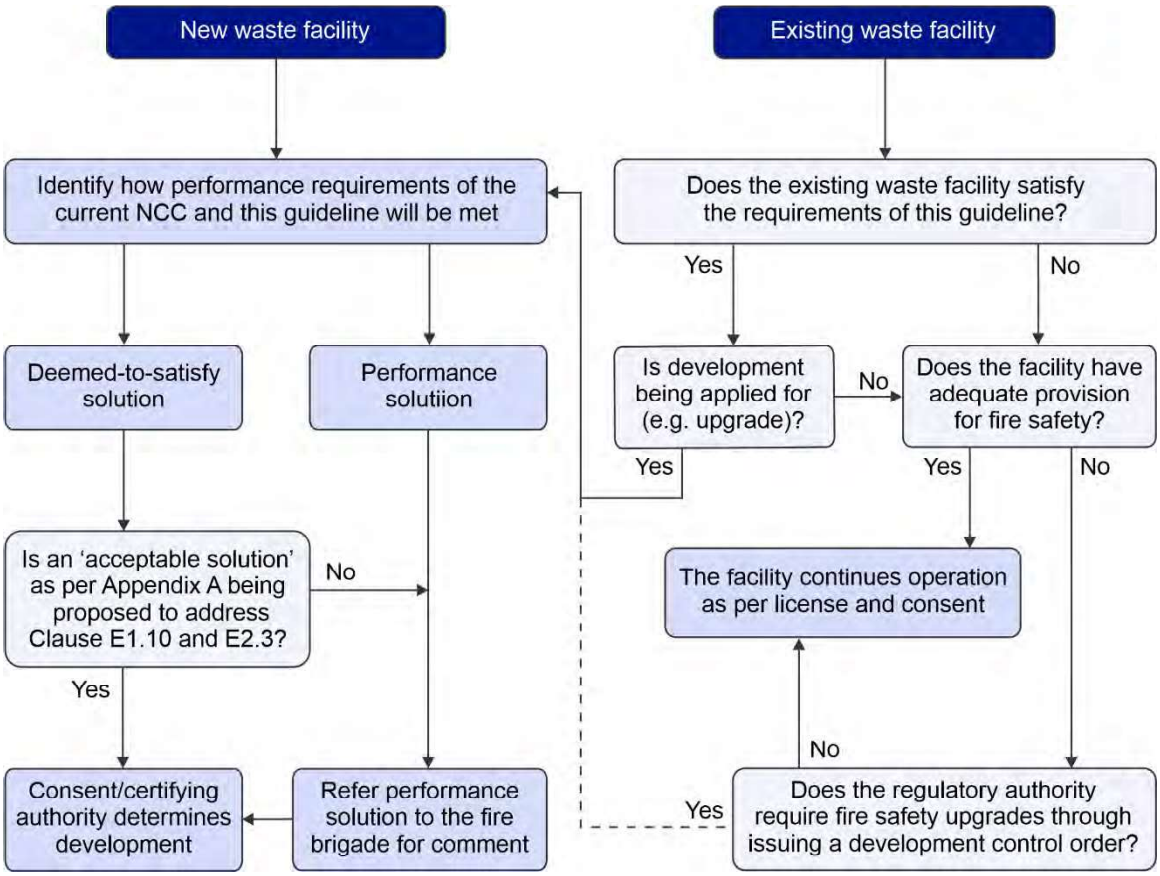



*Figure 1 Development and planning pathways for waste facilities*

## 7.2 Designing for special hazard

7.2.1 Combustible waste should be considered a special hazard and consent authorities should impose the condition on development that Clause E1.10 and E2.3 of the *NCC* be complied with to the satisfaction of the fire brigade.

7.2.2 Development should make adequate provision for fire safety as prescribed by this guideline and either meet the 'acceptable solution' defined in Appendix A or provide a performance solution that complies with *NCC* performance requirements and the requirements of this guideline (refer to clause 7.1.5).

**Note:** The fire brigade should be consulted on any performance solution.

7.2.3 All fire risks and hazards of the waste facility should be identified. A fire safety study is to be done in accordance with *Hazardous Industry Planning Advisory Paper No 2 Fire Safety Study Guidelines* if deemed appropriate by the relevant consent authority.

7.2.4 The development proponent is encouraged to engage a fire safety engineer or other suitably qualified consultant to develop a performance solution specific to the waste facility and its proposed operations.

**Note:** The design should consider all reasonable and foreseeable fire scenarios.

7.2.5 All reasonable and foreseeable combustible waste materials should be identified and considered in any performance solution (i.e. the fire engineered design should consider burn temperature, heat release rate and heat flux, total fire load and burn duration, ease of ignition and flame spread that would be expected from each stockpile).

**Note:** The maximum sizes and minimum separations of all stockpiles should be detailed in an operations plan for the waste facility (refer to section 8.6).

7.2.6 For simplification in designing for special hazards, the following surface burning temperatures and fire risk rating should be applied to stockpiles of common combustible waste materials, as given in Table 1[1].

| Type of waste material | Burn temperature | Fire risk |
|---|---|---|
| Paper and carboard | 850°C | Ordinary |
| Wood products | 860°C | Ordinary |
| Plastic | 1,200°C | High |
| Rubber | 1,130°C | High |
| Refuse derived fuels | 900°C | Ordinary |
| Solid recovered fuels | 950°C | Ordinary |

*Table 1 Typical burn temperature and fire risk of combustible waste material*

7.2.7 Where a stockpile contains a mixture of combustible waste materials, the burn temperature and fire risk of the most predominant waste material should be used for the whole stockpile, and in the case of no clear majority then the worst-case material should be used.

[1] Waste Industry Safety and Health Forum, *WISH INFO 05 Waste fire burn trials summary non-technical report version 2*

## 7.3 Development of existing waste facilities

7.3.1 When development is being applied for, the owner or PCBU should undertake an assessment of the design and performance of their existing waste facility against the requirements specified within this guideline and provide this to the relevant consent or regulatory authority for determination.

7.3.2 If the assessment determines that an upgrade is required to address a deficiency in the design or performance, the relevant authority should impose an appropriate condition (e.g. licensing) or direction (e.g. issue an Order) on the owner.

**Note:** Under *Section 9.35(d)* of the *EP&A Act*, FRNSW authorised fire officers are empowered to issue a fire safety Order.

7.3.3 When an existing waste facility undergoes demolition, erection, rebuilding, alteration, enlargement or extension (i.e. development), the relevant consent authority should consider imposing this guideline (in part or full) as a condition on the development.

7.3.4 When an existing waste facility has restrictions on stockpile sizes and separations, control measures should be implemented to maintain such limits and ensure the fire load remains appropriate to the building and installed fire safety systems.

**Note:** Restrictions may be imposed by an authority including condition of consent, an order, or a licence condition. Installing or upgrading fire safety systems may remove or reduce any restrictions on operations (e.g. larger stockpiles).

## 7.4 Firefighting intervention

7.4.1 The waste facility is to provide safe, efficient and effective access as detailed in FRNSW guideline *Access for fire brigade vehicles and firefighters*.

7.4.2 Performance requirement CP9 of the *NCC* requires access to be appropriate to the building function/use, fire load, potential fire intensity, fire hazard, active fire safety systems and fire compartment size.

7.4.3 Enhanced fire brigade vehicle access should be provided for firefighting intervention, including a perimeter ring road around any large non-sprinklered building and access roads between external stockpiles.

7.4.4 The facility should cater for a large emergency service response (e.g. multiple alarm and multiple agency) if the potential hazard may result in a large emergency.

**Note:** This includes from any pollution event requiring a protracted hazardous materials response (e.g. contain and remove fire water run-off).

7.4.5 A building not fitted with an automatic fire sprinkler system should have a dedicated external quarantine area not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile (refer to clause 8.5.3).

7.4.6 Any development application should be accompanied by a flow rate and pressure test of the water main connected to the fire hydrant system.

7.4.7 Firefighter access should be provided to buildings, structures and storage areas, including to any fire safety system or equipment provided for firefighting intervention.

## 7.5 Fire hydrant system

7.5.1 The waste facility is to have a fire hydrant system installed appropriate to the risks and hazards for the waste facility.

**Note:** A fire hydrant system is only required when a fire brigade station is within 50 km and equipped to utilise the system.

7.5.2 The fire hydrant system should consider facility layout and operations, with fire hydrants being located to provide compliant coverage and safe firefighter access during a fire, including having external fire hydrants to protect any open yard storage (i.e. external stockpiles).

7.5.3 The design of the fire hydrant system is to have enhanced standard of performance when combustible waste material is not protected by a fire sprinkler system, including having an additional fire hydrant outlet required to flow simultaneously for any open yard storage and for any non-sprinklered internal stockpiles, as given in Table 2.

| Fire compartment floor area of non-sprinklered building | Area of open yard (used for stockpiles) | No. of fire hydrants required to flow |
|---|---|---|
| ≤ 500 m² | ≤ 3,000 m² | 2 |
| > 500 m²<br>≤ 5,000 m² | > 3,000 m²<br>≤ 9,000 m² | 3 |
| > 5,000 m²<br>≤ 10,000 m² | > 9,000 m²<br>≤ 27,000 m² | 4 |
| > 10,000 m² | > 27,000 m² | 5 (or more) |

*Table 2 Minimum fire hydrants for non-sprinklered buildings and external storage*

**Note:** Refer to *Australian Standard AS 2419.1-2005* for fire hydrant system design requirements of buildings that are protected by a fire sprinkler system.

7.5.4 Fire hydrants are not to be located within 10 m of stockpiled storage and must be accessible to firefighters entering from the site and/or building entry points.

7.5.5 Where appropriate to protect against high risks and hazards, suitable on-site fixed external fire monitors may be provided as part of the fire hydrant system.

7.5.6 The fire brigade booster assembly is to be located within sight of the designated site entry point, or other location approved by the fire brigade, and be protected from radiant heat from any nearby stockpile (e.g. by a masonry wall).

7.5.7 The fire hydrant system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than four hours.

7.5.8 The fire hydrant system should incorporate fire hose reels installed in accordance with Clause E1.4 of the *NCC* and externally to cover open yard storage areas to enable effective first attack of fires by appropriately trained staff.

**Note:** First attack firefighting is often critical to extinguishing minor fire ignitions.

## 7.6 Automatic fire sprinkler systems

7.6.1 The waste facility is to have an automatic fire sprinkler system installed in any fire compartment that has a floor area greater than 1000 m² and contains combustible waste material.

**Note:** Unsorted mixed combustible waste material generally presents a greater ignition hazard than most other combustibles.

7.6.2 The fire sprinkler system should be demonstrated as being appropriate to the risks and hazards identified for buildings, including externally as necessary (e.g. drenchers to protect plant/equipment, exposures, high-risk external storage).

7.6.3 The fire sprinkler system design should be appropriate to the hazard class (e.g. 'high hazard class') and have enhanced standard of performance as appropriate to the special hazard.

**Note:** Any system design limitation set by specifying content and percentages are to be maintained for the building's operating life unless the system is upgraded.

7.6.4 To protect vital systems, storages or equipment or protect against high risk hazards, a deluge, drencher, fast response, mist or foam system should be provided.

**Note:** A localised system may be installed to protect specific areas or equipment if the whole building is not sprinkler protected.

7.6.5 The fire brigade booster assembly for the fire sprinkler system should be co-located with the fire hydrant system booster within sight of the designated site entry point, or in a location approved by the fire brigade.

7.6.6 The fire sprinkler system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than two hours.

**Note:** The fire sprinkler system should contain fire spread and allow firefighters to enter the building, remove burning waste material and extinguish the fire.

## 7.7 Fire detection and alarm systems

7.7.1 The waste facility is to have a fire detection and alarm system installed appropriate to the risks and hazards identified for each area of a building.

7.7.2 The fire detection and alarm system should warn all occupants of fire and to evacuate the facility, with each component being appropriate to the environment (e.g. flame detector or infrared detector in sorting area, visual alarms around noisy machinery).

7.7.3 Upon positive detection of fire, the system is to activate any required alarm, fire suppression system, passive measure (e.g. fire door, fire shutter) or plant/machinery override (e.g. shutdown of conveyor, shredder) as appropriate to the detector.

**Note:** The system may incorporate multiple levels of detection (e.g. fast acting IR detector to shutdown machinery and activate a local deluge system, and medium acting aspirating system to provide broad area detection).

7.7.4 Manual alarm points should be provided in clearly visible locations as appropriate to the environment so that staff can initiate early alarm of fire.

## 7.8 Smoke hazard management

7.8.1 Buildings containing combustible waste material are to have an automatic smoke hazard management system appropriate to the potential fire load and smoke production rate installed within the building.

7.8.2 Under Clause E2.3 of the *NCC*, additional smoke hazard management measures should be provided to vent or exhaust smoke so that in at least 90% of the compartment, the smoke layer does not descend below 4 m above floor level.

**Note:** To undertake firefighting intervention, visibility is needed so that piled waste can be safely removed using machinery.

7.8.3 Natural low-level openings, either permanent or openable such as roller doors, should be provided on two or more walls to assist with venting de-stratified (i.e. cooled) smoke and ensure minimum visibility is maintained during a fire.

**Note:** Roller doors should have manual override so that the door can be opened in the event of electrical isolation or failure during fire.

7.8.4 Any smoke exhaust system installed should be capable of continuous operation of not less than two hours in a sprinkler-controlled fire scenario, or four hours in any non-sprinkler-controlled fire scenario.

7.8.5 Automatic operation of the smoke hazard management system from smoke detection should not cause undue delay to the activation of any automatic fire sprinkler system.

## 7.9 Fire water run-off containment

7.9.1 The waste facility should have effective and automatic means of containing fire water run-off, with primary containment having a net capacity not less than the total hydraulic demand of installed fire safety systems.

**Note:** The total hydraulic demand is the net discharge of water from both the fire hydrant system and fire sprinkler system.

7.9.2 An alternative means of fire water run-off containment may be proposed, particularly for development of an existing waste facility, including being validated by hydrological engineering assessment where appropriate.

**Note:** Bunding of the processing areas may be a containment option.

7.9.3 The containment system is to wholly incorporate any dedicated external quarantine area required to extinguish any internal stockpile from a building (refer to clause 7.4.5).

7.9.4 The containment system, which includes the base of any storage area, should be impermeable (i.e. sealed) and prevent fire water run-off from entering the ground or any surface water course (e.g. river, stream, lake, estuary, open sea).

7.9.5 The containment system should include secondary/tertiary facilities such as impermeable bunds, storage lagoons, isolation tanks or modified site design (e.g. recessed catchment pit, drainage basin) as appropriate to the facility.

**Note:** Any external pit/basin used to breakdown and extinguish burning waste from within a building must form part of the containment system.

7.9.6 Pollution control equipment such as stormwater isolation valves, water diversion booms, drain mats, should be provided as necessary for the facility's emergency response procedures, and be kept readily accessible for the event of fire.

**Note:** Failure to contain fire water run-off can result in significant pollution of the environment, which may incur substantial remediation costs and/or fines.

### 7.10 Bush fire prone land

7.10.1 The NSW RFS *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers* (PBP) applies to all development on 'bush fire prone land'.

7.10.2 Bush fire prone land is mapped by each respective council under *section 146* of the *Environmental Planning and Assessment Act 1979*.

7.10.3 Suitable fire brigade vehicle access is to be provided to within 4 m of any static water supply if no reticulated water supply is otherwise available (e.g. bulk water tank, dam).

## 8 Facility operation and management

### 8.1 General

8.1.1 This whole section, being '*Facility operation and management*', applies to new and existing waste facilities as determined by the relevant regulatory authority, such as NSW EPA as a condition of licence or the local Council as a condition of consent.

**Note:** NSW EPA regulate waste facilities through an environment protection licence issued under the *POEO Act*.

8.1.2 This whole section takes guidance from the documents *Reducing fire risk at waste management sites and Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.

8.1.3 This whole section addresses the operation and management of a waste facility to ensure the fire hazard from combustible waste material fire is controlled.

8.1.4 This whole section should not override any existing licence or consent in-force if the conditions are being met.

8.1.5 This whole section may be addressed by performance outcomes identified through risk management, including identification of fire hazards, assessment of risks, implementation of controls, and documented review/audit process.

### 8.2 Storage and stockpiles

8.2.1 Storage and stockpiling of combustible waste material should be limited in size and volume appropriate to the given combustible waste material, fire risks, building design and installed fire safety systems.

**Note:** The size, volume and type of waste of all stockpiles should be identified on a site/floor plan and submitted with any development application.

8.2.2 Variations to storage and stockpile requirements, including maximum size and volume, movement, separation distances etc., will be considered through an appropriate pathway such as a performance solution.

8.2.3 The maximum height of any stockpile, loose piled or baled, should not exceed 4 m (see Figure 2).

8.2.4 The uncontained vertical face of any stockpile (i.e. any face not being retained by a masonry wall) should recede on a slope no greater than 45° to minimise the risk of collapse and fire spread (see Figure 2).

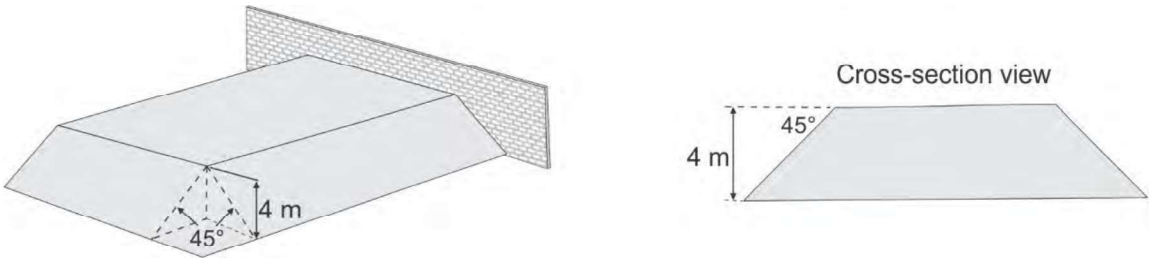



*Figure 2 Maximum stockpile height and face angle*

8.2.5 The storage method and arrangement of stockpiles is to minimises the likelihood of fire spread and provide separation which permits access for firefighting intervention.

**Note:** Fire separating masonry walls (e.g. bunkers) and automatic fire sprinkler systems may allow larger stockpile sizes and/or shorter separation distances.

8.2.6 A separating masonry wall, revetment or pen should extend at least 1 m above the stockpile height and at least 2 m beyond the outermost stockpile edge (see Figure 3).

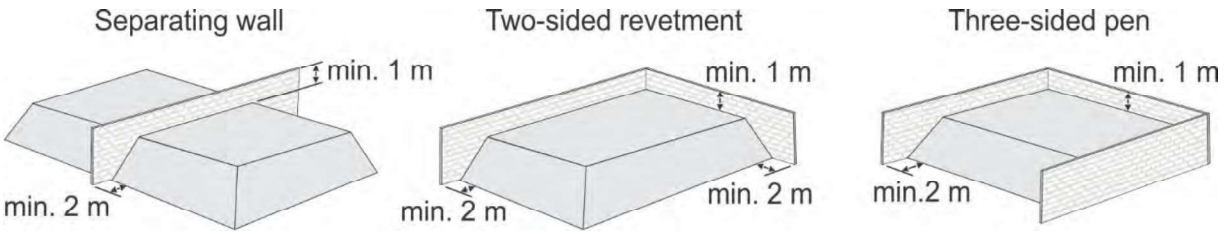



*Figure 3 Example separating masonry wall, revetment or pen*

8.2.7 Stockpile boundary limits should be permanently marked to clearly identify limits that maintain maximum stockpile sizes and/or minimum separations.

## 8.3 Stockpile movement

8.3.1 Stockpiles of combustible waste material should be rotated to dissipate any generated heat and minimise risk of auto-ignition as required.

8.3.2 Any stockpile of combustible waste material prone to self-heating should have appropriate temperature monitoring to identify localised hotspots; procedures outlined in the operations plan should be implemented to reduce identified hotspots.

**Note:** Temperature should ideally be measured at the core of the stockpile where thermal confinement will be highest.

8.3.3 Any processed or treated waste material, such as chipping, shredding, baling or producing crumb should be cooled before being stockpiled.

8.3.4 Procedures for stockpile rotation and monitoring of temperature during hot weather are to be included in the operations plan (refer to section 8.6).

## 8.4 External stockpiles

8.4.1 The maximum width of an external stockpile should be 20 m if fire brigade vehicle access is provided down both sides of the stockpile, and 10 m if access is provided down one side of the stockpile only (see Figure 4).

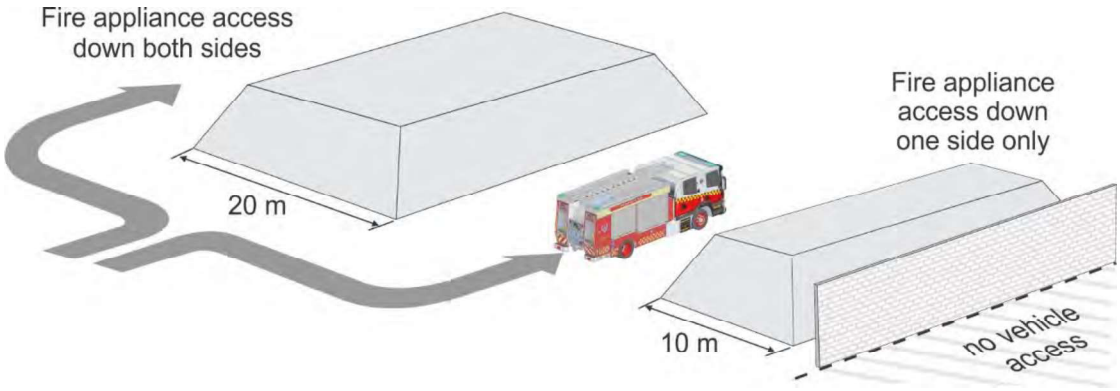
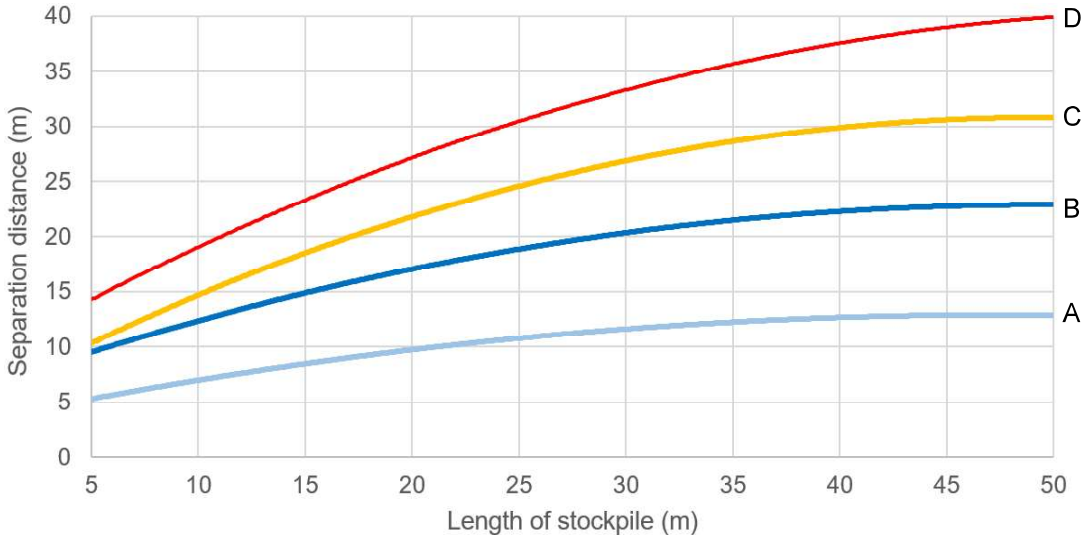



*Figure 4 Maximum external stockpile widths*

8.4.2 The maximum length of an external stockpile should be 50 m, or as determined from required minimum separation distances (refer to clauses 8.4.3 and 8.4.5).

8.4.3 Minimum separation should be maintained between external stockpiles, depending on storage method and fire risk of materials, as given in Table 3 (see also Figure 5).




| Length of stockpile (m) | Ordinary fire risk (i.e. ≤ 1000°C) | | High fire risk (i.e. >1000°C) | |
|---|---|---|---|---|
| | Loose pile (A) | Baled (B) | Loose pile (C) | Baled (D) |
| 5 | 5 m | 9 m | 10 m | 14 m |
| 10 | 7 m | 13 m | 15 m | 19 m |
| 15 | 9 m | 15 m | 18 m | 24 m |
| 20 | 10 m | 17 m | 23 m | 27 m |
| 30 | 11 m | 20 m | 26 m | 34 m |
| 50 | 13 m | 23 m | 31 m | 40 m |

*Table 3 Minimum separation distances between external stockpiles*

8.4.4 If two separation distances apply between different stockpiles (i.e. due to different lengths of each stockpile), the greatest distance is to be used (see Figure 5).

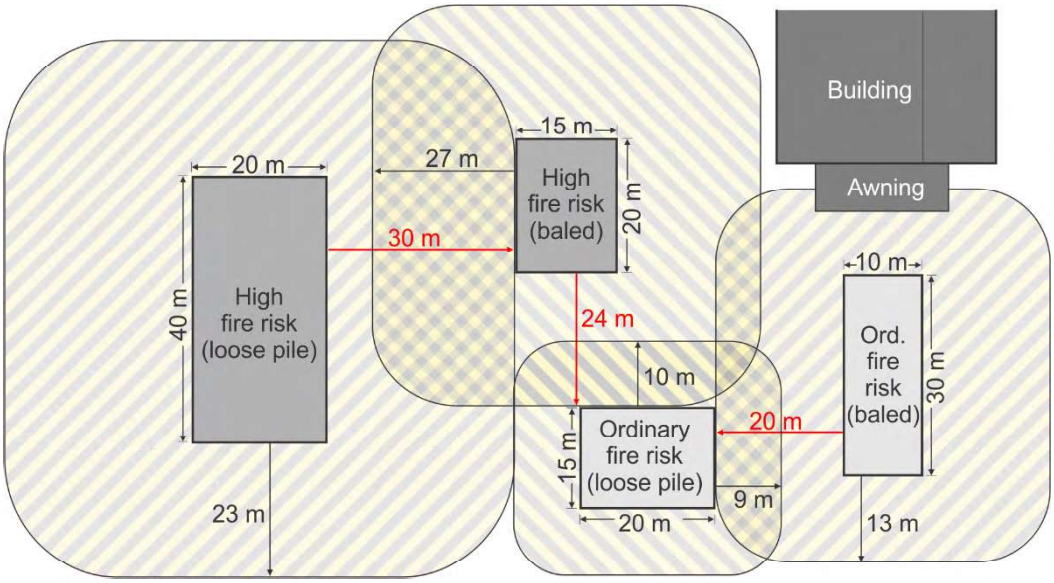
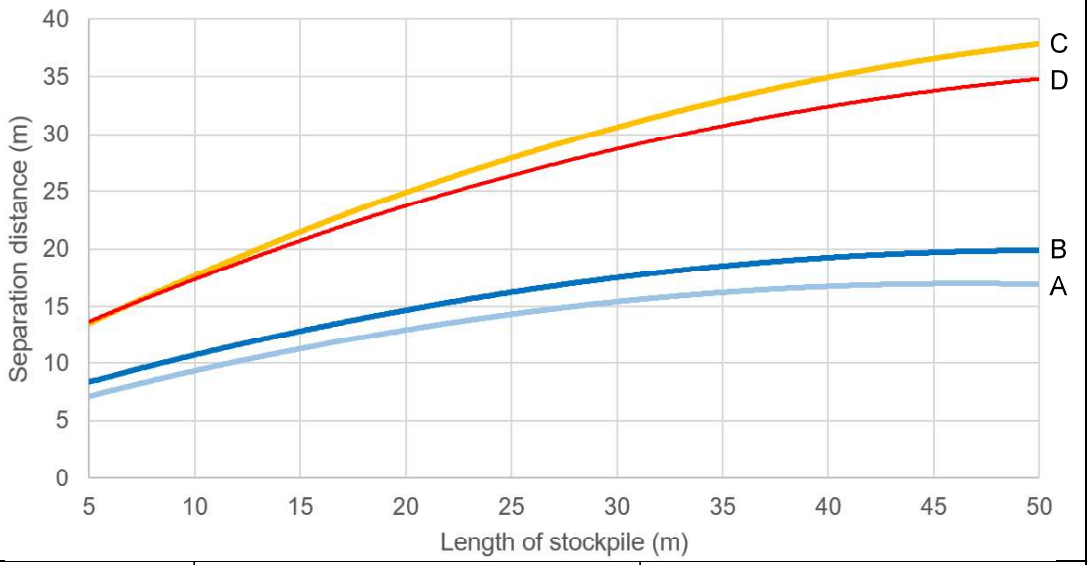



*Figure 5 Examples of minimum separation between external stockpiles*

8.4.5 Minimum separation should be maintained between external stockpiles and any fire-source feature, depending on storage method and fire risk of materials, as given in Table 4 (see also Figure 6):




| Length of stockpile (m) | Ordinary fire risk (i.e. ≤ 1000°C) | | High fire risk (i.e. >1000°C) | |
|---|---|---|---|---|
| | Loose pile (A) | Baled (B) | Loose pile (C) | Baled (D) |
| 5 | 7 m | 8 m | 13 m | 13 m |
| 10 | 9 m | 11 m | 18 m | 18 m |
| 15 | 12 m | 13 m | 22 m | 21 m |
| 20 | 13 m | 15 m | 25 m | 24 m |
| 30 | 15 m | 17 m | 30 m | 28 m |
| 50 | 17 m | 20 m | 38 m | 35 m |

*Table 4 Minimum separation between external stockpile and any fire-source feature*

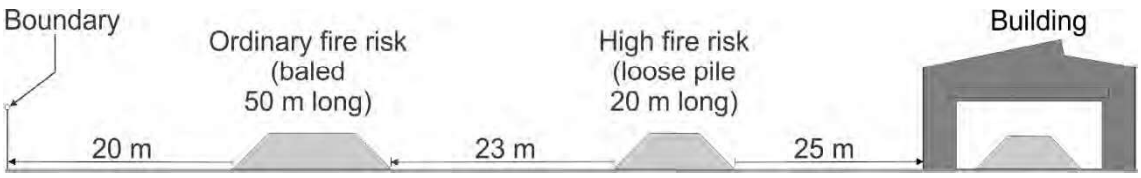



*Figure 6 Examples of separation between stockpile and fire-source features*

8.4.6 Covered areas attached to buildings or structures, such as areas under awnings and undercrofts, should not encroach into the minimum separation distance unless protected by an automatic fire sprinkler system (see Figure 7).


*Figure 7 Example of separation from any covered building part or structure*

8.4.7 The minimum separation between external stockpiles or an external stockpile and any fire-source feature may be reduced when the stockpile is separated by masonry wall or protected by an automatic fire sprinkler system (i.e. drenchers) (see Figure 8).

**Note:** The masonry wall should intersect the direct line between the fire source feature (e.g. building) and top of the stockpile, and be located to provide fire appliance access as necessary.

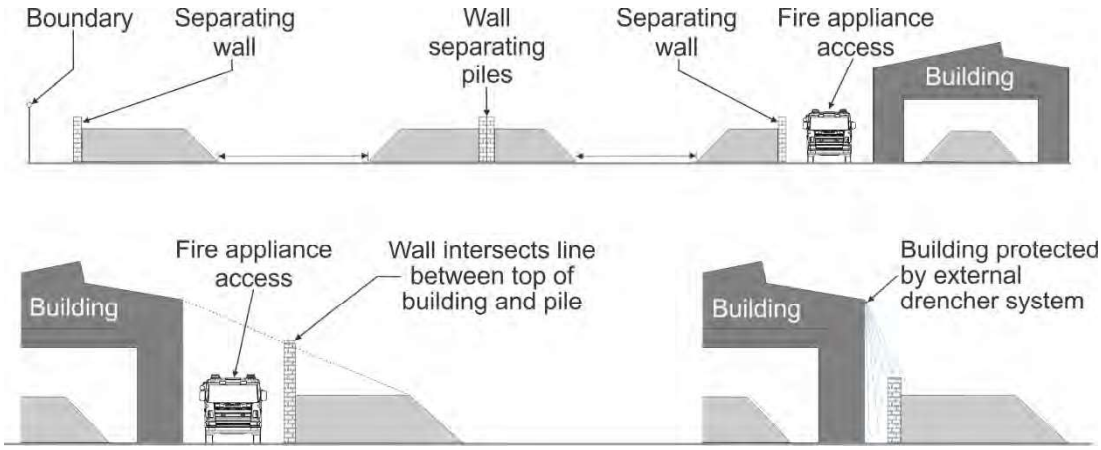



*Figure 8 Examples of reduced separation using masonry wall or sprinkler system*

8.4.8 External stockpile limits should be maintained and not exceeded as per the operations plan, and as appropriate to the facility, boundaries, exposures, buildings, terrain, drainage, vegetation, prevailing winds, vehicular access etc.

8.4.9 External stockpiles should be protected from high or unnecessary external risks (e.g. bushfire, adjacent property fire, arson, self-combustion in hot weather).

8.4.10 External stockpiles should be maintained so that all buildings access and egress points are always kept clear and unobstructed.

8.4.11 External stockpiles should be maintained so that all required fire brigade vehicle access (e.g. around buildings, between stockpiles and to hardstand areas) is always kept clear and unobstructed.

## 8.5 Internal stockpiles

8.5.1 Internal stockpiles of combustible waste material should be maintained as determined by the operations plan, and appropriate to the building size/layout, compartmentation, installed safety systems, process equipment and plant etc.

8.5.2 The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000 $m^3$.

8.5.3 Internal stockpiles should have a minimum of 6 m unobstructed access on each accessible side in a building fitted with an automatic fire sprinkler system, or a 10 m in a building not fitted with an automatic fire sprinkler system (see Figure 9).

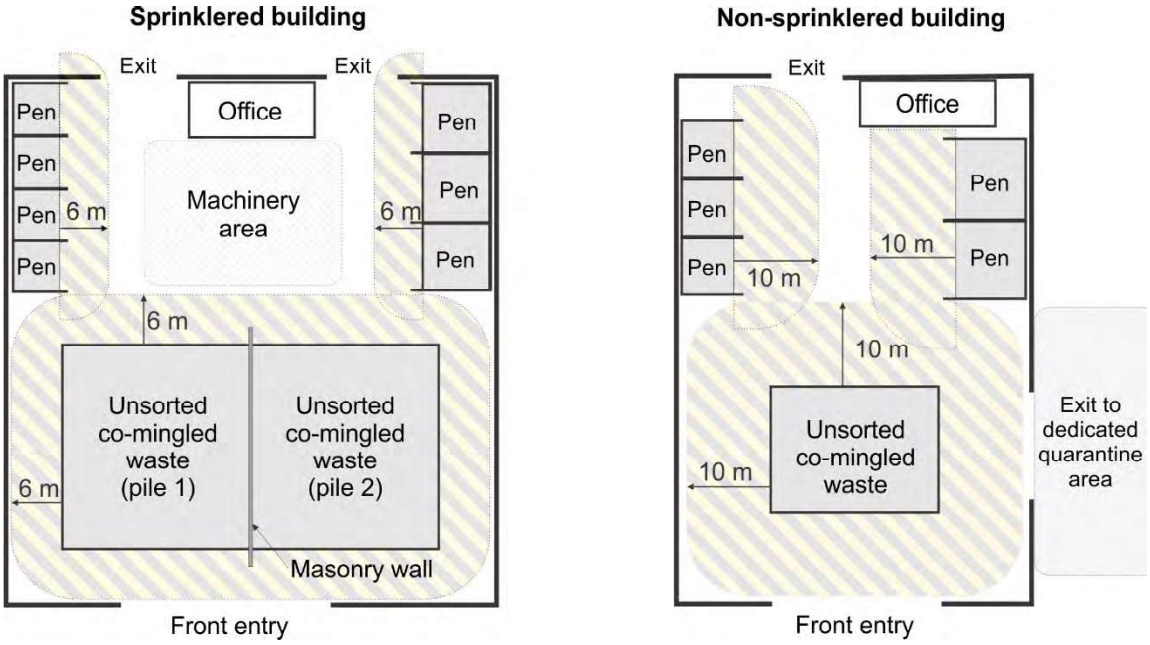



*Figure 9 Example of unobstructed access around internal stockpiles*

8.5.4 Internal stockpiles may be located side by side when separated by a masonry wall (refer to clause 8.2.6).

8.5.5 The internal stockpile of a building not fitted with an automatic fire sprinkler system should be limited in size to be able to be moved to the dedicated external quarantine area using on-site resources only within one hour or less (refer to clause 7.4.5).

**Note:** By example, two waste handlers with 5 $m^3$ bucket capacity taking two minutes per return trip can move a 300 $m^3$ stockpile in an hour (i.e. 2 x 5 $m^3$ x 30 trips).

8.5.6 Internal stockpiles should be protected from high or unnecessary ignition risks (e.g. friction/heating from conveyors, waste movers, heaters, chippers, shredders, balers, sorters, other machinery etc.).

8.5.7 Internal stockpiles should be maintained so that all building egress points and required paths of travel are not blocked or impeded at any time.

8.5.8 Internal stockpiles should be maintained so that access to the dedicated external quarantine area is always kept clear and unobstructed (i.e. by waste handlers).

**Note:** Any door opening (e.g. roller door) providing access to the quarantine area must be able to be readily opened at any time, including when power is lost.

## 8.6 Operations plan

8.6.1 The waste facility should develop and implement a written operations plan outlining the daily operations of the waste facility, including describing the combustible waste materials likely and the method of storage, handling or processing at the facility.

8.6.2 The operations plan should include a site plan drawing that identifies the layout of the waste facility and all locations of storage, handling and processing of combustible waste material.

8.6.3 The operations plan should identify the expected daily and holding inventory of combustible waste material including daily capacities and maximum stockpile limits.

8.6.4 The operations plan should define procedures that ensure maximum stockpile limits are not exceeded by operations at the waste facility.

8.6.5 The operations plan site plan should identify separate and clearly designated areas for materials drop-off, transfer and storage method of combustible waste materials (e.g. internal or external, sorted or unsorted, loose stockpile, bailed stockpile, binned, bundled, bunkered, container etc.).

8.6.6 The operations plan should identify all primary and secondary methods of combustible waste material transfer and stockpile movement (e.g. operational and reserve plant and equipment available at the waste facility).

8.6.7 The operations plan should include procedures for turnover of stockpiles to dissipate internal heat confinement, with the frequency determined by the combustible waste material, storage environment and ambient conditions.

**Note:** Turnover may relate to temperature monitoring where provided. Consideration should be given to periods of hot weather and high ambient temperature, where heat generation and self-combustion is more likely.

8.6.8 The operations plan should be regularly reviewed and updated (i.e. annually from the date of implementation) upon any change in combustible waste materials, storage, handling, processes or other conditions affecting daily operations.

8.6.9 The operations plan should be stored on site at the waste facility and kept in a readily accessible location (e.g. with the emergency plan).

8.6.10 A copy of the operations plan should be placed within the ESIP (refer to section 9.4).

**Note:** If the operations plan is prescribed and daily inventory constant, such details can be directly added to the ESIP rather than a copy of the operations plan.

# 9 Workplace fire safety

## 9.1 General

9.1.1 This whole section, being '*Workplace fire safety*', applies to any person who conducts the business or undertaking of owning, operating or managing a waste facility.

**Note:** SafeWork NSW regulate workplace safety under the *WHS Act*.

9.1.2 This whole section addresses the requirements on the PCBU to operate the waste facility as a safe workplace, especially regarding provision of fire safety.

9.1.3 This whole section does not override any other existing statutory requirement, code of practice or guideline that directly applies to the PCBU.

**Note:** SafeWork NSW publish a range of documents applicable to all PCBUs.

9.1.4 This whole section is to be addressed by thorough risk management, including identification of hazards, assessment of risks, implementation of controls, and documented review/audit process.

## 9.2 Risk assessment and mitigation

9.2.1 The PCBU should implement a hierarchy of control measures for the waste facility including providing information, instruction and training to employees and other persons as necessary to ensure health and safety (e.g. an emergency plan).

9.2.2 The PCBU should implement management procedures for general safety including staff induction, safe plant/equipment use, maintenance checks, safety inspections, clear reporting and communication, emergency drills etc.

9.2.3 The PCBU should implement housekeeping procedures to ensure all emergency access, equipment and exits are kept clear, including regular cleaning undertaken to prevent stockpile creep or litter build-up.

9.2.4 The PCBU should implement procedures to control potential ignition sources (e.g. friction, sparks, heating) including 'no open fire' policy, smoking restricted to designated areas or banned, 'hot-works permit' procedures in place.

**Note:** Plant and equipment such as conveyors, waste movers, heaters, chippers, shredders, balers, sorters etc. should be regularly inspected and maintained.

9.2.5 Vehicles and other machinery (e.g. waste movers) are to have appropriate heat shrouds and spark arrestors fitted and be kept, maintained and refuelled in designated areas away from combustible waste materials.

9.2.6 The PCBU should implement procedures to ensure hazardous materials and highly combustible materials (e.g. gas cylinders, fuels, paints, solvents) are stored in accordance with any relevant statutory requirement, code or standard and away from combustible waste material.

9.2.7 The PCBU should implement appropriate signage and markings, including facility layout plan at main site entry, warning signs (e.g. 'no smoking'), stockpile and clear space markings, emergency and evacuation area signs, fire safety system signs etc.

9.2.8 The PCBU should implement security arrangements (e.g. fencing with locked gate, lighting, alarm system, video surveillance, 24/7 security) to restrict unauthorised access and deter arson, including after-hours when staff have left the facility.

**Note:** Firefighter access must not be prevented (e.g. non-hardened metal chain and lock with key deposited at two nearest fire brigade stations or 24/7 security).

## 9.3 Emergency plan

9.3.1 The PCBU is required to develop an emergency plan for the waste facility, which is done in accordance with *AS 3745–2010 Planning for emergencies in facilities*.

**Note:** The emergency plan is developed for staff and occupants in the workplace. An external consultant should be engaged to provide specialist advice and services in relation to fire safety planning and developing an emergency plan.

9.3.2 The emergency plan is to assess fire safety risks and identify appropriate responses and controls (i.e. a fire safety management plan) and include emergency response procedures for staff and other persons at the waste facility in the event of fire.

9.3.3 The emergency plan is to identify an emergency control organisation for the facility including staff nominated as fire wardens in the emergency response procedures.

9.3.4 The emergency plan is to identify safe evacuation routes and assembly area (and alternates), shutdown processes, firefighting team activation, removal of uninvolved vehicles, activation of pollution control measure etc.

9.3.5 The PCBU is to ensure all staff receive appropriate training in fire safety including emergency response procedures, use of first attack firefighting equipment (e.g. fire hose reels, fire extinguishers), evacuation drills etc.

**Note:** Training in the use of first attack firefighting equipment must include education of fire awareness, including when to cease firefighting and to evacuate.

9.3.6 The emergency plan is to identify a process of regular fire safety audits to ensure fire safety requirements are being met, including reviewing stockpile limits, safe work practices, clear access, firefighting and emergency equipment.

**Note:** The PCBU should nominate a responsible person to conduct the fire safety audit, including check first attack firefighting equipment, stockpiles, access are kept clear and free of obstructions.

## 9.4 Emergency services information package (ESIP)

9.4.1 An ESIP, as detailed in FRNSW guideline *Emergency services information package and tactical fire plans*, should be developed and provided by the PCBU.

**Note:** The ESIP is intended for use by emergency service personnel only and supplements the emergency plan.

9.4.2 The ESIP should provide firefighters with specific information that can be used to develop strategies and tactics for firefighting intervention, including:

- the operations plan (refer to section 8.6)
- facility processes and systems including emergency shutdown procedures
- facility evacuation plan including ward areas and safe assembly area/s
- fire safety systems including on-site fixed fire monitors, deluge or drenchers static water supplies, special extinguishing agents or systems
- firewater containment system including secondary/tertiary facilities
- pollution control equipment including location and procedures, and
- machinery available for waste removal (e.g. waste movers) and location of designated quarantine area/s.

## 9.5 Fire safety statements

9.5.1 Under *clause 177* and *clause 180* of the *EP&A Reg*. the premises owner is to have fire safety systems inspected and maintained by a competent fire safety practitioner, then issue a fire safety statement to the local Council and provide a copy to FRNSW.

**Note:** The fire safety statement is a record of maintenance of the fire safety system. Information on this process including the *Fire Safety Statement* form to be used is available on the DPIE website at *www.planning.nsw.gov.au*.

9.5.2 An annual fire safety statement must be completed once every year for all essential fire safety measures installed, and where applicable, a supplementary fire safety statement completed for all critical fire safety measures installed (e.g. every six months).

9.5.3 The premises owner is responsible for choosing the competent fire safety practitioner to undertake the inspection and maintenance and must provide a written opinion that the person or persons chosen are competent to perform the fire safety inspection.

9.5.4 The PCBU is to make allowance for the premises owner to arrange the inspection and maintenance of fire safety systems for the purpose of a fire safety statement.

# 10 References

Australian Building Codes Board, *National Construction Code 2019, Building Code of Australia Volume One*, 2019, Canberra ACT, Australia.

NSW Department Planning, Industry and Environment, *Hazardous Industry Planning Advisory Paper No 2 Fire Safety Study Guidelines*, 2011, Sydney NSW, Australia

NSW Environment Protection Authority, *Guide to licensing - Under the Protection of the Environment Operations Act 1997*, 2016, Sydney NSW, Australia.

NSW Environment Protection Authority, *Waste Classification Guidelines - Part 1: Classifying waste*, 2014, Sydney NSW, Australia.

Fire and Rescue NSW, *Fire safety guideline - Access for fire brigade vehicles and firefighters*, 2019, Greenacre NSW, Australia.

Fire and Rescue NSW, *Fire safety guideline - Emergency services information package and tactical fire plans*, 2017, Greenacre NSW, Australia.

NSW Rural Fire Service, *Development Planning – A guide to developing a Bush Fire Emergency Management and Evacuation Plan*, 2014, Sydney Olympic Park NSW, Australia.

NSW Rural Fire Service, *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers*, 2014, Sydney Olympic Park NSW, Australia.

SafeWork NSW, *Code of Practice – Managing the work environment and facilities*, 2011, Gosford NSW, Australia

Standards Association of Australia, *AS 1670.1-2018 Fire detection, warning, control and intercom systems – system design, installation and commissioning – Fire*, Standards Australia, 2018, Sydney NSW, Australia.

Standards Association of Australia, *AS 2118.1-2017 Automatic fire sprinkler systems General requirements*, Standards Australia, 2017, Sydney NSW, Australia.

Standards Association of Australia, *AS 2419.1-2005 Fire hydrant installations. Part 1: System design, installation and commissioning*, Standards Australia, 2005, Sydney NSW, Australia.

Standards Association of Australia, *AS 3745-2010 Planning for emergencies in facilities*, Standards Australia, 2010, Sydney NSW, Australia.

Waste Industry Safety and Health Forum, *Waste 28 - Reducing fire risk at waste management sites issue 2*, April 2017, United Kingdom.

Waste Industry Safety and Health Forum, *WISH INFO 05 Waste fire burn trials summary non-technical report version 2*, October 2018, United Kingdom.

# Appendix A – Acceptable solution

**This acceptable solution intends to assist the consent authority make determination on a proposed waste facility without specific referral to the fire brigade.**

The adoption and compliance with the prescriptive requirements outlined by this acceptable solution will ensure that the provisions of Clause E1.10 and E2.3 of the NCC are adequately addressed to the satisfaction of the fire brigade in this given case.

This acceptable solution applies to the case of a typical waste facility that handles unprocessed co-mingled recyclable waste material which includes plastics. For any other case, a performance solution should be undertaken and referred to the fire brigade.

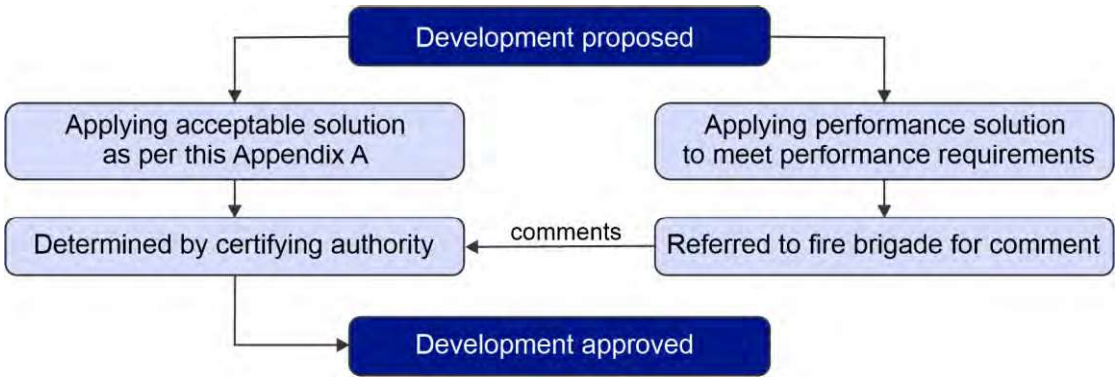



*Figure 10 Pathways involving acceptable solution or performance solution*

The following provisions specifically address special hazards for this typical waste facility:

| Performance requirement | Description of provision | Guideline reference |
|---|---|---|
| CP9 | 'Specialist fire appliance' access is provided to satisfy performance requirement CP9 of the NCC and FRNSW guideline *Access for fire brigade vehicles and firefighters*. | Clause 7.4.1 |
| CP9 | Adequate firefighter access is provided to the building, fire safety systems and equipment. | Clause 7.4.7 |
| EP1.3 | A fire hydrant system is installed to Australian Standard *AS 2419.1* and provides coverage for both internal and external stockpiles. | Clause 7.5.1 |
| EP1.3 | The fire hydrant system incorporates enhanced standard of performance for external stockpiles (i.e. one additional hydrant to flow). | Clause 7.5.3 |
| EP1.3 | Fire hydrants are not located within 10 m of any stockpiled storage (or vice versa), whether being internal or external. | Clause 7.5.4 |
| EP1.3 | The fire hydrant system delivers the required number of fire hydrants to flow simultaneously for a minimum of four hours duration. | Clause 7.5.7 |
| EP1.3 | A fire brigade booster connection is installed within sight of the designated site entry point. | Clause 7.5.6 |
| EP1.1 | A fire hose reel system is installed to Australian Standard *AS 2441* and provides coverage for both internal and external stockpiles. | Clause 7.5.8 |
| EP1.4 | An automatic fire sprinkler system is installed to Australian Standard *AS 2118.1* and designed for special hazard (e.g. 'high hazard' class). | Clause 7.6.1 |

| | | |
|---|---|---|
| EP1.4 | A fire brigade booster connection is installed for the automatic fire sprinkler system and is co-located with the hydrant system booster. | Clause 7.6.5 |
| EP1.4 | The fire sprinkler system delivers not less than the total hydraulic demand for a minimum of two hours duration. | Clause 7.6.6 |
| EP2.2 | A fire detection and alarm system is installed to Australian Standard *AS 1670.1* and designed for the fire scenarios and environment (e.g. visual flame detectors, infrared detectors, heat detectors/probes). | Clause 7.7.1 |
| EP2.2 | Manual alarm points are installed for staff to initiate alarm of fire. | Clause 7.7.4 |
| EP2.2 | An automatic smoke hazard management system is installed and designed so the smoke layer does not descend below 4 m above floor level. | Clause 7.8.1 |
| EP2.2 | Low level openings (e.g. roller doors) on two or more walls to assist with venting de-stratified smoke. | Clause 7.8.3 |
| EP2.2 | The automatic smoke hazard management system is capable of continuous operation for a minimum of two hours duration. | Clause 7.8.4 |
| N/A | An automatic fire water run-off containment system is provided and designed to contain the total hydraulic demand of the fire hydrant and fire sprinkler systems. | Clause 7.9.1 |
| N/A | Pollution control equipment is provided to divert fire water run-off and isolate stormwater drainage in the event of fire. | Clause 7.9.6 |
| *NSW PBP* | The waste facility complies with NSW RFS *Planning for Bush Fire Protection* when located on bush fire prone land. | 7.10.1 |
| CP2 | Any separating masonry wall, revetment or pen is to extend at least 1 m above and at least 2 m beyond the stockpile. | Clause 8.2.6 |
| N/A | Any stockpile prone to self-heating is to be monitored and rotated as necessary to dissipate any hotspots. | Section 8.3 |
| CP2 | Any external stockpile is to be limited in size and maintain minimum separations to prevent fire spread, including reduced separation when protected by a masonry wall or an automatic fire sprinkler system. | Section 8.4 |
| CP9 | Fire brigade vehicle access is provided between external stockpiles. | Clause 8.4.11 |
| CP2 | Each internal stockpile is to be limited in size to 1,000 m³. | Clause 8.5.2 |
| CP9 | Internal stockpiles are to be maintain a minimum of 6 m unobstructed access on each accessible side. | Clause 8.5.3 |
| N/A | An operations plan is to be documented and implemented for stockpile management and a copy is be included within the Emergency Services Information Package (ESIP). | Section 8.6 |
| *WHS Reg.* | An emergency plan is to be provided for staff and other persons at the waste facility in the event of fire. | Section 9.3 |
| N/A | An Emergency Services Information Package (ESIP) is provided for firefighters in accordance with FRNSW guideline *Emergency services information package and tactical fire plans*. | Section 9.4 |
| *EP&A Reg.* | Fire safety systems are to be inspected and maintained with corresponding fire safety statements being issued; The provision of maintenance should be covered in any leasehold contract. | Section 9.5 |

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# APPENDIX B – FRNSW GUIDELINE – ACCESS FOR FIRE BRIGADE VEHICLES AND FIREFIGHTERS

Fire safety guideline

# Access for fire brigade vehicles and firefighters


Version 05
Issued 4 October 2019

Fire Safety Branch
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# Contents

# 1 Purpose

The purpose of this document is to provide safe, efficient and effective access for *fire brigade vehicles* (i.e. a *fire appliance*) to any *premises* and allow firefighters to rapidly intervene when fire or other *emergency incident* occurs.

# 2 Scope

This guideline details the requirements of Fire and Rescue NSW (FRNSW) for:

a) identifying areas within NSW that are protected by the diverse types of *fire appliances* used by *fire brigades* within NSW

b) providing access for *fire brigade vehicles* to any *premises* using public roads

c) providing access for *fire brigade vehicles* to any building, structure or site using a privately-owned road system

d) providing *hardstand* areas that are suitable for firefighting operations

e) roads and structures to support the weights and loads of *fire appliances*

f) consideration of operational limitations when planning *fire brigade vehicles* access for any proposed development

g) *fire brigade vehicle* access on land that is designated as bush fire prone land, and

h) planning and implementing local area traffic management.

When this guideline is followed, the *fire brigade* will be able to undertake their statutory duty and function to protect and save life and property during an emergency in the speediest and most efficient manner.

# 3 Application

This guideline applies to any land subdivision, proposed development, change of building use, or building construction that is intended to meet the *National Construction Code* (*NCC*[1]), and which is located within NSW.

**Note:** Performance requirement CP9 of the *NCC* requires *fire brigade vehicle* access be provided to the degree necessary (this guideline) to facilitate *fire brigade* intervention.

This guideline is intended to be used by owners, developers, designers, engineers, urban planners, regulatory and consent authorities when planning, assessing or determining any application pertaining to any applicable land or *premises*.

Access for *fire brigade vehicles* and firefighters is relevant to all *premises* and is to be commensurate to the potential level of risk; it should be considered even when not specifically identified by any planning instrument, regulation or Act.

**Note:** The relevant consent authority can impose conditions on development or issue orders when provision for access is inadequate.

[1] *National Construction Code 2019, Building Code of Australia Volume One*

Developers, designers, engineers and planners are to ensure that adequate access is given to an *aerial appliance* when appropriate to the development (e.g. multiple-storeys and located within the coverage area of an *aerial appliance*).

This guideline has been developed in the public interest and is intended to be used by any consent authority considering any proposed development (refer to *Section 4.15(1)(e)* of the *Environmental Planning and Assessment Act 1979*).

**Note:** Under *Section 4.17* of the *EP&A Act*, the consent authority may impose requirements from this guideline (in part or full) as a condition on the development consent.

This guideline is to be used for any land or development within NSW as deemed applicable by the consent authority. Access requirements are generally consistent across all emergency services, but reference should be made to other guidelines where appropriate (e.g. NSW Rural Fire Service (RFS) *Planning for Bush Fire Protection* in bush fire prone land).



# 4 Definitions

The following definitions apply in this guideline:

**aerial appliance** — means a specialised type of *fire appliance* fitted with an *aerial apparatus* which elevates to given heights to provide fire suppression and rescue capabilities.

**aerial apparatus** — means a purpose-built device which can elevate, extend, articulate and slew within a field of operations to provide operational functions at elevated height (e.g. water stream, cage rescue, stairway rescue, observation, gear lift, water supply, work platform).

**alternative solution** (or performance solution) – means a method of complying with the *NCC* performance requirements other than by a 'deemed-to-satisfy' solution.

**carriageway** – means any public road, *private road*, shared traffic zone, laneway, access way or the like, whether having a sealed surface layer or not, that is intended for the carriage of vehicles. A carriageway may comprise one or more vehicle lanes.

**complex development** – means any development comprising one or more buildings or structures of higher than normal risk (e.g. infrastructure, podiums, precincts and shared zone or a *major facility*).

**designated building entry point (DBEP)** – means the entry point into a building providing firefighter access when fire or other *emergency incident* occurs.

**Note:** Typically, the *DBEP* will be the main building entrance. The *DBEP* is identified when the building has a fire detection, warning, control and intercom system installed.

**designated site entry point (DSEP)** – means the entry point into a site that provides access to emergency vehicle when fire or other *emergency incident* occurs.

**effective height** – means the same as in the *National Construction Code*.

**emergency incident** – means any abnormal and dangerous situation that has caused, or threatens to cause, harm persons, property or the environment, and requires a response by an emergency service to manage back to safe and normal condition.

**fire appliance** – means any vehicle that forms part of the equipment of a *fire brigade* and that is equipped with an audible warning device and flashing lights.

**fire brigade –** means a statutory authority constituted under an Act of Parliament having as one of its functions, protect life and property from fire and other emergencies.

**fire brigade vehicle –** means any *fire appliance* being used by firefighters from a *fire brigade*.

**fire brigade station –** means a state government operated premises which is a station for a *fire brigade* (i.e. FRNSW fire brigade station or NSW RFS fire brigade station).

**fire district –** means an area which the *Fire and Rescue NSW Act 1989* applies in relation to fires and contributions of costs.

**Note:** Fire districts are constituted by the Governor under *Section 5* of the *Fire and Rescue NSW Act 1989* by order published in the NSW Gazette.

**hardstand –** means an apron or section of *carriageway* specifically designated for use by a stationary *fire appliance* (e.g. for a *fire appliance* at the fire hydrant booster assembly).

**local area traffic management (LATM) –** means the analysis of traffic characteristics and the implementation of *traffic control devices* within a local area.

**national construction code (NCC) –** means the *National Construction Code (NCC) 2019, Building Code of Australia Volume One*, as amended.

**major facility –** means any large building or complex of related buildings on any given site and having multiple designated site or building entry points for emergency response. Any facility having a network of *private roads* providing building access may be considered major.

**premises –** means any building, facility or site (land).

**private road –** means a *carriageway* located within the boundary of privately-owned *premises* and not under the care and management of a council or public authority.

**rural fire district –** means an area which the *Rural Fires Act 1997* applies in relation to the area of the responsible local authority or authorities (e.g. Councils).

**Note:** Rural fire districts are constituted under *Section 6* of the *Rural Fires Act 1997* and published in the NSW Gazette.

**stabiliser –** means a hydraulic operated stabilising jack fitted to an *aerial appliance* to provide stability when the vehicle's centre of gravity shifts during operation of the *aerial apparatus*.

**suction-connection outlet –** means a connection outlet for suction hose that draws water from a static water supply (e.g. tank, reservoir, dam, lake, river).

**traffic control device –** means any sign, signal, pavement markings or other installation placed or erected by an authority having jurisdiction, for the purpose of regulating, warning or guiding road users.

**turning circle radius –** means the minimum arc radius that provides wall-to-wall clearance of a fire appliance turning at full steering lock (e.g. to negotiate corners or turnaround areas).

**wheelbase –** means the distance between the centre-point of the front steer axle (or group) and rear drive axle (or group).

# 5 Background

Under *Section 5A* of the *Fire and Rescue NSW Act 1989* and *Section 9* of the *Rural Fires Act 1997*, *fire brigades* in NSW have the duty to protect persons from injury or death and property from damage from fires and other emergencies. A fundamental factor to achieving this is the ability of firefighters to respond and undertake intervention activities as quickly as possible.

During an emergency, firefighters require efficient and effective access for a rapid and unhindered response. Poor or inadequate access to any *premises* will result in delays to response and intervention and may directly impact on the life safety of occupants.

Access to a given *premises* is primarily provided by a public road network in accordance with *Austroads Guide to Road Design*. On the given *premises*, vehicular access around buildings and structures may be provided by way of *private roads*.

Planners and designers sometimes only consider local traffic (i.e. minor vehicles) and typically exclude the carriage of heavy vehicles. *Fire brigade vehicles* are larger and heavier types of vehicles that may require access to any given *premises* at any time, without notice.

**Note:** When designing for local traffic, access for *fire appliances* should not be prohibited.

Owners of existing *premises* must ensure *fire brigade vehicle* access provisions are maintained at all times (e.g. access is not obstructed by parked vehicles or stored goods).

# 6 Fire appliances

## 6.1 Types of fire appliance

6.1.1 Both FRNSW and NSW RFS have several types of *fire appliances*, each specifically designed to perform a different range of functions at any given emergency.

6.1.2 Most general *fire appliances* comprise a purpose-built body fitted on a two axle truck chassis. Depending on the primary function, various levels of firefighting, rescue and hazardous materials equipment will be carried (see Figure 1).

**Note:** While the core function of a 'general' *fire appliance* is firefighting, some may provide only rescue or hazardous materials capability.


*Figure 1 General fire appliances: tanker, pumper and rescue (from l to r)*

6.1.3 FRNSW operates a fleet of *fire appliances* that are fitted with an *aerial apparatus* that elevates, rotates and extends to a given height to access an emergency in a building or structure. In this guideline, an *aerial appliance* is a 'specialist' fire appliance.

**Note:** An *aerial appliance* is commonly, even though incorrectly, referred to as a 'cherry picker' by the media and public.

6.1.4 Both FRNSW and NSW RFS operate specialist *fire appliances* to undertake specific functions at a given incident. These *fire appliances* are larger and heavier and may be on either a two, three or four axle truck chassis (see Figure 2).

**Note:** Specialist fire appliances are strategically located across NSW to protect key assets and community places as required.


*Figure 2 Specialist fire appliances: bulk water, command and aerial appliance (from l to r)*

6.1.5 Both FRNSW and NSW RFS operate articulated heavy vehicles (e.g. prime mover with trailer) which are excluded from the scope of this guideline.

## 6.2 Overall parameters for design

6.2.1 While specifications vary between *fire appliances*, for the purpose of design overall parameters are broadly categorised into two distinct *fire appliance* types as follows:

| General fire appliance | |
|---|---|
| Gross vehicle mass | 15 000 kg |
| Overall length | 10.0 m |
| Overall width (incl. mirrors) | 3.0 m |
| Body width (excl. mirrors) | 2.5 m |
| Overall height | 3.7 m |

| Specialist fire appliance | |
|---|---|
| Gross vehicle mass | 29 300 kg |
| Overall length | 12.5 m |
| Overall width (incl. mirrors) | 3.0 m |
| Body width (excl. mirrors) | 2.5 m |
| Overall height | 4.3 m |

*Table 1 Overall parameters of fire appliances*

**Note:** A medium rigid (MR) licence or higher is required for a general *fire appliance*, while a heavy rigid (HR) licence is required for a specialist *fire appliance*.

## 6.3 Coverage area by types of fire appliance

6.3.1 A general *fire appliance* will offer fire protection to any *premises* located within a *fire district* or *rural fire district*; *fire brigade vehicle* access commensurate to parameters given for 'general' *fire appliance* is to be provided for all *premises* in NSW.

**Note:** The fire may be attended by FRNSW, NSW RFS or both (e.g. mutual aid) and may also be supported by other emergency vehicles.

6.3.2 Any *complex development* may be attended by a specialist *fire appliance*; *fire brigade vehicle* access commensurate to parameters given for 'specialist' *fire appliance* is to be provided as appropriate to the risk.

**Note:** A non-fire emergency may require attendance of a specialist *fire appliance* (e.g. for rescue, aerial access or hazardous materials incident).

6.3.3 Any building having an *effective height* greater than 9 m (e.g. more than three storeys above ground) and located within the coverage area of an *aerial appliance* should be provided with *fire brigade vehicle* access commensurate to the parameters given for 'specialist' *fire appliance* as appropriate to the risk (refer to section 10.4).

**Note:** The portable extension ladder carried on a fire appliance can only reach 10 m high. An *aerial appliance* can provide a means of emergency escape in any building that only has a single required exit.

6.3.4 *Aerial appliances* are strategically located within *fire districts* for optimum response in areas of greatest fire risk, and cover the greater metropolitan regions of Sydney, Newcastle and Wollongong, and the regional cities of Albury and Wagga Wagga.

**Note:** FRNSW can be consulted to identify when development is located within the coverage area of an *aerial appliance* and 'specialist' access applies.

6.3.5 Clause E1.3 of the *NCC* requires a fire hydrant system (e.g. *AS 2419.1–2005*) be provided only when a *fire brigade station* is no more than 50 km away and is equipped to utilise the fire hydrant. The fire hydrant system is only required when the *fire brigade station* has a *fire appliance* not less than shown in Table 2.

**Note:** The *fire appliance* must have appropriate personnel available (i.e. crew cabin) and carry self-contained breathing apparatus. Refer to Appendix A for typical pump performance of *fire appliances*.

| No. of hydrants required to flow simultaneously | Min. system design flow rate | Operating pressure | Available fire brigade station | Type of fire appliance available (as stationed within 50 km) |
|---|---|---|---|---|
| 1 | 10 L/s (600 L/min.) | 900 kPa | FRNSW | Any Pumper or Tanker |
| | | | NSW RFS | Any Category 1, 3, 10 or 11 |
| 2 | 10 L/s (1,200 L/min.) | 1,000 kPa | FRNSW | Any Pumper or Tanker |
| | | | NSW RFS | Any Category 10 or 11 |
| 3 | 10 L/s (1,800 L/min.) | 1,000 kPa | FRNSW | Any Class 2, 3 or Aerial pumper |
| | | | NSW RFS | Any Category 10 or 11 |
| 4 | 10 L/s (2,400 L/min.) | 1,000 kPa | FRNSW | Any Class 2, 3 or Aerial pumper |
| | | | NSW RFS | None (FRNSW mutual aid only) |
| 5 or more | ≥50 L/s (≥3,000 L/min.) | 1,000 kPa | FRNSW | Two or more pumpers |
| | | | NSW RFS | None (FRNSW mutual aid only) |

*Table 2 Types of fire appliance suitable to operate a fire hydrant system*

# 7 Vehicle access requirements

## 7.1 Carriageway width

7.1.1 A *carriageway* is to be wide enough to allow easy negotiating by the *fire appliance* and provide room around the vehicle to allow firefighters to exit and work with equipment.

**Note:** During an *emergency incident*, the *fire appliance* will be positioned (i.e. parked) in the most tactically advantageous position.

7.1.2 Along any straight *carriageway* section, the minimum width is 4.5 m for general *fire appliance* access, or 6 m for specialist *fire appliance* access (see Figure 3).

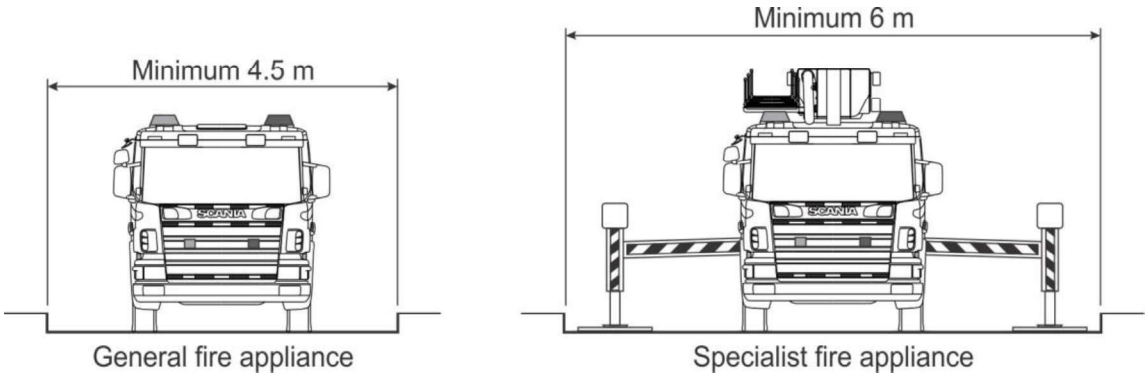



*Figure 3 Minimum carriageway width (straight section)*

**Note:** An *aerial appliance* requires additional width to extend *stabilisers* and operate. A designated *aerial appliance hardstand* area may be considered if continuous minimum width clearance cannot be achieved (see Figure 13).

7.1.3 When the *carriageway* is curved, including a corner around a building or structure, consideration is to be given to the *turning circle radius* and the minimum wall to wall clearances from both inner and outer body sections (including overhangs).

7.1.4 The minimum *turning circle radius* of any curved *carriageway* section is to be 6.5 m (inner) and 11.5 m (outer) for general *fire appliance* access, or 7.5 m (inner) and 14.6 m (outer) for specialist *fire appliance* access (see Figure 4).

**Note:** These turning circles provide wall to wall clearance from the vehicle body and overhangs. They are not the turning circles for the vehicle's wheel tracks.

7.1.5 The distance between inner and outer *turning circle radius* is to provide body swing clearance (i.e. vehicle swept path), and not be less than 5 m for general *fire appliance* access and 7.5 m for specialist *fire appliance* access (see Figure 4).

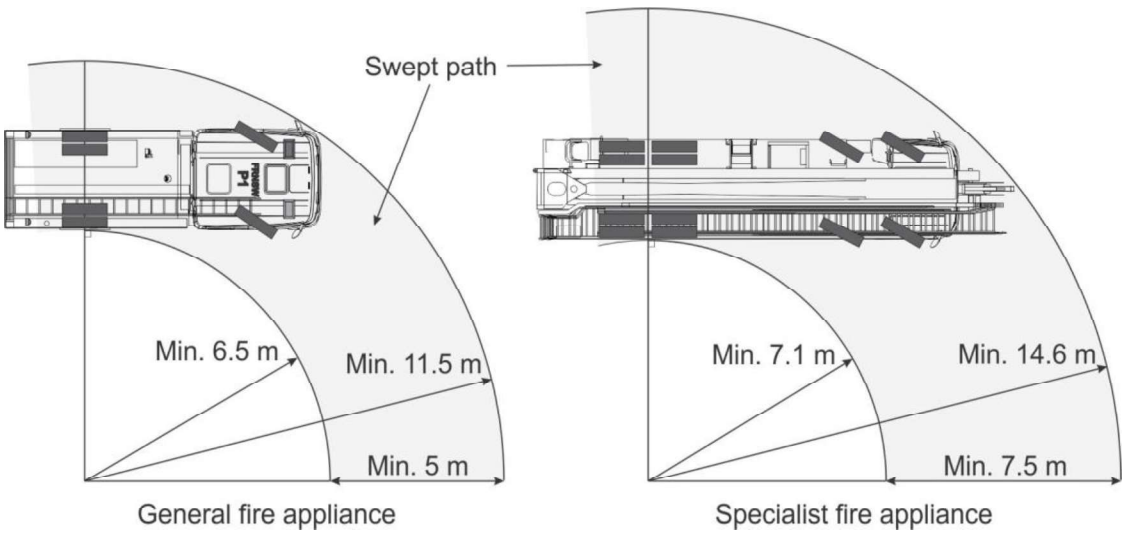



*Figure 4 Minimum turning circle radius (curved section)*

7.1.6 Body swing on turn entry and exit is to be considered, particularly when going around a building (see Figure 5). The pivot is tangential to the centre of the drive axle/s.

**Note:** The body swing arc changes with forward travel to full steering lock and back and arc created by the front opposite corner needs to clear any obstructions.

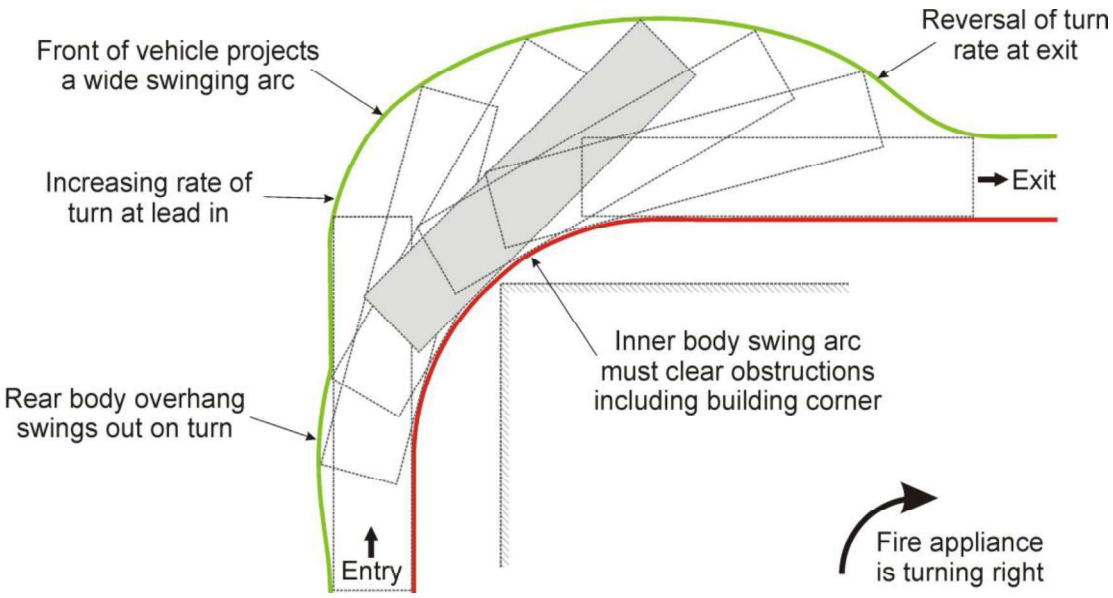



*Figure 5 Typical body swing on entry and exit of turn*

7.1.7 The design vehicle from *AS 2890.2:2018 Parking facilities Off-street commercial vehicle facilities* should be used for swept path analysis, with 'medium rigid vehicle' used for a general *fire appliance* and 'heavy rigid vehicle' for specialist *fire appliance*.

**Note:** The front overhang of some *aerial appliances* results in an increased swept circle diameter of 29.2 m instead of 27.8 m for the design heavy rigid vehicle.

## 7.2 Turnaround area

7.2.1 Any carriageway that extends longer than 120 m from an intersection and does not lead directly to an exit or connecting *carriageway* (i.e. dead end) is to have a suitable turnaround area so that a *fire appliance* does not need to reverse out (see Figure 6).

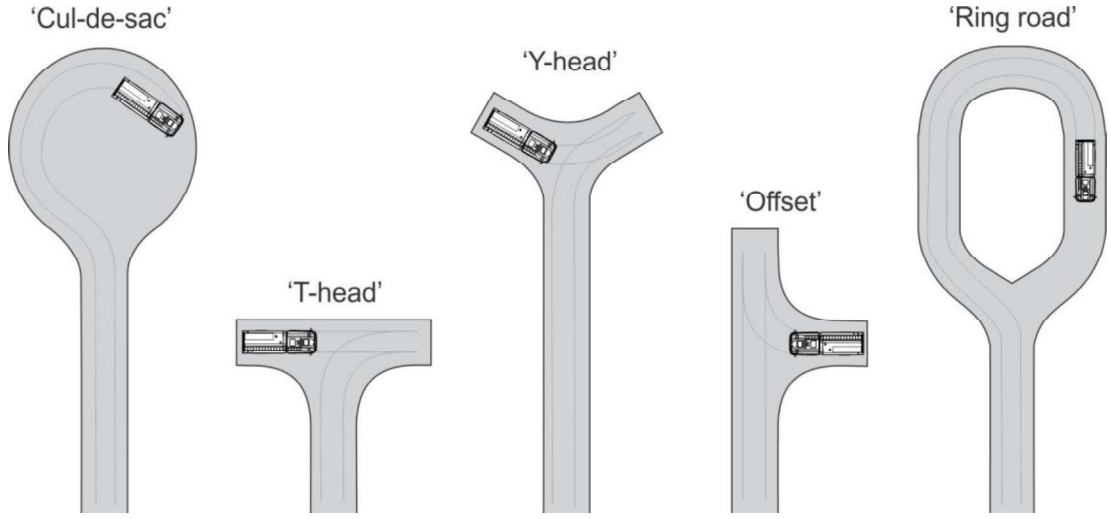



*Figure 6 Examples of typical turnaround area configurations*

7.2.2 The turnaround area must allow for body swing bias to the front of the *fire appliance*. If a multiple-point turn is required due to space restriction, the turning area is to be large enough to not require more than three points of turn (see Figure 7).

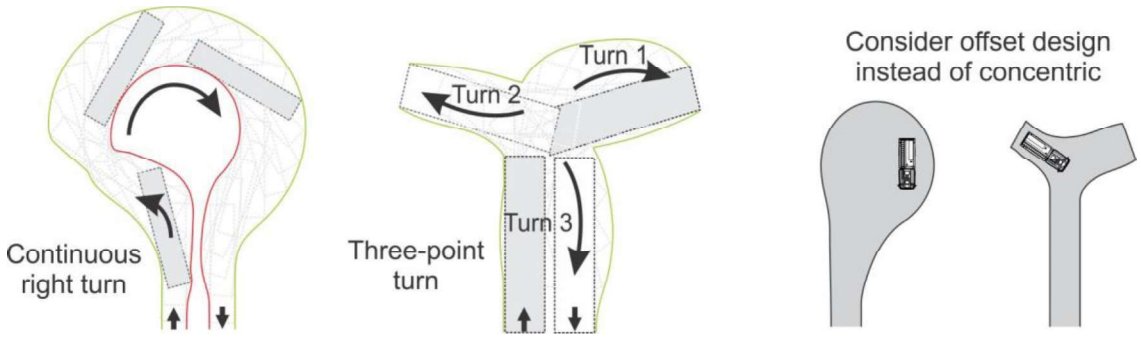



*Figure 7 Turnaround body swing; continuous (left) or multiple point (right)*

## 7.3 Constricted access (i.e. pinch point)

7.3.1 Constricted access is any narrow pinch point around an immovable object (e.g. building, structure, bridge, bollard, pylon, gate, vehicle barrier, *traffic control device*, utility pole, drain, fence, tree etc.) that provides less than 4.5 m width.

**Note:** A pinch point has insufficient width for firefighters to exit the *fire appliance* and work with equipment. A *fire appliance* is not able to stop at any pinch point.

7.3.2 The carriageway is not to have any constricted access providing less than 3.2 m width (see Figure 8).

**Note:** A *fire appliance* is unable to negotiate past a pinch point less than 3.2 m wide.

7.3.3 Any constricted access along a straight *carriageway* section is not to be longer than 50 m (see Figure 8).

**Note:** A 50 m long pinch point allows two lengths of fire hose.

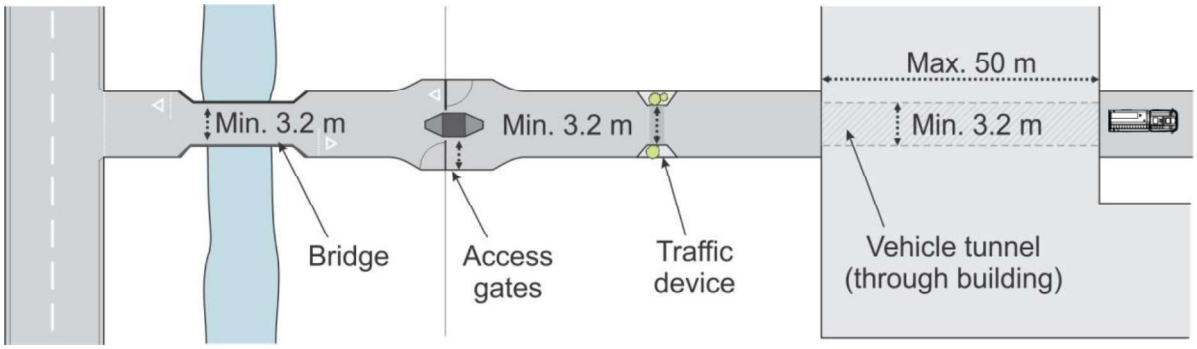



*Figure 8 Examples of constricted access (typical pinch points)*

7.3.4 Site managers are to ensure *fire brigade vehicle* access is not blocked by non-permanent obstructions including by parked vehicles, freight containers, pallets, stored goods, stored waste, bins, temporary structures etc.

## 7.4 Underbody clearance

7.4.1 All raised kerbs along the edge of a *carriageway* are to be no higher than 200 mm and be free of vertical obstructions at least 300 mm back from the kerb face, to allow clearance from and body overhang when turning (see Figure 9).

7.4.2 Kerbs in the centre of a *carriageway* (e.g. splitter islands and median strips) should be no higher than 200 mm and no wider than 500 mm, and be free of obstruction along their length, to allow the *fire appliance* to drive over the kerb (see Figure 9).

**Note:** A *fire appliance* responding to an *emergency incident* may need to manoeuvre onto opposing traffic lanes to get past stationary built up traffic.

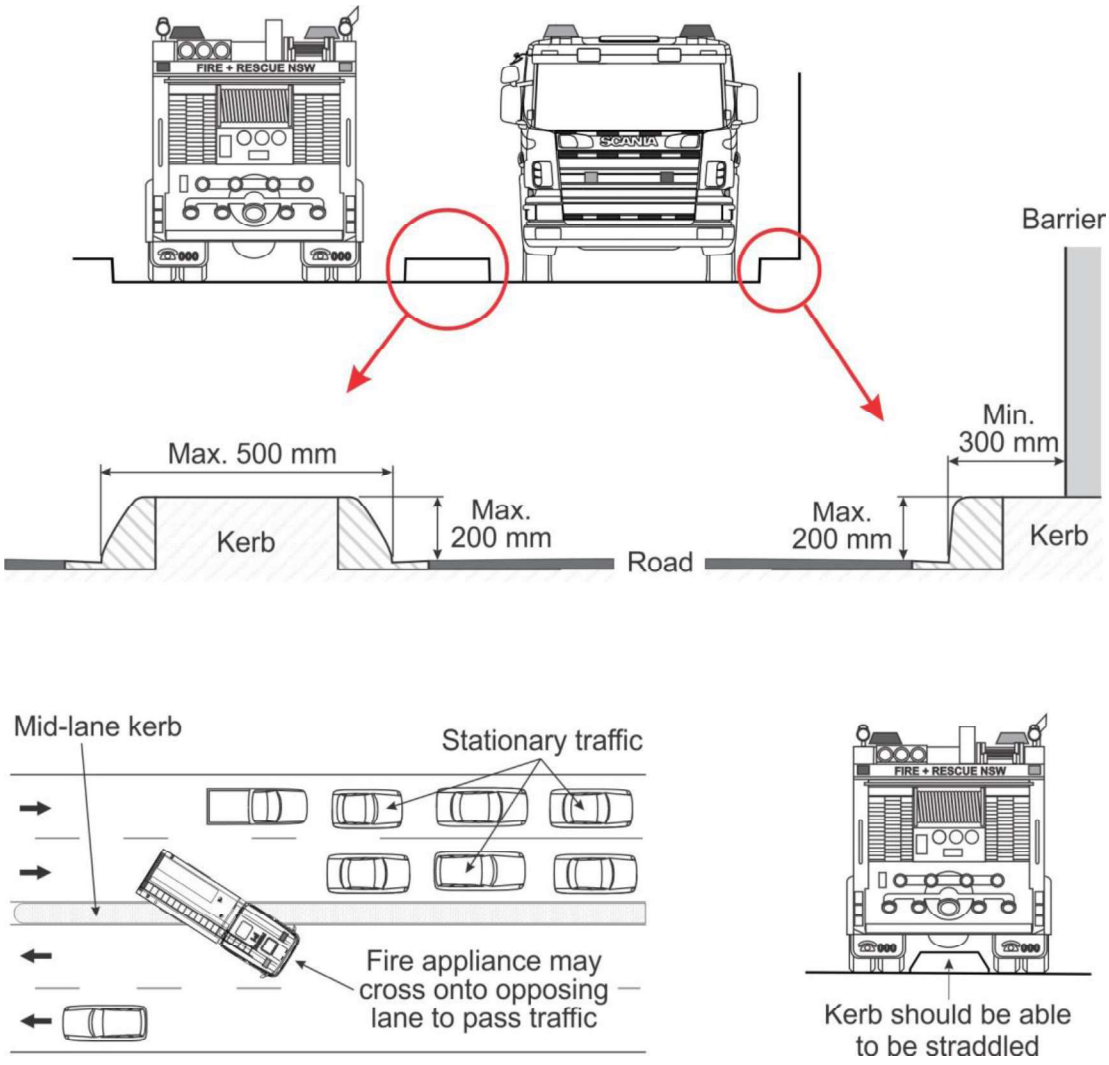



*Figure 9 Kerb clearance dimensions*

7.4.3 *Traffic control devices* that have integrated kerbs to slow traffic (e.g. speed hump, chicane slow point, small roundabout) are to have low profile mountable kerbing with 40 mm bull nose edge to allow easy negotiation by a *fire appliance*.

## 7.5 Overhead clearance

7.5.1 The *carriageway* is to have a minimum overhead clearance height of 4 m for general *fire appliance* access or 4.5 m for specialist *fire appliance* access (see Figure 10).

**Note:** The maximum vehicle height under the *Road Transport (Vehicle Registration) Regulation 2017* is 4.3 m. *AS 2890.2:2018 Parking facilities, Part 2: Off-street commercial vehicle facilities* prescribes a clearance height of 4.5 m.

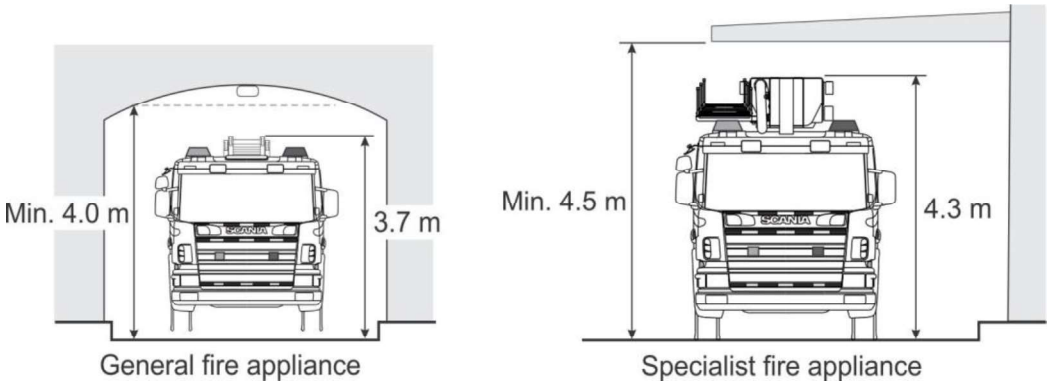



*Figure 10 Minimum clearance height*

7.5.2 Overhead clearance is to be free of any obstructions including building element (e.g. ceiling, beam, truss) bridge, archway, tunnel, walkway, barrier and any ceiling or overhanging fixtures such as lights, signs, poles, pipes, ducts, sprinkler heads etc.

7.5.3 Any restricted height clearance due to unavoidable overhead obstacle (e.g. low bridge) is to be clearly signed and indicate the actual maximum height clearance.

## 7.6 Grades and ramps

7.6.1 The grade of a *carriageway* or ramp is to be no steeper than 1:6 (16.6%).

**Note:** A grade of 1:8 (12.5%) or less is preferred for easier access. *AS 2890.2:2018* prescribes a maximum roadway/ramp grade of 1:6.5 (15.4%).

7.6.2 If the *carriageway* or ramp follows a curved or circular path, the maximum grade is to be no greater than 1:8 (12.5%) as measured along the centre line.

**Note:** The vehicle's chassis and body will twist and flex when negotiating a circular path, increasing with vehicles that have a longer *wheelbase*.

7.6.3 Ramps are to have transition grades between entry and exit which have a maximum rate of change of 1:16 (6.25%) for every 7 m of travel (see Figure 11 below).

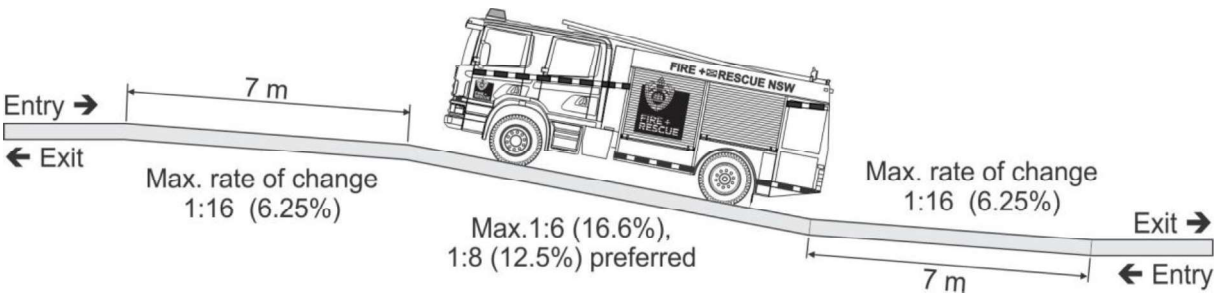



*Figure 11 Maximum gradients of access ramps*

7.6.4 Ramps that do not have a transition grade of at least 7 m are to have an approach and departure angle not exceeding 8° to ensure front and rear body overhang of a *fire appliance* does not contact the ground when negotiating the gradient change.

7.6.5 If any gradient change incorporates a recessed threshold (e.g. gutter or drain at site entrance driveway), the design should consider any reduced entry and exit clearance for the *fire appliance* (see Figure 12).

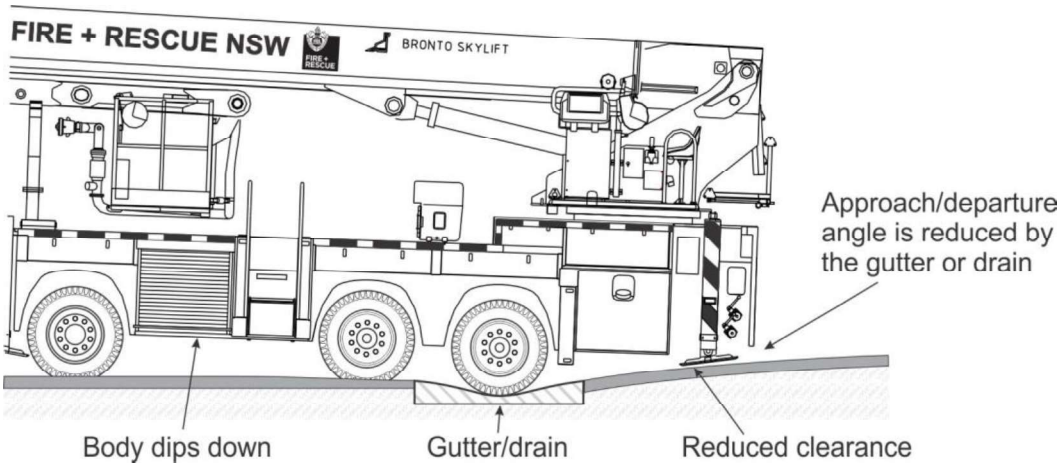



*Figure 12 Reduced gradient clearance from recessed gutter*

**Note:** Wheels will recede into any gutter or drain and reduce the effective approach and departure angle. Clearance is impacted most on *fire appliances* having long front and rear overhanging body sections (e.g. specialist *fire appliance*).

## 7.7 Security points and barriers

7.7.1 Gates, barriers and bollards installed to inhibit vehicle access for security purposes are to be either removeable, retractable or foldable so that a *fire appliance* can gain access to the site during an *emergency incident*, including access after-hours.

**Note:** A bypass should be provided for any weighbridge, vehicle station, loading bay or the like, if likely to be obstructed by a vehicle during normal operations.

7.7.2 Any vehicle access gate that is required to be locked, including any alternate vehicle access gate, should be secured with a non-hardened metal chain and lock (e.g. galvanised mild steel).

**Note:** Firefighters may need to force entry through the vehicle access gate using standard bolt cutters on the chain or lock.

7.7.3 All locks fitted to vehicle access gates and security devices are to be keyed alike, and a copy of the key deposited with the two nearest FRNSW *fire brigade stations* or kept with the site security if 24/7 security is provided for the site.

**Note:** *Premises* keys can be deposited directly with the local FRNSW *fire brigade stations* (see clause 10.5.5).

7.7.4 Any electrically operated vehicle access gate or security device should incorporate either mechanical override, fail-safe open mode, or activation by site security so that fire appliances can access the site in the event of fire.

# 8 Hardstand area

## 8.1 Design requirements

8.1.1 Designated *hardstand* areas are to provide a safe working space for firefighters to exit the vehicle and move around the fire appliance to remove and use equipment, including connecting fire hoses to the *fire appliance* (see Figure 13).

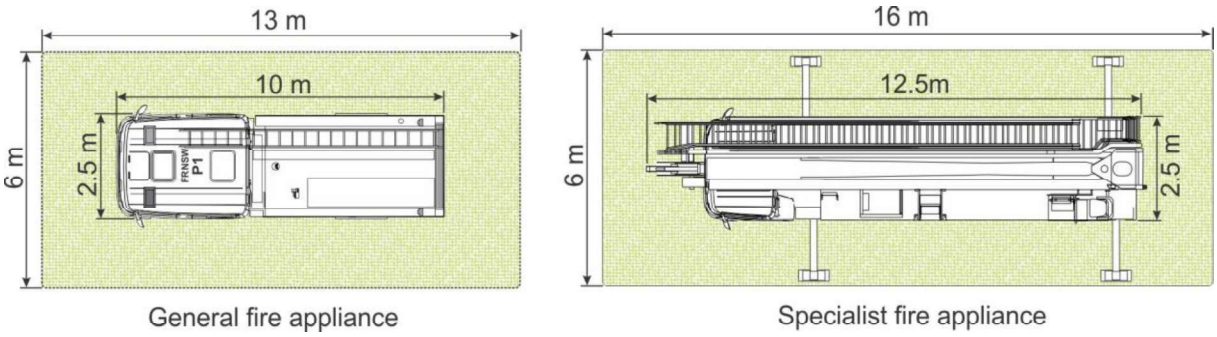



*Figure 13 Minimum working space for hardstand area*

8.1.2 The designated *hardstand* area is to be flat and level all weather surface which is clear of any obstructions that could be hazardous during operations (e.g. bollard, railing, fencing, sign, kerb, gutter, fixed structure, parked vehicle, storage, rubbish).

8.1.3 The designated *hardstand* area is to provide easy manoeuvring for the *fire appliance* to be positioned onto the *hardstand* from the *carriageway*.

8.1.4 Any section of *carriageway* may be used as a designated *hardstand* area only when the passing traffic flow will not be blocked by the positioned *fire appliance*.

**Note:** A minimum clearance of 3.5 m should be provided. A turnaround area may be used as a hardstand only when another fire appliance can safely turn around.

8.1.5 Any *hardstand* serving a *suction-connection outlet* is to have a working space which extends a minimum of 18 m from the point of connection to allow semi-rigid suction hose to be connected to the rear of the *fire appliance* (see Figure 14).

**Note:** *Fire appliances* typically use three x 2.4 m or two x 3.6 m long suction hoses (i.e. combined length of 7.2 m). Some FRNSW 'aerial pumpers' have a mid-mounted pump where the suction hose is connected to the side of the vehicle.

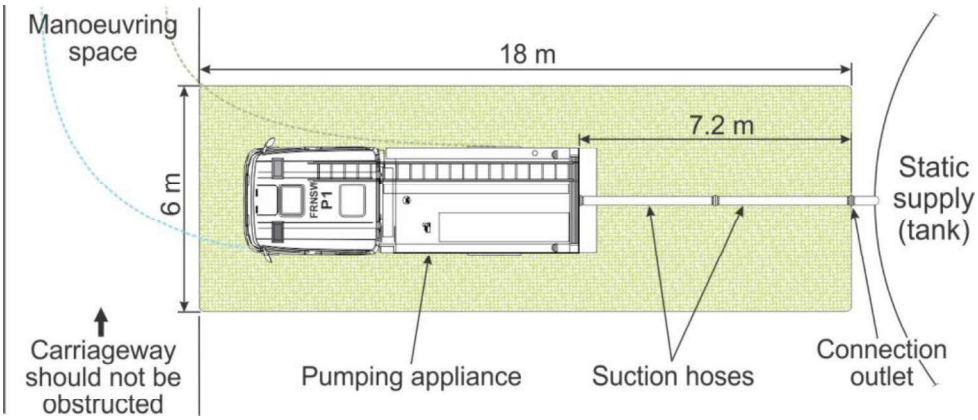



*Figure 14 Hardstand area serving a suction-connection outlet*

8.1.6 Any designated *hardstand* area serving a pumping *fire appliance* for firefighting operations (e.g. pumper using a feed fire hydrant) is to have appropriate guttering and drainage to remove any continuous water discharge from the *fire appliance*.

## 8.2 Hardstand locations

8.2.1 A *hardstand* is to be provided as required by *AS 2419.1—2005 Fire hydrant installations – System design, installation and commissioning*, and as otherwise nominated by the relevant authority having jurisdiction, including:

- within 20 m of any feed fire hydrant
- within 8 m of any fire hydrant booster assembly
- within 50 m of an external attack fire hydrant
- within 20 m of the access door to any external fire pumproom
- in front of any *suction-connection outlet* (e.g. tank, river, lake, dam, sea).

**Note:** The location must also consider other required factors such as firefighter access to the building and maximum hose coverage requirements.

8.2.2 Any *hardstand* area serving a *suction-connection outlet* is to be positioned at an angle not greater than 45º from the outlet's longitudinal direction (see Figure 15).

**Note:** Suction hoses are semi-rigid and only allow slight bending, therefore the *fire appliance* must be positioned relative to the connection outlet. The working space must be kept unobstructed at all times.

8.2.3 If multiple *fire appliances* are required to connect to *suction-connection outlets*, the *hardstand* areas should allow each *fire appliance* to operate independently without encroaching onto the other's working space (see Figure 15).

**Note:** *Suction-connection outlets* are not be located within 5 m of each other.

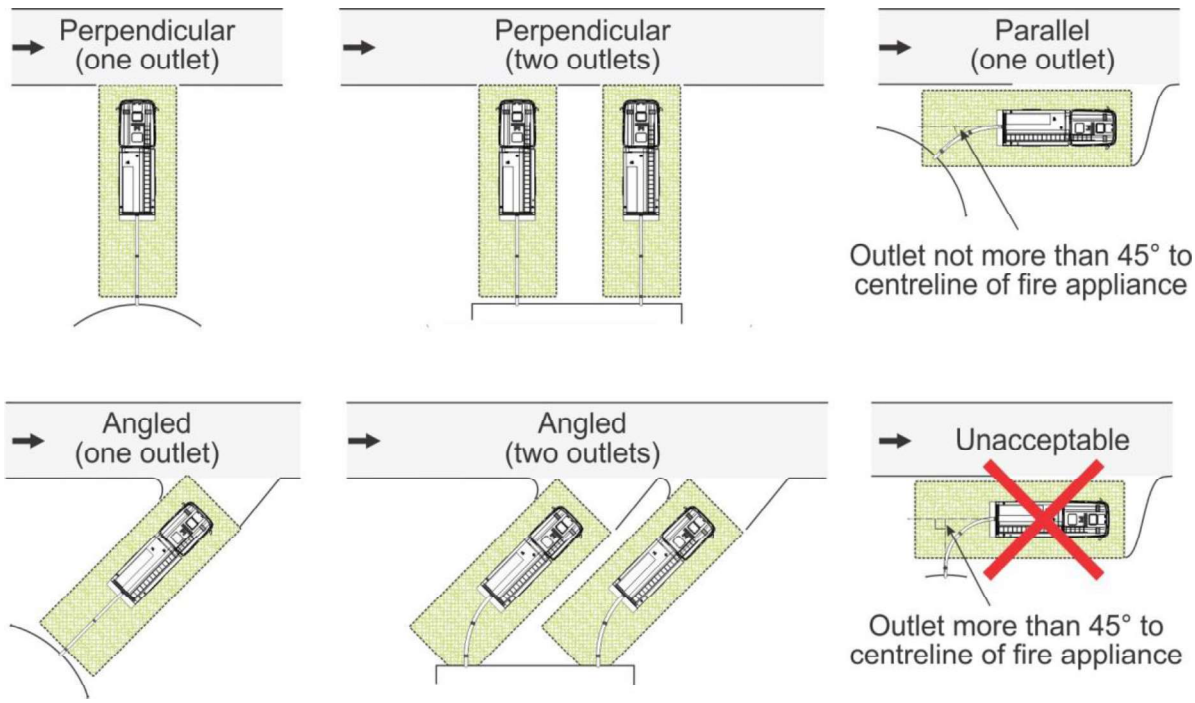



*Figure 15 Example of orientation of hardstand area for suction-connection outlets*

# 9 Weights and loads

## 9.1 Design requirements

9.1.1 All *carriageways* and *hardstand* areas are to be suitably formed and constructed having an all-weather sealed surface capable of supporting the *fire appliance*.

**Note:** Refer to the *Austroads Guide to Road Design* for best practice *carriageway* design and construction.

9.1.2 All *carriageways* and *hardstand* areas are required to maintain structural adequacy under load from a *fire appliance*, including when supported, elevated or reinforced by structural members (e.g. bridge, ramp, apron, suspended floor, wharf etc.).

**Note:** Load limited bridges unable to support a *fire appliance* should be avoided, particularly when alternate routes involve much longer distances.

## 9.2 Weight (static load)

9.2.1 The maximum weight of a general *fire appliance* is 15 tonnes, and 28 tonnes for a specialist *fire appliance*. The static load should be used when determining forces acting through load bearing structures and surfaces (see Figure 16).

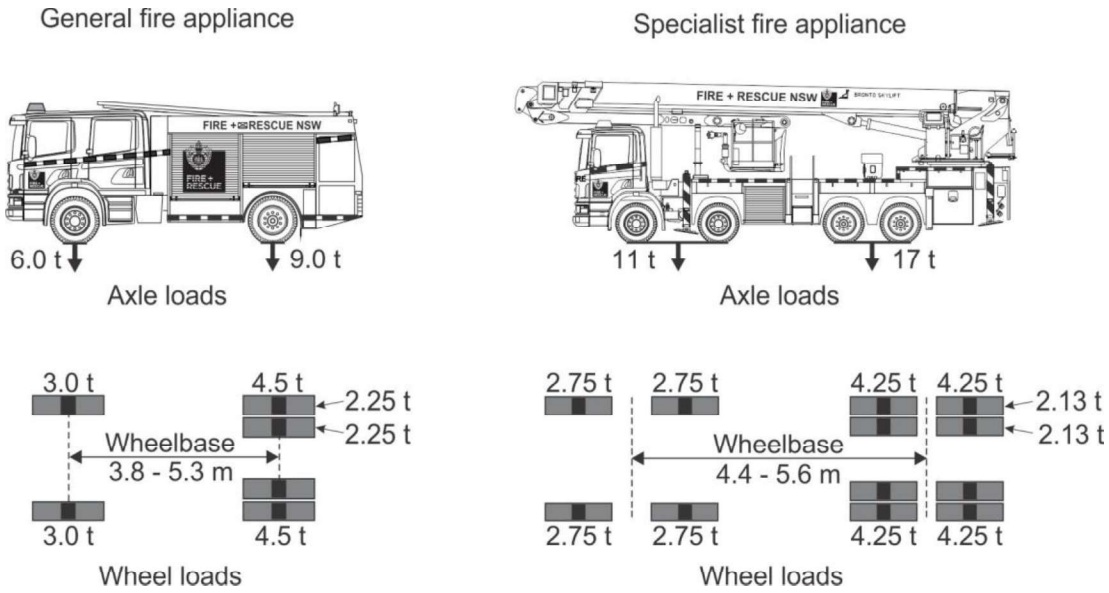



*Figure 16 Static loads from fire appliances*

9.2.2 The *Bronto Skylift F44 RLX aerial appliance* is the heaviest *fire appliance* in the FRNSW fleet and exceeds legal mass limits (i.e. operates by special permit).

9.2.3 The surface of any *carriageway* and *hardstand* area is to have enough binding and hardness to withstand point loads exerted thought each tyre (i.e. tyre pressure contact point as represented by black squares in Figure 16).

**Note:** Tyres are typically inflated around 850 kPa pressure. If the *carriageway* or *hardstand* has insufficient surface integrity, the point load will result in localised damage to the road surface (i.e. cracking of surface layer).

## 9.3 Dynamic load (of an aerial appliance)

9.3.1 An *aerial appliance* is fitted with hydraulically actuated *stabilisers* to support the vehicle when the *aerial apparatus* is operating and will either have two stabilisers at both the front and rear or just two *stabilisers* at the rear only (see Figure 17).

**Note:** *Stabilisers* extend out and lift the *fire appliance* to provide a stable operating base and prevent overbalancing. If any *stabiliser* cannot be fully extended the field of operations of the *aerial apparatus* will be restricted accordingly.

9.3.2 Movement of the *aerial apparatus* results in changing weight distribution and dynamic forces being exerted through the *stabilisers* (e.g. momentum from rotation, torsion from elevation/extension, weight from rescued persons, water stream reaction).

9.3.3 A bearing plate is positioned under each *stabiliser* to increase ground contact surface area and lower the pressure exerted on the ground. A *stabiliser* will only be deployed without a bearing plate when it is opposite to the intended working side.

**Note:** The lower pressure assists maintain surface integrity and minimises the likelihood of the *stabiliser* being pushed through the ground surface.

9.3.4 Bearing plates do not reduce the point load from each *stabiliser*. Designers need to consider the foundation and structural support under the *carriageway* surface, particularly when supported, elevated or reinforced by structural members (e.g. bridges, ramps, aprons, suspended floors, wharfs etc.).

**Note:** Consideration should be given to relocating or reinforcing underground services that may be damaged from high point loads (see Figure 17).

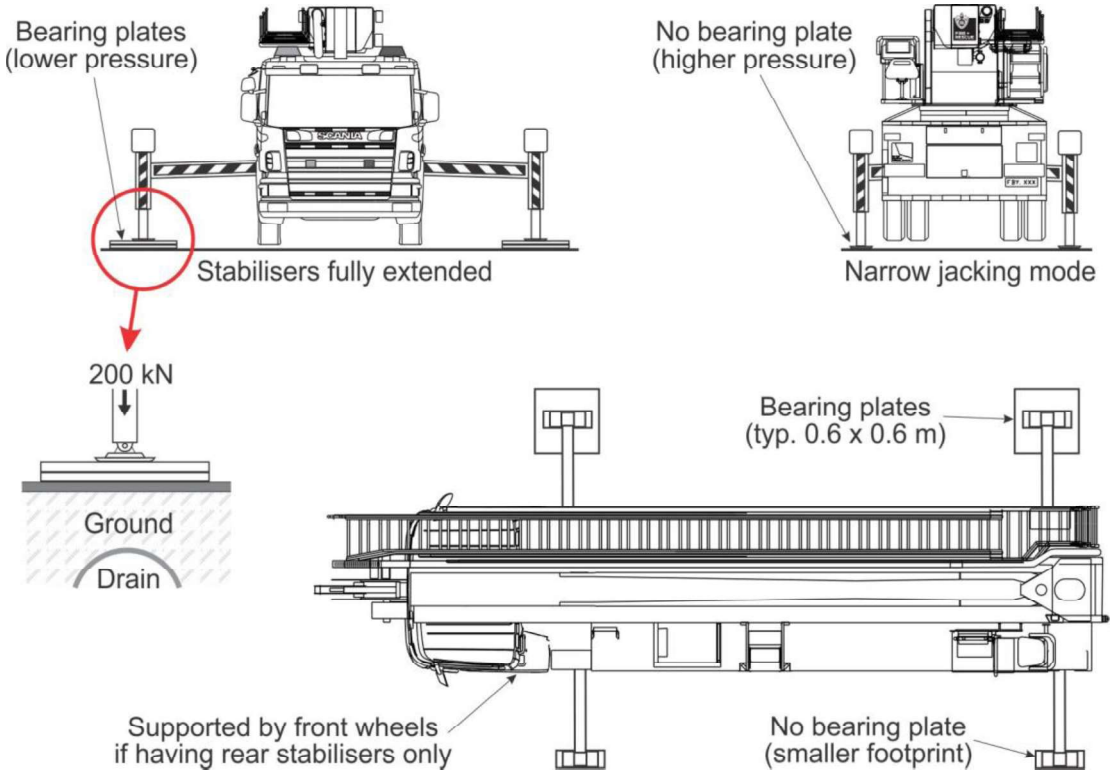



*Figure 17 Typical operation of stabilisers and bearing plates*

9.3.5 When the *Bronto Skylift F44 RLX aerial appliance* has a fully loaded cage (500 kg) at maximum extension and worst-case rotation angle (I.e. over a rear *stabiliser*), the maximum load exerted though a single *stabiliser* is shown in Table 3 (see Figure 18).

| Maximum load through single stabiliser | |
|---|---|
| Force | 200 kN |
| Mass | 20,400 kg |
| Percentage of vehicle mass | 70% of gross |
| Footplate pressure | 11 kg/cm² (1080 kPa) |
| Bearing plate pressure | 2.8 kg/cm² (275 kPa) |

*Table 3 Maximum dynamic loads of an aerial appliance*

**Note:** Dynamic loads should be considered when determining forces acting through load bearing surfaces and structures, particularly when being supported, elevated or reinforced by structural members.

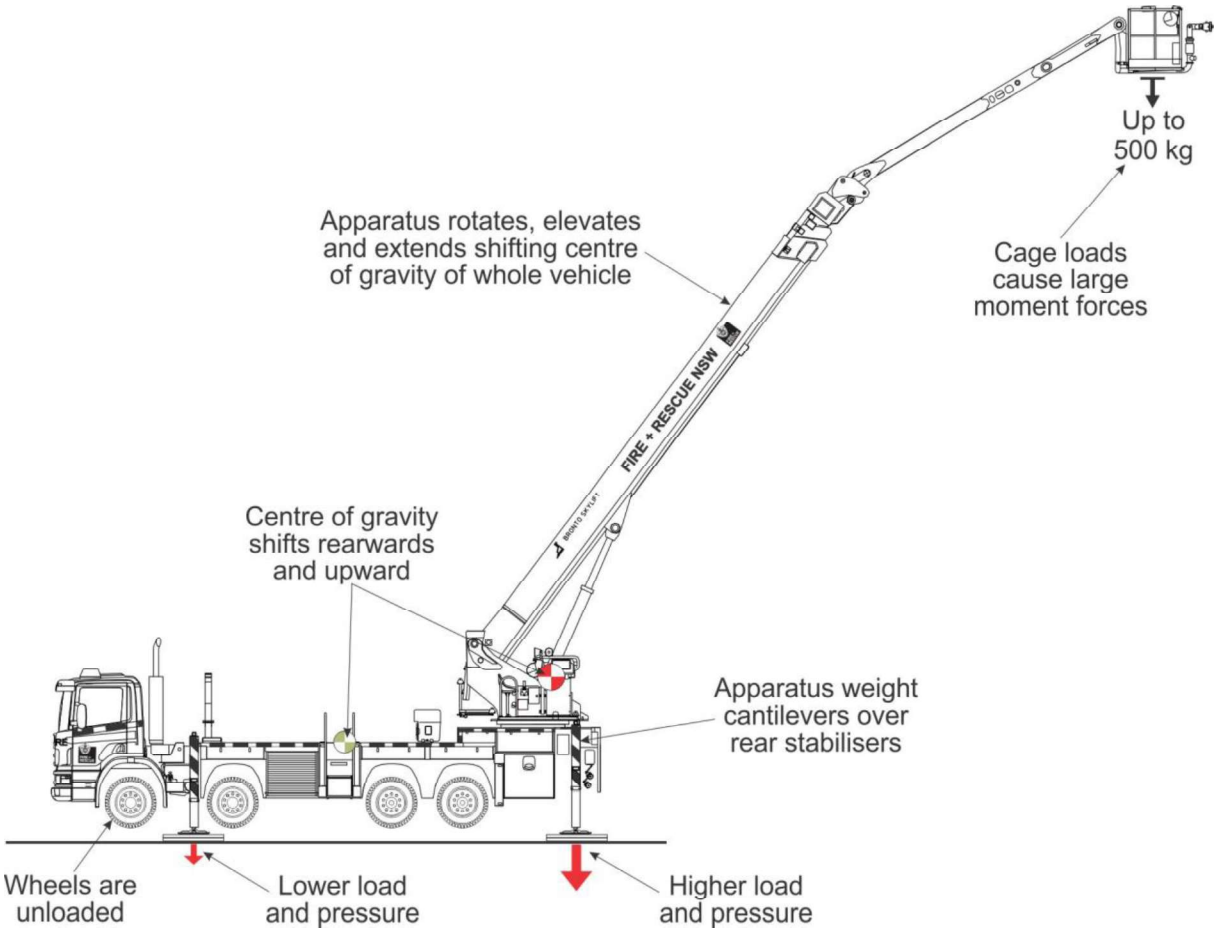



*Figure 18 Dynamic loads exerted during aerial appliance operation*

# 10 Considerations for development

## 10.1 NCC requirements

10.1.1 Performance requirement CP9 of the *NCC* states:

*Access must be provided to and around a building, to the degree necessary, for fire brigade **vehicles** and **personnel** to facilitate fire brigade intervention appropriate to –*
*a) the function or use of the building; and*
*b) the fire load; and*
*c) the potential fire intensity; and*
*d) the fire hazard; and*
*e) any active fire safety systems installed in the building; and*
*f) the size of any fire compartment.*

10.1.2 *Fire brigade vehicle* access is critical to *fire brigade* intervention. Performance requirement CP9 is to be considered in any performance-based design (i.e. *alternative solution*) where *fire brigade* intervention is to be verified.

**Note:** When identifying relevant performance requirements under clause A2.2(3)(b) of the *NCC*, CP1, CP2, CP9, DP5, EP1.3, EP1.5, EP1.6, EP2.2 and GP4.4 all require verification of *fire brigade* intervention and/or firefighting operations.

10.1.3 Except for Clause C2.3 of the *NCC*, there are no deemed-to-satisfy provisions directly applicable to the provision of *fire brigade vehicle* access to comply with performance requirement CP9.

**Note:** The *NCC* deemed-to-satisfy provisions deal with general firefighter access.

10.1.4 Design and planning of development should holistically consider *fire brigade vehicle* access for any type of major *emergency incident* (e.g. fire, explosion, accident, gas leak, hazardous material, structural damage or collapse, bomb threat, terrorism etc.).

**Note:** A major *emergency incident* will require a multiple alarm response; good *fire brigade vehicle* access will assist *fire brigades* and other emergency services to manage the incident and treat casualties.

## 10.2 Large isolated building

10.2.1 Clause C2.3 of the *NCC* allows the size of a fire compartment in a building to exceed that specified in Table C2.2 when the building is provided with perimeter vehicular access complying with Clause C2.4(b) of the *NCC*.

10.2.2 Clause C2.4(b) of the *NCC* requires the vehicular access to:

- provide continuous forward direction vehicular access around the building
- have a minimum unobstructed width of 6 m, with no part being more than 18 m from the building
- provide reasonable pedestrian access to the building
- have a load bearing capacity and unobstructed height suitable to permit the operation and passage of *fire brigade vehicles*, and
- be wholly within the allotment, except when a complying public road is used.

10.2.3 Any external panel walls must be designed to minimise the likelihood of external collapse onto the vehicular access *carriageway*, with emphasis on Clause 3(g) of Specification C1.11 of the *NCC*.

10.2.4 The unobstructed width of a *carriageway* may be less than 6 m only when:

a) the development is in an area where a specialist *fire appliance* is unlikely to attend (i.e. outside of major metropolitan areas)

b) the unobstructed width is not less than 4.5 m and the external wall adjacent the *carriageway* is a fire wall having a suitable fire resistance level (see Figure 19)

c) a performance-based design (i.e. *alternative solution*) has been undertaken and agreed to by FRNSW

d) openings in the fire wall are passenger doors only and suitably protected to maintain the required fire rating.

**Note:** A carriageway having a reduced unobstructed width will impact on *fire brigade* intervention, accessibility and safety.

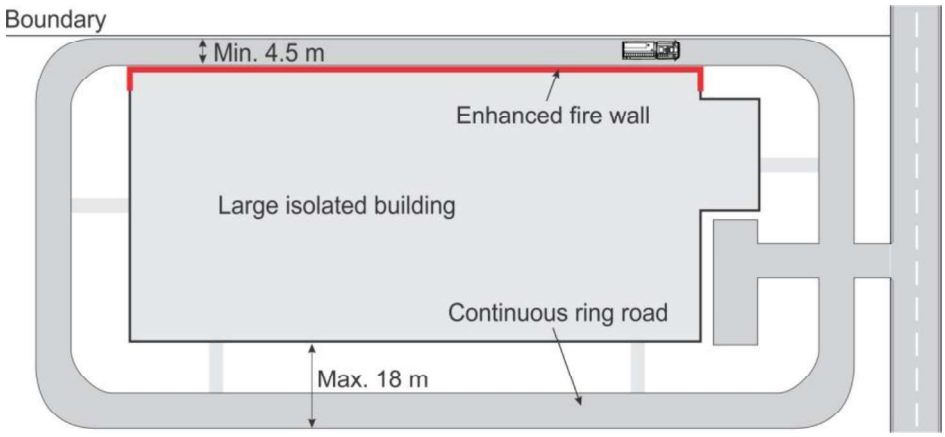



*Figure 19 Large isolated building with reduced carriageway width*

10.2.5 If the building is protected by an automatic fire sprinkler system, any awning over the *carriageway* is to also be protected by sprinkler system (see Figure 20).

**Note:** The sprinkler system is to be appropriate to the hazard and minimum clearance is to be maintained under the awning for *fire appliance* access.

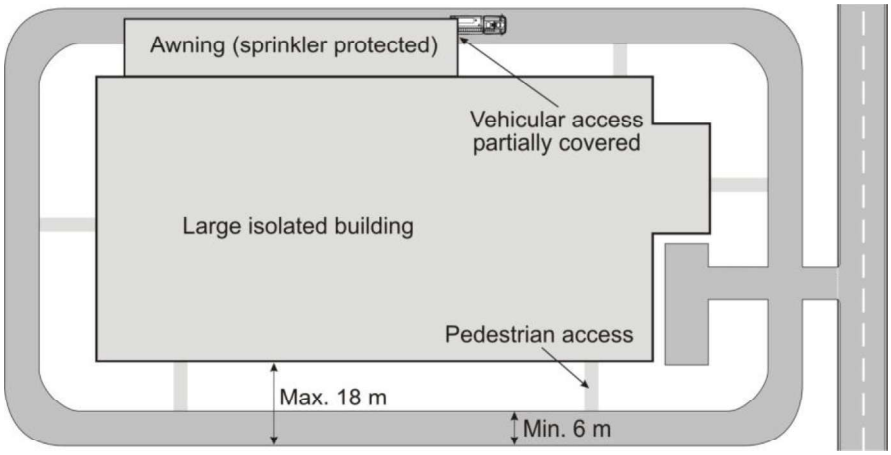



*Figure 20 Large isolated building with awning over carriageway*

10.2.6 If continuous forward travel around the building is not possible, a performance-based design (i.e. *alternative solution*) should be undertaken and agreed to by FRNSW.

## 10.3 Complex development

10.3.1 Development typically has a building adjacent to a public road providing easy access; modern development may be complex in design and require firefighters to negotiate a complicated route through the premises to undertake *fire brigade* intervention.

10.3.2 *Complex development* may involve several buildings which may be united (e.g. podium), clustered (e.g. urban precinct), or be a *major facility*. Such development is likely to have higher than normal occupation levels and/or risks.

10.3.3 *Complex development* may not require any specific *fire brigade vehicle* access other than to a designated entry point. However, this can have a significant adverse impact on operations during any *emergency incident*, including:

- increased *fire brigade* intervention times
- congestion of emergency vehicles and personnel at the designated entry
- not being able to position an *aerial appliance* within its field of operations
- confusion and delay from complicated routes through building, facility or site
- the need to carry equipment over greater distance to/from *fire appliances*
- greater dispersal of evacuees at multiple building evacuation points
- the need to move casualties over more distance to triage areas or ambulances

**Note:** A holistic assessment of *fire brigade vehicle* access for possible or likely major emergencies should be considered during the design phase, including provision of accessible *private roads* and *hardstand* areas as appropriate.

## 10.4 Buildings under 25 m effective height

10.4.1 Performance requirement CP9 of the *NCC* requires access be provided for *fire brigade vehicles* to facilitate *fire brigade* intervention. The *Guide to NCC Volume One* also states 'access for the *fire brigade* must be appropriate to their needs and the type of vehicles and equipment to be used'.

10.4.2 In regard to the 25 m *effective height*, Clause D1.2(b)(i) of the *Guide to NCC Volume One* states that 25 m is 'the effective operating height of *fire brigade* ladders and other firefighting and rescue equipment'.

**Note:** The *Guide to NCC Volume One* further identifies the role of the *fire brigade* 'to undertake external rescue or firefighting from ladders' in clauses D1.2(d)(i), D1.8 and E1.8(a), performance requirement EP1.4, and Table E1.5.

10.4.3 All buildings should have suitable 'provision for escape' from each storey, such as multiple required exits (e.g. building over 25 m) or a single required exit with an alternate means of emergency escape (e.g. fire brigade ladders).

**Note:** During *fire brigade* intervention, a portable extension ladder can only reach up to 10 m and an *aerial appliance* up to 25 m (see Figure 21).

10.4.4 Any non-sprinklered building more than three storeys above ground, and having a single stairway serving each storey (i.e. under 25 m building), should demonstrate that an *aerial appliance* can be positioned to provide means of emergency escape.

**Note:** If an *aerial appliance* cannot be suitably positioned to provide means of emergency escape, an *alternative solution* should be sought to demonstrate compliance with performance requirement CP9 of the *NCC*.

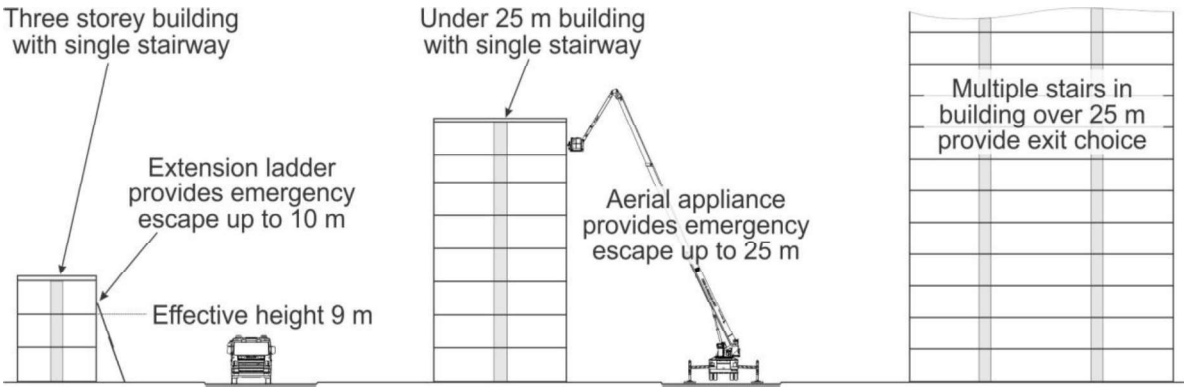



*Figure 21 Using fire brigade ladders to provide emergency escape*

10.4.5 An *aerial appliance* has a limited field of operations that requires it to be positioned adjacent to and near the building; any part of a building that is set back from the *carriageway* may be outside the reach of the *aerial appliance* (see Figure 22).

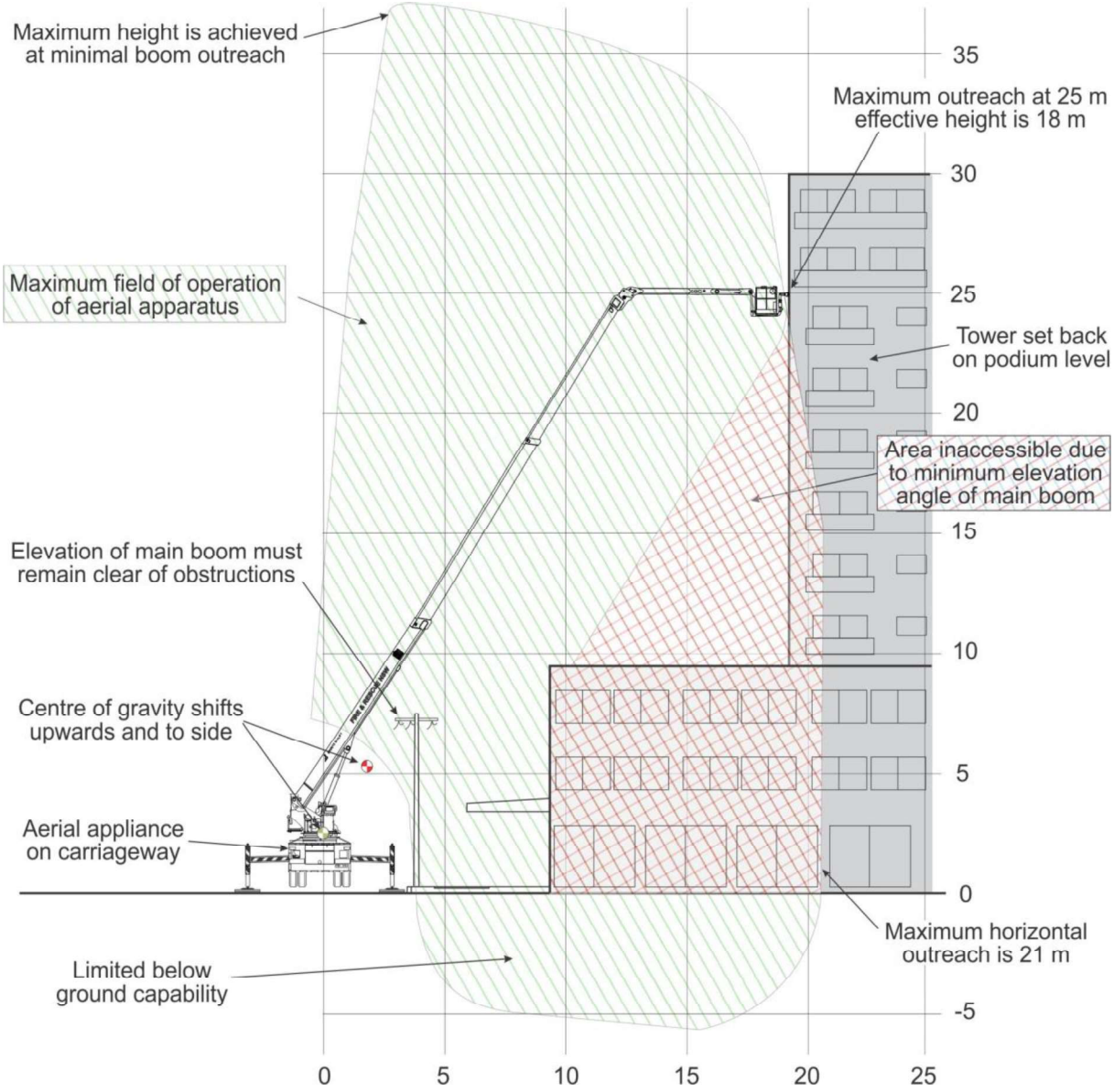



*Figure 22 Typical field of operations of an aerial appliance*

## 10.5 Building access

10.5.1 Buildings with a monitored automatic fire alarm system are to provide firefighters access into the *DBEP* and to the fire control centre (e.g. if located within a room off the main entrance) including after-hours.

**Note:** Any delay in gaining access during an *emergency incident* may be life critical.

10.5.2 When building access through an emergency exit door is necessary in an emergency (e.g. to enter a fire isolated stairway to access upper storeys), the emergency exit door is to be openable from the outside using either a key, fob or security passcode.

10.5.3 Doors to essential services and systems including pump room, sprinkler control valve room, fire control room, facility emergency control centre etc. are to be kept unlocked or accessible using either a key, fob or security passcode.

10.5.4 If the building has an emergency lift, a copy of the fire service lift key is to be kept at the fire control centre and clearly identified.

10.5.5 A copy of all *premises* keys, fire service lift keys, electronic access fob or security passcode should be deposited with the two nearest FRNSW *fire brigade stations*.

**Note:** Keys are kept in a wire sealed bag within a locked cabinet until needed during notification of alarm. The owner may apply their own seal if they wish.

10.5.6 When multiple *premises* keys are being kept or deposited, individual keys are to be readily identifiable (e.g. engraved, numbered or colour coded).

## 10.6 Signage and wayfinding

10.6.1 Clear signage should be provided at the *DSEP* to direct *fire brigade vehicles* around the site (e.g. buildings, structures, roadways, access points, fire safety systems, *hardstand* areas, assembly areas, storage areas, hazardous chemicals etc.).

10.6.2 Clear signage should be provided at the *DBEP* to direct emergency service personnel around the building (e.g. access/egress points, emergency lifts, refuge areas, fire safety systems, control rooms, utilities and services etc.).

10.6.3 A block plan located at the fire control centre is to clearly indicate how and where firefighters are to access different areas of the building including upper storeys, especially when exiting the *DBEP* to enter via an emergency exit.

10.6.4 When multiple exits discharge at a common point, each exit door should have signage identifying the area/floors the exit will provide access to (see Figure 23).

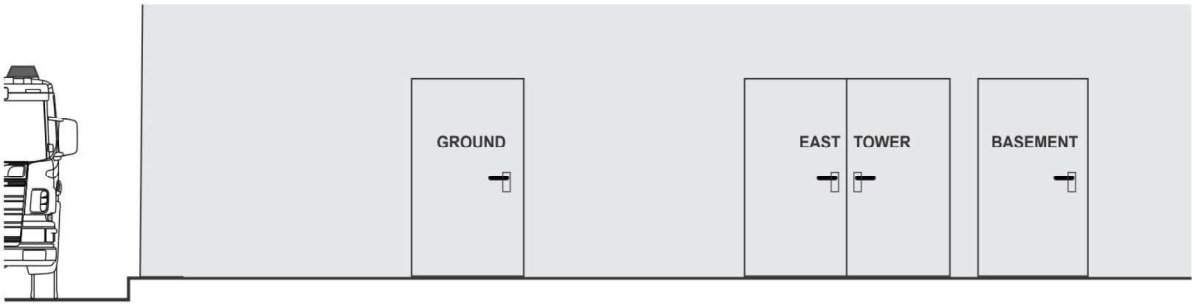



*Figure 23 Example of exit door signage to assist firefighters*

10.6.5 All buildings, towers, areas and floors are to be adequately labelled to assist with wayfinding, including corresponding identification provided on the safety side of emergency exit doors (e.g. 'East Tower – Level 3' sign being in the lift lobby as well as on the reverse side of all emergency exit doors on the same storey).

**Note:** Firefighters ascending fire stairs must be able to readily identify their actual location (e.g. floor level).

10.6.6 Signage is to be permanently affixed, weather resistant if external, high contrasting (e.g. black on white), clearly visible and readable at the expected viewing distance.

**Note:** Font height of signage is to be not less than 10 mm per metre of viewing distance as per *AS 1319–1994 Safety signs for the occupational environment*.

## 10.7 Other operational issues

10.7.1 The scale of response by *fire brigades* and other emergency services is proportional to the nature of the emergency. A major *emergency incident* will require a multiple alarm response by multiple combat and support agencies.

10.7.2 Any *complex development* having multiple site access points to deal with an *emergency incident* is to have all *DSEPs* clearly identified with signage to ensure it does not get obstructed (e.g. 'Emergency vehicle access – do not block').

10.7.3 Additional *fire brigade vehicles* may be responded to provide extra personnel for the *emergency incident*. These vehicles will likely be staged at an assembly area nearby.

**Note:** *Fire appliances* generally have a crew of four to six firefighters. At a large fire, many *fire appliances* will respond to provide additional firefighters.

10.7.4 An *aerial appliance* will be positioned in the most operationally advantageous position having clear overhead working space to safely operate within its field of operation.

10.7.5 When fire occurs in a building not having a fire-resisting roof, the risk of roof collapse may require firefighters to not enter the building and fight the fire externally.

10.7.6 When fire occurs in a building not having Type C construction, the risk of wall collapse may require firefighters to fight the fire defensively outside collapse zones.

**Note:** When external walls are tilt-slab panels, the collapse zone is 1.5 time the height of the wall. *Fire appliances* will be strategically positioned at corners.

10.7.7 When significant firefighting operations is being undertaken *carriageways* and *hardstand* areas may be partly or fully obstructed by fire hose running between *fire appliances*, water sources and buildings.

**Note:** If fire hose is required to cross the carriageway (e.g. to access a street fire hydrant), passing road traffic may be stopped for safety reasons

10.7.8 Development comprising multiple privately-owned dwellings, where not all dwellings have direct frontage onto a public road, is to have *fire brigade vehicle* access as outlined within *Firefighting access and water for minor residential development*.

# 11 Bush fire prone land

11.1 The NSW RFS *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers* (PBP) applies to all development on 'bush fire prone land' within NSW.

**Note:** Bush fire prone land is mapped by each respective council under *section 146* of the *Environmental Planning and Assessment Act 1979*.

11.2 As all general *fire appliances* have comparable specifications, complying with the requirements of this guideline will ensure PBP requirements are also satisfied.

11.3 Suitable *fire brigade vehicle* access is to be provided to within 4 m of a static water supply if no reticulated water supply is available (e.g. 10,000 L tank).

11.4 Perimeter roads on a bush fire interface are to provide not less than 8 m clear width (i.e. exclusive of parking) so that firefighters can safely operate when heavy smoke reduces visibility across the road.

11.5 Access roads are to allow traffic to pass by having passing bays at least 20 m long by 2 m wide provided every 200 m if the *carriageway* does not allow traffic to freely pass (see Figure 24).

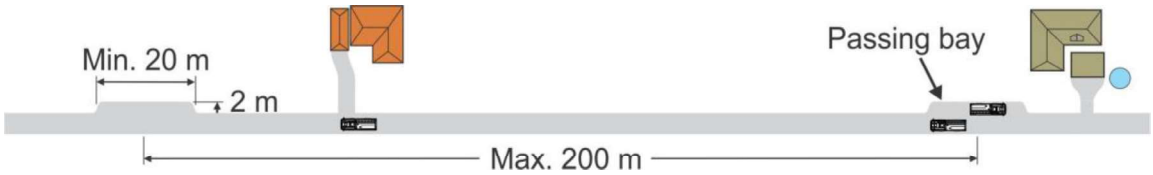



*Figure 24 Example of passing bays on road in bush fire prone land*

# 12 Local area traffic management (LATM)

## 12.1 Design requirements

12.1.1 *LATM* is the installation of *traffic control devices* to purposely modify speed, volume and composition of traffic in a local area. LATM devices will slow or restrict all traffic including *fire appliances* that are responding with speed to an *emergency incident*.

12.1.2 Traffic engineers and planners should consider the effects of *LATM* on *fire brigade* response. *LATM* should be implemented strategically to achieve optimum balance of managing traffic without detrimentally delaying response times.

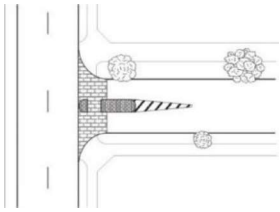
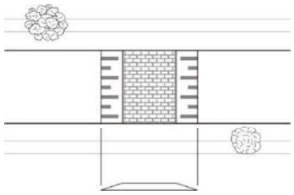
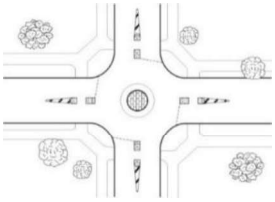
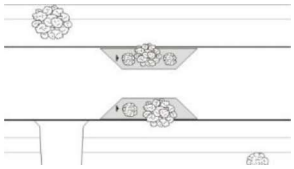
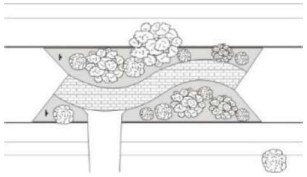
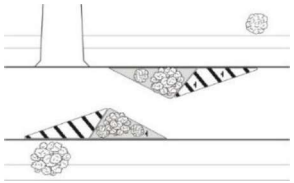
12.1.3 *LATM* impact on both public and *private roads*. Roads that prohibit heavy vehicles (i.e. trucks) still need to be accessible by *fire brigade vehicles*, including by a specialist *fire appliance*, that is responding to an *emergency incident*.

**Note:** Improper *LATM* design may delay or terminate the response of a *fire appliance* and potentially result in loss of life and/or property.

## 12.2 LATM devices

12.2.1 *LATM* devices are to comply with *AS 1742.13 Manual of uniform traffic control devices - Local area traffic management*.

12.2.2 *Fire brigades* prefer *LATM* device that are easily negotiated by a *fire appliance*. The impact on *fire appliance* access by each *LATM* device is provided in Table 3 below.

| LATM device | Impact to fire appliance access |
|---|---|
| **Perimeter treatment**  | • Street entry is at very low speed as extra caution is required.<br>• The treatment should not reduce entry/departure angles.<br>• Any island should allow negotiation by turning fire appliances.<br>• Any island should not exceed kerb clearance dimensions.<br>• Non-mountable islands may impede fire appliance response.<br>• Traffic bank up may occur on street exit, impeding response.<br>• Landscaping should not restrict visibility at intersection. |
| **Road hump**  | • Actual design will greatly impact on negotiating speed.<br>• Flat top hump (shown) preferred over Watts profile hump.<br>• Shallow entrance/exit allow better negotiating and reduce delays.<br>• Short humps require slow negotiating and results in delays.<br>• Humps will strain vehicle suspension and increase wear and tear.<br>• Should be installed strategically; significant delays to response times will result if many are installed locally. |
| **Roundabout**  | • Design should allow negotiation by turning fire appliances.<br>• Roundabout should not exceed kerb clearance dimensions.<br>• Approach islands should not exceed kerb clearance dimensions.<br>• Non-mountable roundabouts and/or approach islands may impede fire appliance response.<br>• Traffic bank up may occur if through traffic is constant.<br>• Landscaping should not restrict visibility at intersection. |
| **Single-lane slow point**  | • Minimum width of 3.2 m required. Width of 4.0 m preferred to allow easier and speedier negotiating by fire appliance.<br>• Conflict with opposing traffic may occur if road is dual direction.<br>• Should not be used with another *LATM* device (e.g. road hump)<br>• Landscaping should not adversely restrict visibility past device. |
| **Driveway link**  | • Design should allow easy negotiation and constant line of sight.<br>• Negotiation speed very slow because of manoeuvring required.<br>• If negotiation is not possible for a specialist appliance an alternative route is needed significantly delaying response times.<br>• Surfaces must be suitable for loads from fire appliances.<br>• Conflicts with opposing traffic may occur.<br>• Landscaping should not adversely restrict visibility past device. |
| **Single-lane angled slow point**  | • Design should allow easy manoeuvring on approach and exit, especially for a specialist fire appliance.<br>• Any kerbs should not exceed kerb clearance dimensions.<br>• Should be installed strategically; significant delays to response times will result if many are installed locally.<br>• Access may be restricted by improperly parked vehicles.<br>• Conflicts with opposing traffic may occur.<br>• Landscaping should not adversely restrict visibility past device. |

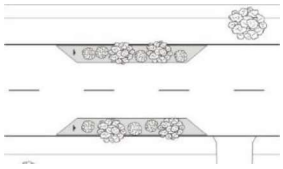
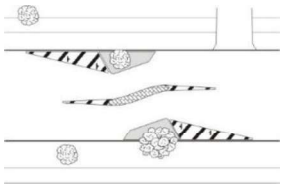
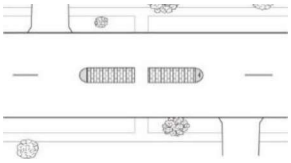
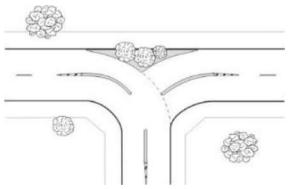
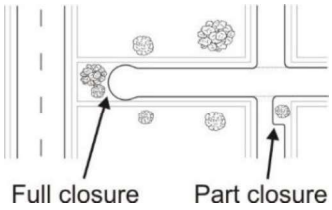
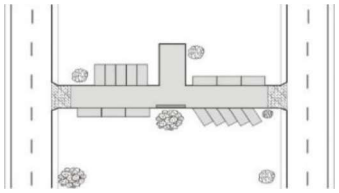
| LATM device | Impact to fire appliance access |
|---|---|
| **Two-lane slow point**  | • Preferred method of speed reduction (i.e. over road humps).<br>• Should not be used with another *LATM* device (e.g. mid-block island, road hump).<br>• Landscaping should not adversely restrict visibility past device. |
| **Two-lane angled slow point**  | • Design should allow easy manoeuvring on approach and exit, especially for a specialist fire appliance.<br>• Kerbs or islands should not exceed kerb clearance dimensions.<br>• Non-mountable islands may impede fire appliance response.<br>• Should be installed strategically; significant delays to response times will result if many are installed locally.<br>• Access may be restricted by improperly parked vehicles.<br>• Landscaping should not adversely restrict visibility past device. |
| **Mid-block island**  | • Preferred method of speed reduction (i.e. over road humps).<br>• Island is generally used for pedestrian refuge.<br>• Any island should not exceed kerb clearance dimensions.<br>• Non-mountable islands may impede fire appliance response.<br>• Landscaping should not restrict visibility; pedestrians require unobstructed view of traffic and vice-versa. |
| **Modified intersection**  | • Design should allow easy manoeuvring through intersection<br>• Intersection priority can be confusing when responding emergency vehicles are encountered.<br>• Any island should allow negotiation by turning fire appliances.<br>• Any island should not exceed kerb clearance dimensions.<br>• Non-mountable islands may impede fire appliance response.<br>• Traffic bank up may occur, impeding response.<br>• Landscaping should not restrict visibility at intersection. |
| **Road closure**   | • Diverts traffic onto adjacent roads which may increase congestion and result in delays to response times.<br>• Detour and alternative route required when full road closure.<br>• Suitable turnaround area for fire appliance should be provided if full road closure is used.<br>• Minimum width of 3.2 m required if part road closure is used.<br>• Landscaping should not restrict visibility at intersection when part road closure is used. |
| **Shared zone**  | • Careful design required to ensure negotiation by fire appliances.<br>• Negotiation speed very slow due to conflicts with pedestrians, traffic and parked vehicles being encountered.<br>• Access may be restricted by improperly parked vehicles.<br>• Surfaces must be suitable for loads from fire appliances.<br>• Generally avoided unless *emergency incident* is in shared zone.<br>• Local traffic bank up may occur, impeding response. |

*Table 4 Impact of LATM on fire appliance access and response*

# 13 References

Australian Building Codes Board, *National Construction Code 2019, Building Code of Australia Volume One*, 2019, Canberra ACT, Australia.

Austroads, *Guide to Road Design* (document set), 2014, CanPrint Communications, Fyshwick ACT, Australia.

National Heavy Vehicle Regulator, *National heavy vehicle mass and dimension limits*, 2016, Fortitude Valley QLD, Australia.

National Heavy Vehicle Regulator, *National heavy vehicle inspection manual Version 2.3*, 2018, Fortitude Valley QLD, Australia.

NSW Rural Fire Service, *Planning for bush fire protection – A guide for councils, planners, fire authorities and developers*, 2017, Lidcombe NSW, Australia.

Standards Association of Australia, *AS 2419.1–2005 Fire hydrant installations. Part 1: System design, installation and commissioning*, Standards Australia, 2005, Sydney NSW, Australia.

Standards Association of Australia, *AS 1319–1994 (R2018) Safety signs for the occupational environment*, Standards Australia, 1994, Sydney NSW, Australia.

Standards Association of Australia, *AS 1742.13–2009 Manual of uniform traffic control devices - Local area traffic management*, Standards Australia, 2009, Sydney NSW, Australia.

Standards Association of Australia, *AS 2890.2:2018 Parking facilities, Part 2: Off-street commercial vehicle facilities*, Standards Australia, 2018, Sydney NSW, Australia.

# Appendix A – Pump performance of fire appliances

## A1 General

Most *fire appliances* are fitted with a fire pump that have varying pumping capacity depending on the type of pump, installation, connections and efficiency (i.e. condition) of the fire pump. When boosting a fire hydrant and/or sprinkler system, the highest capacity pump available at the scene will be typically be used.

A standard urban *fire appliance* has a maximum of four 65 mm inlets and outlets, so fire brigade booster inlets are grouped into a maximum of four per *fire appliance*. Under *AS 2419.1–2005*, fire brigade booster inlets are calculated to flow at 10 L/sec per inlet.

**Note:** If the required fire hydrant and/or sprinkler system performance exceeds 40 L/sec, then a second *fire appliance* will be required to boost the additional inlets.

A standard urban *fire appliance* also has a single large bore suction inlet to take water from a static water source (e.g. on-site storage tank). A *suction-connection outlet* is required for each *fire appliance* required to boost the system.

Under *AS 2419.1–2005*, if more than eight fire brigade booster inlets are required for the system (i.e. exceeds 80 L/sec), then a separate fire brigade booster assembly and third *fire appliance* is required.

A standard urban *fire appliance*, being an FRNSW Class 3 pumper, is capable of delivering 50 L/sec through four fire hydrant booster inlets. A performance-based design (i.e. *alternative solution*) may be sought to increase the flow rate per booster inlet to 12.5 L/sec.

**Note:** If the required fire hydrant and/or sprinkler system performance is 50 L/sec (normally five booster inlets), an alternative solution can remove the need for the fifth booster inlet, second *fire appliance* and second *suction-connection outlet*.

A performance-based design (may also be sought for increased flow rate per booster inlet (at 12.5 L/sec) to remove the need for a separate fire brigade booster assembly.

**Note:** If the required fire hydrant and/or sprinkler system performance is 100 L/sec (i.e. ten booster inlets), an alternative solution can remove the need for a third *fire appliance*, third *suction-connection outlet* and second fire brigade booster assembly.

Any performance-based design proposing an alternative solution as discussed in this Appendix should be referred to FRNSW for consultation.

## A2 FRNSW fire appliances


**Class 1 Tanker**
- Min. 1,500 L/min at 1,000 kPa
- Min. 2,200 L water
- Two 65 mm outlets
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x4 crew-cab chassis

**Maximum hydrant design**
- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

**Note:** Light tankers used for hazard reduction role are excepted.


**Class 2 Pumper**
- Min. 2,900 L/min at 1,000 kPa
- Min. 2,000 L water
- Four 65 mm outlets
- Four 65 mm inlets
- One 125 mm inlet (at rear)
- 4x2 crew-cab chassis

**Maximum hydrant design**
- 40 L/sec (2,400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection* (using a 150-125 mm Storz reducer)


**Class 3 Pumper**
- Min. 3,500 L/min at 1,000 kPa
- Min. 1,800 L water
- Four 65 mm outlets
- Four 65 mm inlets
- One 150 mm inlet (at rear)
- 4x2 crew-cab chassis

**Maximum hydrant design**
- 40 L/sec (2400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection*
- Up to 50 L/sec possible (via *alternative solution* of 12.5 L/sec per inlet/outlet)


**Aerial Pumper**
- Min. 5,000 L/min at 1,000 kPa
- or 2,500 L/min at 2,000 kPa
- 2,000 L water
- Four 65 mm outlets
- Four 65 mm inlets
- 150 mm inlets (side or rear)
- 6x4 crew-cab chassis

**Maximum hydrant design**
- 40 L/sec (2400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection*
- Up to 50 L/sec possible (via *alternative solution* of 12.5 L/sec per inlet/outlet)

## A3 NSW RFS fire appliances

**Category 1 or 3**

- Min. 1,100 L/min at 1,000 kPa
- 3,500 L water
- One 65 mm outlet, and
- two 38 mm outlets
- One 75 mm inlet (at rear)
- 4x4 crew-cab chassis (Cat 1)
- 4x2 crew-cab chassis (Cat 3)

**Maximum hydrant design**

- 10 L/sec (600 L/min)
- 1 inlet/outlet design
- One small bore *suction-connection* (using a 75-65 mm Storz reducer)

**Category 10**

- Min. 2,100 L/min at 1,000 kPa
- 1,800 L - 2,400 L water
- Two 65 mm outlets, and one 38 mm outlet
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x2 crew-cab chassis

**Maximum hydrant design**

- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

**Category 11**

- Min. 2,000 L/min at 1,000 kPa
- 1,800 L water
- Two 65 mm outlets, and one 38 mm outlet
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x4 crew-cab chassis

**Maximum hydrant design**

- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

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*https://twitter.com/FRNSW*

# APPENDIX C – FRNSW GUIDELINE – EMERGENCY SERVICES INFORMATION PACKAGE AND TACTICAL FIRE PLANS

Fire safety guideline

# Emergency services information package and tactical fire plans

Version 02
Issued 7 January 2019

Fire Safety Branch
Community Safety Directorate

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# Contents

# 1 Purpose

The purpose of this guideline is to ensure that firefighters are provided with specific information regarding a building, facility or site (i.e. premises) that allows them to develop and implement effective strategies and tactics to manage a fire or other emergency incident.

# 2 Scope

This guideline details Fire and Rescue NSW (FRNSW) requirements for:

a) meeting legislated obligations to provide information for use during an emergency

b) an emergency services information package (ESIP) that provides emergency services personnel with specific information for strategic and tactical purposes

c) tactical fire plans (TFPs) that identify installed fire safety systems and features

d) standardised form and content of ESIP and TFPs including colour coding, symbols and terminology

e) acceptable locations for the ESIP

f) management of the ESIP including review, audit and updating.

# 3 Application

This guideline applies to any premises that:

a) contains a fire control centre (FCC) or fire control room (FCR)

b) contains a facility emergency control centre (FECC)

c) is a major hazard facility (MHF) as determined under the *Work Health and Safety Regulation 2017* (*WHS Reg.*)

d) is an explosives site as defined by the *Explosives Regulation 2013*

e) has been determined applicable by a consent or regulatory authority.

This guideline is intended to be used by any person conducting a business or undertaking (PCBU), or otherwise nominated the responsibility, of any applicable premises.

**Note:** The PCBU may delegate specific roles in emergency preparedness and response as deemed appropriate for the emergency control organisation (ECO) of the premises.

This guideline may be used by any external contractor or consultant who is engaged to provide specialist advice and services with developing and reviewing emergency planning, including associated documentation.

This guideline has been developed in the public interest and is intended to be used by any consent or regulatory authority when determining any relevant premises.

**Note:** Any consent or regulatory authority may impose requirements from this guideline, either in part or in full, as a condition of consent or licensing.

# 4 Definitions

The following definitions apply in this document:

**Alternative solution** (or performance solution) – means a method of complying with the National Construction Code performance requirements other than by a 'deemed-to-satisfy' solution.

**Emergency incident** – means an abnormal and dangerous, or potentially dangerous, situation that may harm or threaten to harm persons, property or the environment, and which requires urgent action to control, correct and return to a safe condition.

**Emergency plan** – means a written plan which details the actions required to be undertaken by occupants of a premises during a fire or other emergency incident.

**Emergency response procedures** – means written procedures outlining the response to an emergency incident, such as activation of the ECO, emergency response teams, firefighting teams, evacuation, emergency shutdown, spill containment, specialised equipment etc.

**Emergency services** – means an agency with the legislated responsibility for combating and managing an emergency incident (e.g. Police, Fire and Ambulance).

**Emergency services information package (ESIP)** – means a folder containing concise information necessary to allow emergency services to commence operations and develop effective strategies and tactics to manage a fire or emergency incident.

**Explosives site** – means a site which stores more than 50kg net explosive quantity of explosives (mass of explosive exclusive of non-explosive components), or more than 50 tonnes of security sensitive dangerous substances, or combination of both.

**Fire control centre (FCC)** – means an area from which firefighting operations or other emergency procedures can be directed or controlled.

**Fire control room (FCR)** – means a dedicated room which contains the FCC as well as other controls, indicators and equipment for fire services installed within a building.

**Facility emergency control centre (FECC)** – means an area where designated persons coordinate information, develop strategies, support logistics, control response teams, address media, and other functions to manage an emergency incident.

**Fire safety system** – means an active and/or passive system which warns people of an emergency, provides safe evacuation, restricts or extinguishes fire.

**Hazard scenario** – means a credible and likely scenario that causes an emergency incident at the premises, and requires attendance of the emergency services.

**National construction code (NCC)** – means the *National Construction Code (NCC) Volume One, Building Code of Australia Class 2 to Class 9 Buildings*, as amended.

**Major hazard facility (MHF)** – means any facility determined by the regulator to be a major hazard facility under Part 9.2 of the *WHS Reg.*

**Premises** – means any building, facility or site in which this guideline applies.

**Regulator** – means the regulatory authority responsible for general workplace safety and hazardous chemicals within the workplace, being SafeWork NSW.

**Tactical check list (TCL) –** means a check list of tactical tasks firefighters follow or consider to effectively manage a fire or emergency incident.

**Tactical fire plans (TFPs) –** means scaled drawings of the premises that show the location of installed safety systems and features. TFPs are a component on the ESIP.

# 5 Background

The *WHS Reg.* requires the PCBU to identify hazards and manage risks to health and safety by implementing a hierarchy of control measures at their premises. The PCBU must provide information, instruction and training to employees and other persons as may be necessary to ensure their health and safety (e.g. emergency plan).

When the premises inherently present greater occupant life safety risks, the PCBU should provide information and instruction to emergency services that are required to manage identified hazards and risks during a fire or emergency incident.

**Note:** Increasing levels of complexity of a premises will result in commensurate increases in hazards and risks faced by emergency services during a fire or emergency incident.

The ESIP provides firefighters with concise, easy to read information necessary to direct and control emergency operations from the control centre. Such information may be critical for developing and implementing an incident action plan and appropriate tactics.

**Note:** As a minimum, an ESIP containing basic overview, contact details, site plan and schematic drawings should be provided at the FCC facility for use by firefighters.

# 6 Legislated requirements

## 6.1 National Construction Code

Clause E1.8 of the NCC requires a FCC facility in accordance with Specification E1.8 be provided for:

a) a building with an effective height of more than 25m; and

b) a Class 6, 7, 8 or 9 building with a total floor area of more than 18 000m².

Clause 2 of Specification E1.8 of the NCC requires the FCC to be an area to direct or control firefighting operations or other emergency procedures, and not used for any other purpose unless concerning occupant safety or security.

Clause 3 of Specification E1.8 of the NCC requires the FCC be located so that egress from the floor to a road or open space does not exceed 300mm change in elevation.

Clause 6 of Specification E1.8 of the NCC requires a FCC to be within a separate room (i.e. FCR) if the building has an effective height of more than 50m.

Clause 9 of Specification E1.8 of the NCC requires the FCR to contain additional controls and indicators for fire pumps, smoke control fans and other required fire safety equipment installed in the building (e.g. master emergency, lift annunciation, utility shutdown, emergency generator, security/surveillance).

Clause 9 of Specification E1.8 of the NCC also requires the FCR contain durable colour-coded TFPs and a plan layout table of suitable size to lay out the plans.

## 6.2 Work Health and Safety Regulation 2017

SafeWork NSW has republished the code of practice *Managing the work environment and facilities*.

Clause 43 of the *WHS Reg*. requires the PCBU to provide an emergency plan for their workplace, detailing emergency procedures for staff and occupants of the premises.

**Note:** Refer to AS 3745–2010 *Planning for emergencies in facilities* for guidance on developing emergency plans and procedures.

Clause 361 of *WHS Reg*. requires any workplace that use, handles or stores hazardous chemicals that exceed manifest quantities as prescribed in Schedule 11 of the *WHS Reg*. to lodge a copy of their emergency plan to FRNSW.

Clause 557 of *WHS Reg*. requires an operator of a licensed MHF, as determined by the regulator, to consult with FRNSW when preparing their emergency plan.

## 6.3 Explosives Regulation 2013

Clause 90 of the *Explosives Regulation 2013* requires a licence holder who stores more than 50kg net explosive quantity of explosives, or 50 tonnes of security sensitive dangerous substances, to provide a draft of their emergency plan to FRNSW.

## 6.4 State Environmental Planning Policy No 33

The *State Environmental Planning Policy No 33 – Hazardous and Offensive Development* is an environmental planning instrument used when considering any application for potentially hazardous or offensive development. It assists the consent authority to assess whether a development is hazardous or offensive, and conditions to impose on the development that will reduce or minimise any adverse impact it has.

The policy makes reference to various *Hazardous Industry Planning Advisory Paper* (*HIPAP*) documents which define the risk assessment and safety planning processes that are to be formulated and implemented.

*HIPAP No. 1 – Emergency Planning* identifies the resources necessary to effectively manage an emergency including a FECC, emergency alarm system, emergency communications system, public warning system, and other emergency equipment. These requirements are specified into the design and approval following extensive consultation with stakeholders, including FRNSW.

The FECC (or any alternative) is required to be readily accessible, appropriately resourced with communications equipment, and provided with essential documentation to manage any emergency incident. Ideally, the FECC is located outside the potential hazard zone. If the hazard zone envelops the FECC during an emergency, control operations should proceed to an alternative control centre identified within the emergency plan.

**Note:** A dedicated FECC may not be necessary for smaller facilities that could utilise existing office amenities during an emergency.

Documentation essential for managing an emergency include the emergency plan and emergency response procedures for use by premises occupants, and ESIP, hazardous chemicals manifest and safety data sheets for use by responding firefighters.

# 7 Emergency services information package

## 7.1 Function

7.1.1 The ESIP is to provide firefighters and other emergency services with specific information that can be used during operations and develop effective strategies and tactics to manage a fire or emergency incident.

**Note:** The ESIP is intended for use by emergency services only and supplements the emergency plan for occupants. Operational considerations may result in attendance by firefighters who are totally unfamiliar with the premises.

7.1.2 The ESIP is to provide guidance to the FRNSW incident commander (IC) on specific tasks critical to safely managing the emergency (e.g. occupant evacuation, emergency shutdown procedures, special extinguishing agents or systems).

## 7.2 Form and construction

7.2.1 The ESIP is to be a complete, self-contained, portable package that can be picked up and used in any location deemed appropriate for the given emergency.

**Note:** The ESIP may be removed and taken to an external location such as a mobile command centre that has been established as the incident command point.

7.2.2 The ESIP is to be constructed and assembled as follows:

a) The contents are contained within an A3 size plastic covered D-ring binder folder.

b) The ESIP folder must be clearly identified by the following (see Figure 1):
- the company or premises name
- '**EMERGENCY SERVICES INFORMATION PACKAGE (ESIP)**'
- '**IMPORTANT INFORMATION**'
- '**DO NOT REMOVE FROM**' followed by the ESIP location.

c) All pages (except TFPs) are to be printed on medium stock A3 size paper (i.e. 120-150gsm) in portrait orientation.

d) All pages are to be laminated for durability and protection against damage, then hole-punched so they are easily removable from the ESIP folder.

e) The ESIP must be indexed into sections with tab dividers that enable firefighters to quickly access relevant information (refer to section 7.3.1).

f) All drawings (e.g. TFPs) must be added to the ESIP as follows:
- A3 size directly inserted into the folder
- A2 size folded in half, with score line, then directly inserted into the folder
- where there are many A2 size drawings, these may be inserted into a separate A2 size plastic covered D-ring binder folder which is appropriately labelled and kept with the ESIP
- where larger than A2 size, rolled and stored within a roll tube which is appropriately labelled and kept with the ESIP.

**Note:** Drawings larger than A2 size are only acceptable when a suitably sized plan layout table is provided.

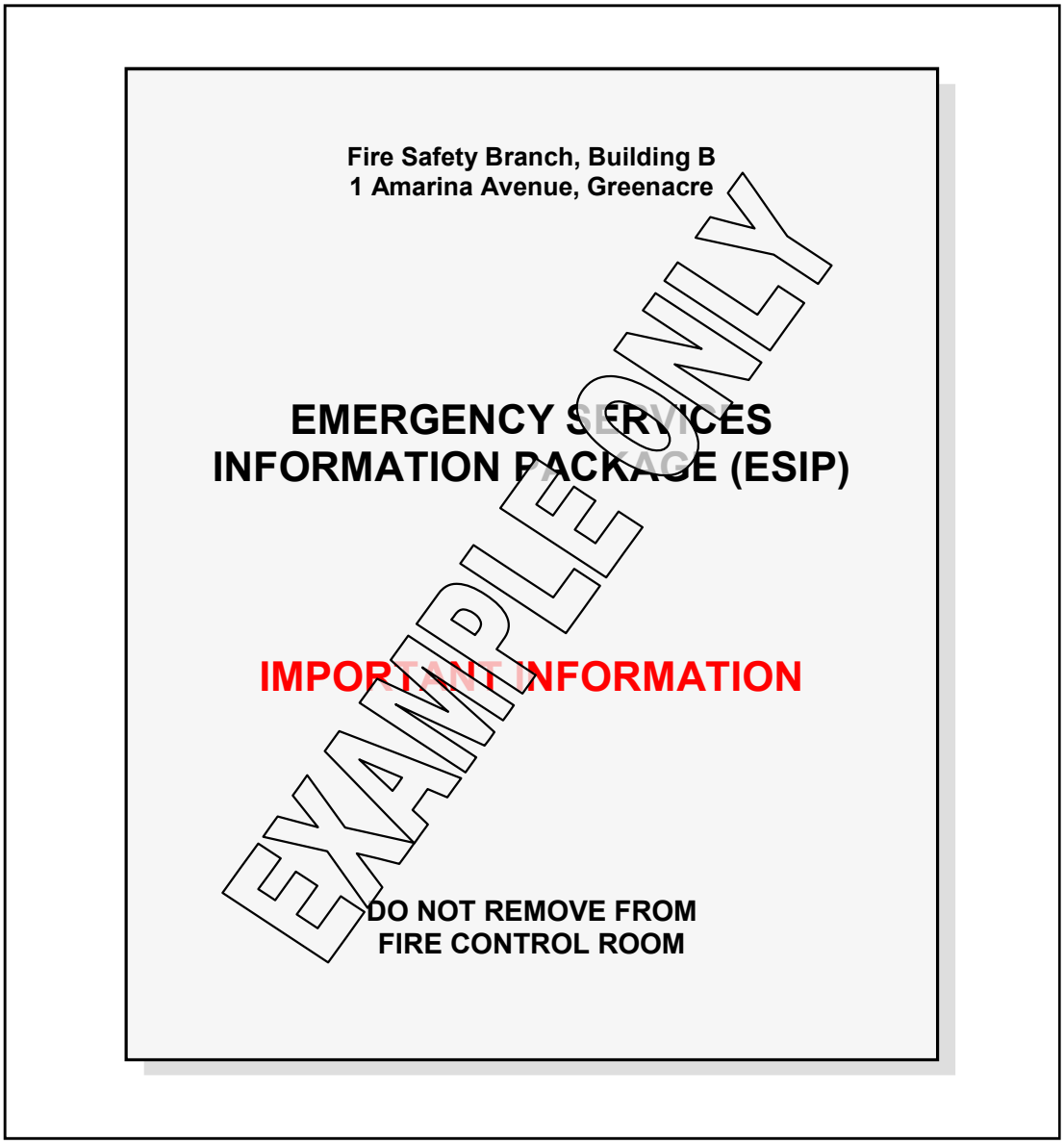



*Figure 1 Example folder cover of ESIP*

7.2.3 All textual information is to be minimum Arial size 14 font with 1.5 times line spacing and double line paragraph spacing.

7.2.4 Each page is to be identified for continuity (e.g. header/footer with section title, version or revision number, date of issue, page number by page ‘x’ of ‘y’ pages etc.).

7.2.5 The ESIP is to use standard terms and abbreviations as referenced by relevant Australian Standards. Where industry specific abbreviations are used, a list is to be provided (refer to Appendix A for list of common abbreviations).

7.2.6 Pages may be printed double-sided on the long edge, so pages remain upright when turned. However, single-side pages may make it easier to update individual pages.

7.2.7 If any existing A4 size information pages are to be included into the ESIP, they are to be printed or copied scaled at 141% (i.e. A4 → A3 enlargement ratio).

## 7.3 Content of emergency services information package

7.3.1 The ESIP is to contain the following:

a) Title page – the first page when the ESIP folder is opened must include:
- the company or premises name and logo
- the premises address and company head office address
- the premises geocode location (i.e. GPS latitude and longitude coordinates)
- the SafeWork NSW reference number (if applicable)
- two (2) emergency contacts (name, position and after-hours phone number)
- the version/revision number, date of issue and date of next review.

b) Premises overview – a brief overview outlining primary nature of business, key functions or processes undertaken, number and size of buildings (e.g. number of levels), typical tenancy/occupancy during day time and night time etc.

c) Contacts list – a list of key personnel that can be contacted during an emergency (e.g. facility emergency controller, emergency services liaison officer, emergency response team, area managers, engineers or technicians, security etc.).

d) Evacuation overview – the ECO and warden structure with corresponding floor, zone or building evacuation plan (site or elevation view as appropriate) which also indicates the primary and secondary assembly areas.

e) Tactical check lists – TCLs as detailed in section 7.4.

f) Hazardous chemicals – a copy of any manifest as detailed in section 7.5.

g) Alternative solution summary – a copy of any summary as detailed in section 7.6.

h) Tactical fire plans – a copy of TFPs as detailed in section 8.

## 7.4 Tactical check lists

7.4.1 Where appropriate TCLs are to provide a checklist of tasks to be undertaken, including in specific order if required, to manage any hazard scenario identified by the emergency planning committee during their emergency identification and analysis process (refer to Appendix C and Appendix D for examples).

7.4.2 TCLs should be developed through consultation between the PCBU, subject matter experts, emergency planning consultants and FRNSW. The FRNSW fire safety branch can be consulted to provide advice, including operational capabilities within the area and emergency management or disaster plans needing consideration.

7.4.3 TCLs are to include a transition between emergency response procedures for the emergency response team (ERT) to management by the emergency services.

**Note:** Tasks may need to be incorporated into the emergency response procedures to ensure they are enacted by the ECO and ERT.

7.4.4 TCLs are to identify a hierarchy of staff to undertake specific roles as per the ECO and emergency response procedures (e.g. facility emergency controller, emergency services liaison officer, wardens, ERT, engineers/technicians).

7.4.5 TCLs are to identify the location and type of control, valve or assembly that performs an activation, shutdown, isolate, transfer, bypass or other task as identified in the check list.

**Note:** The relevant TFPs drawing and grid location should be referenced.

7.4.6 Details of equipment or features specific to each TCL should be provided, including:

- fixed suppression system details – e.g. location and capacity of water monitors, deluge system, foam system, gas extinguishing system, static water source/volume
- suppression medium details – e.g. volume/quantity, storage method, foam type, application rate (%), equipment/delivery method
- bulk storage tank details – e.g. typical contents, actual and maximum capacity, roof type, diameter/height, access points
- spill containment details – e.g. bund wall and compound construction, capacity, surface area, spill equipment, barriers/dams, stormwater isolation valves
- exposure details – e.g. heat radiation zones, explosion zones, exclusion area, cooling water for exposures (in L/min.).

7.4.7 Where necessary, TCLs are to incorporate tasks to return critical systems, processes and/or equipment to normal operation, and ready the premises for reoccupation.

7.4.8 The 'worst case' scenario is any emergency that exceeds the capacity of installed measures and requires an augmented response by the emergency services. A TCL for any 'worst case' scenario should be provided when relevant.

7.4.9 Where a TCL is common to a number of hazard scenarios a reference table can be provided to assist the user locate the correct TCL (refer to Appendix E).

## 7.5 Hazardous chemicals manifest

7.5.1 A hazardous chemicals manifest is required if the workplace uses, handles or stores hazardous chemicals above manifest quantities as prescribed in Schedule 11 of the *WHS Reg*. Under Clause 347 of the *WHS Reg.* the workplace must prepare a hazardous chemicals manifest for firefighters responding to an emergency incident.

**Note:** Refer to *Notification for Schedule 11 hazardous chemicals and abandoned tanks – guidance material* from SafeWork NSW for further information.

7.5.2 FRNSW has published a *Hazardous chemicals manifest* technical information sheet outlining requirements for this manifest, which is available at www.fire.nsw.gov.au.

7.5.3 A consent or regulatory authority may require the manifest quantity workplace to provide an ESIP as a condition of consent or licensing, even if not a threshold quantity workplace or determined MHF.

7.5.4 If an ESIP is required to be provided for the premises, a copy of the hazardous chemicals manifest including manifest site plan is to be included within the ESIP.

**Note:** The hazardous chemicals manifest is still required to be located in positions as outlined in the *Hazardous chemicals manifest* technical information sheet.

## 7.6 Alternative solution summary

7.6.1 If the building has an alternative solution to meet the performance requirements of the NCC, a summary of the solution is to be provided to assist firefighters determine what impact, if any, it may have on firefighting operations.

7.6.2 The summary is to be developed with the assistance of the fire safety engineer who developed the alternative solution and is to include any specific recommendations that have been made by FRNSW for inclusion during its design and construction.

7.6.3 The summary is to provide details of the applicable fire engineering report (FER) including where a copy of the report is kept on site, document number, version number, date of issue and name of author/fire engineer who prepared the report.

7.6.4 A summary of each alternative solution issue is to be made and grouped by NCC performance requirement which include, but is not limited to:

| | | | |
|---|---|---|---|
| CP1 | Structural stability | EP1.3 | Fire hydrant system |
| CP2 | Spread of fire | EP1.4 | Fire suppression system |
| CP9 | Fire brigade vehicle access | EP1.6 | Fire brigade facilities |
| DP4 | Building exits | EP2.2 | Evacuation route tenability |
| DP5 | Fire isolated exits | EP3.2 | Emergency lifts |

**Note:** Provisions for special hazards (e.g. Clauses E1.10 or E2.3 of NCC) should be identified in each respective summary where applicable.

7.6.5 The summary is to be presented in simple table format, with each alternative solution issue summarised into plain English and the impacts/potential impacts on firefighting operations explained in a format readily understood by firefighters. For example:

| Summary of solution | Impact to operations |
|---|---|
| **CP1 Structural stability** | |
| FRL in retail levels reduced from 180/180/180 to 120/120/120. | Cease fire suppression and evacuate upon any sign of structural weakening. |
| **EP1.3 Fire hydrant system** | |
| Fire hydrant booster located in ‘Side’ street. Signage provided at main entrance and booster fitted with green strobe light. | Second arriving appliance should proceed to ‘Side’ street as per pre-incident plan. |
| Additional hydrant not within 30m of stairwell ‘B’ fire hydrant. | Additional hydrant is intended for sprinkler contained fire in SW corner only. In all other cases, coverage can be provided by fire hydrants in stairwells ‘A’ or ‘B’.<br>Two lengths of hose may be required if the additional hydrant is not safe to use (i.e. exposed to fire). |
| **EP1.4 Fire suppression system** | |
| Sprinkler alarms valves located in basement instead of at ground level. Access door fitted with ‘Sprinkler stop valve inside’ signs. | If required, firefighters are to access sprinkler room from access door adjacent to main entry. |
| **EP1.6 Fire brigade facilities** | |
| Fire control room located in basement level instead of at ground level. Access doors fitted with ‘Fire control room access’ sign. | If required, firefighters are to access FCR via door adjacent to main entry or via foyer area. Building manager will direct second fire officer to FCR. |

# 8 Tactical fire plans

## 8.1 Function

8.1.1 TFPs are colour-coded drawings that visually display the installed fire safety systems and other essential features critical to managing a fire or emergency incident. They are intended for firefighter use only and are a component of the ESIP.

8.1.2 The FRNSW IC, or their nominated operations officer, will tactically use information from TFPs during operations. It is therefore vital that all TFPs are accurate and kept current at all times, reflecting the actual 'as installed' condition.

## 8.2 Form and construction

8.2.1 Each drawing is to be clearly identified by its title (e.g. within title block, and if needed for clarity, by a heading located in the same position on each drawing).

8.2.2 Drawings are to clearly identify the version or revision number, and the date of issue.

8.2.3 Drawings are to have an acceptable scale not smaller than 1:200 scale, unless otherwise agreed following consultation.

**Note:** Site plans which cover a large area may require small scales (not smaller than 1:500 scale).

8.2.4 Drawings are to be printed in full colour on heavy stock paper (e.g. 160gsm) then laminated or framed for durability, fade resistance and protection from damage.

8.2.5 Depending on scale, drawings should be printed on A2 size paper where possible. Drawings should never be smaller than A3 size and may only be larger than A2 size when being used inside the FCR or FECC (refer to clause 8.2.10(b)).

8.2.6 Drawings are to be clear, unambiguous and provide sufficient detail on each system or feature. Any superfluous information should be omitted (e.g. details of fit out, fixtures, equipment, contents, installations, tenancies, measurements etc.).

8.2.7 Drawings are to be developed using computer aided design and be consistent with Australian Standards *AS 1100 – Technical Drawing* (suite) and *SAA HB20–1996: Graphical symbols for fire protection drawings*.

8.2.8 Drawings are to use standardised symbols, icons and colour-coding (refer to Appendix B).

8.2.9 All labels and text on drawings are to be minimum Arial size 14 font.

8.2.10 All drawings making a complete set of TFPs are to be provided as follows:

a) a copy is to be inserted into each ESIP folder, or within a separate folder or roll tube that is kept with each ESIP folder.

b) a copy is to be mounted hanging vertically from the wall within a FCR or FECC, or placed on/under a plan layout table of suitable size within that room.

**Note:** The number of drawings making a complete set will depend on the complexity of the premises and the overlay of required information on each drawing.

## 8.3 Content of tactical fire plans

8.3.1 TFPs must detail information that may be critical to managing a fire or emergency incident, and should include:

- an overview of the building, facility or site including evacuation
- fire hydrant system including booster, fire pump and ring main
- fire sprinkler system including booster, fire pump and ring main
- other active systems including air-handling, foam, monitors, suppression, detection
- essential utility services including distribution and controls
- hazardous chemicals storages or processes including containment features.

8.3.2 If the overlay of information makes any drawing cluttered and difficult to read, the information is to be logically separated across multiple drawings.

8.3.3 The following drawings are to be provided where appropriate:

a) a general site plan which includes:
   – location of buildings, structures, amenities and internal roadways
   – site access points and restrictions to vehicular access
   – adjacent properties and/or public roads
   – primary and secondary assembly areas.

b) a plan view of each building level and/or section view of each building showing:
   – fire/ smoke compartments including fire/smoke doors, duct dampers
   – location of installed fire protection equipment (e.g. fire hydrants, hydrant or sprinkler isolation valves, warden intercom phone).

c) schematics of installed systems including:
   – fire hydrant system identifying fire brigade booster, fire pump, ring main system (including diameters), isolation valves, water supplies
   – fire sprinkler system identifying fire brigade booster, fire pump, ring main system (including diameters), isolation valves, water supplies
   – air handling system identifying supply and return shafts/ducts, smoke control/exhaust, fire dampers and pressurization fans
   – fire detection, warning, control and intercom systems
   – other active systems such as foam systems, monitors/deluge systems, gas/agent suppression systems etc.
   – essential utilities including power distribution, isolation points/switch rooms, alternative power, substation/transformers, fuel/gas distribution and controls.

d) an evacuation system plan which includes:
   – floors/areas as identified within the emergency response procedures
   – location of primary and secondary assembly areas
   – means of egress including fire isolated and pressurised stairways, ramps, passageways
   – emergency lifts and lift recall controls
   – refuge areas where occupants may require assisted evacuation.

e) a copy of any applicable hazardous chemical manifest site plan which is required to be provided as per Schedule 12 of the *WHS Reg.*

**Note:** Refer to the *Hazardous chemicals manifest* technical information sheet which is available at firesafety.fire.nsw.gov.au.

8.3.4 Any instructions critical for safe control of a system (e.g. activate, shutdown, isolate, bypass) should be provided on the drawing and headed with the word 'Warning'.

8.3.5 Only required exits are to be identified by colour-coding. Non-required stairways and exits should be shown as part of the building outline.

8.3.6 Air ducts should not be drawn where they will unnecessarily complicate a drawing. If detectors are located within air ducts, a section of the air duct can be included to help identify the location of the detector being within the duct.

# 9 Location and identification

9.1 The ESIP is to be kept in approved locations readily accessible to FRNSW at all times, including the following where provided:

a) at the FCC, either within the cabinet or a wall mounted bracket

b) within the FCR, either at the FCC as above or on/under the plan layout table

c) within the FECC, on/under the plan layout table

d) within an 'emergency information' container if the premises doesn't have an FCC or FECC (refer to hazardous chemicals manifest requirements of section 7.5.2).

9.2 A copy of the ESIP is to be provided in other locations as determined by the consent or regulatory authority (e.g. alternate control centre, designated site entry point).

9.3 If the ESIP location is not apparent and in clear line of sight, signage is to be provided (e.g. '**EMERGENCY SERVICES INFORMATION PACKAGE (ESIP) INSIDE**').

9.4 Persons should be prompted to return the ESIP to its home location if removed (e.g. a label displaying 'ESIP missing' when ESIP is not stored in-situ).

9.5 A copy of the emergency plan and emergency response procedures, as applicable to the occupants of the premises, should be kept with the ESIP.

# 10 Management

10.1 The PCBU should delegate a person responsible for ensuring the ESIP is developed and managed appropriately, including ongoing review and auditing.

**Note:** The ESIP should be developed by the EPC in conjunction with the emergency plan and emergency response procedures for the premises.

10.2 Development of the ESIP should be initiated as early as practicable and be completed and ready for implementation when the premises is to be occupied.

10.3 The ESIP should be verified and validated prior to implementation (e.g. drill, simulation test, table top review, emergency services exercise).

10.4 The ESIP contents are to be reviewed to ensure it remains current and effective, including routine (e.g. annual) auditing, post emergency review, or whenever changes occur requiring the ESIP be updated (e.g. a system is modified or updated).

# 11 References

Australian Building Codes Board, *National Construction Code Volume One, Building Code of Australia Class 2 to Class 9 Buildings*, 2016, Canberra ACT, Australia

NSW Planning & Environment, *Hazardous Industry Planning Advisory Paper (HIPAP) No. 1 Emergency Planning,* 2011, available electronically from www.planning.nsw.gov.au

NSW Planning & Environment, *Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 Fire Safety Study Guidelines,* available electronically from www.planning.nsw.gov.au

Standards Australia, *Australian Standard AS 1100 – Technical Drawing* (suite), Sydney NSW, Australia

Standards Australia, *Australian Standard AS 3745-2010 – Planning for emergencies in facilities*, 2010, Sydney NSW, Australia

Standards Australia, *Australian Standard AS 4083-2010 – Planning for emergencies – Health care facilities*, 2010, Sydney NSW, Australia

Standards Australia, *SAA HB20–1996: Graphical symbols for fire protection drawings*, 1996, Sydney NSW, Australia

Safe Work Australia, *Code of Practice – Managing the work environment and facilities*, available electronically from www.safeworkaustralia.gov.au

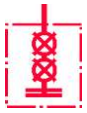
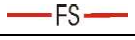
Safe Work NSW, *Notification for Schedule 11 hazardous chemicals and abandoned tanks – guidance material*, available electronically from www.safework.nsw.gov.au

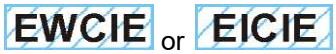
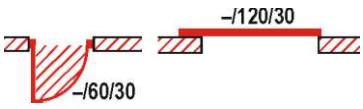
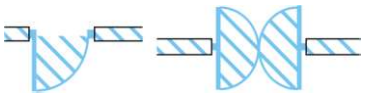
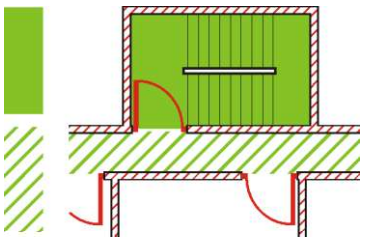
# Appendix A Abbreviations used in this document

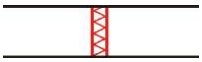
| Abbreviation | Description |
|---|---|
| BLEVE | Boiling liquid expanding vapour explosion |
| ECO | Emergency control organisation |
| EICIE | Emergency intercommunication control and indication equipment |
| EP | Emergency plan |
| EPC | Emergency planning committee |
| ERP | Emergency response procedures |
| ERT | Emergency response team (of premises) |
| ESIP | Emergency services information package |
| ESLO | Emergency services liaison officer |
| EWCIE | Emergency warning control and indication equipment |
| FBP | Fire brigade panel |
| FCC | Fire control centre |
| FCR | Fire control room |
| FCTL | Fire crew team leader (of premises) |
| FDCIE | Fire detection control and indication equipment |
| FEC | Facility emergency controller |
| FECC | Facility emergency control centre |
| FFCP | Fire fan control panel |
| FFs | Firefighters |
| FIP | Fire indicator panel |
| FRNSW | Fire and Rescue NSW |
| IC | Incident controller (FRNSW) |
| GHS | Globally harmonised system (of classification and labelling of chemicals) |
| MHF | Major hazard facility |
| MP | Mimic panel |
| SHCIE | Special hazard control and indication equipment |
| TCL | Tactical check list |
| TFPs | Tactical fire plans |
| VCE | Vapour cloud explosion |
| WIP | Warden intercommunication phone |

# Appendix B Tactical fire plans symbols and colour coding

**Note:** Where available, Australian Standard graphical symbols for fire protection should be used and provided in colour to make it readily visible from all other elements.

| Type | Description | Colour | Symbol | |
|---|---|---|---|---|
| | | | Plan (top) | Elev. (front) |
| Hydraulic fire safety system | Fire hydrant booster assembly (typical H-pattern with gate valve, non-return valve four inlets/outlets) | Red |  |  |
| | Fire hydrant booster assembly (booster cabinet with gate valve, non-return valve and two inlets) | Red |  |  |
| | Fire hydrant valve (above-ground external with two outlets) | Red |  |  |
| | Fire hydrant Valve (internal single outlet) | Red |  |  |
| | Fire hose reel | Red |  |  |
| | Fire pump | Red |  | |
| | Fire sprinkler booster assembly (booster cabinet with two inlets) | Red |  |  |
| | Fire sprinkler – pendant | Red |  |  |
| | Fire sprinkler – upright | Red |  |  |
| | Pipe work – fire hydrant system | Red |   | |
| | Pipe work – fire sprinkler system | Red |   | |
| | Valve – isolating or control | Red |  | |
| | Valve – non-return | Red |  | |
| | Water tank | Red |   | |
| Detectors and alarms | Detector – flame | Red |  | |
| | Detector – smoke | Red |  | |
| | Detector – thermal | Red |  | |
| | Manual call point | Red |  | |

| | | | |
|---|---|---|---|
| Control & indicating equipment | Fire brigade panel | Hatched red |  |
| | Fire detection control and indication equipment (e.g. fire indicator panel) | Hatched pink |  |
| | Emergency warning/intercom control and indication equipment | Hatched blue |  |
| | Mimic panel | Hatched blue |  |
| | Fire fan control panel | Hatched pink |  |
| | Special hazard control and indication equipment | Hatched red on yellow |  |
| | Fire control room (FCR) or facility emergency control centre (FECC) | Red border (room outline) |  |
| | Emergency telephone | Red |  |
| Passive fire safety | Fire rated wall (include fire rating if possible) | Hatched red |  |
| | Smoke compartment | Hatched blue |  |
| | Fire door (include fire rating if possible) | Hatched red |  |
| | Smoke door | Hatched blue |  |
| Evacuation and egress | Fire isolated stairway, ramp or passageway | Green |  |
| | Pressurised stairway, ramp or passageway | Hatched Green | |
| | Assembly area | Green |  |
| | Refuge area (e.g. disabled pre-evacuation assembly area) | Green |  |
| | Evacuation assist device | Green |  |
| | Escalator emergency stop control | Red |  |
| | Lift emergency recall control | Red |  |
| | Warden intercommunication phone | Blue |  |

| | | | |
|---|---|---|---|
| Air handling | Fire Dampers | Red |  |
| | Duct/shaft – supply air | Blue |  |
| | Duct/shaft – return air | White |  |
| | Duct/shaft – smoke exhaust | Yellow |  |
| Electrical | Electrical riser/duct | Orange |  |
| | Switchboard, substation or transformer | Orange |  |
| | Stored power (e.g. batteries, uninterruptible power supply) | Orange |  |
| | Switch room/cupboard | Hatched orange |  |
| Hazardous chemicals | Fuel storage, distribution and controls | Purple (with GHS placard) |  |
| | Gas storage, distribution and controls | Brown (with GHS placard) |  |
| | Hazardous chemical storage, distribution and controls | Yellow (with GHS placard) |  |
| | Special risk area (e.g. laboratories) | Yellow (with GHS placard) |  |
| | Hazardous chemical spill kit | Yellow |  |

# Appendix C Example tactical check list for major hazard facility

TCL no. 4 – Rim seal fire in Tank 12

| | |
|---|---|
| Contents | Premium unleaded – PULP 95 |
| Tank size | 28m (diam) x 25m (h) – maximum volume 15,300m$^3$ (15.3M litres) |
| Bund size | 5,000 m$^3$ (intermediate bund only) |
| Foam system | Automatic operation – 4 outlets @ 18 lpm of 3% ARFF for 20 minutes (360 litres) |

| No. | Description of task | Task complete |
|---|---|---|
| 1 | Upon alarm, initiate evacuation of sector 'A' using sector siren and enact emergency response procedures and ECO. | ☐ _____ Initials _____ am/pm |
| 2 | Fire Crew Team Leader (FCTL) confirms foam pourer operation from control centre, and notifies FEC and ESLO. | ☐ _____ Initials _____ am/pm |
| 3 | ESLO calls '000' and confirms type of incident with FRNSW (e.g. rim-fire in tank involving 15 million litres of unleaded petrol). | ☐ _____ Initials _____ am/pm |
| 4 | ESLO goes to gate 'A' and directs the first arriving fire appliance to the FECC, then others to the sector 'A' staging area. | ☐ _____ Initials _____ am/pm |
| 5 | FEC goes to the FECC and confirms evacuation of sector 'A' with Chief warden. | ☐ _____ Initials _____ am/pm |
| 6 | FEC confirms all emergency shutdowns including liquid transfer to tanks 10 and 11 (i.e. transfer valves are in 'isolate' mode). | ☐ _____ Initials _____ am/pm |
| 7 | FEC confirms operating status of main fire pumps and foam pourers are operating within limits (i.e. foam application rate). | ☐ _____ Initials _____ am/pm |
| 8 | FEC hands control to FRNSW IC. FEC must give briefing and notify any casualties or unaccounted persons. | ☐ _____ Initials _____ am/pm |
| 9 | FRNSW rescue teams tasked to conduct sweep area around tank 12 for any casualties or unaccounted persons. | ☐ _____ Initials _____ am/pm |
| 10 | Two pumpers tasked to hydrant booster at gate 'B' for setup and remain in standby mode in case of main fire pump failure. | ☐ _____ Initials _____ am/pm |
| 11 | Operations officer liaises with FCTL on fixed fire systems operation, including control of main fire pump and foam pourers. | ☐ _____ Initials _____ am/pm |
| 12 | Aerial appliance and pumper should be defensively positioned adjacent to tanks 10 and/or 11 if safe to do so. | ☐ _____ Initials _____ am/pm |
| 13 | Monitor tank temperatures using TIC. Tank deluge system activated as required (e.g. tanks 10 & 11 if westerly prevailing wind). | ☐ _____ Initials _____ am/pm |
| | **WARNING – In the event of any escalation in fire beyond the rim seal:**<br>Full tank surface fire go to TCL 2<br>Bund fire go to TCL 6 | |
| 14 | FEC arranges transport of bulk foam concentrate to fire pump station. If foam level decreases to 15%, commence bulk foam refilling procedure. | ☐ _____ Initials _____ am/pm |
| 15 | When flames are extinguished, FCTL switches foam control panel to 'fire out' mode, decreasing application rate to maintain foam blanket. | ☐ _____ Initials _____ am/pm |
| 16 | Monitor tank for temperature hotspots using thermal cameras. Continue applying foam until temperature stabilisation has been reached. | ☐ _____ Initials _____ am/pm |
| 17 | IC directs FEC to begin recovery operations (e.g. assess site, survey damage, engineering/process integrity check, product transfer). | ☐ _____ Initials _____ am/pm |
| 18 | When site has been declared safe, IC hands formal control of premises back to responsible person (e.g. FEC, investigation team). | ☐ _____ Initials _____ am/pm |

# Appendix D Example tactical check list for high rise building

TCL no. 3 – Fire occurring in Tower C

| Description of task | Done |
|---|---|
| Fire floor will be in automatic 'partial' evacuation mode. Facility supervisor investigates the FDCIE to identify alarm location and nature. Contact floor warden or security if necessary. | ☐ |
| Activate the ECO and emergency response procedures. Duty manager assumes chief warden role. Facility supervisor proceeds to foyer and assumes ESLO role. | ☐ |
| ESLO meets firefighters and advises of 'fire on floor X' and is being evacuated, then escorts firefighters to the emergency lift or FBP as required by the officer. | ☐ |
| First arriving firefighters take emergency lift to commence operations on fire floor. ESLO remains in foyer for second arriving firefighters. | ☐ |
| ESLO escorts second arriving fire officer to FCR (or FBP if requested) to assume the role of FRNSW IC. Arriving firefighters are tasked by IC. | ☐ |
| **Tasks determined by operational requirements** | |
| **Casualties or unaccounted persons** | |
| Sector commander tasks FFs to undertake search and rescue | ☐ |
| Staging officer deploys additional FFs to fire floor sector commander | ☐ |
| Lift rescue crew prioritises emergency lift control for casualty removal. Based on situation, numbers etc. triage may be established near fire floor or down in foyer. | ☐ |
| **Smoke extension to non-fire areas (e.g. failure of smoke management system)** | |
| Smoke control officer determines rate of smoke exhaust against make-up air for fire floor is balanced to minimise smoke migration, and smoke is discharging at venting point. | ☐ |
| Take manual control to override zone smoke control system and remove smoke from fire floor and smoke filled zones | ☐ |
| Seek expertise from building services engineer to identify points of failure (e.g. exhaust fan failure/non-closed damper) and provide advice when manual control is taken. | ☐ |
| **Fire extension (e.g. failure of sprinkler system)** | |
| Full ICS established – sector commanders established above and below fire floor | ☐ |
| ECO directed to implement full staged evacuation – evacuation stairs to be nominated and communicated to floor wardens | ☐ |
| IC appoints operations officer to liaise with ECO in the FCR. IC transfers point of control to MCV or duty commander's vehicle outside exclusion zone. | ☐ |
| Water supply officer identifies sprinkler and water supply requirements from TFPs and identifies strategies to increase pressure/flow to fire floor/s for operations. | ☐ |
| ECO advises access/evacuation officer of any safe refuges/disabled persons requiring evacuation assistance – FFs tasked as required | ☐ |
| **External fire extension (e.g. facade fire)** | |
| IC initiates an immediate whole of building evacuation – evacuation stairs nominated and communicated to floor wardens. | ☐ |
| Exclusion zone around building established safe from falling burning debris. | ☐ |
| Access/evacuation officer redirects evacuations to leeward side of building where safe. | ☐ |
| Water supply officer prioritises hydraulic input into sprinkler system to minimise internal fire spread. Suppression efforts should be limited to containing fire spread only. | ☐ |

# Appendix E Example tactical check list reference table

TCL reference table

| ESIP section | Hazard scenario (i.e. emergency) | TCL no. |
|---|---|---|
| A Tank fire | Tank 10 – Fire in main tank | 1 |
| | Tank 11 – Fire in main tank (e.g. float roof failure) | 2 |
| | Tank 12 – Fire in main tank (e.g. float roof failure) | 2 |
| B Rim seal fire | Tank 11 – Rim seal fire around tank float roof | 3 |
| | Tank 12 – Rim seal fire around tank float roof | 4 |
| C Bund fire | Tank 10 – Tank contents spill and fire in bund | 5 |
| | Tank 11 – Tank contents spill and fire in bund | 6 |
| | Tank 12 – Tank contents spill and fire in bund | 6 |
| D Tank exposure fire | Tank 10 – Fire threat to tank (external fire threat) | 7 |
| | Tank 11 – Fire threat to tank (external fire threat) | 7 |
| | Tank 12 – Fire threat to tank (external fire threat) | 7 |
| E Tank spill | Tank 10 – Tank contents spill into bund, no fire | 8 |
| | Tank 11 – Tank contents spill into bund, no fire | 9 |
| | Tank 12 – Tank contents spill into bund, no fire | 9 |
| F Other liquid spill | Any – Ruptured pipework, uncontained spill | 10 |
| | Any – Ruptured pipework, contained spill | 11 |
| G Cylinder fire | Cylinder 5 – Fire impinging on cylinder | 12 |
| | Cylinder 6 – Fire impinging on cylinder | 12 |
| | Cylinder 7 – Fire impinging on cylinder | 13 |
| H Gas leak | Cylinder 5 – Gas leak, no fire | 14 |
| | Cylinder 6 – Gas leak, no fire | 14 |
| | Cylinder 7 – Gas leak, no fire | 15 |
| | Any – Ruptured pipework, no fire | 15 |
| | Any – Gas leak and fire | 16 |
| K Major incident | Catastrophic or multiple tank failure | 17 |
| | Catastrophic cylinder failure or gas explosion | 17 |
| | Other catastrophic explosion (e.g. terrorism, accident) | 18 |
| | Failure of primary fire systems (e.g. ring main failure) | 19 |

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Greenacre NSW 2190

1 Amarina Avenue
Greenacre NSW 2190

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**E** firesafety@fire.nsw.gov.au
**W** firesafety.fire.nsw.gov.au

https://www.facebook.com/frnsw
https://twitter.com/FRNSW

# APPENDIX D – FIRE ALARM DETECTION SYSTEM SPECIFICATIONS

fire protection
TECHNOLOGIES

GASEOUS SUPPRESSION | WATER SUPPRESSION | FOAM SUPPRESSION | EXPLOSION PROTECTION | FIRE DETECTION | MILITARY & DEFENCE | SPECIAL APPLICATIONS | SUPPORT SERVICES

# SigniFire™

FLAME, SMOKE AND
INTRUSION VIDEO
DETECTION TECHNOLOGY

STATE-OF-THE-ART

FIRE DETECTION AND

VIDEO SURVEILLANCE


Authorised Fike® Distributor

# SigniFire

**STATE-OF-THE-ART FIRE DETECTION AND VIDEO SURVEILLANCE**

Due to the inherent nature of their design, many of today's modern, large structures are not adequately protected against smoke and fire. Features like large atriums, vast open areas and high ceilings, can make the use of traditional smoke and fire detection methods impractical, ineffective and difficult to maintain and operate. High airflow and smoke stratification can prevent smoke from reaching spot-type smoke detectors, adding to the ineffectiveness of traditional fire detection in open area facilities.

## THE SOLUTION: SigniFire

### VIDEO FIRE DETECTION TECHNOLOGY

**Signi*Fire*** by Fike, is a turnkey video, flame, smoke and intrusion detection solution. The state-of-the-art, camera-based **Signi*Fire*** detection system, visually detects the presence of fire or smoke at its source, independent of airflow in the area. **Signi*Fire*** represents a critical advantage for early warning fire detection, identifying and reacting to fire situations in their earliest stages, and protecting lives and property.


- Detects flame in seconds
- Supplies vital, situational awareness through live video to remote locations
- Triggers fire alarm systems
- Provides pre-recorded video forensic evidence for future fire investigations
- Provides video surveillance capabilities

Challenging environments and open area venues no longer have to settle for inadequate fire protection. Protection and security … that's **Signi*Fire*** video fire detection.

Each **Signi*Fire*** IP camera can be configured with multiple detection and/or exclusion zones within the field of view. These zones are set to either detect specific events (fire, smoke and motion) within the zone, or detect events outside the zone. The activation of each zone can also be linked to time schedules – so the system is always working when you need it, but won't interfere with special events or circumstances.

**Signi*Fire*** *… SCALABLE TECHNOLOGY THAT CAN BE APPLIED AS A STAND-ALONE SYSTEM FOR NEW INSTALLATIONS, OR INTEGRATED INTO YOUR CURRENT VIDEO MANAGEMENT SYSTEM.*

### Signi*Fire* Approvals

UL · FM APPROVED · CE

## DEPENDABLE, INNOVATIVE AND INTELLIGENT

Fike®

# THE COMPLETE SIGNI*FIRE* LINE OF PRODUCTS:

**Signi*Fire*** ... state-of-the-art fire detection and advanced video surveillance capabilities in a single product family.


## IP Network Camera

The **Signi*Fire*** IP camera combines the enhanced resolution and picture clarity of a standard network camera with built-in flame, smoke and motion detector capabilities. The **Signi*Fire*** technology detects:

- Presence of flames within the field of view of the camera
- Reflected fire light when flames are obstructed
- Presence of pluming smoke clouds and ambient smoke
- Unauthorized intrusion

## FSM-IP

A scalable, Network Video Recorder (NVR) with video management software, each FSM-IP NVR is designed to support up to 32 **Signi*Fire*** network cameras:

- Constantly records video streams on to internal hard disk
- Includes up to 6 terabytes of storage space with on-demand playback
- Provides a platform for monitoring of live videos
- Maintains an event log for all alarm conditions
- Dispatches alarms and videos to remote locations
- Provides a network management interface for configuration and maintenance

## Spyder*Guard*

**Spyder*Guard*** is a state-of-the-art monitoring, investigative and administrative tool designed to seamlessly access multiple FSM-IP servers over an enterprise-wide network or the internet. SpyderGuard combines physical security with early warning flame and smoke detection:

- Access multiple **FSM-IP** NVRs at a time
- Integrates building, site and floor plans
- Remote monitoring over the internet
- Remote playback of archived events
- Emails alarms and video snapshots
- Generates commissioning and maintenance reports

## Spyder*Panel*

**Spyder*Panel*** is a touch-screen panel designed to provide security personnel with a simplified user interface for quick response to an emergency situation. The intuitive SpyderPanel does not require any training to review alarms, video feeds, building plans or vital site information.

***In its simplest form, a* Signi*Fire* *installation will consist of multiple* Signi*Fire* *IP cameras connected to the FSM-IP NVR platform over a local area network. Guards and administrators can then monitor and configure the system over this network, or remotely using the Internet. Additional FSM-IP NVRs are added as necessary, each capable of handling as many as 32 cameras and providing continuous recording and on-demand video playback.***

# SIGNI*FIRE* FLEXIBILITY – NVR-BASED EARLY WARNING DETECTION

**Signi*Fire*** is a total video, flame, smoke and intrusion detection solution – scalable and ideal for new facilities, stand-alone systems and some retro-fit projects. However, existing facilities may already have a video security system in place.

## *CAN EXISTING SECURITY CAMERAS BE USED TO PROTECT THE FACILITY FROM FIRE?* ***Yes!***

The **Signi*Fire*** Server is a Wintel based solution for flame, smoke and intrusion detection, designed for use in places where analog/network cameras are already in place. While the result may not be an NFPA approved solution, the **Signi*Fire*** Server uses the same algorithms as the **Signi*Fire*** IP camera and is capable of detecting and alarming on a variety of events. The **Signi*Fire*** Server can process the video signals from up to 16 ONVIF video streams and can be used in conjunction with **Spyder*Guard***.


- 16 ONVIF video streams (IP Camera or Encoders)*
- Multiple unit scalability over IP network
- Remote monitoring over the Internet
- Remote playback of archived events
- Addresses security needs of organization

** Please contact factory for compatibilty of existing cameras*

***Signi*Fire *Server can be a cost-effective alternative in many retro-fit and existing security applications.***

***Protection WHEN You Need It.***

The complex detection algorithms of **Signi*Fire*** *provide endless configuration options for optimal system performance and flexibility.*

SigniFire

## FIRE CONTROL PANEL INTERFACE

The **Signi*Fire*** IP camera can easily connect directly to a Fire Alarm Control Panel as a regular smoke and flame detector via three built-in dry-contact relays mounted on the back plane of each camera. These relays are configurable to signal alarms such as flame, smoke, motion and fault conditions which include no picture, camera out of focus and low-light situations. The dry contacts can also be programmed by the end-user to include a delay of the relay closure on specific events to allow video verification before the alarm panel is notified. This delay helps to reduce or eliminate nuisance alarms.

## EXCEEDING YOUR EXPECTATIONS –

### DEPENDABLE, INNOVATIVE AND INTELLIGENT

### CyberCat® – the digital, peer-to-peer bi-directional, communication system that delivers it all.


When smoke and fire threaten lives and property, reaction time is critical. That's why we've designed our **CyberCat** fire alarm and control panels to respond faster than the industry requires, by eliminating polling, delays and interference. Information is delivered simultaneously from the intelligent sensors to the alarm panel and other devices within the system.

This direct communication, or peer-to-peer technology, not only reduces response time, but each **CyberCat** device is capable of generating accurate and highly detailed information. Conventional systems give you a general idea of a fire's location – for example, the second floor of your building. **CyberCat's** intelligent sensors tell you precisely which device is in alarm. And the intelligent **CyberCat** can be programmed to relay information and perform process management tasks.

## UNPRECEDENTED PERFORMANCE

## THE TOTAL SOLUTION

Fike has long been known for being a leader in service, support and delivery in the fire protection industry. No matter what the concern, no matter what the time, we make it easy to reach a trained, knowledgeable Fike representative who will assist you quickly. Combine that with the most advanced technology available in fire alarm systems, competitively priced to meet all your application needs, and you have a total solution for all your fire alarm and fire protection needs.

## FIKE GLOBAL MANUFACTURING, SALES AND SERVICE

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UL FM APPROVED CE

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w: www.fire-protection.com.au e: enquiries@fire-protection.com.au

fire protection TECHNOLOGIES

DIAS Infrared Systems

# Infrared Fire Surveillance System

## PYROVIEW/PYROSOFT FDS
## Fire Detection System

# Fire Surveillance Systems PYROVIEW/PYROSOF


## ↗ Storage areas

Our fire detection system is a reliable system for surveillance and recognition of spontaneous fires inside bunkers or free air dumps of waste or combustible materials like paper, waste or charcoal among many others.

Since the dumped materials are mostly inflammable the probability of spontaneous combustions is high with disastrous effects for man and environment.

Many Insurance policies recommend the usage of fire early warning systems based on infrared cameras.

The high performance infrared cameras **PYROVIEW 380L** and **640L** combined with the powerful Software **PYROSOFT FDS** for the analysing the thermographic images allows an early warning and fire prevention.

The infrared cameras **PYROVIEW 380L** and **640L** mounted on a pan-tilt head automatically monitors the user defined area to be observed and continuously quantifies the surface temperature distribution.

The **PYROSOFT FDS** software checks the temperatures inside the regions of interest (ROI). An alarm will be raised in case the predefined temperature limits are exceeded and the current infrared image is saved.

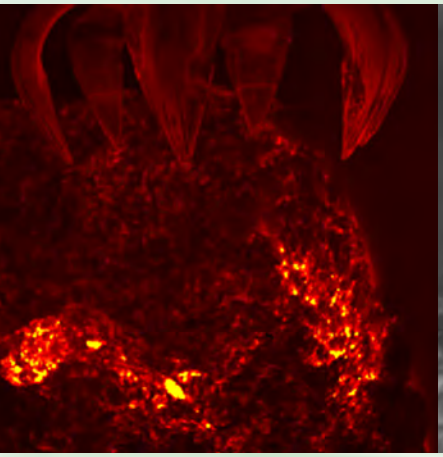
Alarms and the system status are displayed on the monitor and the control panel. External equipment for alerting and firefighting can be controlled via the flexible I/O system.

## ↗ Waste bunkers

If waste is stored for waste incineration plants, as well as combustible materials for coal-fired or wood-fired power plants in closed bunkers and storage areas, devices for the detection and control of fires are necessary.

Due to chemical processes within the material or the insertion of hot material may spark a fire with great danger for people and environment. Proper facilities for early fire detection and fire fighting are needed.

The **PYROVIEW / PYROSOFT WBFDS** offers a suitable monitoring solution to detect thermal developments at the surface of the collected waste in such a way that fires can be prevented upfront before they start. The uncontrolled production and emission of toxic air pollutants by burning waste can be forestalled efficiently. Hazards to people and environment are minimized. The cameras are built in in a robust industry housing (safety class IP65).

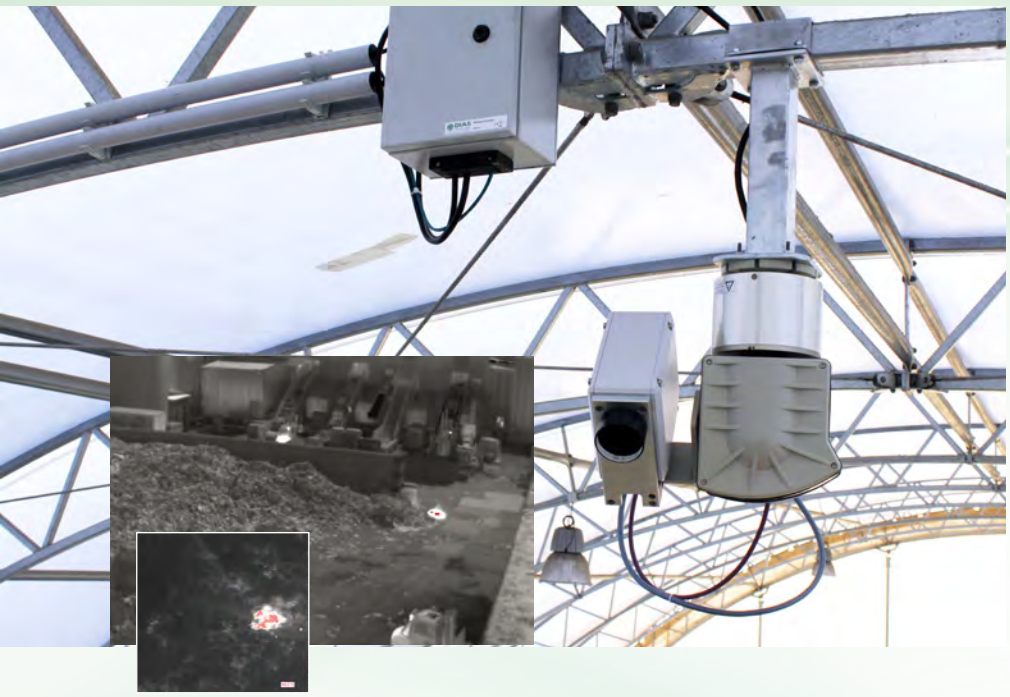


Infrared image: hot spot in waste bunker

Our PYROVIEW 380L with industry housing

# T FDS

DIAS Infrared Systems



## ↗ Fire detection

The infrared image is displayed in a pseudo color image mode gray-scale; the brighter the color, the higher the temperature.

In case of fire areas exceeding the temperature limits become red colored. The operator recognizes the source of fire immediately and can start fire fighting actions. The infrared image on the left side shows a initial fire in a paper stock.

Because of the early recognition and warning fire fighting is started instantly with a high efficiency – ecological and material damages are avoided.

| Overview – FDS components | |
|---|---|
| **Infrared camera PYROVIEW 380L/640L** ... detects infrared radiation with an infrared image sensor und transferrs image information as digital data via Ethernet. | – temperature range from –20 °C to 300 °C (optional: 500 °C)<br>– spectral range 8 µm to 14 µm<br>– 384 × 288 pixels (380L) or 640 × 480 pixels (640L)<br>– maximum frame rate 50 Hz<br>– integrated air purge to prevent/delay disposal of soiling |
| **Weatherproof housing**[1] | – with heating and hard-coated GE window |
| **Pan-tilt head** | – move towards to programmable positioning<br>– free manual positioning<br>– 359° horizontal, 180° vertical, 0.2° resolution |
| **Reference radiator**[2] | – control of camera function, lens soiling<br>– little deviations are corrected, malfunction information when heavily soiled |
| **Power supply/USV**[2] | – 2 isolated feeds (1x buffered, 1x unbuffered)<br>– switch for feeds<br>– optional: separated USV for 4 h operation |
| **I/O system** programmable bus controller | – control of pan-tilt heads, control panel, video system, reference radiator<br>– control system status – transmission to PC<br>– altering via relay, 24 V or PROFIBUS®/PROFINET® |
| **Touch-PC** | – operation and surveillance station<br>– with 21"/19" touch display |
| **Software PYROSOFT FDS** | – server-/client software |

[1] Only for storage areas FDS. [2] Optional.

## Operation

The software **PYROSOFT FDS** is easy to handle and offers various possibilities to setup the whole functionality:

- Displaying of status information
- Displaying of the maximum temperature inside the image
- Definition of ROIs (Region of interest)
- Overview images and state of single sectors
- Cyclic changeover for up to 32 cameras
- Current image of the camera setting off an alarm
- Free positioning of the pan-tilt head in manual operation mode
- Map display/Panorama display

# References

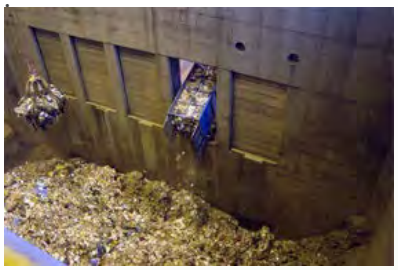
## Successfully installed fire detection systems (extracts)

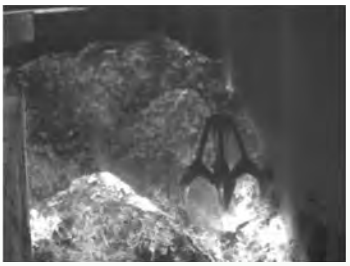
### • Umweltdienst Burgenland (Oberpullendorf, Austria)

In the Austrian city Oberpullendorf a camera systems monitors a recycling storage.

### • Uddevalla Energi AB (Uddevalla, Sweden)

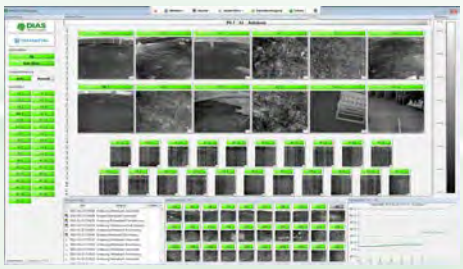
In Swedish city of Uddevalla our PYROVIEW/PYROSOFT FDS monitors the waste incineration plant of Uddevalla Energi AB.





### • Hazardous waste deposit Kölliken (Kölliken, Switzerland)

A part of the new security concept is the permanent monitoring of the entire dismantling of the hall and storage area with the thermal i
cameras. The decision was made for the system solution PYROVIEW/PYROSFT FDS of the company DIAS Infrared GmbH, which was realized
together with the company Transmetra GmbH.



### • National park Pirin (Province Blagoevgrad, Bulgaria)

For the project "Sustainable forest management and environmental protection by building a forest fire detection system and an info
center in the national park Pirin, Bulgaria", funded by the Foundation European Economic Area (EEA Grants), a fire detection system P
VIEW/PYROSOFT FDS was delivered and installed by the company DIAS Infrared GmbH.



We are certified for many years according to ISO 9001

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Authorised DIAS Infrared Systems Distributor

# WASTE RECYCLING FACILITIES

VESDA®

## VESDA Provides Dependable Smoke Detection in Waste Recycling Plants

- Mechanical conveyors
- Sieves
- Digesters
- Loading docks
- Electrical Rooms/ High-Low Voltage Annexes
- Extraction systems
- Cyclones
- Silos

xtralis

VESDA®

**Waste Recycling Facilities** involve a large variety of risk factors which could cause a fire. The materials are widely varied and are highly flammable. The processed materials are transferred throughout the entire facility via conveyor belt systems. Whether a spark occurs or a hot surface inflames the material, the fire can easily spread throughout the entire facility.

The combustible nature of waste management and recycling sites make a fire an ever-present possibility. Operators need to ensure they have adequate controls in place to prevent fires and should a fire occur, minimize the consequences to human health and the environment.

## HARSH CHALLENGING CONDITIONS

Waste recycling facilities are challenging to protect with conventional smoke detection technologies for various reasons. Most common are:

- **Dirty processes and dusty environments** when sorting and processing materials that can **contaminate** traditional detectors resulting **in false alarms** and/or **reduced sensitivity**
- **High airflows** in sorting areas **dilute smoke** and make detection difficult
- **Potentially hazardous atmospheres** due to material decomposition that can lead to **spontaneous combustion** and generate toxic and flammable gas leaks
- **Slow growth fires** originating from within electrical equipment, mechanical systems or other confined spaces are difficult to identify and cause damage
- **High frictional heat sources** from large collection and sorting equipment such as conveyor belt systems that can quickly spread the fire into the whole building
- **Arcing spots** due to electrical faults, or **creeping current** in high voltage machines due to humidity and dirt deposits

## CONSEQUENCES OF SMOKE OR FIRE IN A WASTE AND RECYCLING PLANT

The consequence of loss due to a fire is inversely proportional to how well the detection system can detect smoke. That is, the higher the sensitivity and performance reliability of the detection system the lower the risk and losses will be. Equally important, the detection system needs to be able to cope with the environment where it is installed, offering longevity with minimal service and maintenance. Smoke or fire in a waste recycling facility may:

- **Endanger the lives** of employees
- **Cause enormous damage to equipment** including smoke contamination particularly within electrical equipment requiring long downtimes to be repaired
- **Take days to extinguish** consuming valuable fire brigade resources
- **Cause excessive pollution** to the environment
- **Lead to service penalties** for breach of Service Level Agreements (SLA)
- **Lead to negative publicity** which will impact turnover and profits


*Source FIA (2001 to 2013)*

*There is a fire at a recycling or waste management facility almost every day, according to figures from the Environment Agency (Source FIA).*




## WHY USE A VESDA ASPIRATING SMOKE DETECTION SYSTEM?

In order to minimize the risk of fire, it is essential to reduce hazards that could trigger a fire as early as possible. Therefore, a recycling plant needs a reliable active smoke detection system that responds within seconds as the consequences of a fire could be fatal.

An Aspirating smoke detection system provides the designer flexibility by meeting the design requirements of prescriptive codes as well as facilitating the use of today's performance-based fire engineering methodologies. VESDA VLI buys time, time to respond to a fire threat, minimizing damage and business downtime. VLI provides:

- Detection of both **small incipient smouldering fires and large flaming fires**
- **Superior lifetime** in harsh environments given the **IP66 enclosure** and **conformal coating**
- **High resistance to contamination** through the use of **clean air barrier** technology that protects the detection chamber
- **Flexibility to design** on ceiling, underfloor voids, cable ducts and across return air intakes, as well as in targeted equipment sampling such as electrical cabinets and conveyor belt systems
- **Multiple configurable settings** to provide, for example, very early warning for investigation, and subsequent warnings to initiate a fire response plan, evacuation and ultimately suppression if needed

## VESDA VLI PARTICULARLY DESIGNED FOR WASTE RECYCLING INDUSTRY

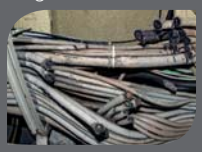
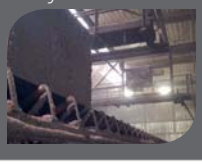
Xtralis is protecting waste recycling facilities around the world by offering an actively monitored sampling system, robust detection performance, reliability and consistent sensitivity consistency over time.

| | |
|---|---|
| **VESDA VLI**<br>  <br>CE IP66 EN60529<br>SIL | Area coverage of 2,000 $m^2$ (1,600 $m^2$ in some EU countries)<br>Absolute smoke detection<br>Clan air barrier for optics protection<br>Patented Intelligent filter<br>Air flow monitoring<br>AutoLearn smoke levels and thresholds<br>IP66 ABS enclosure<br>NEC 500 Class I Division II<br>Class A, B, & C fires |
| **VESDA VLC-EX**<br>  <br>IEC IECEx | Area coverage of 800 $m^2$<br>Absolute smoke detection<br>Clan air barrier for optics protection<br>Air flow monitoring<br>AutoLearn smoke levels and thresholds<br>Rugged industrial IP54 high impact resistance design<br>Corrosion resistant stainless steel 304 enclosure<br>ATEX/IECEx approval for Zone 2<br>Gas group IIA & IIB<br>NEC 500 Class I Division II<br>Class A, B, & C fires |

VESDA®


## APPLICATIONS THAT OFFER PARTICULAR STRONG SOLUTION-FIT

Waste Recycling Industry applications are wide and varied and present various challenges to effective and reliable smoke detection and on-going maintenance.

| Applications | Causes | Consequences | Detection Challenges |
|---|---|---|---|
| Loading and offloading docks, sorting areas, large open areas  | Reception of hot loads, or hazardous materials (gas cylinders, flammable liquids) which can subsequently cause a fire. Some materials can spontaneously combust under certain conditions, and the risk generally increases when materials are stored for prolonged periods | The fire might spread via cable trays. Smoke, toxic and corrosive gases are generated during these fire events that can affect the whole building, and impact the operational functions | High level of dust, various particle sizes, humidity and high airflows creating dilution |
| High machinery voltages  | Generation of arcs due to contact faults at the screw-type or clamp connections of contactors, switches and other components<br>Creeping current due to humidity, dust, oil and coalification<br>Mechanical damage due to shocks, vibration stress and rodent attack<br>Insulation faults | Impact on operational functions due to power failures that may affect the entire premises | Heat build-up due to insufficient discharge of heat, too densely arranged connections, or dirt deposits on electrical equipments<br>High ambient temperatures |
| Electrical and processing cabinets  | Electronics, electrical circuits, power supplies | Critical impact on operational functions, risk of downtimes | Incipient slow-growth fires, low smoke levels, diluted at source by electronics cooling systems |
| Conveyor belts  | Friction caused by the build-up of material around a roller, resulting in a heat source sufficient to ignite nearby materials<br>Electrical and mechanical faults resulting in a smouldering fire within the conveyor's mechanism or housing | Critical impact on operational functions, risk of disruptions | Fire risk from burning flammable loads, such as paper or cardboard, travelling along the conveyor belt at fast speed |

## ABOUT XTRALIS

Xtralis® is the leading global provider of converged solutions for the early detection and remote visual verification of fire, gas and perimeter threats. Our technologies prevent disasters by giving users time to respond before life, critical infrastructure or business continuity is compromised. We protect high-value and irreplaceable assets belonging to the world's top governments and businesses. Our brands include the VESDA-E – the next generation of aspirating smoke detection technology; VESDA® – the world's No.1 very early warning aspirating smoke detection (ASD) systems; ICAM™ for flexible ASD; ECO™ – Gas detection & environmental monitoring modules for VESDA & ICAM systems; OSID™ – easy to use smoke detection for open areas; ADPRO® –passive infrared sensors, perimeter, multisite, and enterprise security; HeiTel™ – digital video remote monitoring; and, ASIM® – intelligent traffic detection.

To learn more, please visit us at **www.xtralis.com**

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