



Fire and Emergency Management Plan

Armadale Tyre Recycling Plant

Prepared for Tyre Recycling Perth Pty Ltd

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Table of Contents

1	Introduction	4
1.1	Purpose of the Plan.....	4
1.2	Regulatory Context	4
1.3	Scope.....	4
1.4	Regulatory Engagement.....	5
2	Facility Description	6
2.1	Site/Building Overview.....	6
2.2	Facility Layout and Access.....	6
2.3	Process/Operations Description	6
3	Fire Prevention and Mitigation Measures.....	8
3.1	Tyre Processing	8
3.2	Tyre Storage	8
3.2.1	Whole Tyres	8
3.2.2	Shredded Tyres	8
3.2.3	Summary	9
3.3	Building Ventilation.....	9
3.4	Housekeeping and Maintenance	10
3.5	Electrical and Equipment Safety	10
3.5.1	Electrical Safety Controls	11
3.5.2	Equipment Safety Controls	11
3.6	Smoking and Ignition Source Controls.....	11
3.6.1	Smoking Controls	12
3.6.2	Ignition Source Controls.....	12
4	Fire Detection and Suppression Systems	13
4.1	Fire Detection Systems	13
4.2	Firefighting Equipment	13
4.3	Fire Water Supply.....	13
4.4	Inspection, Testing, and Maintenance Schedule	14
5	Firefighting Water Containment.....	16
5.1	Facility Access	16
5.2	Containment Strategy	16
5.2.1	Within the Building	16
5.2.2	At the Sea Container	17

5.2.3	Fire Aftermath	17
5.3	Inspection, Testing, and Maintenance Schedule	18
6	Emergency Preparedness and Response	19
6.1	Emergency Response Structure	19
6.2	Emergency Evacuation Procedure	19
6.3	DFES and Emergency Services Notification Procedure	19
6.4	Spill and Major Incident Response	19
6.5	Induction and Fire Safety Training	20
7	Fire Hazard Risk Assessment	21
7.1	Sources of Fire Ignition	21
7.2	Combustible Materials Inventory	21
7.3	Pathways of Potential Contamination or Harm	22
7.4	Receptors of Potential Contamination or Harm	22
7.5	Risk Rating Matrix	22
7.6	Risk Profile.....	25
7.7	Residual Risk Profile	26

Tables

Table 3-1:	Summary Tyre Storage Design	9
Table 4-1:	Summary of Indicative Inspection, Testing, and Maintenance Schedule for Fire Alarms ...	14
Table 4-2:	Summary of Indicative Inspection, Testing, and Maintenance Schedule for Fire Extinguishers	14
Table 5-1:	Inspection, Testing, and Maintenance Schedule	18
Table 7-1:	Combustible Materials Onsite	21
Table 7-2:	Generic Receptors that may be Impacted by Potential Contamination or Harm.....	22
Table 7-3:	Risk Assessment Matrix	22
Table 7-4:	Consequence of Risk Occurring†	24
Table 7-5:	Likelihood.....	25
Table 7-6:	Risk Treatment Table†	25
Table 7-7:	Fire Risk Assessment	26

Appendices

APPENDIX A Drawings

APPENDIX B Flow Rate Test Report

APPENDIX C Equipment Specifications

1 Introduction

1.1 Purpose of the Plan

This Fire and Emergency Management Plan (FEMP) outlines the arrangements for preventing, detecting, responding to, suppressing, containing, and controlling fire and emergency events at the proposed establishment of a tyre recycling plant at Unit 1, 12 Dickens Place, Armadale (the Site). The Site is to be operated by Tyre Recycling Perth Pty Ltd as a Prescribed Premise under Part V of the Environmental Protection Act 1986 (EP Act).

The FEMP has been developed to satisfy the Department of Water and Environmental Regulation (DWER) Request for Further Information (RFI Item #5) under the Works Approval application for the premises at Unit 1, 12 Dickens Place, Armadale.

Its primary purpose is to:

- Identify potential fire and ignition hazards associated with the storage and mechanical processing of used tyres;
- Describe the engineering and operational measures that minimise the likelihood and consequences of a fire;
- Demonstrate that adequate firefighting water supply, containment capacity, and access for emergency services are provided; and
- Establish procedures for emergency response, evacuation, communication, training, and continual review of fire-safety performance.

1.2 Regulatory Context

This FEMP has been prepared in accordance with the following legislation, standards, and guidance:

- Environmental Protection Act 1986 (WA) – Part V Division 3 (Works Approvals);
- Work Health and Safety Act 2020 (WA) and subsidiary regulations;
- Department of Fire and Emergency Services (DFES) Guideline GN02 (2023) – Bulk Storage of Rubber Tyres Including Shredded and Crumbed Tyres (DFES GN02);
- DFES GL-11 (2023) – Site Planning and Fire Appliance Specifications; and
- AS 3745:2010 Planning for Emergencies in Facilities (as amended).

The plan also aligns with the operational scope authorised under the Works Approval and forms part of the Site's Environmental Management System.

1.3 Scope

The FEMP applies to all operations undertaken within a warehouse that is approximately 18m × 18m and associated hardstand areas at Unit 1, 12 Dickens Place, Armadale.

It covers:

- Storage of up to 1,100 whole tyres;
- Mechanical processing (de-beading, shredding, conveying);

- Storage of shredded rubber and recovered steel beads in single-layer bulka bags;
- Fuelling and maintenance of mobile plant;
- Fire-fighting water containment and drainage systems; and
- All employees, contractors, and visitors present at the Facility.

1.4 Regulatory Engagement

In November 2025, TRP and Talis met with representatives from the DWER as well as the Built Environment Branch and HAZMAT branch of the Department of Fire and Emergency Services (DFES) to discuss the Site and offer advice and feedback which was incorporated within this FEMP.

In March 2025, the District Officer Hills for DFES confirmed that the Site falls within the gazetted fire district and ESL boundary for Armadale. Therefore, there are no requirements to solicit feedback from the Community Emergency Services Manager Serpentine-Jarrahdale or the District Officers from the Cockburn, Cardup or Hope Valley stations. The District Officer Hills was also able to outline the following information with regards to the local DFES response to a fire incident at the Site:

- Local Stations:
 - Armadale Career Fire and Rescue Service (CFRS) is the closest station (2.56km away by road);
 - Cardup CFRS (11.2km) and Maddington CFRS (14.82km) are the next stations to responded;
 - Armadale Volunteers would also be mobilised to support the career response;
- Staffing Levels:
 - All three local stations are crewed 24/7 with Armadale and Maddington consisting of one officer and 3 firefighters and Cardup staffing at one officer and 5 firefighters;
- Local Station Response:
 - If an incident was to occur at the Site, then DFES would classify as a 3rd alarm response which would see a minimum of 3 stations responded in the first instance;
 - The 3 closest stations mentioned above all have a structural firefighting appliance capable of delivering 4,500 litres per minute and one smaller 4 x 4 light tanker. Cardup CFRS has an additional 3,000 litre 4 x 4 tanker;
 - Response time from Armadale CFRS to be within 2-4 minutes if on station;
 - Response time from Cardup CFRS would be 6-8 minutes if on station;
 - Response time from Maddington CFRS would be 8-10 minutes if on station; and
 - All response times could be shorter or longer depending on the crew's location within their own fire district at time of call.

In addition, the Armadale CFRS would require the most up-to-date copy of this FEMP to be provided, and a site familiarisation visit with the Armadale CFRS would be scheduled once the Site is operational.

2 Facility Description

2.1 Site/Building Overview

The Facility is located at Unit 1, 12 Dickens Place, Armadale WA, within an established light-industrial area. It comprises a 18m × 18m steel-framed warehouse with concrete hardstand, an adjoining admin building, a single roller-door access on the eastern side, and two pedestrian access doors. The warehouse has two skylights in the centre of the roof and one roof turbine along the building roof's eastern edge (i.e. passive ventilation from the two mechanical ventilation fans within the building).

According to the engineering plans requested from the City of Armadale (attached in Appendix A), the building was constructed in the late 1900s. There is a fire wall between Unit 1 and Unit 2, which has a rating of 120/90 (insulation/structural adequacy). The calculations for determining the fire wall rating are provided in Appendix A.

The building's stormwater system consists of four drains within the building's car parking area. These drains are soakwells that are linked with PVC piping that ultimately diverts stormwater run-off to the main stormwater drain along the roadside.

The layout of the building overall is shown in Drawing W-100, provided in Appendix A.

2.2 Facility Layout and Access

The equipment to be used for the processing of whole tyres at the Site includes the following:

- Shredder (Model YX-1000) with conveyor belts;
- Tyre Cutter (Model JQ700); and
- Debeader (Model LSJ-800).

The equipment specifications can be found in Appendix C.

Drawing W-101 (Appendix A) illustrates the proposed internal warehouse configuration and external hardstand. Key features include the following:

- Whole-tyre storage bay: 30m² (≈ 5m × 6m) footprint, stacked to a maximum height of 3.7m;
- L-shaped processing line: de-beader, conveyor, and shredder centrally located;
- Product-storage area: 11m × 2m (22m²) single-layer bulka-bag area along the eastern wall;
- Internal access pathways: ≥ 3m clear aisles between storage zones and 3m clearance from walls for firefighter movement and hose access; and
- External fire-appliance access: hardstand apron directly outside the roller door for DFES staging in accordance with DFES GL-11 (2023).

2.3 Process/Operations Description

The Facility receives, stores and mechanically processes end-of-life tyres into shredded rubber and recovered steel beads for recycling. The key process stages are as follows:

1. Delivery and unloading of whole tyres into the designated storage bay;
2. De-beading to remove embedded steel;

3. Primary shredding via a medium-duty twin-shaft shredder rated at approximately 300–500 tyres per hour (5–8 tyres per minute);
4. Conveying and bagging of shredded rubber into bulka bags; and
5. Daily removal of shredded rubber and steel beads from the building and stored in sea container which will be emptied/delivered to downstream recyclers frequently.

Whole-tyre inventory is actively managed to ensure the stockpile does not exceed 30m² in footprint or 3.7m in height, in accordance with DFES Guidance Note 2 (2023). Deliveries are staggered and fed directly to the processing line to maintain continuous turnover and prevent accumulation beyond the permitted stockpile dimensions. Storage of whole tyres during the daytime to be in a designated area that is separated with a metal fence or equivalent form of infrastructure, and there will be no overnight storage of whole tyres.

Operations will cease one hour before the end of the working day in order to undertake daily wipe-down of all equipment following shut down and general housekeeping.

The product storage area within the building is a temporary daytime storage area while personnel are on site. There will also be no overnight storage of tyre shreds within the building. Any remaining tyre shreds not taken offsite at the end of the day will be stored overnight within a sea container (minimum 20 feet) in the front parking lot outside of the administration building. The doors of the sea container will be kept closed when not loading or unloading.

DFES previously advised that the sea container should have a minimum separation distance of 3m from any fire source features, boundary without a fire wall or from fire spread paths to combustible/non-fire rated walls or opening. The location of the sea container should also provide free access (minimum 3m) to container doors openings. The proposed location of the sea container in the front parking lot outside of the administration building satisfies these conditions.

All of these operational practices intend to have no tyres or tyre materials stored within the building overnight which is the biggest risk of an out-of-control fire establishing (i.e. when there are no personnel onsite who can attend to any fire incidents).

3 Fire Prevention and Mitigation Measures

3.1 Tyre Processing

The shredder is equipped with an integrated water spray system, which mitigate both temperature rise and dust levels during the shredding process through moisture control, in accordance with DFES GN02.

To reduce the risk of spontaneous combustion of the resulting tyre shred product, the minimum size of the tyre shred produced is 70mm, which allows for a lower surface-area-to-volume ratio and sufficient void space for air movement within a tyre shred stockpile.

Heating may still be possible in deep piles. Therefore, the tyre shred will be stored in bulk bags that allow only a maximum height of 1m and will be open at the top to allow air flow.

3.2 Tyre Storage

3.2.1 Whole Tyres

Whole tyres are stored within a single stockpile located inside the warehouse on the concrete hardstand floor and partially enclosed within a cage to mitigate the rolling of whole tyres during a fire emergency. The stockpile is restricted to a maximum footprint of 30m² and a maximum height of 3.7m, consistent with DFES GN02. These dimensions represent the absolute limit of storage at any one time.

The whole tyre storage area within the warehouse is positioned to maintain:

- ≥ 3m separation from internal walls and structural columns;
- ≥ 3m wide access aisles on at least two sides to allow fire-fighter movement and hose access; and
- A minimum 3m separation from the product-storage area (shredded rubber and steel beads) and processing equipment, as required by DFES GN02.

3.2.2 Shredded Tyres

The shredded tyres that have been processed will be packed into bulka bags for easy transport and either temporarily stored within the warehouse during operations prior to being transferred into a truck for transport offsite or directly into a sea container located in the front car park of the facility. This sea container will be taken offsite by a third-party contractor once at capacity and replaced with an empty sea container for continued operations.

The stockpile area within the warehouse is restricted to a maximum footprint of 20m² and the bulka bags will not be stacked within this area, consistent with DFES GN02. These dimensions represent the absolute limit of storage at any one time.

The shredded tyre storage area within the warehouse is positioned to maintain:

- ≥ 3m separation from internal walls and structural columns;
- ≥ 3m wide access aisles on at least two sides to allow fire-fighter movement and hose access; and

- A minimum 3m separation from the whole tyre stockpile area (shredded rubber and steel beads) and processing equipment, as required by DFES GN02.

In the last hour of operations for the day, any remaining bulka bags within the warehouse will be transferred to a sea container located in the front car park of the facility. This is to mitigate risk to the building in the event of a fire due to spontaneous combustion of shredded tyre within a bulka bag, and is intended to provide for a simpler, more manageable fire emergency response from the local Fire Department.

3.2.3 Summary

The tyre storage design is summarised in Table 3-1.

Table 3-1: Summary Tyre Storage Design

Material	Storage Footprint	Height / Volume	Maximum Equivalent Tyres Capacity	Notes
Whole tyres	30m ²	3.7m (≈ 110m ³)	1,100 (tyre size disregarded)	Stacked sidewall down on hardstand floor
Shredded rubber	20m ²	1m (≈ 20m ³ area)	1,000*	Single layer bulka bags
	Sea Container**	2m (≈ 33m ³ area)	1,650*	Stacked bulka bags, loaded back to front
Steel beads	2m ²	1m (≈ 2m ³)	–	Bulka bags or sealed bins

Notes: *Calculation of equivalent tyres based on DWER advice of 2m³ of shredded, broken or pieces of used tyres are to be taken to equal 100 used tyres.

** Approximate Internal Dimensions of 20ft Standard Sea Container (LxWxH): 5.90m x 2.35m x 2.39m.

3.3 Building Ventilation

Following a building assessment undertaken by BCA Consultants in October 2025, the existing ventilation provision is considered to be adequate for the intended use of the space. Natural ventilation requirements are compliant with AS 1668.4: Natural ventilation of buildings. Minimum opening of 5% of floor area (310m²) which equates to 15.5m² and the roller door for the warehouse is approximately 19m². Figure 3-1 shows the layout the mechanical ventilation fans within the warehouse.



Figure 3-1: Photo of Existing Mechanical Ventilation Fans (West to East aspect)

3.4 Housekeeping and Maintenance

Effective housekeeping and preventive maintenance are critical to minimising ignition sources and preventing the build-up of combustible materials within the warehouse.

The following housekeeping measures are to be undertaken:

- The warehouse floor, access aisles, and areas surrounding the tyre and product storage bays will be kept clear of debris, rubber off-cuts, dust, and combustible waste at all times.
- Daily cleaning will occur at the end of each operating shift, including sweeping or vacuuming to remove fine rubber particles that could ignite or smoulder;
- No materials, packaging, or waste will be stored within access pathways, fire-equipment zones, or near electrical panels;
- A weekly visual inspection will verify that fire-safety signage, extinguishers, hose reels, and egress routes remain unobstructed; and
- External hardstand areas and the fire-appliance access zone will be kept free of vehicles, bins, or other obstructions.

3.5 Electrical and Equipment Safety

Effective electrical and equipment safety controls are essential in reducing fire risk at the Site. The combination of high-load machinery, combustible rubber dust, hydraulic systems, and continuous mechanical processing creates multiple potential ignition sources. The following measures represent standard industry practice and form a critical component of a comprehensive fire-prevention strategy.

3.5.1 Electrical Safety Controls

A robust electrical-safety framework reduces the likelihood of ignition caused by electrical faults, overheating, or arcing. Therefore, the key controls include the following:

- Routine inspection and testing of electrical systems to identify deteriorated wiring, loose connections, and overheating components;
- Use of dust-protected, industrial-grade electrical equipment, including sealed switchboards and motor enclosures, to prevent the ingress of rubber dust and debris;
- Overload protection and circuit segregation, ensuring high-load equipment (i.e. tyre shredder) operate on dedicated circuits with appropriate overcurrent protection;
- Lockout/Tagout (LOTO) procedures to prevent accidental energisation during maintenance, reducing the risk of electrical arcing and equipment damage;
- Grounding and bonding of all equipment to minimise static electricity buildup;
- Emergency power-isolation points, clearly marked and easily accessible, enabling rapid shutdown of equipment in the event of a fire or mechanical malfunction; and
- Regular cleaning and maintenance of electrical cabinets to prevent the accumulation of combustible dust.

3.5.2 Equipment Safety Controls

Mechanical equipment used in tyre processing presents significant fire hazards due to friction, heat generation, and hydraulic systems. Therefore, the key controls include the following:

- Preventive maintenance programs for all machinery to identify worn bearings, friction points, and overheating components;
- Temperature monitoring on critical equipment, including sensors on motors, bearings, and hydraulic systems, to detect abnormal heat buildup;
- Use of fire-resistant hydraulic fluids, where feasible, to reduce the likelihood of ignition in the event of a leak;
- Removal of metal from the whole tyres prior to be processing through the shredder to reduce the presence of metal fragments that may cause sparking within shredders;
- Dust-control measures, including natural ventilation and regular housekeeping, to prevent the accumulation of combustible rubber dust;
- The shredder is equipped with an integrated water spray system, which mitigate both temperature rise and dust levels during the shredding process through moisture control, in accordance with DFES Guideline GN02 (refer to equipment specification in Appendix C);
- The machinery includes guarding and interlocks to prevent foreign objects entering equipment and to reduce the risk of jams that generate frictional heat; and
- The machinery includes thermal cut-outs and motor-protection relays that automatically shut down equipment when temperatures exceed safe operating limits.

3.6 Smoking and Ignition Source Controls

Effective control of smoking and other ignition sources is essential in preventing fires within a tyre-recycling facility. Rubber, rubber dust, and associated processing residues are highly combustible,

and even small ignition sources can lead to rapid fire development. A structured approach to eliminating or tightly managing ignition sources significantly reduces the likelihood of fire incidents.

3.6.1 Smoking Controls

The following measures are to be implemented at the Site:

- Strict smoking-prohibited zones across all operational areas;
- Signage and communication measures to ensure all staff, contractors, and visitors are aware of smoking restrictions and the location of approved smoking areas; and
- Use of smoke detectors within the warehouse, located over critical area, including the shredder and temporary tyre storage areas.

3.6.2 Ignition Source Controls

A tyre-recycling facility contains multiple potential ignition sources, including hot surfaces, sparks, static electricity, and open flames. Standard controls include:

- Strict prohibition of open flames (e.g., lighters, matches, blowtorches) within operational areas unless authorised under a formal hot-work permit system;
- Hot-work permit procedures requiring risk assessment, isolation of combustibles, fire watch arrangements, in line with any total fire bans, and post-work monitoring to detect smouldering materials;
- Only approved, industrial-rated equipment is to be used in processing areas and that personal devices (e.g., phone chargers) are restricted to the administration building;
- Static electricity management, including grounding and bonding of equipment, use of anti-static flooring/mats where appropriate, and ensuring operators wear suitable PPE to reduce static discharge risk;
- Management of friction-based ignition sources, such as overheated bearings, jammed conveyors, or metal-on-metal contact, through preventive maintenance and real-time monitoring systems;
- Safe storage and handling of flammable/combustible liquids, including industrial gear oils, grease lubricant, and cleaning agents, in compliant containers and segregated storage cabinets;
- Control of vehicle-related ignition sources, ensuring mobile plant (i.e. forklift) is fitted with spark arrestors where required, no refuelling to occur at the Site; and
- Prohibition of hot works such as grinding, cutting, or welding at the Site.

4 Fire Detection and Suppression Systems

4.1 Fire Detection Systems

As the tenancy is less than 2,000m², the NCC 2022 does not require automatic detection or sprinkler systems. Regardless, the following measures are to be implemented at the Site for early fire detection:

- Installation of CCTV with infrared cameras for early detection within the building and within the proposed storage sea container;
- Installation of fire/heat and smoke detectors for early detection, in particular aspirating smoke detection devices which will be installed within the administration building and in areas within the warehouse building away from the processing area where dust, rubber fines and other particulates could cause false alarms; and
- 1hr shut down of all equipment prior to end of the operational day to allow for the cleaning of equipment of any tyre debris / dust and inspection of equipment and temporary storage areas for signs of fire.

For the infrared cameras, there are to be 2-4 fixed cameras mounted at a high level and angled to cover the shredder infeed and discharge as well as the whole tyre and shredded tyre stockpiles areas. It is intended to have overlapped fields of view to avoid blind spots.

It will be the Site personnel's responsibility to give notification of emergency services via 000 in the case of a fire.

4.2 Firefighting Equipment

Portable ABE dry-chemical and CO₂ extinguishers will be located at each exit and within 10m of processing equipment. In addition, B class firefighting foam extinguishers or larger scale/capacity fire suppression units will be located within the building for early fire-fighting response.

All extinguishers will be maintained under AS 1851: Maintenance of fire protection systems and equipment. A premises map showing the location of fire safety systems and fire safety equipment is provided in Appendix A.

4.3 Fire Water Supply

The premise is classified as a Special Hazard under NCC 2022 Clause E1D17, as confirmed by BCA Consultants under their building assessment undertaken in October 2025. The tenancy area (310m²) is below the 2,000m² sprinkler trigger; therefore, automatic sprinklers are not required.

According to AS 2419.1-2021, the required hydrant protection specifies one hydrant operating at 10L/s for compartments under 500m². However, DFES GN02 requires that for a non-sprinklered tyre facility under 5,000 m², three hydrant outlets must be capable of discharging 10L/s each for four hours, giving a total effective volume of 432,000L (432m³).

Following consultation with DFES' Built Environment Branch in November 2025, it is preferred based on the building and site usage that there is at a minimum one hydrant with a discharge rate of 20 L/s at 200 kPa for four hours, which equates to a volume of 288,000L (288m³). Refer to Section 5 for discussion details on the containment of any firewater wash waters.

A flow and pressure test was carried out on the existing street hydrant at 12 Dickens Place in December 2025. The hydrant achieved an average flow rate of approximately 13 L/s at 200 kPa (refer to report provided in Appendix B) and would serve as the primary supply.

At this stage, no additional auxiliary infrastructure is proposed to be installed in the future.

4.4 Inspection, Testing, and Maintenance Schedule

All relevant fire-protection equipment (i.e. fire alarms and fire extinguishers) will be inspected and maintained to AS 1851 – Routine Service of Fire Protection Systems and Equipment. Indicative schedules for fire alarms and fire extinguishers are outlined in Table 4-1 and Table 4-2, respectively.

Table 4-1: Summary of Indicative Inspection, Testing, and Maintenance Schedule for Fire Alarms

Service Interval	Required Actions
Monthly	<ul style="list-style-type: none"> Inspect control & indicating equipment Check for faults, isolations, abnormal conditions Verify power supply and battery status Inspect detectors and call points for damage/obstruction
Six-Monthly	<ul style="list-style-type: none"> Functional test of sample detectors Test manual call points Test sounders/strobes Confirm fault monitoring and system interfaces
Yearly	<ul style="list-style-type: none"> Full functional test of all detectors and alarm devices Battery capacity test Inspect cabling and terminations Test all system outputs (HVAC shutdown, doors, lifts)
Five-Yearly	<ul style="list-style-type: none"> Comprehensive system review Replace/refurbish components as required Full performance verification of detection and alarm circuits

Table 4-2: Summary of Indicative Inspection, Testing, and Maintenance Schedule for Fire Extinguishers

Service Interval	Required Actions
Six-Monthly (Level 1 Service)	<ul style="list-style-type: none"> Check accessibility and signage Inspect for damage/corrosion Check pressure gauge Weigh extinguisher Inspect hose, nozzle, safety pin Update service tag
Yearly	<ul style="list-style-type: none"> Detailed internal/external inspection Check discharge hose integrity Replace tamper seals

	<ul style="list-style-type: none">• Inspect mounting hardware• Confirm compliance with coverage requirements
Five-Yearly (Hydrostatic Test)	<ul style="list-style-type: none">• Discharge and empty extinguisher• Hydrostatic pressure test• Replace valve assemblies and O-rings• Refill and recharge• Apply new service tag
Ten-Yearly	<ul style="list-style-type: none">• Some extinguisher types require cylinder replacement or retirement per AS 1851 and manufacturer requirements

All inspections must be carried out by a competent and qualified person. Any defects will be rectified promptly and recorded. Records will be retained onsite and made available to DFES or DWER upon request.

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5 Firefighting Water Containment

5.1 Facility Access

The existing condition of the Site fulfills the access and site requirements of DFES GL-11: Site Planning and Fire Appliance Specifications. The fire brigade appliance can park a pumping appliance in the driveway (10m from the building) within 20m of the street hydrant. Access to the warehouse is via a pedestrian access door to the south-west corner or via a roller door to the western side and all areas of the tenancy are within 60m of the appliance.

5.2 Containment Strategy

There are two potential fire source locations at the Site either within the building or at the sea container where the tyre shreds (if any) are stored overnight. Regardless of location, any firefighting water is intended to be contained using a temporary deployable system rather than fixed perimeter bunding. The necessary equipment will be stored in a designated box/cage within the southwest corner of the car park (i.e. the furthest point from the building or sea container) and it will be locked with a padlock that can be cut with bolt cutters by the firefighting brigade.

5.2.1 Within the Building

In the event of an uncontrollable fire within the building, sandless sandbags (e.g. FloodSax or similar flood protection/prevention sandbags) will be positioned across the three building access points: one roller door and two pedestrian doors. The barriers will be stacked to a height that would still allow for firefighters to enter into the building if required.

For example, each FloodSax unit measures approximately 20mm high, 450mm wide and 500mm deep when dry, and swells to about 200mm in height when in contact with water. Stacking three bags high across the roller door and four bags high across each pedestrian door will achieve an effective barrier of 0.6m, providing partial internal containment within the 310m² warehouse.

Any overflow from the building will be directed onto the adjoining car park hardstand area of approximately 860m². During an emergency, the four drains within the car park will be covered, preventing discharge to the stormwater network and enabling the entire car park area to act as secondary containment. The sandbags may need to be deployed along the driveway access point to further the firefighting waters within the car park.

With the sandbag barriers deployed:

- The warehouse provides internal containment of approximately 186m³ (310m² × 0.6m);
- The car park provides external containment of approximately 105m³ (860m² × 0.120m average ponding depth; and
- Combined capacity is approximately 288m³, consistent with the DFES recommendation of one hydrant operating at 20L/s for four hours, which equates to 288m³.

This approach satisfies containment requirements without altering the building structure or installing permanent bunding on the leased premises.

5.2.2 At the Sea Container

In the event of an uncontrollable fire within the sea container, the doors will remain closed. Sandless sandbags (e.g. FloodSax or similar flood protection/prevention sandbags) will be positioned around the perimeter of the sea container set approximately 2-3m away from all sides. The barriers will be stacked to a height that would still allow for firefighters to enter into the sea container if required as shown in Table 5-1.

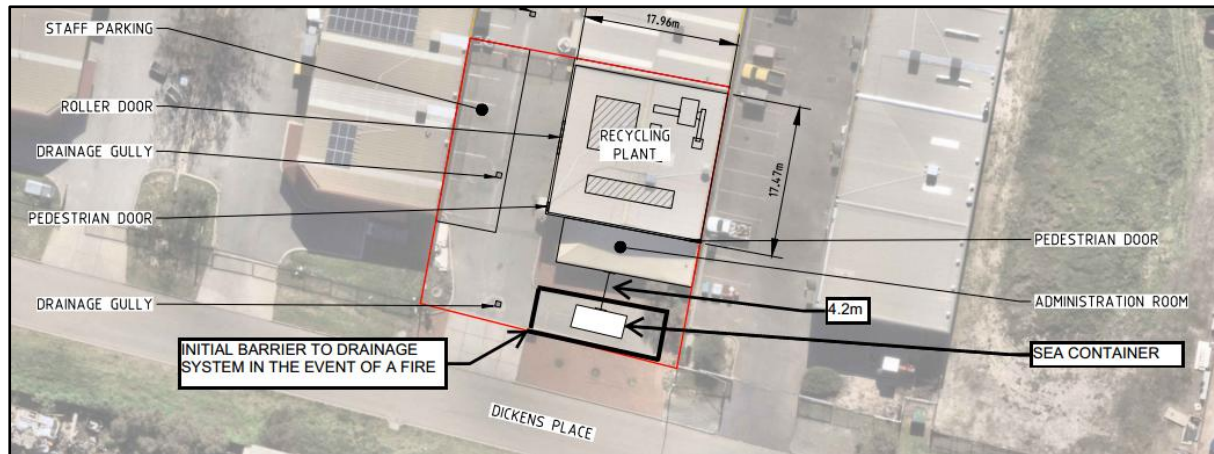


Figure 5-1: Indicative Layout of Sea Container at the Site

For example, each FloodSax unit measures approximately 20mm high, 450mm wide and 500mm deep when dry, and swells to about 200mm in height when in contact with water. Stacking three bags high will achieve an effective barrier of 0.6m, providing partial internal containment.

Any overflow from the sea container will be directed onto the adjoining car park hardstand area of approximately 860m². During an emergency, the four drains within the car park will be covered, preventing discharge to the stormwater network and enabling the entire car park area to act as secondary containment. The sandbags may need to be deployed along the driveway access point to further the firefighting waters within the car park.

With the sandbag barriers deployed:

- The sea container area provides internal containment of approximately 42m³ (70m² × 0.6m);
- The car park provides external containment of approximately 105m³ (860m² × 0.120m average ponding depth); and
- Combined capacity is approximately 147m³, which would allow for one hydrant operating at 10L/s for four hours.

5.2.3 Fire Aftermath

Once the fire has been extinguished, any accumulated firefighting water that has been contained at the Site must be managed. For a tyre-recycling facility, the contaminated firefighting water may contain elevated levels of hydrocarbons, pyrolysis by-products, and other pollutants associated with tyre combustion. This water is considered as a high-risk controlled waste. Therefore, a licenced vacuum-truck contractor is to be engaged to remove the water and transport it to an appropriately licenced treatment or disposal facility.

Depending on the nature of the fire and based on advice from the DWER, sampling of the contained water may be undertaken to confirm waste classification and ensure it is directed to the correct facility. After removal, the sealed surfaces are inspected and cleaned to remove any remaining residues, and all actions are documented to demonstrate compliance with any environmental and regulatory requirements as required.

Any breaches of the accumulated firefighting water will be reported to the DWER within 24hrs of a breach.

5.3 Inspection, Testing, and Maintenance Schedule

Table 5-1 outlines the inspection, testing, and maintenance schedule for firefighting water containment.

Table 5-1: Inspection, Testing, and Maintenance Schedule

Item	Frequency	Inspection / Action	Record
FloodSax sandbags (stored dry)	Monthly	Check condition, replace if damaged or expired	Maintenance Register
Drainage Covers	Monthly	Check condition, replace if damaged or expired	Maintenance Register
Containment verification	Annually	Simulated deployment drill	Emergency Response Log

6 Emergency Preparedness and Response

6.1 Emergency Response Structure

The emergency response structure ensures a clear chain of command during fire or major incident events at the Site.

- Chief Warden: overall control of the emergency, activation of the emergency plan, coordination with DFES and emergency services;
- Wardens: lead evacuation of designated areas, check that all persons have exited, and report to the Chief Warden; and
- First Aiders: provide assistance for any injury until emergency services arrive.

All staff will be familiar with their specific roles through annual drills and induction training.

6.2 Emergency Evacuation Procedure

In the event of an uncontrollable fire or major incident, all persons must:

1. Stop work immediately and follow the nearest safe egress route to the external muster point in the southwest corner of the car park (i.e. the further point from the building);
2. Do not attempt to retrieve personal belongings;
3. The Chief Warden or designated Warden will ensure the roller door and pedestrian doors are closed after evacuation and that sandless sandbags and drainage covers are deployed if safe to do so; and
4. Muster at the designated area and remain there until cleared by the Chief Warden or DFES officer.

6.3 DFES and Emergency Services Notification Procedure

Any person identifying a fire must immediately raise the alarm by calling 000 and stating:

- The address: Unit 1, 12 Dickens Place, Armadale;
- The nature of the emergency (fire, spill, or other);
- Any known hazards (tyres, fuel, machinery); and
- The Chief Warden or designated Warden will then notify DFES, the premises manager, and if applicable the DWER.

TRP is to provide DFES with the latest copy of this FEMP and site layout prior to initial operations or change in existing operations.

6.4 Spill and Major Incident Response

For any spill or release of oils and lubricants:

1. Stop the source of the spill if safe;
2. Contain the spill using absorbent materials or portable spill kits located within the budling;

3. Prevent entry to drains by using spill socks or sandbags or drainage covers; and
4. Dispose of used absorbents as controlled waste through a licensed contractor.

TRP is to report any spill or major incident to the DWER within 24hrs.

6.5 Induction and Fire Safety Training

All staff will complete a Site-specific induction before commencing work. The induction will include:

- Identification of fire and ignition hazards;
- Location and operation of extinguishers, any other fire-fighting equipment, and emergency exits;
- Emergency communication and evacuation procedures; and
- Deployment procedure for sandless sandbags and drainage covers.

Refresher training and a full emergency drill will be carried out annually. Training records will be retained in a Site Safety and Maintenance Register.

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7 Fire Hazard Risk Assessment

A fire risk assessment has been undertaken as per the *DWER Guidance Statement: Risk Assessments - Part V, Division 3, Environmental Protection Act 1986* (February 2017) (Guidance Statement). The objective of the Residual Risk Assessment is to ensure the potential risks are understood and managed appropriately to ensure that there is no unacceptable residual risk. Details of this risk assessment framework, including the sources of hazards, pathways and receptors of hazards identified, are outlined in the following subsections.

7.1 Sources of Fire Ignition

Potential ignition sources within the facility include:

- Mechanical friction and overheating from the de-beader, shredder, and conveyors. Bearings and cutting surfaces can generate heat during prolonged use;
- Electrical equipment including motors, switchboards, extension leads, and portable tools. Faulty wiring, overloading, or dust accumulation can increase ignition risk;
- Mobile plant and vehicles entering or exiting the Site. Engines and exhausts may act as ignition sources if flammable vapours or rubber dust are present;
- Spill or release of oils or lubricants;
- Static electricity generated during mechanical processing and material handling. Equipment will be earthed in accordance with *AS/NZS 1020: Control of Undesirable Static Electricity*; and
- Spontaneous combustion of whole tyres or tyre shreds.

7.2 Combustible Materials Inventory

Combustible materials stored or handled at the facility are presented in Table 7-1.

Table 7-1: Combustible Materials Onsite

Material	Form	Quantity / Area	Combustibility	Control Measures
Whole tyres	Solid rubber	30m ² stack, max 3.7m high	High	Limited footprint and height; 3m separation to walls
Shredded rubber	Chipped rubber in bulka bags	≈ 20m ³	High	Daily removal; stored 3m from other materials
Steel beads	Metallic, recovered from tyres	≈ 2m ³	Non-combustible	Stored separately in sealed containers
Packaging or pallets	Cardboard or plastic	Minor	Moderate	Removed daily
Lubricants and oils	Industrial gear oil, grease	< 15kg (i.e., up to 3 months supply)	Combustible liquid	Stored in bunded cabinet within admin building

7.3 Pathways of Potential Contamination or Harm

For the purpose of this assessment, a pathway for a hazard is defined as the route by which potential contamination or harm can migrate. The key migration pathways generally include the following:

- Air through which lightweight materials, such as dust, travel;
- Surface along which the sources of contamination or harm can travel or be present at (e.g. firefighting water runoff); and
- Sub-surface whereby the underlying soils and drainage infrastructure permit contaminated stormwater migration towards the receptors.

7.4 Receptors of Potential Contamination or Harm

For the purpose of this assessment, a receptor is defined as the location where the impact of the contamination or harm is registered. The possible receptors of the contamination or harm caused by the hazards identified are summarised in Table 7-2.

Table 7-2: Generic Receptors that may be Impacted by Potential Contamination or Harm

Receptor	Description of the Receptor
Surrounding Land Users	People who work or live beyond the boundary of the Site.
Site Users	Persons authorised to traverse across the Site, including: <ul style="list-style-type: none"> • Operational staff; • Contractors carrying out maintenance or monitoring; and • Visitors inspecting the Site.
Buildings/Infrastructure	Buildings or infrastructure that are semi-permanently or permanently occupied and used for work or residential purposes.
Surface Water	The Site’s car park drainage is linked to the City of Armadale’s combined stormwater management system.

7.5 Risk Rating Matrix

To assess the various risks, the potential hazards identified in Section 7.1 were classified according to the risk assessment matrix shown in Table 7-3. This risk assessment matrix considers the consequence and likelihood of the risk, the definitions of which are outlined in Table 7-4 and Table 7-5. Table 7-6 shows the appropriate risk treatments for each risk level.

The risk matrix in Table 7-3 combines the level of likelihood and consequence to determine the level of associated risk.

Table 7-3: Risk Assessment Matrix

	Consequence				
	Slight	Minor	Moderate	Major	Severe

Probability	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Medium	Medium	Medium	High
	Rare	Low	Low	Medium	Medium	High

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Table 7-4: Consequence of Risk Occurring†

Environment		Public Health* & Amenity (i.e. air/water quality, noise, odour)
Severe	<ul style="list-style-type: none"> On-site impacts: catastrophic Off-site impacts local scale: high level or above Off-site impacts wider scale: mid-level or above Mid to long term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Major	<ul style="list-style-type: none"> On-site impacts: high level Off-site impacts local scale: mid-level Off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Moderate	<ul style="list-style-type: none"> On-site impacts: mid-level Off-site impacts local scale: low level Off-site impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Minor	<ul style="list-style-type: none"> On-site impacts: low level Off-site impacts local scale: minimal Off-site impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Slight	<ul style="list-style-type: none"> On-site impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal impacts to amenity Specific Consequence Criteria (for public health) criteria met

[^] Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting

* In applying public health criteria, DWER may have regard to the Department of Health's, Health Risk Assessment (Scoping) Guidelines

† From DWER Guidance Statement: Risk Assessments rev. V2 February 2017 "on-site" means within the prescribed premises boundary

Table 7-5: Likelihood

Likelihood	Criteria to Determine Likelihood of Risk Event Occurring
Almost Certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Table 7-6: Risk Treatment Table†

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable	Risk event will not be tolerated. DER may refuse application
High	May be acceptable. Subject to multiple regulatory controls	Risk event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions
Medium	Acceptable, generally subject to regulatory controls	Risk event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied
Low	Acceptable, generally not controlled	Risk event is acceptable and will generally not be subject to regulatory controls

† From DWER Guidance Statement: Risk Assessments rev. V2 February 2017

7.6 Risk Profile

Risk management measures refer to the key management strategies that will be adapted onsite to ensure that all hazards and potential risks identified are controlled to an appropriate level, and that strategies are in place to react to any potential incidents or accidents. In most cases these risk management measures decrease the probability and/or consequence of the identified hazards, therefore lowering the risk rating. Table 7-7 presents a summary of the ‘source-pathway-receptor’ scenarios identified in the risk assessment process. The table includes risks both before and after the successful implementation of the proposed management measures prescribed within this FEMP.

7.7 Residual Risk Profile

Table 7-7: Fire Risk Assessment

Source	Pathway	Receptor	Risk Description	Probability	Consequence	Initial Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
Shredder overheating	Surface	<ul style="list-style-type: none"> Site Users Buildings/Infrastructure 	Fire from frictional heating during shredding	Possible	Major	High	<ul style="list-style-type: none"> Preventive maintenance Automatic shutdown alarms Integrated water spray system to mitigate both temperature rise and dust levels during the shredding process Fire-fighting extinguishers within 10m Fire watch and staff training on fire awareness and early response CCTV/thermal monitoring within building Installation of fire/smoke alarms in key areas of the warehouse 	Unlikely	Slight	Low
Electrical fault	Air	<ul style="list-style-type: none"> Site Users Buildings/Infrastructure 	Fire in switchboard or motor control panel due to short circuit or overload	Unlikely	Major	Medium	<ul style="list-style-type: none"> RCD protection, inspection, and isolation before maintenance Fire-fighting extinguishers within 10m Fire watch and staff training on fire awareness and early response CCTV/thermal monitoring within building Installation of fire/smoke alarms in key areas of the warehouse 	Rare	Slight	Low
Vehicle exhaust	Air	<ul style="list-style-type: none"> Site Users Buildings/Infrastructure 	Fire from idling vehicle near stockpile	Rare	Major	Medium	<ul style="list-style-type: none"> No-idling policy Vehicle exclusion near storage zones Fire-fighting extinguishers within 10m Fire watch and staff training on fire awareness and early response CCTV/thermal monitoring within building Installation of fire/smoke alarms in key areas of the warehouse 	Rare	Slight	Low
Flammable or combustible liquid spill	Surface	<ul style="list-style-type: none"> Site Users Buildings/Infrastructure 	Unsafe work conditions or fire from spilled oils, lubricants, etc	Possible	Moderate	Medium	<ul style="list-style-type: none"> Bunded storage Use of spill kits Use of fire extinguishing equipment Staff training on spill awareness, early response and clean up 	Unlikely	Slight	Low
Static electricity	Air	<ul style="list-style-type: none"> Site Users Buildings/Infrastructure 	Fire during mechanical processing and material handling due to static electricity	Possible	Major	High	<ul style="list-style-type: none"> Equipment earthed in accordance with AS/NZS 1020 General housekeeping Routine equipment maintenance and inspections Fire-fighting extinguishers within 10m 	Rare	Slight	Low

							<ul style="list-style-type: none"> • Fire watch and staff training on fire awareness and early response • CCTV/thermal monitoring within building • Installation of fire/smoke alarms in key areas of the warehouse 			
Spontaneous combustion of whole tyre	Air	<ul style="list-style-type: none"> • Surrounding Land Users • Site Users • Buildings/Infrastructure • Surface Water 	Fire to spontaneous combustion within whole tyre stockpile	Rare	Major	Medium	<ul style="list-style-type: none"> • Temporary storage within cages/bunkers • Storage size and layout within warehouse in accordance with DFES GN02 • All whole tyres processed within an operational day • Implementation of fire-fighting water containment strategy • Fire-fighting extinguishers within 10m • Fire watch and staff training on fire awareness and early response • CCTV/thermal monitoring within building • Installation of fire/smoke alarms in key areas of the warehouse 	Rare	Minor	Low
Spontaneous combustion of tyre shred	Air	<ul style="list-style-type: none"> • Surrounding Land Users • Site Users • Buildings/Infrastructure • Surface Water 	Fire to spontaneous combustion within tyre shred stockpile	Possible	Major	High	<ul style="list-style-type: none"> • Medium/Large tyre shred size • Use of single layer bulka bags that are open at the top and allow for only a maximum 1m high pile of tyre shred • Storage size and layout within warehouse in accordance with DFES GN02 • No overnight storage of tyre shred within warehouse • CCTV/thermal monitoring within building and sea container • Installation of fire/smoke alarms in key areas of the warehouse • Implementation of fire-fighting water containment strategy • Fire-fighting extinguishers within 10m • Fire watch and staff training on fire awareness and early response 	Rare	Minor	Low

APPENDIX A

Drawings

- Engineering Plans, with Fire Wall Rating Calculations
- Drawing W-100: Site Layout
- Drawing W-101: Building Layout

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APPENDIX B

Flow Rate Test Report

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APPENDIX C

Equipment Specifications

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