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Building Surveying
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Bushfire Attack Level

# Proposed FOGO processing building
# 324 Horton Road, Woottating
# Fire Safety Engineering Report

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## Executive summary

It is proposed to construct a FOGO processing building at 324 Horton Road, Woottating. Details of the proposed building are shown below:


**Site plan**

This fire safety report addresses the following:

- Oversized fire compartment of Type C construction having a floor area of 2,520m$^2$ and a volume of 32,130m$^3$.
- A fire hydrant system based on the farm building requirements.
- Egress from the building to a single exit, with the alternative exists provided by two roller doors.

The information provided in this report shows the fire safety objectives of the Building Code of Australia have been met. Compliance with Performance Requirement C1P2, D1P4, E1P3 & E2P2 have been demonstrated.

The information provided in this report shows it is acceptable to:

- Have an oversized fire compartment of Type C construction.
- Use the farm building fire hydrant system requirements to achieve fire hydrant coverage for the proposed building.
- Have a travel distance of 60m to the exit, and use the 2 roller doors as alternative exits base on the 2 roller doors being open for a minimum height of 2m while the building is being lawfully occupied.

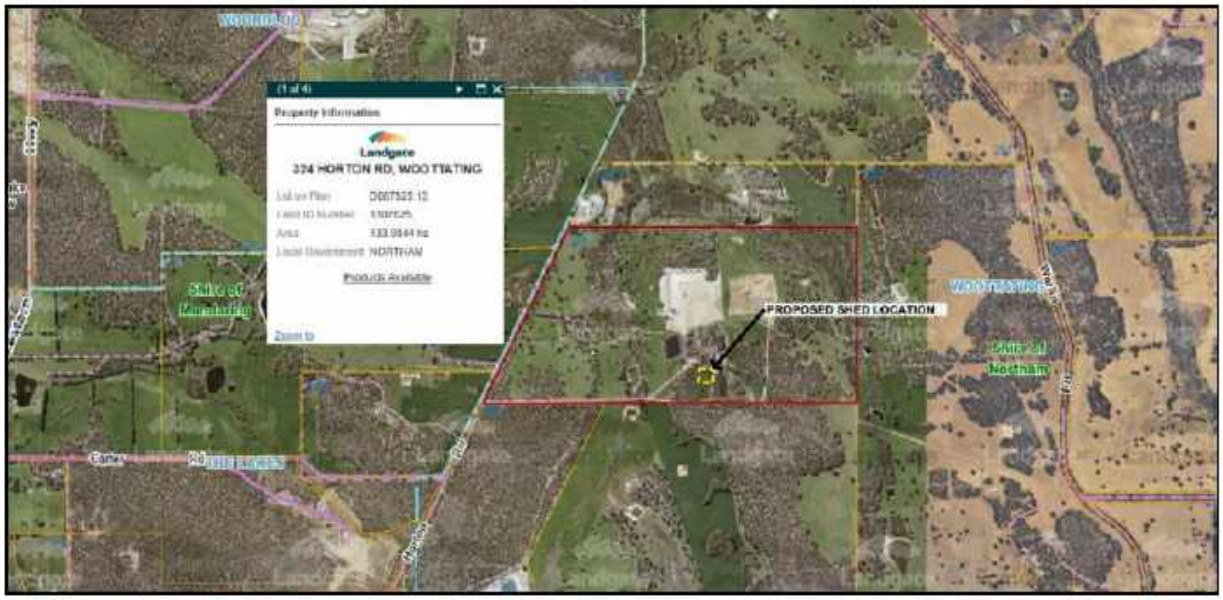
| Project details | |
|---|---|
| Our ref: | C10648 |
| Document: | Fire Safety Engineering Report |
| Project: | 324 Horton Road, Woottating |
| Client: | Auspan |
| Architect: | Auspan |
| Builder: | Auspan |

| Document control | | |
|---|---|---|
| Prepared by: | **Helmut Schwanke**<br>M Fire Safety Engineering UWS<br>MSFS, MFPAA | |
| Position: | Fire Safety Engineer | |
| Signed: | [redacted] | |
| Date: | 7 October 2025 | |
| Reviewed by: | **Caillam Bruyn**<br>**Managing Director** | |
| Signed: | [redacted] | |
| Date: | 7 October 2025 | |
| Revision number: | Description of revision: | Date: |
| 0 | FSER issued to client for information and the building certifier for approval and submission to DFES for comment | 7 October 2025 |
| 1 | FSER amended to clarify fire hose reel and portable fire extinguisher requirements | 31 March 2026 |
| | | |
| | | |
| | | |
| | | |

# 1.0 Introduction

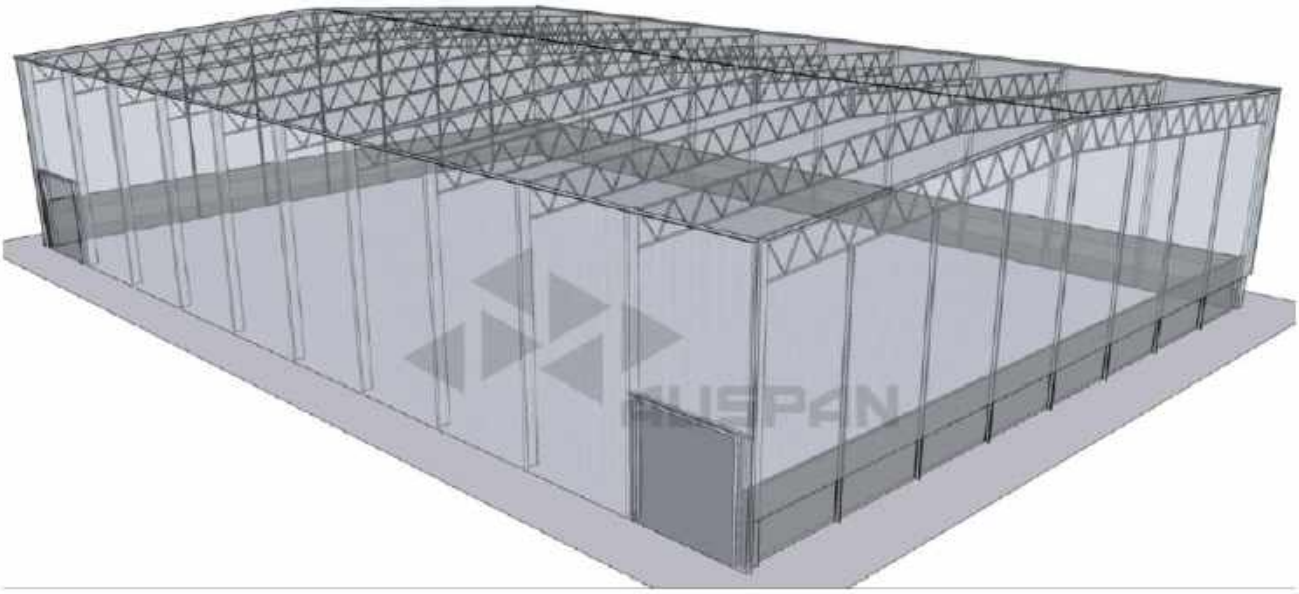
## 1.1 Description of the development

It is proposed to construct a FOGO processing facility building at 324 Horton Road, Woottating. Details of the proposed building are shown below:




**Location plan**


**Site plan**



## 1.2 Regulatory framework

The proposed building will be designed and constructed in accordance with **BCA 2022 Volume 1 Amendment 2** which is a performance-based document. This performance-based design brief has been prepared using the International Fire Safety Engineering Guidelines Edition 2005 and the Australian Fire Engineering Guidelines 2021 as general guidance. The building certifier for the project is **Constructive Building Consultants Pty Ltd**, the Permit Authority is the **Shire of Northam**, with the **Department of Fire and Emergency Services** being a referral agency.

In a building there are features that combine to create an overall fire safety system for the building. To assist in analysing the fire safety system for a building, the IFEG and AFEG considers the system as comprising six 'sub-systems', as shown in the diagram below:


## 1.3 Relevant stakeholders

| Name | Organisation | Role |
|---|---|---|
| **Selwyn Imberti** | Auspan Commercial | Client/designer/builder |
| **Paul Curtis** | Purearth | Owner |
| **Caillam Bruyn** | Constructive Building Consultants | Building Certifier |
| **Keith Choo** | Department of Fire and Emergency Services | Fire Brigade |
| **Helmut Schwanke** | Constructive Building Consultants | Fire Safety Engineer |

**Table 2 – Summary of relevant stakeholders**

## 1.4 Principal building characteristics

The principal building characteristics of the proposed building are summarised below:

| Building characteristic | Comment |
|---|---|
| Classification | Class 8 |
| Rise in storeys | 1 |
| Number of storeys | 1 |
| Total floor area | 2,520m$^2$ |
| Total volume | 32,130m$^3$ (Top of external walls – 12m, top of ridge – 13.5m, average height = 12.75m) |
| Effective height | N/A |
| Type of Construction | Type C based on RIS & volume (large-isolated building) |
| Compartmentation | Single fire compartment (Volume to be addressed as a Performance Solution). |
| Egress | Travel distance to a single exit to be addressed as a Performance Solution. |
| Fire brigade access | Access is off Horton Road |
| Fire hydrant system | Proposed fire hydrant system will be based on the farm building requirements addressed by a Performance Solution |
| Fire hose reel system | A farm building does not require a FHR system where portable fire extinguishers are provided in accordance with I3D11 |
| Sprinklers | Not required under DTS provisions |
| Portable fire extinguishers | As per I3D11 |
| Smoke hazard management | Not required under DTS provisions |
| Emergency lighting | As per DTS provisions |
| Exit signs | As per DTS provisions |

**Table 3 – Summary of principal building characteristics**

## 1.5 DTS departures, performance requirements and methods of analysis

### 1.5.1 Performance Solution 1 – Oversized fire compartment of Type C construction

The proposed building has a total floor area of 2,520m$^2$ and a total volume of 32, 130m$^3$. The volume requires the building to be considered a large isolated building under the DTS provisions. It is proposed to consider the building an oversized Type C building using a Performance Solution.

| | | | |
|---|---|---|---|
| 1. DTS Departure | BCA Clause | Departure | |
| | C3D3 | The building exceeds the maximum volume in Table C3D3 for Type A construction. | |
| 2. Intent of DTS Provision | The Guide to the BCA states the intent is to limit the size of any fire in a building by limiting the size of the floor area and volume of a fire compartment. | | |
| 3. Performance Requirements | Relevant Performance Requirement | Related Performance Requirement | |
| | C1P2 | Nil | |
| 4. Methods of Analysis | Comparative or Absolute | Qualitative or Quantitative (Refer to 5 for details) | Deterministic or Probabilistic |
| | Absolute | Qualitative & quantitative | Deterministic |

| | | |
|---|---|---|
| 5. Quantitative analysis | Method of analysis to be used | Fire load comparison |
| 6. NCC A2G2 | Assessment method | (2)(d) |
| 7. AFEG Sub-systems | Applicable sub-systems |  C (Fire spread & impact & control) |
| 8. Sensitivity, redundancy & uncertainty | Sensitivity | Not applicable to this assessment |
| | Redundancy | Not applicable to this assessment |
| | Uncertainty | Not applicable to this assessment |
| 9. Acceptance Criteria | The Performance Solution must show it is acceptable to have an oversized fire compartment of Type C construction | |
| 10. Factors of Safety | Not applicable to this assessment | |

### 1.5.2 Performance Solution 2 – Fire hydrant system

It is proposed to use the farm building fire hydrant requirements for the proposed building; including the provision of a single water storage tank with a total capacity of 144,000 litres (20L/s for 2 hours).

It is proposed to address the fire hydrant system as a Performance Solution.

| | | | |
|---|---|---|---|
| 1. DTS Departure | BCA Clause | Departure | |
| | E1D2 | Use of the farm building fire hydrant requirements for a building that is technically not a farm building by definition. | |
| 2. Intent of DTS Provision | The Guide to the BCA states the intent of installing a fire hydrant system is to provide adequate water, under sufficient pressure and flow, to allow the fire brigade to fight fires. | | |
| 3. Performance Requirements | Relevant Performance Requirement | Related Performance Requirement | |
| | E1P3 | Nil | |
| 4. Methods of Analysis | Comparative or Absolute | Qualitative or Quantitative (Refer to 5 for details) | Deterministic or Probabilistic |
| | Absolute | Quantitative | Deterministic |
| 5. Quantitative analysis | Method of analysis to be used | Comparison of fuel load permitted under a DTS Solution where 1 outlet is permitted to flow simultaneously | |
| 6. NCC A2G2 | Assessment method | (2)(d) | |
| 7. AFEG Sub-systems | Applicable sub-systems |  F (Fire services intervention) | |
| 8. Sensitivity, redundancy & uncertainty | Sensitivity | Not applicable to this assessment | |
| | Redundancy | Not applicable to this assessment | |
| | Uncertainty | Not applicable to this assessment | |
| 9. Acceptance Criteria | The Performance Solution must show the proposed fire hydrant system is suitable for fire brigade intervention. | | |
| 10. Factors of Safety | Not applicable to this assessment | | |

### 1.5.3 Performance Solution 3 – Egress

The travel distance to a single exit is the proposed building is 60m instead of the maximum 20m, and the alternative exits are two roller doors. The non-compliances will be addressed as a Performance Solution.

| | | | |
|---|---|---|---|
| 1. DTS Departure | BCA Clause | Departure | |
| | D2D5 & D3D24 | 1. The travel distance to a single exit is 60m instead of the maximum 20m; and<br>2. Roller doors are being used as alternative exits. | |
| 2. Intent of DTS Provision | The Guide to the BCA states the intent is to maximise the safety of occupants by enabling them to be close enough to an exit to safely evacuate, and to minimise the risk that a door may obstruct a person evacuating. | | |
| 3. Performance Requirements | Relevant Performance Requirement | Related Performance Requirement | |
| | D1P4 | E2P2 | |
| 4. Methods of Analysis | Comparative or Absolute | Qualitative or Quantitative (Refer to 5 for details) | Deterministic or Probabilistic |
| | Absolute | Qualitative | Deterministic |
| 5. Quantitative analysis | Method of analysis to be used | N/A (analysis is qualitative) | |
| 6. NCC A2G2 | Assessment method | (b)(ii) | |
| 7. AFEG Sub-systems | Applicable sub-systems | E (Occupant Evacuation & Control) | |
| 8. Sensitivity, redundancy & uncertainty | Sensitivity | Not applicable to this assessment | |
| | Redundancy | Not applicable to this assessment | |
| | Uncertainty | Not applicable to this assessment | |
| 9. Acceptance Criteria | The Performance Solution must show the provision of a single exit and roller doors as alternative exits provides safe egress from the building. | | |
| 10. Factors of Safety | Not applicable to this assessment | | |

## 1.6 Fire safety objectives

This report addresses the following fire and life safety objectives:

### 1.6.1 Building regulatory objectives

The general Building Code objectives are:

- Protecting building occupants from the effects of fire
- Facilitating the activities of emergency services personnel
- Protecting the property from the effects of fire
- Preventing the spread of fire between buildings

### 1.6.2 Other regulatory objectives

Other regulatory objectives may include:

- Environmental protection

- Occupational health and safety
- Fire services
- Dangerous goods
- Land use and other planning matters

This report does not propose any other regulatory objectives.

### 1.6.3 Non regulatory objectives

The non-regulator objectives for a project may include other objectives set by the client or other stakeholders such as the insurer to:

- Limiting structural and fabric damage
- Limiting building contents and equipment damage
- Maintaining continuity of business operations and financial viability
- Safeguarding community interests and infrastructure
- Protecting corporate and public image
- Protecting heritage in older or significant buildings
- Limiting the release of hazardous materials into the environment

The client has not proposed any non-regulatory objectives.

### 1.7 Performance Based Design Brief

A PBDB was submitted to the stakeholders on the 4 September 2025. The FES Commissioner provided comments on the 22 September 2025. CBC provided a response letter dated 25 September 2025. Copies of the correspondence are provided in the Appendices.

## 1.8 Scope and limitations

Any changes in building use, occupant, or fire load conditions outside of those considered by this report, or any deviation in the implementation of the fire safety strategy outlined in this report may result in outcomes not anticipated or covered by the fire safety strategy and should be reviewed by a fire safety engineer.

The following limitations apply to the fire safety assessment/s outlined in this report. Any changes in the limitations may alter the Performance Solutions presented in this report.

- Any matters which have not been expressly stated in this report as being non-compliant shall comply with the relevant requirements of the BCA either by satisfying the performance requirements through the deemed-to-satisfy provisions, or other performance solutions engineered to meet the performance requirements.

- It is not possible to protect persons intimately involved in the fire, in a scenario where flammable liquids are incorrectly handled in the presence of an ignition source and therefore this report does not cover such situations.

- This assessment is consistent with the aims and objectives of the BCA. To this end, this report does not specifically consider incendiarism (other than a single limited source of initial ignition) multiple ignition sources, acts of terrorism, business interruption or loses, or personal or moral obligations of the owner/

occupier. These issues can be considered; however, they have been specifically excluded from the scope of this report. Protection of property which is normally excluded under this clause is considered to the extent necessary by the client's requirement to provide hydrant coverage to all buildings, regardless of their size.

- The goal of 'absolute' or 100% safety is not attainable. There will always be a finite risk of property damage, injury, or death due to fire.

- The consequences of fire on people and property are both complex and dynamic, hence a fire safety system may not effectively cope with all possible scenarios. This needs to be understood by the designers, occupiers, contractors, authorities having jurisdiction ('AHJ'), advisory bodies and others in their assessment of fire engineered solutions.

- It is assumed the fire safety systems will be designed, installed, tested, commissioned, and maintained in accordance with the relevant Australian Standards, common industry practice and any prescriptive legislative requirements.
- All building materials used are assumed to be compliant with the BCA insofar as flammability index is concerned, such that materials such as polyurethane and other plastics with high toxicity are not forming part of the construction.

- The fire safety engineering report and subsequent recommendations are based on the reasonable and practical efforts of Constructive Building Consultants Pty Ltd. The extent to which the fire safety requirements recommended because of the engineering and analysis are implemented will affect the probability of achieving fire safety. It is important to note however; Constructive Building Consultants Pty Ltd cannot guarantee fire ignition and fire damage will not occur as the risk of fire cannot be absolutely eliminated.

- It is assumed storage of flammable, combustible and oxidising materials is undertaken in accordance with the relevant Acts and Regulations and where licences are required for such storage, such licences are obtained by the owner.

- This report deals with only the stated non-compliant items pertaining to the life safety provisions of the BCA and does not cover amenity, non-fire health issues or other elements of the BCA not related to life safety in the building.

- The analysis is limited to the population figures, egress provisions and installations of fire safety systems discussed in this report.

- The assessment is limited to an analysis of the level of compliance of the proposed building solution with the performance requirements of the Building Code of Australia as detailed in this report.

- This assessment is limited to obligations under the *Building Act 2011* (WA) and *Building Regulations 2012* (WA). This report does not address obligations under other pieces of legislation such as (but not limited to) the *Occupational Health and Safety Act 1984* (WA), *Fire Brigades Act 1942* (WA) or the *Health Act 1911* (WA).

- This report pertains to the FOGO processing building at 324 Horton Road, Woottating. Should the use of the building or the building be altered then the Performance Solutions documented in this report may no longer be valid, and a reassessment of the building will need to take place by a fire safety engineer.

# 2.0 Performance Solution 1 – Oversized fire compartment of Type C construction

## 2.1 Purpose of the assessment

The proposed building has a total floor area of 2,520m$^2$ and a total volume of 32, 130m$^3$. The volume requires the building to be considered a large isolated building under the DTS provisions. The purpose of this assessment is to determine whether it is acceptable to:

- To consider the building an oversized fire compartment of Type C construction.

The IFEG and AFEG sub-system that directly relates to the Performance Solution is sub-system C (Fire Spread & Impact & Control). The description of the relevant sub-systems is provided below:

| | |
|---|---|
| **Sub-system C**<br>Fire Spread &<br>Impact & Control | Sub-system C (SS-C) is used to analyse the spread of fire beyond an enclosure, the impact a fire might have on the structure and how the spread and impact might be controlled. |

The relevant Performance Requirement applicable to the assessment is:

**C1P2 Spread of fire**
*A building must have elements which will, to the degree necessary, avoid the spread of fire:*

- *To exits; and*
- *To sole-occupancy units and public corridors; and*
- *Between buildings; and*
- *In a building.*

Avoidance of the spread of fire must be appropriate to:

- *The function or use of the building; and*
- *The fire load; and*
- *The potential fire intensity; and*
- *The fire hazard; and*
- *The number of storeys in the building; and*
- *Its proximity to other property; and*
- *Any active fire safety systems installed in the building; and*
- *The size of any fire compartment; and*
- *Fire brigade intervention; and*
- *Other elements they support; and*
- *The evacuation time.*

## 2.2 Hazard identification and mitigating measures

The potential hazards associated with the proposed Performance Solution include:

- The potential size of the fire may exceed the limitations for Type C construction.

The aim of the fire engineering solution is therefore to show that:

- Type C construction is appropriate for the fire load present in the building.

## 2.3 Assessment

The Guide to the BCA states the intent of the general floor area and volume limitations is to limit the size of any fire in a building by limiting the size of the floor area and volume of a fire compartment. The hazard in this case is the potential size of the fire may exceed the limitations for Type C construction.

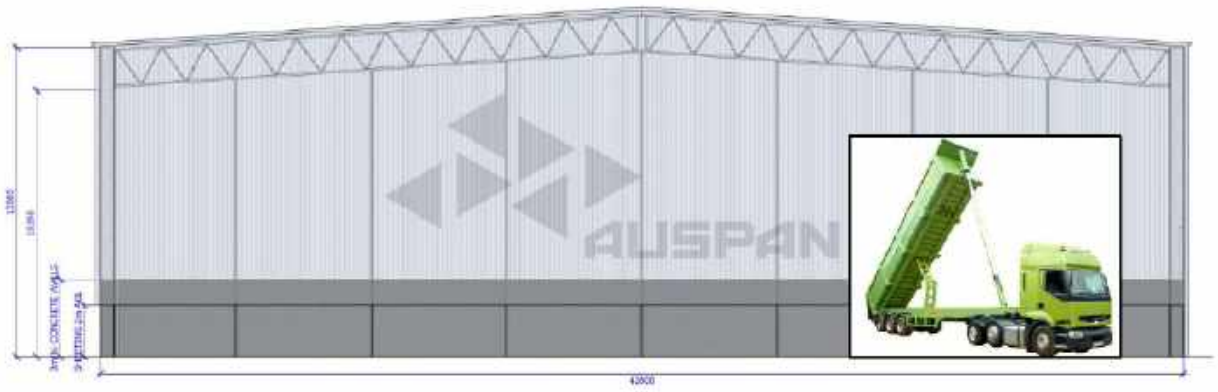
The building will be used for the processing of raw fogo, where a front-end loader will pick up the fogo and load it into a depackaging machine. The depackaging machine separates the fogo, with the contaminates going to one side and the clean fraction to the other side. The contaminated fraction is taken outside by front end loader and loaded into a waste bin and taken to landfill. The clean fraction is then picked up by a front-end loader and taken outside the facility and unloaded into the mixing hall next door for further blending with other organics before being taken to the concrete bunkers for composting.

The following hazards or fire risks will be present in the building:

- Semi-trailers (Maximum of 2 inside the building at any one time at opposite ends of the building)
- Front-end loader
- Depackaging machine
- Raw fogo, clean material and contaminates

The Guide to the BCA states the allowable size of the fire compartment depends on two things. The first is the type of construction, which is a measure of a building's ability to resist a fire. The second is the classification of the building, which is an indicator of a building's potential fire load.

### Type of construction




The proposed floor area is 2,520m$^2$ and the volume is 32,130m$^3$, based on an average ceiling height of 12.75m. The volume requires the building to be considered a large-isolated building under the DTS provisions. The height is required to allow semi-trailers to tip the raw fogo inside the building without hitting the roof trusses as shown by the image above. The height to the underside of the roof trusses is 10.35m, while at the ridge line the height to the underside of the roof trusses is 12m. This gives an average height of 11.2m. This gives a 'usable' volume of 28,161m$^3$. The usable volume is below the large-isolated building requirements.

The semi-trailer and front-end loader tipping height will dictate the raw fogo pile height. The tipping height of a front-end loader is about 3m, with the semi-trailer tipping height even lower. It is unlikely the raw fogo

will be stored higher than 3m. This height matches the concrete bund walls around the perimeter of the building of 3m. This further reduces the 'usable' volume of the building.

The external walls (concrete and metal sheeting), steel portal frame and metal roof sheeting are all non-combustible and require no fire resistance level as the building is single storey. Type C construction is considered to be appropriate.

If the average ceiling height of the proposed building was to be reduced to 11.9m, the volume would reduce to 30,000m$^2$. This is the maximum volume for Type A construction. The only difference between Type C construction and Type A construction is under Type A construction the external walls must be non-combustible and the roof is permitted to be non-combustible as the building has a rise in storeys of 3 or less.

The requirements for each Type of construction are summarised below:

| Building element | Type C construction | Type A construction | Comment |
|---|---|---|---|
| Fire rating of external walls | No requirement as the walls are ≥3m from a FSF (Table S5C24a) | External walls must be non-combustible. No requirement to fire rate the externals as the non-loadbearing walls are ≥3m from a FSF (Table S5C11b) | The external walls of the proposed building are non-combustible. |
| Fire rating of portal frame | No requirement (Steel column concession applies) (S5C6(1)(a)) | No requirement (Steel column concession applies) (S5C6(1)(a)) | Steel portal frame is not required to be fire rated. |
| Fire rating of the roof | No requirement (Table S5C24e) | Permitted to be non-combustible as per the roof concession as the building has a RIS of ≤3 (S5C15(b)) | The proposed building is single storey. The roof covering is metal. |

The proposed building actually satisfies the requirements for Type A construction.

## Potential fire load

The raw fogo is made up of food waste, lawn clippings, small green waste and compostable packaging and has a moisture content of about 50% in winter and 30% in summer. The raw fogo has about 5% contaminates. The likely fire risk from the fogo is a smouldering fire rather than a flaming fire due to self-ignition from overheating of the material; however, given the moisture content, the risk of this occurring is considered to be low. If a fire occurs, the front-end loader can be used to spread the material around to extinguish the smouldering fire. The material is moved in and out of the building very quickly so the risk of the material overheating is unlikely to occur.

The green waste will be separated into manageable piles to reduce the likelihood of fire spread and larger uncontrollable fires.

### Conclusion

The assessment shows it is acceptable for the building to be Type C construction.

## 2.4 Compliance with Performance Requirement C1P2

**C1P2 Spread of fire**
*A building must have elements which will, to the degree necessary, avoid the spread of fire:*

- *To exits; and*
- *To sole-occupancy units and public corridors; and*
- ***Between buildings**; and*
- *In a building.*

Avoidance of the spread of fire must be appropriate to:

| Performance Requirement | Comment |
|---|---|
| *The function or use of the building* | The building will be used for the processing of raw fogo, where a front-end loader will pick up the fogo and load it into a depackaging machine. The depackaging machine separates the fogo, with the contaminates going to one side and the clean fraction to the other side. The contaminated fraction is taken outside by front end loader and loaded into a waste bin and taken to landfill. The clean fraction is then picked up by a front-end loader and taken outside the facility. |
| *The fire load* | Taken into account in the assessment |
| *The potential fire intensity* | |
| *The fire hazard* | |
| *The number of storeys in the building* | The building is single storey |
| *Its proximity to other property* | The proposed building is ≥6m from the nearest building |
| *Any active fire safety systems installed in the building* | The building is provided with an onsite fire hydrant system |
| *The size of any fire compartment* | The size of the fire compartment has been considered in the assessment. |
| *Fire brigade intervention* | The fire hydrant system is addressed by Performance Solution 2 |
| *Other elements they support* | None of the building elements require a fire rating |
| *The evacuation time* | Addressed by Performance Solution 3 |

It is concluded the requirements of Performance Requirement C1P2 have been met to the degree necessary.

# 3.0 Performance Solution 2 – Fire hydrant system

## 3.1 Purpose of the assessment

It is proposed to use the farm building fire hydrant requirements for the proposed building. The purpose of this assessment is to determine whether:

- The farm building fire hydrant requirements are suitable for fire brigade intervention.

The IFEG and AFEG sub-system that directly relates to the Performance Solution is sub-system F (Fire Services Intervention). The description of the relevant sub-systems is provided below:

| Sub-system F<br>SS-F<br>Fire Services Intervention | Sub-system F (SS-F) is used to analyse the effects of the intervention activities of fire services on a fire including the effectiveness of suppression activities. |
|---|---|

The relevant Performance Requirement applicable to the assessment is:

**E1P3 Fire hydrants**
*A fire hydrant system must be provided to the degree necessary to facilitate the needs of the fire brigade appropriate to:*

- *Firefighting operations; and*
- *The floor area of the building; and*
- *The fire hazard.*

## 3.2 Hazard identification and mitigating measures

The potential hazards associated with the proposed Performance Solution include:

- There may not be sufficient fire hydrant water to deal with the fuel load present in the subject fire compartment.

The aim of the fire engineering solution is therefore to show that:

- 20L/s or 2 outlets flowing simultaneously for 2 hours is sufficient for the fire load present in the building.

## 3.3 Assessment

Under a DTS Solution, a Class 6, 7 or 8 fire compartment having a floor area of ≤ 5,000m$^2$, is required to have 2 outlets flowing simultaneously for 4 hours as per Table 2.2.5(B) below:

**Table 2.2.5(B) — Number of fire hydrant outlets required to flow simultaneously — Class 2 to Class 9 buildings (excluding Class 7a open deck car parks)**

| NCC building classification | Fire compartment floor area, $m^2$ | Number of fire hydrant outlets |
|---|---|---|
| NON-SPRINKLER-PROTECTED BUILDINGS | | |
| 2, 3, 5 and 9 (having a rise in storeys less than 2) | ≤ 1 000 | 1 |
| 2, 3, 5 and 9 (having a rise in storeys less than 2) | > 1 000 ≤ 5 000 | 2 |
| 2, 3, 5 and 9 (having a rise in storeys of more than 2) | ≤ 500 | 1 |
| 2, 3, 5 and 9 (having a rise in storeys of more than 2) | > 500 < 5 000 | 2 |
| 6, 7 and 8 | ≤ 500 | 1 |
| 6, 7 and 8 | > 500 ≤ 5 000 | 2 |
| All classes | > 5 000 < 10 000 | 3 |

**It is proposed to use the farm building fire hydrant requirements for the proposed building. The requirements are outlined below:**

(2) A *farm building* referred to in (1) must be—
- (a) provided with a fire hydrant system installed in accordance with AS 2419.1, except reference to '4 hours' water supply in clause 4.2 is replaced with '2 hours'; or
- (b) located on the same allotment as an access point to a water supply which—
  - (i) has a minimum total capacity of 144,000 litres; and
  - (ii) is situated so as to enable emergency services vehicles access to within 4 m; and
  - (iii) is located within 60 m of the building and not more than 90 m from any part of the building.

(3) For the purposes of (2)(b), water supply for a *farm building* must consist of one or any number of the following:
- (a) A water storage tank.
- (b) A dam.
- (c) A reservoir.
- (d) A river.
- (e) A lake.
- (f) A bore.
- (g) A sea.

(4) If the whole or part of the water supply referred to in (2)(b) is contained in a water storage tank, it must be—
- (a) located not less than 10 m from the building; and
- (b) fitted with at least one small bore suction connection and one large bore suction connection where—
  - (i) each suction connection is located in a position so as to enable emergency service vehicles access to within 4 m; and
  - (ii) the suction connections are located not less than 10 m from the building; and
  - (iii) 'small bore suction connection' and 'large bore suction connection' have the meanings contained in AS 2419.1.

**In summary, the proposed fire hydrant system will be based on the following:**

- **The provision of a fire hydrant water storage tank with a minimum capacity of 144,000 litres, providing a water supply for 2 hours.**
- **The water supply providing 20L/s or 2 outlets flowing simultaneously.**
- **Fire brigade appliance access to the water storage tank within 4m.**
- **The water storage tank will be located within 60m of the building and not more than 90m from any part of the building.**
- **The water storage tank will be located ≥10m from the building.**
- **The water storage tank will be fitted with at least one small bore and one large bore suction connection.**
- **The suction connections will be positioned to enable the fire brigade appliance access to within 4m.**
- **The suction connections will be located ≥10m from the building.**

## Cooling capacity of water

The Fire Brigade Intervention Model (FBIM) indicates 5 litres of water has an extinguishing capacity of 8MW, 10 litres of water has an extinguishing capacity of 16MW, and 20 litres of water has an extinguishing capacity of 32MW. The heat release rate (HRR) will decay if the cooling capacity is equal to or greater than 110% of the HRR. Accordingly, the capacity of water supplied from a single hose at 10L/s is equal to:

Flow rate/5L/s x (8MW/1.1) which gives 10L/s/5L/s x (8MW/1.1) = **14.5MW**. A flow rate of 20L/s gives a cooling capacity of **29MW.**

The FBIM states the application of water on a fire will either result in fire decay (extinguishment), the fire will be controlled (fire remains constant), or the application of water has no effect. The table below summarises the 3 conditions:

| Application of water on a fire | Outcome |
|---|---|
| The heat release rate will decay at an appropriate rate and the fire will be extinguished over time if at the time of water application, the cooling capacity is equal or greater than 110% of the heat release rate. | Decay |
| The heat release rate will be controlled and remain constant if at the time of water application, the cooling capacity is within a +/- 10% range of the heat release rate. | Constant |
| The heat release rate will remain unaffected and the fire continue to grow if at the time of water application, the cooling capacity is equal to or less than 90% of the heat release rate. | No effect |

| Effect of internal fire attack | | | | | |
|---|---|---|---|---|---|
| Applied water (L/s) | hrr (MW) | 110% hrr | 90% hrr | Extinguishing capacity (MW) | Result |
| 5 | 5 | 5.5 | 4.5 | 8 | Decay |
| 10 | 10 | 11 | 9 | 16 | Decay |
| 20 | 30 | 33 | 27 | 32 | Constant |
| 20 | 40 | 44 | 36 | 32 | No effect |
| 30 | 40 | 44 | 36 | 48 | Decay |
| 30 | 50 | 55 | 45 | 48 | Constant |

| Effect of external fire attack | | | | | |
|---|---|---|---|---|---|
| Applied water (L/s) | hrr (MW) | 110% hrr | 90% hrr | Cooling capacity (MW) | Result |
| 10 | 5 | 5.5 | 4.5 | 5.25 | Constant |
| 20 | 10 | 11 | 9 | 10.5 | Constant |
| 30 | 10 | 11 | 9 | 15.75 | Decay |
| 40 | 15 | 16.5 | 13.5 | 21 | Decay |
| 40 | 30 | 33 | 27 | 21 | No effect |

Table 5.4: Effect of water application on heat release rate

Table 5.4 from the FBIM shown above summarises the effects of internal and external fire attack based on the amount of water applied to the fire and the HRR.

If the HRR is greater than 29MW by the time fire fighters arrive on site, 2 hose lengths flowing 10L/s each (20L/s) will not be sufficient to extinguish the fire. Once flashover occurs, extinguishment is no longer possible until the fire reaches the decay stage where 80% of the fuel has been consumed.

The time 29MW will be reached can be calculated. If we assume the fire has a Medium $t^2$ HRR, the time will be:

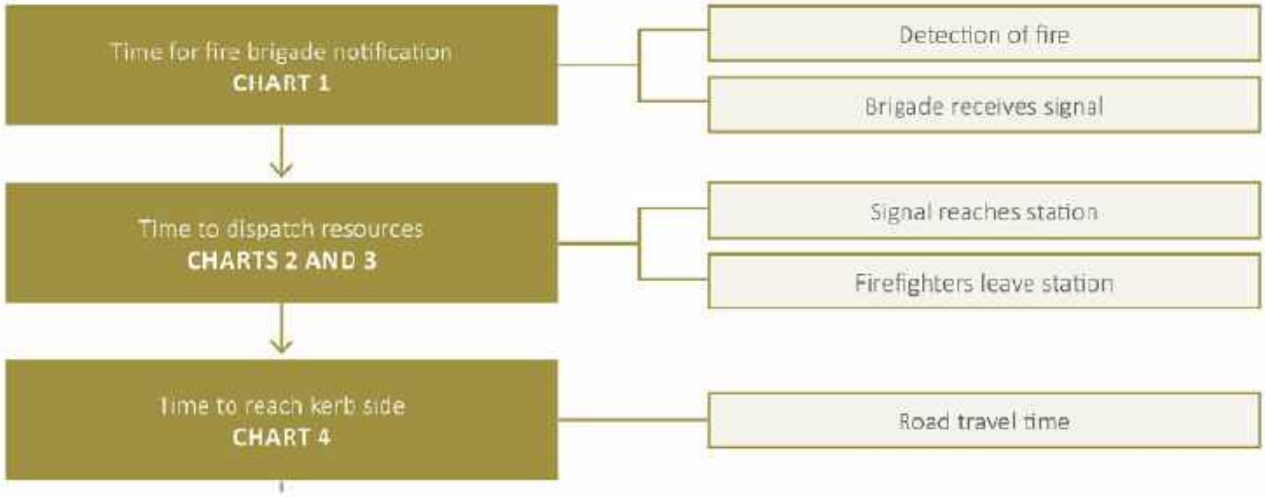
300√29MW = 1,616 seconds or 26.9 minutes

or if the fire has a Fast $t^2$ HRR, the time will be:

150√29MW = 808 seconds or 13.5 minutes

## Fire Brigade Intervention Model

The FBIM can be used to determine the likely arrival time of the responding fire brigade. Charts 1 to 4 estimate the time it will take for the fire brigade to reach kerb side (reach the subject building).

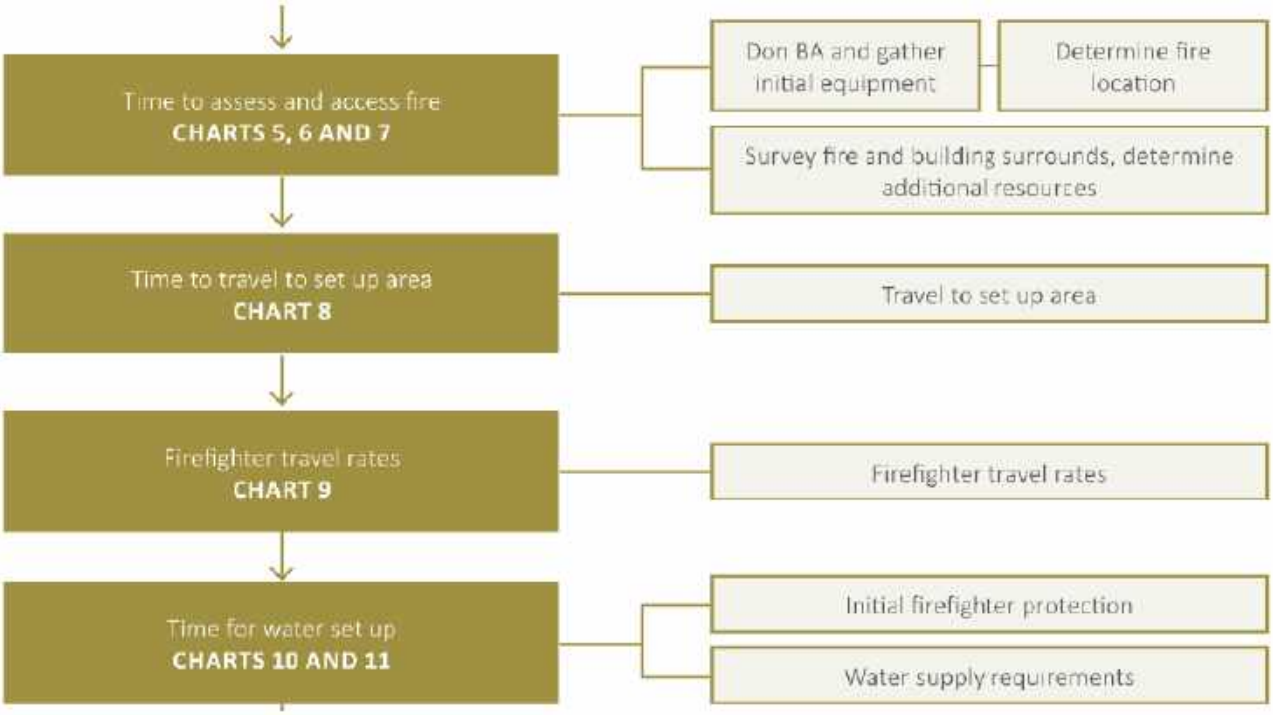



The times for the various activities are summarised in the table below:

| Activity | Time (s) | Comments |
|---|---|---|
| **Chart 1 Time for fire brigade notification** | | |
| Time to verify fire | 60 | Notification by mobile phone by an on-site worker |
| Time delay for access, dial and connection | 30 | |
| Time to transmit information to fire brigade | 90 | |
| **Charts 2 & 3 Time to dispatch resources** | | |
| Time to receive and take down verbal information | 60 | |
| Time to relay dispatch information | 30 | Dispatch by phone |
| Time to travel to fire station, dress, assemble, assimilate information and leave station | 480 | Fire station not staffed full time |
| Time to respond and depart fire station | 570 | |
| **Chart 4 Time to reach kerb side** | | |
| Travel time | 840 | Nearest fire station is Chidlow Volunteer Bushfire Brigade, 14.1km away. Travel time is assumed to be 14 minutes. |

| | | |
|---|---|---|
| | 900 | Next closest station is Wooroloo, 14.3km away. Travel time is 15 minutes. |
| **Total time to kerb side of 1st appliance** | **1,500** | **25 minutes to kerb side** |

The following charts outline the activities fire fighters carry out prior to carrying out a search and rescue or commence fighting the fire.



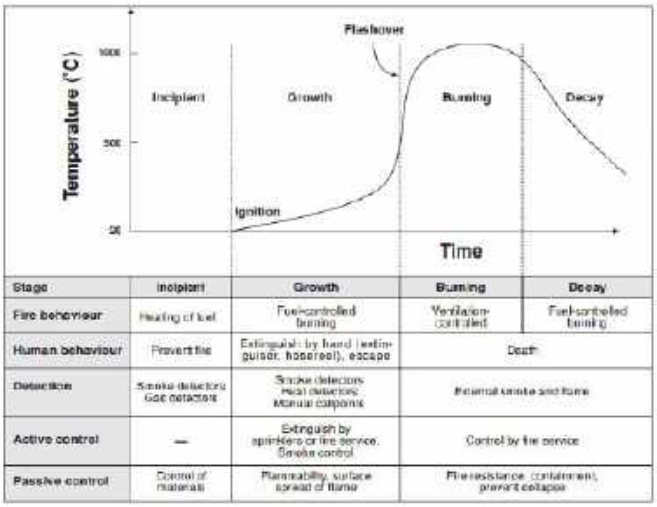

The times for the various activities are summarised in the table below:

| Activity | Time (s) | Comments |
|---|---|---|
| **Charts 5, 6 & 7 Time to assess and access fire** | | |
| Time to travel through the site | 477 | Estimated time to reach building location from the road travelling at 8km/h for a distance of 1050m. |
| Time to communicate with fire warden | 45 | Building >1000<5000 |
| Time for information gathering | 30 | Building <5000 |
| **Total time taken to determine fire location** | **552** | |
| Time to dismount fire appliance & don BA | 123 | Mean + standard deviation |
| Time to conduct safety procedures | 54 | Mean + standard deviation |
| **Total time to don safety equipment** | **177** | |
| Time for fire assessment | 0 | Location of fire is obvious without reconnaissance |
| **Chart 8 Time to travel to set up area** | | |
| Time taken to set up area | 0 | Internal travel already taken into account under Chart 5 |
| **Chart 9 Firefighter travel rates** | | |
| Horizontal travel | 10 | Assume a distance of 20m at a travel speed of 2m/s |
| **Total time to travel internally** | **10** | |

| | | |
|---|---|---|
| **Charts 10 & 11 Time for water set up** | | |
| Time to position appliance at appropriate entrance | 5 | In this case it is to position the appliance within 4m of the water storage tank. 2m/s. Assume 10m travel distance. |
| Time to lay and charge necessary hose from appliance | 34 | V4.1 Charge delivery hose from appliance |
| Total time to set up water for initial firefighting protection | 34 | |
| Time to obtain static water | 65 | Remove suction hose and connect to tank. Prime suction hose from tank. Mean + standard deviation. |
| Total time taken to set up water requirements | 65 | |
| **Total time required for water set up** | **838** | Charts 5 to 11 |

**Total time from dispatch to water set up is 2,338 seconds or 39 minutes.**

## Building heat release rate profile




| Stage | Incipient | Growth | Burning | Decay |
|---|---|---|---|---|
| Fire behaviour | Heating of fuel | Fuel-controlled burning | Ventilation-controlled | Fuel-controlled burning |
| Human behaviour | Prevent fire | Extinguish by hand (extinguisher, hosereel), escape | Death | |
| Detection | Smoke detectors, Gas detectors | Smoke detectors, Heat detectors, Manual callpoints | Thermal smoke and flame | |
| Active control | — | Extinguish by sprinklers or fire service, Smoke control | Control by fire service | |
| Passive control | Control of materials | Flammability, surface spread of flame | Fire resistance, containment, prevent collapse | |

*Figure 4.2: Typical fire development curve*

Figure 4.2 from the NZ Fire Engineering Design Guide[1] shows a typical fire development curve. The curve is made up of several stages (incipient, growth, burning and decay). To assess the likely fire size and stage of development of a fire in the subject building at the time of fire brigade intervention, a fire will be assumed to occur in the building. The worst credible design fire when considering firefighting is a ventilation-controlled fire. A ventilation-controlled fire means the size of the fire is limited by the available ventilation, regardless of the amount of fuel that is present in the building. A ventilation-controlled fire is therefore always the largest possible fire that can occur in any given compartment.

To model the building HRR profile, the growth stage, flashover, the burning stage, and decay stage have to be defined. For this assessment we only need to consider the following:

- The fire growth rate (Heat release rate).
- Whether flashover will occur, and the time it occurs?
- The time fire brigade intervention will occur to determine whether flashover can be prevented?

[1] NZ Fire Engineering Design Guide, 3rd Edition, NZ Centre for Advanced Engineering, Christchurch, NZ, 2008

## Fire growth rate

Given the moisture content of FOGO, it is reasonable to assume a Medium $t^2$ fire is representative of a FOGO fire. For a truck fire or a front-end loader fire, a Fast $t^2$ fire is a reasonable representation of such a fire.

## Flashover

CIBSE Guide E states a presentation and comparison of the different correlations which are available to predict the conditions which give rise to flashover are given in the SFPE Handbook. The simplest of these relates the heat release rate required for flashover, $Q_f$ (kW), to what has become known as the ventilation factor ($A_{vo}\sqrt{h_o}$), such that

$$Q_f = 600\, A_{vo}\sqrt{h_o}$$

where $Q_f$ is the heat release rate required for flashover (kW), $A_{vo}$ is the area of the opening to the compartment ($m^2$) and $h_o$ is the height of the opening (m).

The proposed building will have two roller doors measuring 5m wide by 5m high. This gives a total opening area of $50m^2$ (2 x $25m^2$). The height of each opening is 5m.

$$Q_f = 600\ (50m^2)\ (\sqrt{5})$$
$Q_f$ = 67,082 kW or **67MW**

If we assume a Medium $t^2$ fire, it will take 2456 seconds or **41 minutes** ($300\sqrt{67}$) to reach 67MW, or 1228 seconds or **21 minutes** ($150\sqrt{67}$) if it is a Fast $t^2$ fire.

## Time fire brigade intervention will occur

The estimated fire brigade intervention time is 39 minutes. If the fire is a Fast $t^2$ fire, flashover is likely to have already occurred prior to fire brigade arrival. If the fire is a Medium $t^2$ fire, flashover may not have occurred, however, the HRR at 39 minutes is 60MW. From the table below, 20L/s of applied water will have no effect. Even if the fire brigade is able to apply 30L/s of water, decay is not possible. It is more likely the outcome will be no effect until decay commences when 80% of the fuel has been consumed.

| Effect of internal fire attack | | | | | |
|---|---|---|---|---|---|
| Applied water (L/s) | hrr (MW) | 110% hrr | 90% hrr | Extinguishing capacity (MW) | Result |
| 5 | 5 | 5.5 | 4.5 | 8 | Decay |
| 10 | 10 | 11 | 9 | 16 | Decay |
| 20 | 30 | 33 | 27 | 32 | Constant |
| 20 | 40 | 44 | 36 | 32 | No effect |
| 30 | 40 | 44 | 36 | 48 | Decay |
| 30 | 50 | 55 | 45 | 48 | Constant |

Apart from the FOGO, a maximum of 2 trucks and a front-end loader will be present in the building at any one time, with the 2 trucks separated by a significant distance. A front-end loader fire is likely to have a peak HRR of 15MW, while a truck fire 15-30MW. The fire may already be in the decay stage by the time fire fighters will arrive on site. Sufficient water will be available to deal with these individual fires.

**Conclusion**

The assessment shows fire brigade operations will not be compromised by using the farm building fire hydrant system requirements.

### 3.4 Compliance with Performance Requirement E1P3

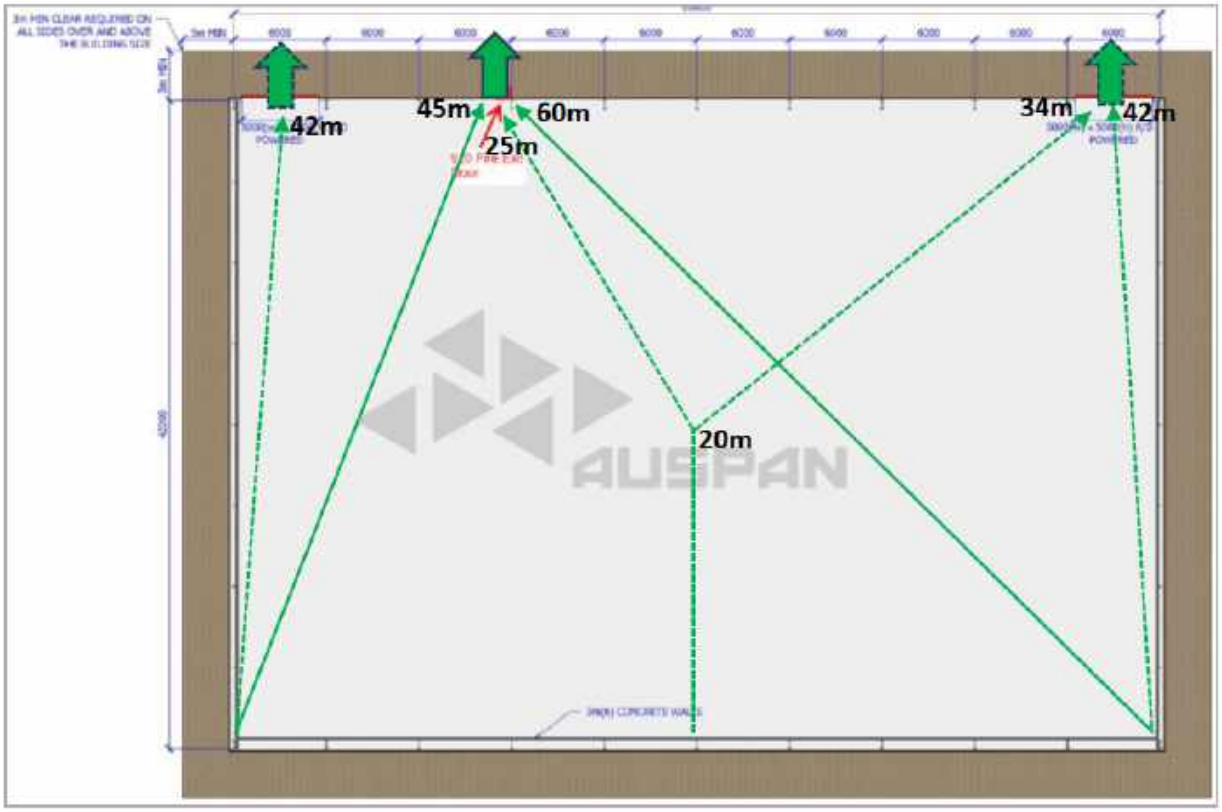
A fire hydrant system must be provided to the degree necessary to facilitate the needs of the fire brigade appropriate to:

| Performance Requirement | Comment |
|---|---|
| *Fire-fighting operations* | Firefighting operations will not be compromised as the assessment shows it is acceptable to provide 20L/s for 2 hours rather than 4 hours, and using the farm building fire hydrant requirements given the response will be by a volunteer bushfire brigade. |
| *The floor area of the building* | Considered in the assessment. |
| *The fire hazard* | Considered in the assessment. |

It is concluded the requirements of Performance Requirement E1P3 have been met to the degree necessary.

# 4.0 Performance Solution 3 – Egress

## 4.1 Purpose of the assessment




The purpose of this assessment is to determine whether it is acceptable to:

1. The travel distance to a single exit is 60m instead of the maximum 20m; and
2. Roller doors are being used as alternative exits.

The IFEG and AFEG sub-system that directly relates to the Performance Solution is sub-system E (Occupant Evacuation & Control). The description of the relevant sub-systems is provided below:

| | | |
|---|---|---|
|  | **Sub-system E**<br>Occupant Evacuation & Control | Sub-system E (SS-E) is used to analyse the evacuation of the occupants of a building. This process enables estimates to be made of the times required for occupants to reach a place of safety |

The relevant Performance Requirement applicable to the assessment is:

**D1P4 Exits**

*Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to-*

*(a) To the travel distance; and*
*(b) The number, mobility and other characteristics of occupants; and*
*(c) The function or use of the building; and*
*(d) The height of the building; and*
*(e) Whether the exit is from above or below ground level.*

**E2P2 Safe evacuation routes**

*(1) In the event of a fire in a building the conditions in any evacuation route must be maintained for the period of time occupants take to evacuate the part of the building so that-*
- *(a) The temperature will not endanger human life; and*
- *(b) The level of visibility will enable the evacuation route to be determined; and*
- *(c) The level of toxicity will not endanger human life.*

*(2) The period of time occupants take to evacuate referred to in (1) must be appropriate to-*
- *(a) The number, mobility and other characteristics of the occupants; and*
- *(b) The function or use of the building; and*
- *(c) The travel distance and other characteristics of the building; and*
- *(d) The fire load; and*
- *(e) The potential fire intensity; and*
- *(f) The fire hazard; and*
- *(g) Any active fire safety systems installed in the building; and*
- *(h) Fire brigade intervention; and*

## 4.2 Hazard identification and mitigating measures

The potential hazards associated with the proposed Performance Solution include:

- The hazard is occupants may be exposed to smoke for longer while travelling to the single exit, or the roller doors may be closed and unable to be opened, therefore obstructing a person evacuating.

The aim of the fire engineering solution is therefore to show that:

- The proposed travel distance will still be safe.

## 4.3 Assessment

The building will be provided with 2 roller doors and one egress door. The roller doors will be open while the building is in use to allow movement of semi-trailers and front-end loaders in and out of the building. The occupancy number will be 3 to 4 persons. The occupants will be familiar with their surroundings, including the location of the exit and the two roller doors.

There will be a 3m high concrete wall around both sides and the rear of the building to allow the material to be placed against the external walls. The travel distance to the exit and roller doors will reduce depending on the amount of raw fogo, clean and contaminated material that is present in the building. The worst-case travel distances are shown above.

The proposed travel distances are supported by the following statements in the CIBRE Fire Safety Engineering Guide[2].

[2] CIBRE Guide E Fire Safety Engineering, 4th Edition, The Chartered Institution of Building Services Engineers, June 2019

> In large open areas, travel distances substantially in excess of those specified in fire safety design codes may be acceptable, provided that the exits are clearly visible and accessible.

> In most buildings with a high occupant density, the occupants will be distributed throughout the accommodation and those people located nearest to an exit will have a very short travel time of only a few seconds. Individuals who are located some distance from an exit will clearly take longer. However, unless the time taken to move to the exit exceeds the notional evacuation time (typically 2½ minutes), the individuals may still have to queue on arrival at the exit doorway. Therefore, in many cases, unless the distance to be travelled exceeds 150 m, travel distance is unlikely to have a dominant effect on the overall evacuation time, i.e. 150 m can be travelled in about 2 minutes at a speed of 1.2 $m \cdot s^{-1}$. Even at 0.6 $m \cdot s^{-1}$, over 70 m can be traversed in 2 minutes.

The CIBRE Guide states where there are open areas, the travel distances can be substantially increased provided the location of the exits are clearly visible and accessible. A travel distance of 150m can be achieved within 2 minutes travelling at a speed of 1.2m/s. 60m, which is the longest distance in the building to reach the exit that leads directly to open space, can be reached within 50 seconds or less than 1 minute. The travel time will be even shorter if the occupant travels to one of the two roller doors.

Apart from passive or active fire life safety systems, the other variable that can influence an evacuation route is the ceiling height. F5D2 gives the following ceiling heights in a Class 7 or 8 building:

> The height of rooms and other spaces in a Class 5, 6, 7 or 8 building must be not less than—
> (a) except as allowed in (b) and (8) — 2.4 m; and
> (b) for a corridor, passageway, or the like — 2.1 m.

The minimum permitted ceiling height in a workshop or carpark is 2.4m. The average ceiling height in the building is 12.75m. This height is substantially higher than the minimum ceiling height of 2.4m and provides a significant smoke reservoir which ensures the smoke layer remains above head height for much longer.

> (b) must not be fitted with a roller shutter or tilt-up door unless—
> (i) it serves a Class 6, 7 or 8 building or part with a *floor area* not more than 200 $m^2$; and
> (ii) the doorway is the only *required exit* from the building or part; and
> (iii) it is held in the open position while the building or part is lawfully occupied; and

The BCA allows the use of a roller shutter or tilt-up door where the Class 8 building has a floor area not more than 200$m^2$, the doorway is the only required exit from the building, and it is held in the open position while the building is lawfully occupied.

Whilst the floor area of the building far exceeds the maximum 200$m^2$, the same principle applies. The two roller doors will be in the open position while the building is being occupied to allow semi-trailers to enter the building and for the front-end loader to move material in and out of the building. If both roller doors are closed, occupants can use the exit door to evacuate the building.

The exit door and two roller doors will be provided with an illuminated exit sign to ensure occupants will be able to identify the location of the exits. It will be a condition of the Performance Solution to have the two roller shutters open for a minimum height of 2m while the building is being occupied.

**Conclusion**

The assessment has shown the proposed travel distances in the proposed building are acceptable.

## 4.4 Compliance with Performance Requirement D1P4 & E2P2

**D1P4 Exits**

Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to-

| Performance Requirement | Comment |
|---|---|
| *The travel distance* | The assessment has shown the proposed travel distances in the proposed building are acceptable. |
| *The number, mobility and other characteristics of occupants* | The building use is for the initial processing of FOGO which is a low occupancy use (3 to 4 persons). Occupants will be familiar with the layout of the building and the location of the exits. |
| *The function or use of the building* | Initial processing of FOGO. |
| *The height of the building* | The building is single storey. There is no vertical travel required to reach open space. |
| *Whether the exit is from above or below ground level* | The exits are from above, which the BCA considers a safer scenario. |

It is concluded the requirements of Performance Requirement D1P4 have been met.

**E2P2 Safe evacuation routes**

In the event of a fire in a building the conditions in any evacuation route must be maintained for the period of time occupants take to evacuate the part of the building so that-

| Performance Requirement | Comment |
|---|---|
| *The temperature will not endanger human life* | The large smoke reservoir and low fire load will ensure the potential exposure to temperature will be equivalent or better than a DTS solution. |
| *The level of visibility will enable the evacuation route to be determined* | The large smoke reservoir and high ceiling height will ensure the visibility will be equivalent or better than a DTS solution. |
| *The level of toxicity will not endanger human life* | The large smoke reservoir and low fire load will ensure the potential exposure to toxic smoke will be equivalent or better than a DTS solution. |

The period of time occupants take to evacuate must be appropriate to-

| Performance Requirement | Comment |
|---|---|
| *The number, mobility and other characteristics of the occupants* | The building use is for the initial processing of FOGO which is a low occupancy use (3 to 4 persons). Occupants will be familiar with the layout of the building and the location of the exits. |
| *The function or use of the building* | Initial processing of FOGO. |
| *The travel distance and other characteristics of the building* | The assessment has shown the proposed travel distances in the proposed building are acceptable. |
| *The fire load* | The fire load, the potential fire intensity, and fire hazard are equivalent to a DTS solution. |
| *The potential fire intensity* | |
| *The fire hazard* | |
| *Any active fire safety systems installed in the building* | The building is provided with a fire hydrant system, and a fire hose reel system for first aid firefighting by the occupants. |

| | |
|---|---|
| *Fire brigade intervention* | Fire brigade intervention is not impacted by the Performance Solution. |

It is concluded the requirements of Performance Requirement E2P2 have been met.

# 5.0 Fire safety system design requirements

The following fire safety system design requirements are applicable to ensure compliance with the Performance Requirements addressed in this report:

## 5.1 Compartmentation and fire resistance

| No. | Requirement | Provision | Design responsibility | Solution |
|---|---|---|---|---|
| 1 | Fire resistance levels | The building is designed to the requirements of Type C construction. No fire resistance levels are required. | Architect/structural engineer | Performance |
| 2 | Fire compartmentation (Floor area & volume) | The fire compartment is permitted to be Type C construction, with the floor area permitted to be 2,520m$^2$ & the volume 32,130m$^3$. | Architect/structural engineer | Performance |
| 3 | Fire hazard properties | The requirements of C1.10 and Specification C1.10 are to be met | Architect | DTS |

## 5.2 Egress

| No. | Requirement | Provision | Design responsibility | Solution |
|---|---|---|---|---|
| 4 | Travel distances | A maximum travel distance of 60m is proposed to a single exit, with the two roller doors providing alternative exits. The roller doors must be kept open for a minimum height of 2m while the building is being occupied. | Architect | Performance |
| 5 | Emergency lighting | As per DTS provisions | Electrical engineer | DTS |
| 6 | Exit signs | Exit signs are to be provided to the exit door and the two roller doors in accordance with the DTS exit sign provisions. | Electrical engineer | Performance |

## 5.3 Fire services equipment

| No. | Requirement | Provision | Design responsibility | Solution |
|---|---|---|---|---|
| 7 | Fire hydrant system | The fire hydrant system will consist of a fire tank holding 144,000 litres of water to either provide 20L/s for 2 hour or 10L/s for 4 hours. The tank will have at least one small bore & one large bore suction connection. Each suction connection will be located so as to enable the fire brigade appliance access to within 4m, and the suction connections will be located not less than 10m from the building. | Hydraulic/fire services engineer | Performance |

| | | | | |
|---|---|---|---|---|
| 8 | Fire hose reel system | A farm building does not require a FHR system where portable fire extinguishers are provided in accordance with I3D11 | Hydraulic/fire services engineer | DTS |
| 9 | Portable fire extinguishers | A portable fire extinguisher rated at not less than 4A60BE is to be provided adjacent to the exit door and the two roller shutters. Location signs complying with Clauses 3.3 to 3.9 of AS 2444 above each required portable fire extinguisher. An onboard portable fire extinguisher is to be provided to the front-end loader. | Architect/fire services engineer | DTS |

### 5.4 Fire brigade intervention

| No. | Requirement | Provision | Design responsibility | Solution |
|---|---|---|---|---|
| 10 | Access to the building | Access to the onsite fire hydrant system is off Horton Road | Hydraulic/fire services engineer | DTS |
| 11 | Access within the building | AS per DTS provisions | Hydraulic/fire services engineer | DTS |

### 5.5 Building management

Maintenance outlined in Section 6.0 and any management in use requirements outlined in Section 5.0 is to be carried out or be complied with.

## 6.0 Maintenance of fire safety systems

The following fire safety systems must be maintained in accordance with the requirements of the AS1851 to ensure the Performance Solutions outlined in this report remain valid:

- Fire hydrant system
- Portable fire extinguishers

The following fire safety systems must be maintained in accordance with the requirements of the AS/NZS 2293.1 to ensure the Performance Solutions outlined in this report remain valid:

- Emergency lighting and exit signs

## 7.0 Conclusion

The information provided in this report shows the fire safety objectives of the Building Code of Australia have been met. Compliance with Performance Requirement C1P2, D1P4, E1P3 & E2P2 have been demonstrated.

The information provided in this report shows it is acceptable to:

- Have an oversized fire compartment of Type C construction.

- Use the farm building fire hydrant system requirements to achieve fire hydrant coverage for the proposed building.
- Have a travel distance of 60m to the exit, and use the 2 roller doors as alternative exits base on the 2 roller doors being open for a minimum height of 2m while the building is being lawfully occupied.

## 8.0 References

1. Building Code of Australia 2022 Volume 1, Australian Building Codes Board.
2. International Fire Safety Engineering Guidelines Edition 2005, Australian Building Codes Board, 2005.
3. CIBRE Guide E Fire Safety Engineering, 4th Edition, The Chartered Institution of Building Services Engineers, June 2019.

## 9.0 Appendices

9.1 Building drawings

9.2 FES Commissioner correspondence

## 9.1 Building drawings


ISSUED FOR APPROVAL
ARCHITECTURAL DRAWINGS
PUREARTH
Lot 13 (324) Horton Road
Woottating WA 6562
Proposed FOGO
Storage Facility
PART SITE PLAN
AUSPAN
AS1733
A102
A
PART SITE PLAN
SCALE 1:500
EXISTING SHED
STORAGE
BOUNDARY LINE
APPROX SETBACK
APPROX
O/A BUILDING
CLEAR
O/A BUILDING


EXISTING SHED
EXISTING TANKS
EXISTING TANK
EXISTING STOCKPILES
EXISTING PADDOCK
EXISTING ROADWAY
DFES ACCESS
DFES HARDSTANDING
FIRE TANK
STORAGE BUILDING 2559m²
FIRE COMPARTMENT 2443m2
INTERNAL 60m FIRE HOSE +10m SPRAY
INTERNAL 35m FIRE HOSE +10m SPRAY
EXTERNAL 63m FIRE HOSE LENGTH
FIRE BRIGADE APPLIANCE
ISSUED FOR APPROVAL
ARCHITECTURAL DRAWINGS
PUREARTH
Lot 13 (324) Horton Road Woottating WA 6562
Proposed FOGO Storage Facility
PART SITE PLAN
AS1733
A103
PART SITE PLAN
SCALE 1:500

## 9.2 FES Commissioner correspondence

Government of **Western Australia**
Department of **Fire & Emergency Services**

DFES
Department of Fire & Emergency Services

Our Ref 502757\1\1
Your Ref: C10648

Phone Enquiries: 9482 1771 Keith Choo
Email: bebadmin@dfes.wa.gov.au

Attention: Helmut Schwanke

[redacted]

Dear Applicant,

**PERFORMANCE-BASED DESIGN BRIEF / FIRE ENGINEERING BRIEF**
**FES COMMISSIONER'S PRELIMINARY ADVICE**

| | |
|---|---|
| Project: | FOGO PROCESSING BUILDING |
| Address: | 324 Horton Road, Woottating |
| Documents Submitted: | FEB Rev 0 03/09/2025, (DFES Lodgement Ref: A1DC4E) |

The Department of Fire and Emergency Services (DFES) and The Department of Mines, Industry Regulation and Safety - Building and Energy Division endorse the methodology of the Australian Fire Engineering Guidelines, including the production of a Performance-Based Design Brief (PBDB) or Fire Engineering Brief (FEB).

A PBDB/FEB for the above project has been submitted to the DFES Built Environment Branch, who has assessed it against the requirements of the National Construction Code Volume One (BCA 2022) insofar as they apply to the current FES Commissioner's Operational Requirements and provides the following preliminary advice.

**PRELIMINARY ADVICE**

**Performance Solution 1 – Oversized Compartment of Type C Construction**
The following issues were identified in the assessment:

**a)** Specific storage height limitation should be included in the fire engineering report and the building occupancy permit. Permanent signage should also be provided within the building to indicate that FOGO waste storage should not exceed 3 m.
**b)** Green waste should be separated into manageable piles to reduce the likelihood of fire spread and larger uncontrollable fires.

The FES Commissioner's advice above should be addressed by the relevant stakeholders; otherwise, the proposed Performance Solution does not meet the

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Performance Requirements of the BCA (C1P2), and FES Commissioner's Operational Requirements (ORG 10).

**Performance Solution 2 – Fire Hydrant System**
The following issues were identified in the assessment:

- **a)** The fuel load assessment provided is based on a green grocer and a carpark, this not considered comparable to this building due to the potential bulk quantity of waste storage and large vehicles within such as front loaders and large trucks. The assessment should focus on the extinguishing capacity and duration of water supply compared to actual credible fire scenarios within this building. DFES expect that the full farm building capacity hydrant water supply be provided as a minimum as this is already a reduction from NCC DtS Class 7b/8 fire hydrant requirements.
- **b)** As this performance solution pertains directly to DFES operations, the performance solution should have been discussed with DFES prior to the submission of the PBDB.
- **c)** The hydrant coverage drawing provided places the fire appliance more than 4m from the fire water tank and within 10m of the building, this should be revised and any impact on hydrant coverage assessed or be revised.

Based on the above, it is the FES Commissioner's advice that the proposed Performance Solution does not meet the relevant Performance Requirements of the BCA (E1P3), and FES Commissioner's Operational Requirements (ORG 1, 4 and 5).

**Performance Solution 3 – Egress**
The following issues were identified in the assessment:

- **a)** The NZ building code should not be used for justification unless it can be shown that the building complies holistically with the NZ building code.
- **b)** DFES prefers that extended travel distances be assessed using a quantitative assessment. The Performance Solution should be updated to quantitatively indicate that occupants can safely evacuate in the event of a fire.

The FES Commissioner's advice above should be addressed by the relevant stakeholders; otherwise, the proposed Performance Solution does not meet the Performance Requirement of the BCA (E2P2), and FES Commissioner's Operational Requirements (ORG 10).

**GENERAL ADVICE**

**Consultation Process**
DFES should be consulted as a relevant stakeholder where a performance solution is required. Early consultation with DFES ensures the design meets DFES Operational requirements. Our records indicate that no consultation has occurred before the lodgement of the Performance Based Design Brief. This is not in line with the process as outlined in the International Fire Engineering Guidelines and Section A of the NCC as appropriate.

**BCA E1D4 considerations**
Stored quantities of goods (height and volume) should form part of the CDC documentation to ensure DtS BCA Clause E1D4 storage limitations applicable to the

building are documented. Buildings with storage (of the type identified) in excess of 1000m$^3$ or 4m in height are considered an occupancy of excessive hazard requiring sprinkler installation.

The following should be noted:

- The above advice is not final. Final advice will be provided at the Fire Engineering Report (FER) stage once the submission has been lodged to DFES in accordance with the Building Regulations 2012 (18B) and DFES Guideline GL-07.
- A response should be appended to a revised PBDB/FEB or form part of the FER submission.
- This advice letter is issued to the private/consultant fire engineer only and should be distributed to all stakeholders.

Should you require any further assistance with this project, please contact the undersigned to discuss.

Yours faithfully

[redacted]

Fire Engineer
Built Environment Branch

22 September 2025

CONSTRUCTIVE
BUILDING
CONSULTANTS
Unit 2, 5 Supreme Loop
Gnangara, WA, 6077
Building Surveying
Building certification
Fire Safety Engineering
Structural engineering
Access consulting
Energy efficiency
Bushfire Attack Level

24 September 2025

FES Commissioner
20 Stockton Bend
Cockburn Central WA 6164

Attention: [redacted]

## FES Commissioner Preliminary Advice

**Project:** **POGO Processing Building**
**Address:** **324 Horton Road, Woottating**

We refer to the FES Commissioner correspondence dated 22 September 2025 (Ref: 502757\1\1) and provide the following comments.

### 1. Performance Solution 1 – Oversized compartment of Type C construction

**(a)** Comment will be considered in the FSER.

**(b)** Comment will be included in the FSER.

### 2. Performance Solution 2 – Fire hydrant system

**(a)** The water storage tank will be increased to 144,000 litres which will provide 20L/s for 2 hours. Only two trucks and one front end loader will be in the building as any one time. The trucks are only in the building for a short time. As soon as unloading is completed the trucks leave the building.

The waste storage does not consist of general waste but consists of garden and food waste. The waste has a high moisture content, reducing the risk of ignition.

The FSER will comment on the extinguishing capacity and the duration of the water supply.

**(b)** Comment noted.

**(c)** The image on Page 11 of the PBDB shows the fire appliance within 4m of the water storage tank, and is also confirmed by item 3 above the image.

### 3. Performance Solution 3 – Egress

**(a)** A performance solution is able to use 'best practice' information to show compliance with the Performance Requirements. The quoted NZ Building Code travel distances are supported by the CIBRE Guide which supports a travel distance of up to 150m with the notional evacuation time of 2.5 minutes. We note DFES request compliance with a British Standard when dealing

with fire spread between buildings, without design the whole building to the British building standards.

**(b)** The comment is noted; however, given the height, volume and openness of the building, the low occupancy number, and the occupants being familiar with the building layout and the location of the exits, there is no need to justify the travel distances by smoke modelling.

Yours sincerely,

[redacted]

**Fire Safety Engineer**
BBldgSurv CQU | MFireSafeEng WSU
BSP287 (WA) | BDC04930 (NSW) | MSFS (Eng Aust)
[redacted]