Fremantle PORTS

# Harbour Master Office - HMOP 04 Adverse weather monitoring and management procedure

(Marine Operations)

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## Acceptance And Release

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| Prepared and Owned By: | Savio Fernades, Harbour Master |
| Key People: | Harbour Master Office, Vessel Traffic Service Operators, Port Services officers, Bulk services officers, IH and OH operations teams, Fremantle Pilots, Towage service providers, Line boat operators. |
| Approved By: | Thor Elliott, Acting General Manager - Operations |
| Initial Release Date: | 14 May 2024 |

## Change History Record

| Version Number | Change Description | Inserted By | Signature | Authorisation Date |
|---|---|---|---|---|
| 0.0 | Initial Release | HM | Savio Fernandes | 14 May 2024 |
| 1.0 | Added new section 4.2<br>Amended sections 2.3 & 4.4 | HM | Savio Fernandes | 29 August 2024 |
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# 1. Introduction and Overview

## 1.1 Objective

The objective of this procedure is to provide safe parameters for vessels and all personnel rendering services during adverse weather events while within Fremantle Port waters (Berth and anchorages) and for protection of the Port of Fremantle marine environment and infrastructure, through a structured weather monitoring and decision support process.

## 1.2 Scope

The scope of this procedure is to cover all marine commercial vessel operations within Fremantle Port waters being impacted or potentially impacted by adverse weather forecasts for the monitored areas around the Port of Fremantle.

## 1.3 Corporate Values

This procedure follows 'The values' of Fremantle Ports. The values are our minimum standards of behaviour that are expected of everyone, all the time. To be part of our organisation, we must each commit to always adhering to these values and using them to guide our decisions.

**C**ollaboration: Achieving together

**A**ccountability: Owning it

**R**espect: Valuing everyone, always

**E**xcellence: Delivering our best

## 1.4 Application

This procedure applies to:

- All commercial vessels visiting and within Port of Fremantle port limits.
- Harbour Master, Fremantle Ports.
- Deputy Harbour Masters, Fremantle Ports.
- Vessel Traffic Service Operators, Fremantle Ports.
- Fremantle Pilots
- Towage services providers
- All Terminal operators - Fremantle Ports operated and private terminals.

This procedure does not apply to:

- Recreational vessels navigating within the Port of Fremantle port limits.
- Local ferries operating within the Port of Fremantle port limits.
- Australian sail training vessels operating within the Port of Fremantle port limits.
- Naval vessels operating within the Port of Fremantle port limits.

## 1.5 Accountability

The Harbour Master is the owner of this Adverse weather monitoring and management procedure (Marine Operations) and accountable for decisions implemented.

The Harbour Master Office (HM and DHMs) is responsible for the safe implementation of this procedure.

# 2. Weather Monitoring

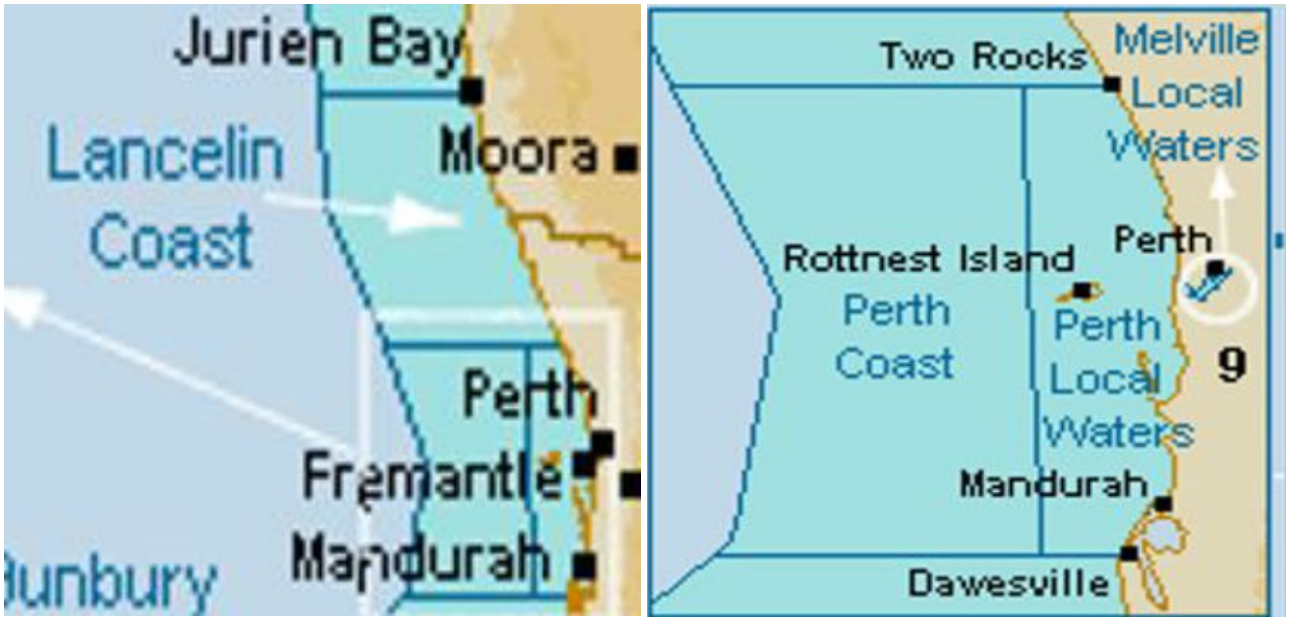
Fremantle Ports' Harbour Master's Office and VTS monitors the following resources of information in order to make an informed decision regarding adverse weather management on a rolling 7-day basis:

- Australian Bureau of Meteorology
- Weatherzone
- Windy

Any developing adverse weather situations are discussed between the HMO and VTS as part of daily situational awareness.

## 2.1 Sea areas of reference

The Fremantle Ports Sea areas of reference for Australian Bureau of Meteorology (BoM) forecasts are divided into the following areas, namely **Lancelin Coast, Perth Coast and Perth Local Waters (coastal sea area from Jurien Bay to Mandurah).**



## 2.2 Bureau of Meteorology (BoM) wind forecast criteria

A description of the forecast criteria issued by the Bureau of Meteorology is given in the below table:

| Average wind speed (knots) | Gust strength that should be planned for (knots) | Wind Warning thresholds |
|---|---|---|
| **10** | 14 | |
| **15** | 21 | |
| **20** | 28 | |
| **26 - 33** | 36 - 45 | **Strong wind warning issued** |
| **34 - 47** | 48 - 65 | **Gale force warning issued** |
| **48 - 63** | 67 - 88 | **Storm force warning issued** |
| **64 or more** | 90 or more | **Hurricane force warning issued** |

The corresponding descriptions as per the Beaufort scale are given in the below table

| Beauf. scale | Desc. term | Units in knots | Description on Land | Description at Sea |
|---|---|---|---|---|
| 6 | Strong winds | 22-27 knots | Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty. | Large waves begin to form; the white foam crests are more extensive with probably some spray |
| 7 | Near gale | 28-33 knots | Whole trees in motion; inconvenience felt when walking against wind. | Sea heaps up and white foam from breaking waves begins to be blown in streaks along direction of wind. |
| 8 | Gale | 34-40 knots | Twigs break off trees; progress generally impeded. | Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown in well-marked streaks along the direction of the wind. |
| 9 | Strong gale | 41-47 knots | Slight structural damage occurs - roofing dislodged; larger branches break off. | High waves; dense streaks of foam; crests of waves begin to topple, tumble and roll over; spray may affect visibility. |

Wind is made up of gusts and lulls. The Bureau's forecasts of wind speed and direction are the **average** of these gusts and lulls, measured over a 10-minute period at a height of 10 metres above sea level. The gusts during any 10-minute period are typically 40% higher than the average wind speed. For example, when the average wind speed is 25 knots, it is normal to experience gusts of 35 knots and lulls of lighter winds. Thunderstorm and squalls may produce even stronger gusts.

Bureau of Meteorology wind warnings are issued as much as 42 hours in advance and are then updated every 6 hours. However, if conditions develop rapidly, warnings can be issued and updated at any time. Each warning indicates the period covered.

## 2.3 Strong wind and Gale warnings

A **Strong wind warning** is issued by the Bureau of Meteorology when winds averaging from 26 knots and up to 33 knots are forecasted.

A **Gale warning** is issued by the Bureau of Meteorology when winds averaging from 34 knots and up to 47 knots are forecasted.

On receipt of a Strong wind warning, Fremantle VTS shall on behalf of the Harbour Master, in accordance with regulations 12 and 21 of the Port Authority Regulations, advise all vessel agents operating within Fremantle Ports. This advice is to be forwarded or relayed to the Masters of all vessels (moored or anchored), who have engaged agency services, within the Fremantle Port Limits or arriving at Port Limits within the warning period.

The **strong wind or gale warning advice** issued by Fremantle VTS will include the following information:

- Marine Wind Warning Summary - as received in the BoM warning, highlighting one or all the sea areas of reference.
- The strong wind warning advice by Fremantle VTS to Masters of vessels is to be issued only when a strong wind warning is issued for Perth Local Waters and / or Perth Coast waters.
- The gale wind warning advice by Fremantle VTS to Masters of vessels is to be issued when a gale wind warning is issued for any one (1) of the three (3) areas of reference.
- Details of the Forecast - including date and time of issue, winds, seas, swell and weather conditions.
- Advice to Masters of vessels in the Port of Fremantle (refer below format)

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**ADVICE TO MASTERS OF VESSELS IN THE PORT OF FREMANTLE on behalf of the Fremantle Ports Harbour Master**

**Date and time of advice: XX/XX/XXXX XXXX hours LT.**

**Warning Type: Strong wind warning with winds from 26 to 33 knots OR Gale wind warning with winds from 34 to 47 knots (delete as appropriate)**

**To all vessels**

- Main engine immobilisation is NOT permitted, and all on-going immobilisations are to be ceased and engines readied for use.
- Vessel engines are to be kept is a state of readiness to be available for use at short notice.
- Vessels arriving at the port to anchor OR berth are required to monitor weather forecast received on board throughout their stay within Fremantle Port waters.
- All vessels are to maintain a continuous listening watch on VHF channel 12.
- When direction of predicted winds during a gale warning, ranges between an arc from due W (270°T) to NE (045°T), container vessels of >310m will not be permitted to berth.

**Vessels alongside at Berth**

- Vessels are required to monitor and tend to all mooring lines as required to ensure that the vessel is maintained safely alongside at all times, with all lines in a taut condition.
- If additional mooring lines are considered as required by the vessel's Master, this must be requested for through the agents. Ship's crews are not permitted to add any mooring lines to shore bollards.
- Fremantle Ports' mooring team will be assigned for additional line deployment. Vessel crews may be permitted to handle mooring lines in an emergency after notifying Fremantle VTS.
- The use of self-tensioning winches in the 'auto-tension' mode is prohibited in the Port of Fremantle.
- The outboard anchor is to be lowered to the seabed.
- In case of a Gale warning, vessels may be required to vacate the berth and either proceed to anchor or sea.
- When direction of predicted winds during a gale warning, ranges between an arc from due W (270°T) to NE (045°T), container vessels of >310m will be required to vacate the berth

**Vessels at anchor**

- Vessels at anchor are required to closely monitor their positions at anchor and maintain positions using all available means. Fremantle VTS must be informed if required to use main engine to maintain anchor position.
- In case of a Gale warning, vessels may be directed to heave anchor and proceed to sea.
- Vessels scheduled to berth during a Strong winds / Gale winds forecasted period are to contact their respective agents to confirm their berthing schedules.

The above instructions must be strictly complied with at all times during your stay in the port.

Upon receipt of the above advice, Masters of all vessels MUST:

1.Acknowledge receipt by replying to Weather.Warnings.Advice@fremantleports.com.au

2.Inform Fremantle VTS on VHF channel 12 when all tasks above have been completed.

## 2.4 Conditions for warping of vessels at KBB2 and ALCOA berth

No warping operations are to be conducted when winds >20 kts are experienced from a direction **'westward' from South-South-East (SSE) to West (W).** The vessel's Master is responsible for the safe mooring / warping of the vessel and must comply with the weather restriction.

The vessel's main engine is to be kept on stand-by but is not to be used during warping operations. If the engine is deemed necessary, a pilot and tugs will be required for the warp.

However, this decision must be made by the vessel in advance of the warp considering the 2-hour notice required for tugs and pilots.

## 2.5 Use of the NCOS software for mooring analysis

A mooring analysis using the NCOS software is carried out for Inner Harbour container berths and NQ 11 & 12.

Each vessel is entered into the NCOS system to provide the most optimal mooring arrangement for the vessel and to obtain the mooring loads that are expected to be experienced by a vessel's mooring equipment during it's period of stay alongside the berth. Mooring loads are assessed based on the following criteria;

- Weather forecast
- Mooring rope MBLs and Winch brake rendering loads
- Mooring bollard SWLs and conditions

# 3. Adverse Weather - Planning, Preparation and Execution

## 3.1 Adverse weather assessment criteria

The below enlisted criteria form the basis for decision support for adverse weather-related risk management that may include berth evacuation, cancellation of berthing movements and evacuation of anchorages;

- Wind directions and speed in relation to the berth orientation,
- Swell direction and height, waves,
- Issue of strong wind warnings and large container vessels (for eg: >275m)
- Issue of gale warnings,
- Windage areas of vessels where available,
- Duration of expected adverse weather,
- Shore mooring bollards capacities,
- Ship pre-arrival vetting ship's winch brake tests, ship's mooring arrangements etc,
- Use of Shore Tension Units - Inner Harbour berths only,
- Availability of tugs,
- Number of vessels at anchor,
- Number of vessels at all Inner and Outer Harbour berths,
- Monitoring of port waters by Vessel Traffic Services,
- Use of and assessment of the NCOS software guidance for each vessel.

## 3.2 Management of vessels at anchorage

The following dedicated vessel anchorages exist within Fremantle Ports' limits.

- Outer anchorage
- Gage Roads anchorage

- Oil Refinery anchorage (North) - ORAN
- Oil Refinery anchorage - ORA
- Emergency Owen anchorage

The Outer anchorage and Gage Roads anchorage are located to the north of the Success and Parmelia channels while the ORAN and ORA anchorages are located to the south of the Success and Parmelia channels within Cockburn Sound.

Arrival and departures from ORAN and ORA anchorages are piloted movements. In order to avoid congestion at the above two anchorages and from Risk and Emergency management perspective the following controls have been implemented;

- Any vessel with a waiting period of more than 7 days for berths in the Outer Harbour is to be allocated a Gage Roads or Outer anchorage, until 7 days prior berthing.
- A vessel seeking to conduct Authorised Officers (AO) inspections for loading at the Kwinana Grain Jetty in advance of the 7 days period may do so at an ORAN or ORA anchorage provided that the vessel then moves to a Gage Roads or Outer anchorage as soon as the cargo holds are approved for loading.
- Any non-routine request for prolonged stay will be assessed by HMO on a case-by-case basis.

## 3.3 Gale warnings and management

On receipt of a Gale warning from the Australian Bureau of Meteorology for any one (1) of the three (3) areas for reference, Fremantle VTS will issue the advice to all ships through the vessel agents in accordance with section 2.3.

Harbour Master's Office shall conduct a situational awareness exercise as per the adverse weather assessment criteria given in section 3.1.

In case of a prolonged gale weather event (>12 hours) being predicted, HMO and VTS will discuss and plan a staged anchorage and berth evacuation plan that will include the following stages;

- Evacuation of ORAN and ORA anchorages
- Evacuation of KBB2 and Alcoa berths
- Evacuation of Oil Refinery Berths
- Evacuation of Kwinana Grain Jetty
- Evacuation of Kwinana Bulk Jetty
- Evacuation of Inner Harbour Berths
- Evacuation of Gage Roads anchorage
- Evacuation of Outer anchorage

In case of gale weather event (<12 hours), the berth and anchorage evacuation plan will be dependent on potential impact on the vessels at each berth.

Harbour Master Office will contact / communicate with Inner Harbour and Outer Harbour stakeholders along with Port services teams, Fremantle Pilots and Towage services providers to discuss the potential adverse weather impacts, evacuation and return to berth plans.

A Shipping Agents Memo will be issued regarding finalised plans.

Due to unexpected conditions where a vessel is not evacuated, use of additional moorings, tugs attendance, storm moorings etc will be considered.

The timing of anchorage and berth evacuation shall be such as to assist the vessel's master to proceed to sea and take avoiding action from the impending adverse weather conditions.

## 3.4 Gale Watch for tugs

On issue of a 'Gale' warning for any 'one' or 'all' of the areas of reference, Fremantle Ports' VTS and Svitzer scheduling teams are to comply with the gale watch requirements. Time of commencement of the gale watch is to coincide with the commencement of 'gale' warning forecast until the warning is cancelled by BoM.

Any requirements for additional tugs during gale watch shall be implemented on a risk-based approach after consultation between Harbour Master's office and SVITZER - Port Manager or delegate authority.

Given below are the conditions of 'Gale Watch' for tugs;

- One (1) Tug is fully manned and on standby around the clock ready to provide immediate assistance to any vessel in port experiencing difficulties in each of the Inner Harbour and Outer Harbour of the Port.
- Port customers are not charged for this gale watch service unless a standby tug is actually used to assist a vessel.
- Any tug on gale watch can be contacted directly by Fremantle Ports' Port Control Officer (VTSO), either by phone or by radio; and
- The towage service provider uses reasonable endeavours in emergency circumstances to respond as soon as possible to any call for assistance acknowledging that transit times from the vessel storm moorings to wharves in the Outer Harbour will determine the actual response time in that part of the Port.

Gale watch tugs may be deployed also during 'Strong wind warning' periods at the discretion of the HMO based on the forecast wind conditions, direction of impact and size of vessels in the Port.

When a moored vessel requests the attendance of a tug during a Gale Watch, Fremantle VTS is to consult with the towage service provider and inform that a moored vessel has requested their services. VTS is to ascertain the times for when the notice was given to the towage service provider, the estimated time the tug will be on station for the moored vessel and when the tug is actually on station at the moored vessel. VTS will inform the vessel that the tug has been arranged and will be available on station from the time provided by the towage service provider.

Fremantle VTS is to also inform the agent for the vessel and Harbour Master of the tug's attendance.

## 3.5 Shore Tension Units

Fremantle Ports deploys the ShoreTension® - Dynamic Mooring System as a control measure to prevent vessels in the Inner Harbour, from breaking away from berth during an adverse weather event.
The ShoreTension® system is a safety enhancing equipment that also significantly reduces movement of vessels alongside a berth caused by severe winds, currents and swell etc.

The installation of Shore Tension Units is not applicable for vessels bound for Fremantle Ports - Outer Harbour (Kwinana) berths - ALCOA / Kwinana Bulk Terminal / Kwinana Bulk Jetty / BP / Kwinana Grain Jetty.

A Harbour Master Instruction is reviewed and issued each year at the commencement of the winter season. While the units may be deployed during a gale / severe weather warning at any time during the year, the primary use of the units is intended during the period 15 May - 15 October

# 4. Lightning Preparedness

**What is lightning?**

Lightning is an electrical discharge caused when static electricity builds up between positively and negatively charged areas such as between thunderclouds. Lightning can occur from cloud-to-cloud, within a cloud, cloud-to ground, or cloud-to-air.

Lightning is one of the most dangerous and frequently encountered weather hazards in Australia. It is estimated there are six to ten deaths and over one hundred severe injuries caused by lightning every year.

**What can lightning strike?**

Lightning tends to strike higher ground and more prominent objects, especially objects that are good conductors of electricity, such as metal and water.

Most lightning fatalities and injuries occur when people are caught outdoors with no shelter.

**What other impacts are there from lightning?**

Lightning can impact:

- **Light vehicles** - through direct strike, indirect damage or causing a vehicle accident
- **Mobile plant** - Mobile plant is subject to the same impacts as a light vehicle, with the addition hazard of tyre explosions due to overheating of rubber from a strike
- **Buildings** - the three main hazards to buildings are fire danger, power surge damage and shock wave damage
- **Marine vessels** - the most common damage is to electronics, but damage may also occur to fiberglass and hull damage

**How can lightning cause injury?**

Lightning can cause injury through a range of mechanisms including:

| Impact Type | Description |
|---|---|
| **Direct strike** | Where lightning directly hits the victim |
| **Indirect strike** | Which can include:<br>• Side flash (when standing near an object that is struck)<br>• Contact potential (from physical contact with a struck object) |
| **Step voltage/ground current** | Occurs when lightning strikes the ground or infrastructure and voltage gradient occurs across a person between two or more contact points, such as a two footed stance (it is recommended to keep feet together when trapped in the open) |
| **Surge propagation** | When a person is close to or in contact with an electrical appliance, power line or communication line which is struck by lightning |
| **Shock wave** | Impacts from the force of a lightning strike and/or associated damage to nearby objects can cause injury |

## 4.1 Lightning monitor locations

The three lightning monitoring locations are:

- **Inner Harbour - 32° 03.26′ S, 115° 44.49′ E**

Fremantle Ports AoB building provides reference point for Inner Harbour marine and landside activities.

- **Outer Harbour North - 32° 09.64′ S, 115° 44.78′ E**

Lightning reference point centred on AMC for use with marine and landside activities.

- **Outer Harbour South - 32° 13.99′ S, 115° 43.31′ E**

Lightning reference point at ORJ3 as a central location for marine and landside activities at KBT, KBJ and KGJ.

## 4.2 Monitoring and responding to lightning

Fremantle Ports personnel monitor the risk of lightning through the Weatherguard App. Weatherguard will raise alerts across the three Fremantle Ports locations - Inner Harbour, Outer Harbour North and Outer Harbour South.

| Alert Level | Action Required |
|---|---|
| **Red Alert** | **Bring the job to a safe condition and cease operations.**<br>**All exposed workers must seek shelter** for 30 minutes from the time of a red alert being issued **(see 4.3)**<br>Lightning has been detected within a 10km radius. |
| **Yellow Alert** | **Crane/ship loader operations are to cease -** At Yellow Alert when lightning is moving towards crane/ship loaders worker location, workers should commence making their work area safe (eg running product off conveyors, positioning cranes in a safe location, packing away equipment, etc) in preparation for an immediate move to shelter in the event of a Red Alert and no crane works or ship loading operations are to commence when a yellow alert has been issued.<br>Lightning has been detected within a 20km radius. |
| **Blue Alert** | **All workers should be aware and monitor** conditions<br>Lightning has been detected within a 30km radius. |
| **All Clear** | **Workers continue normal work activities** |

## 4.3 Seeking shelter from lightning

Workers should seek shelter as follows:

| Preferred Location (in order) | To keep safe |
|---|---|
| **1. Shelter in buildings** | When sheltering in a building: |

| | |
|---|---|
| | • Avoid contact with conductors eg wiring, pipes, metallic materials<br>• Keep clear of windows<br>• Avoid contact with external surfaces and walls<br>• Avoid direct skin contact with earth ground as lightning can travel through soil and across wet/damp concrete |
| **2. Shelter in enclosed light vehicles and mobile plant** | Cabins offer protection to operations where most of the current flows around the outside of the car's metal cage into the ground below.<br>Park the vehicle in a safe location, turn the engine off, put hands in your lap and avoid touching metal components inside the vehicle |
| **3. Shelter in fixed plant** | Avoid open sections of the plant and move to a safe location, such as an enclosed level with non-conductive flooring |

## 4.4 Notification groups for lightning alerts

The following workers shall be notified of the occurrence of lightning:

**By email:**

Lightning Alert - FPA@fremantleports.com.au

Lightning Alert - nonFPA@fremantleports.com.au

**By text message:**

Harbour Master - 0417 540 139

Deputy Harbour Master - 0418 954 362

Deputy Harbour Master - 0481 282 847

IH Operations Manager - 0419 959 783 & 0408 088 564

OH Operations Manager - 0419 672 060

IH Team Leader - 0418 945 209

OH Team Leader - 0417 171 419

SCP Duty Master - 0417 900 836 / 0439 972817

KBT Operations Superintendent - 0482 132 990

KBT Operations Manager - 0439 968 696 / 0407 027 594

KBT Gatehouse - 0418925457

KBJ Operations Manager - 0414 426 043

KBJ Gatehouse - 0403231638

VQ Patrol - 0419 852 065

NQ Patrol - 0418 902 785

# 5. Review and Revision Process (HMO)

This procedure shall be reviewed every 12 months from date of first approval for the first 3 years and once most improvements / recommendations have been incorporated, this process will change to a two-yearly process.

Fremantle PORTS

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