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Solid & Liquid Waste Management Plan

Perdaman Urea Project

Burrup Peninsula, Western Australia

PCF-PD

Proponent:

Perdaman Chemicals and Fertilisers Pty Ltd.

ABN: 31 121 263 741

Date: 25 October 2023

Assessment No:

Ministerial Statement 1180 (WA)

2018/8383 (Commonwealth)



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Summary

Project Title	Project CERES
Proponent name	Perdaman Chemicals and Fertilisers Pty Ltd.
Assessment Number	2184 (WA) 2018/8383 (Commonwealth)
Ministerial Statement Number	MS 1180 (Western Australia)
Proposed Construction & Operation Commencement Dates	Bulk earthworks is scheduled to commence in September 2023. Construction is scheduled to commence June 2024. Operation of the facility is proposed to commence 2027.
Purpose of the SLWMP	The purpose of the SLWMP is to provide a framework which describes how the project will assess, manage, monitor and mitigate impacts from solid and liquid waste during construction, operation and decommissioning phases of the project in accordance with the applicable regulatory requirements, permit obligations and industry best practice. NB: This Plan is not part of the EPA suite of Plans required under MS 1180. This version of the SLWMP has been prepared to reflect changes in design of the Project.
Key environmental factors and objectives	The key environmental factors and objectives relevant to the Project include: <ul style="list-style-type: none"> ■ Coastal processes - To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected. ■ Marine environmental quality - To maintain the quality of water, sediment and biota so that environmental values are protected. ■ Marine fauna - To protect marine fauna so that biological diversity and ecological integrity are maintained. ■ Flora and vegetation - To protect flora and vegetation so that biological diversity and ecological integrity are maintained. ■ Terrestrial fauna – To protect terrestrial fauna so that biological diversity and ecological integrity are maintained. Ecological integrity is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements. ■ Inland waters - To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. ■ Human Health – To protect human health from significant harm. ■ Social Surroundings – To protect social surroundings from significant harm.
Key provisions in the plan	The SLWMP's key provisions are included in Section 7 Management Measures. This Section details the outcome and management-based actions, that will be applied for the life of the Project.

Foreword

This Solid & Liquid Waste Management Plan (SLWMP) is a sub-plan of the overarching Project Environmental Management Plan (PEMP), PCF-PD-EN-PEMP, for Perdaman's Urea project (Project CERES). An overview of the structure of the PEMP and associated management plans is illustrated in Figure 0-1.

This plan shall be reviewed and updated as necessary throughout the construction, operation and decommissioning phases of the project. The review process is detailed in Section 15 of the PEMP: *Review and Continual Improvement*.

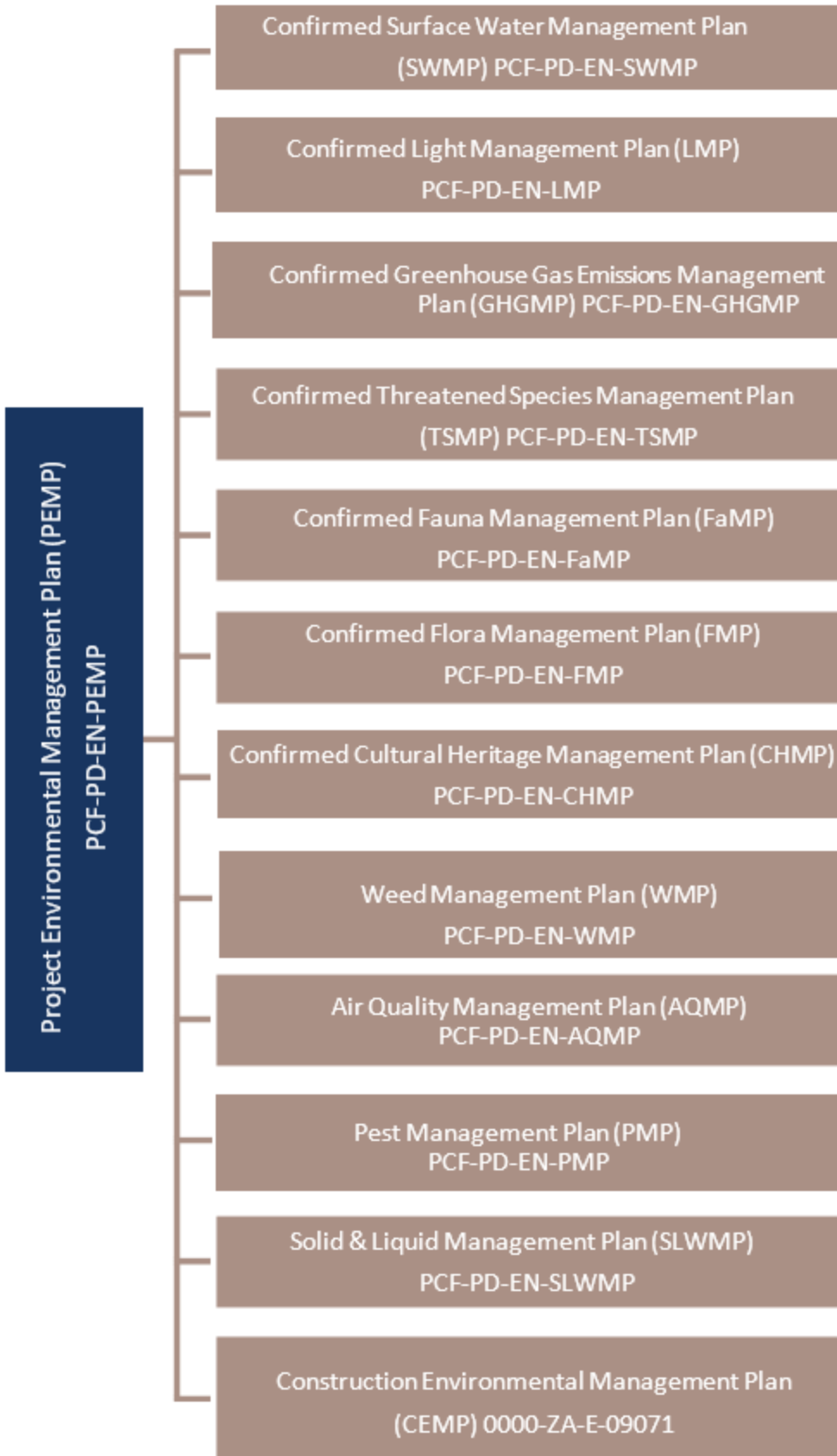


Figure 0-1 Structure of the Project Environmental Management Plan and a selection of supporting management plans

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1 Introduction

Perdaman Chemicals and Fertilisers Pty Ltd (Perdaman) proposes to establish a state-of-the-art urea production plant within the Burrup Strategic Industrial Area (BSIA). The site is situated approximately 8 km from Dampier and 20 km north-west of Karratha on the north-west coast of Western Australia.

The key elements of the Project include the design, engineering, construction and operation of the main urea production facility, administration, maintenance and storage infrastructure, conveyor and port storage and shiploading facilities.

This Solid & Liquid Waste Management Plan (SLWMP) provides the environmental management requirements for the control, containment, treatment and disposal of the solid and liquid waste during the operational phase of the Project.

Management strategies that will be applied during the construction phase are provided in the Construction Environmental Management Plan (0000-ZA-E-09071) and Solid & Liquid Waste Management Sub-Plan (0000-ZA-E-09738).

Additional environmental management controls may be required as conditions of the anticipated Works Approval for the construction of the Project, as well as the operational Licence under Part V of the *Environmental Protection Act 1986*. This SLWMP shall be updated with any additional controls as required.

The objective of waste management on the Project is to minimise generation of solid and liquid wastes and maximise opportunities to reuse or recycle material in preference to disposal. The generation of wastewater will occur throughout the Project. The management measures which will be employed during the construction and then operational phases will ensure no contaminated liquid wastes such as black / grey water, trade waste and dewatering discharge are released to the environment.

1.1 Purpose and Scope

The purpose of the SLWMP is to provide a framework which describes how the Project will assess, manage, monitor and mitigate impacts from solid and liquid waste during the operational phase of the Project in accordance with the applicable regulatory requirements, permit obligations and industry best practice as outlined in Section 3 of this document.

The SLWMP will provide guidance to Project employees and contractors in respect to the minimisation and management of waste streams generated by the Project.

The SLWMP applies to all areas of the Project, including Site C, Site F, the causeway, the conveyor corridor, Port side storage, product transfer and ship loading areas.

2 Project Overview

Perdaman plans to construct and operate a state-of-the-art urea plant with a production capacity of approximately 2 million tonnes per annum (Mtpa) on the Burrup Peninsula in the Northwest of Australia Figure 2-2 (the Project).

The Project infrastructure including the main production facility (urea plant), administration, maintenance and storage infrastructure, conveyor and port storage and shiploading facilities are situated within the Burrup Strategic Industrial Area (Burrup SIA) approximately 8 km from Dampier and 20km north-west of Karratha on the Burrup Peninsula. The Burrup SIA has established industrial facilities including Yara Pilbara Fertilisers and Nitrates plants and Woodside's Pluto LNG plant. The estate's proximity to gas, port and other key infrastructure makes it an ideal location for the Project.

The Burrup SIA is located in close proximity to the Murujuga National Park which covers an area of 4,913ha on the Burrup Peninsula. The area is considered to host the largest concentration of ancient rock art in the world. As such, the Project will apply effective management strategies that minimise or abate, actual or potential impacts on the environment, heritage and cultural values of the region.

The Project involves piping natural gas from the nearby Woodside operated LNG facility to the Project site under a long term commercial off-take agreement. Natural gas is converted to urea and the final granulated product is transported by conveyor to the Dampier Port by closed conveyor along the East West Service route, where new facilities will include an enclosed stockpile shed and ship loading facilities.

Proven Urea production technology underpins each of the key stages of this Project. The technologies being applied to the plant are equivalent to the industry best for the specific applications and successfully operate elsewhere in the world. The processing plant can be broadly considered in four sections, or Blocks, namely:

- Gas Block
- Product Block
- Utility Block
- Infrastructure and Logistics

Each of the Process Blocks is made up of a number of process units or physical sections of the plant. The major process are described in Figure 2-1 below.

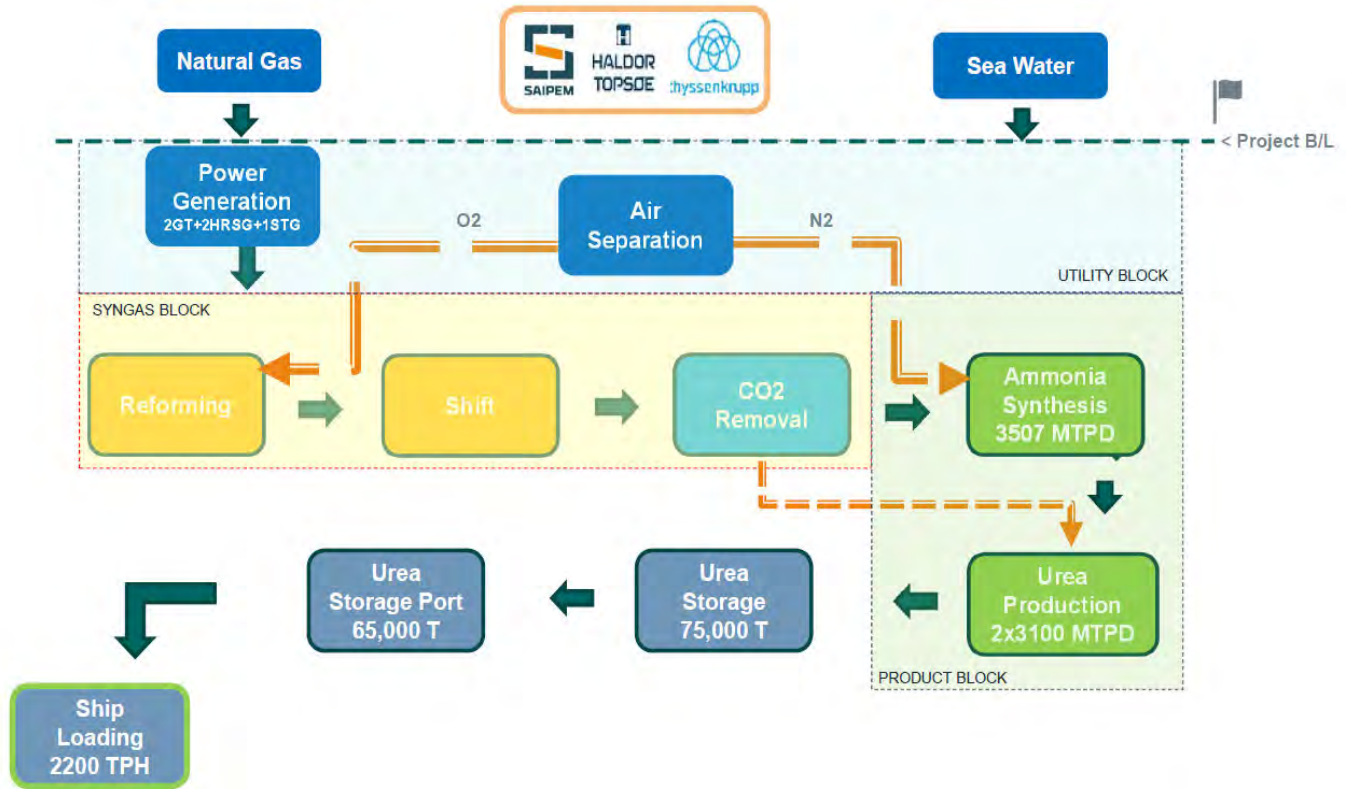
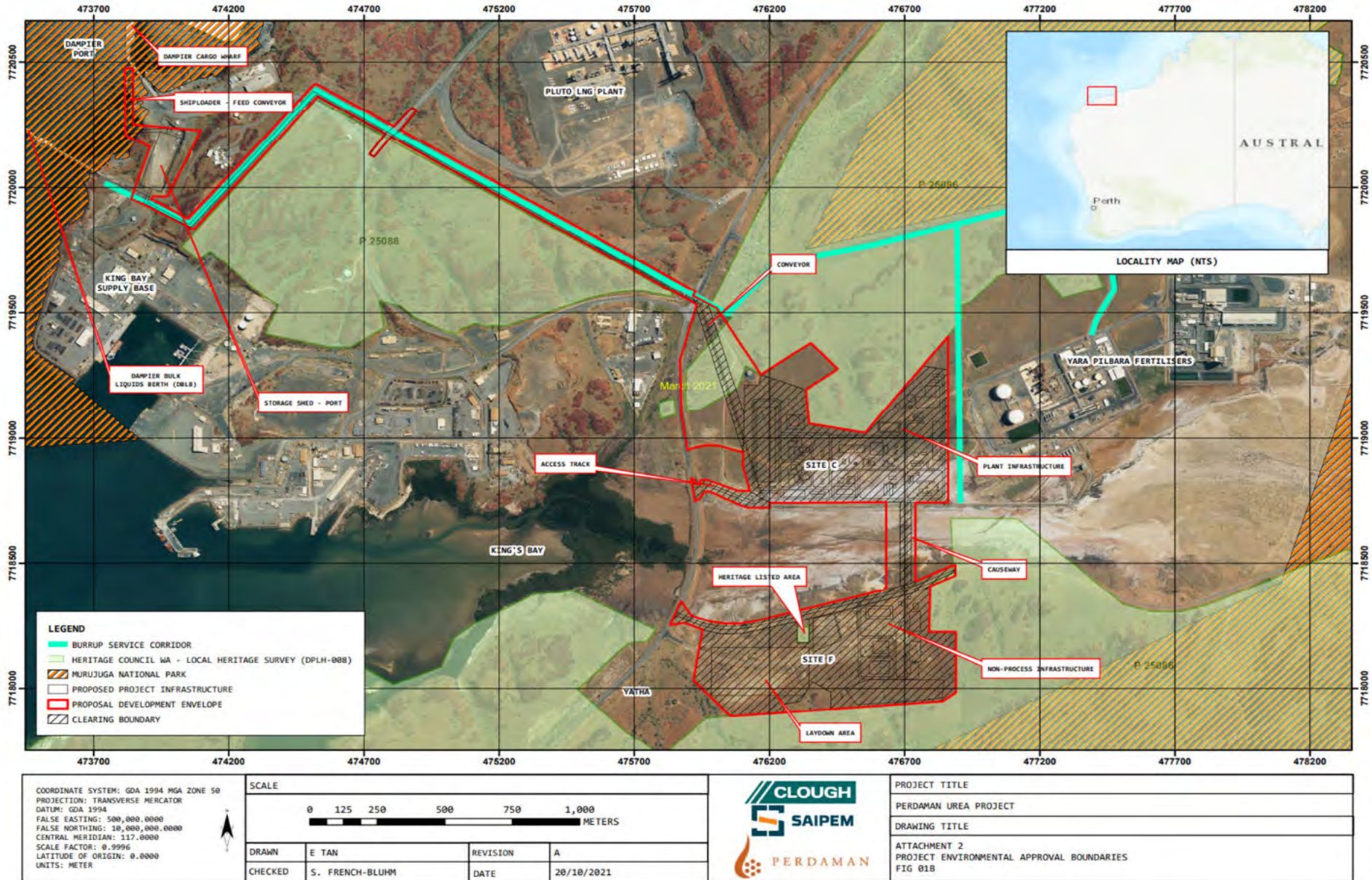


Figure 2-1 Process Block Diagram

Figure 2-2 Development Envelope & Infrastructure



2.1 Location and Regional Setting

The Project area, including Sites C & F, the causeway, conveyor and Port storage and loading facilities, extends east-west approximately 3.4km covering about 105 hectares in area. The Project area can be separated into five key areas. Each area has specific surface water issues associated with its location and, or proposed Project activities.

2.1.1 Site C

Site C is relatively undeveloped with the exception of a few access roads. The site is situated adjacent to the Yara Ammonia Plant to its east, to the north are steep rocky outcrops and to the south the supra-tidal flat area. Surface water from the site flows in a southerly direction towards the supra-tidal flat between Hearson Cove and King Bay.

Once developed Site C will include the main process plant and a 75,000-tonne urea storage shed.

2.1.2 Site F

Site F is situated to the south of Site C, on the opposite side of the supra-tidal flat area. It includes Hearson Cove Road and a significant proportion of previously disturbed area (now rehabilitated). Surface water from this area flows primarily north into the supra-tidal flat.

This area will be used as laydown for equipment and modules, and for shutdown/ maintenance activities. The east portion of Site F will include the Project's administration, maintenance, storage and warehousing facilities.

2.1.3 Causeway

The causeway, which links Sites C and F, extends across the supra-tidal flat area.

The causeway will be built up above the supra-tidal flat area to a road height of approximately 6m AHD with regular culverts to ensure the structure does not impede natural surface water or tidal flows.

2.1.4 Conveyor

The 3.2km conveyor will transport urea from the storage shed at Site C to the Port loading shed.

From Site C the conveyor will be constructed on relatively undisturbed land, to the west of the existing Water Corp pipeline corridor. It will extend north, connecting to the existing Burrup East West Services Corridor (EWSC).

The EWSC is a bitumen sealed corridor which already includes the Yara Pilbara Fertiliser's ammonia pipeline which extends to the Dampier Bulk Liquids Berth (DBLB) adjacent to the Project's Port facilities. The Project's conveyor will be positioned within this corridor and where possible use existing culverts to avoid roads and other infrastructure. Where the conveyor crosses Woodside's Haul Road the road will be built up to allow the conveyor to pass under.

Surface water in the EWSC will be managed via existing surface water systems for the EWSC infrastructure.

2.1.5 Port Area

The Port Area includes a 75,000-tonne storage shed, covered conveyor and ship loader. The storage shed will be located within an existing quarry and the shiploader on a wharf which will be constructed by Pilbara Port Authority (PPA). The Conveyor will be situated on cleared area associated with the new wharf and quarry, and a small section of rocky ground between these two areas.

To maintain product integrity, it is imperative that urea is kept dry throughout the storage, transfer and loading process. As such, urea will remain isolated from rainfall and stormwater which will be managed through existing surface water channels.

3 Legislation, Commitments and Other Obligations

Perdaman has obtained approvals from the state and federal environment regulators. Ministerial Statement 1180 was issued by the Western Australian Minister for Environment under Part IV of the *Environmental Protection Act 1986*. Approval was granted by the Federal Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999*, EPBC Approval 2018/8383.

Perdaman requires further approvals to construct and operate the Project under Part V of the *Environmental Protection Act 1986*, for prescribed activities: Screening etc. of Material (Category 12); Chemical Manufacturing (Category 31); Electric Power Generation (Category 52); Bulk Material Loading (Category 58); Bulk Storage of Chemicals (Category 73); and Sewage Treatment Plant (Category 85).

In accordance with Ministerial Statement 1180, Perdaman was required to prepare, submit for approval, and implement the following Management Plans:

- Flora Management Plan (PCF-PD-EN-FMP)
- Fauna Management Plan (PCF-PD-EN-FaMP)
- Threatened Species Management Plan (PCF-PD-EN-TSMP)
- Light Management Plan (PCF-PD-EN-LMP)
- Surface Water Management Plan (PCF-PD-EN-SWMP)
- Air Quality Management Plan (PCF-PD-EN-AQMP)
- Greenhouse Gas Management Plan (PCF-PD-EN-GHGMP)
- Cultural Heritage Management Plan (PCF-PD-EN-CHMP)

The Project will require discharge of wastewater to the Multi-User Brine Return Line (MUBRL), owned and operated by the Water Corporation. The Water Corporation holds Ministerial Statement 594 for the supply of seawater and the discharge of a combined brine and wastewater stream to King Bay via the MUBRL. Perdaman is required to comply with the water quality criteria stipulated in Ministerial Statement 594 for discharge of wastewater.

To facilitate construction of the Project, a temporary concrete batching plant shall be constructed. The concrete batching plant is not a prescribed activity under the Environmental Protection Regulations 1987. This activity will be regulated under the Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998.

3.1 Regulatory Obligations

In addition to the specific regulatory requirements outlined above, the following environmental protection legislation will also apply to the operation of the Project:

- *Environmental Protection Act 1986*
- Environmental Protection Regulations 1987
- Environmental Protection (Controlled Waste) Regulations 2004
- Environmental Protection (NEPM UPM) Regulations 2003
- *Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
- Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007
- Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 2004
- Environmental Protection (Unauthorised Discharge) Regulations 2004
- *Litter Act 1979*

- *Health Act 1911*
- Health (Treatment of sewage and Disposal of Effluent and Liquid Waste) Regulations 1974
- Planning and Development (Local Planning Schemes) Regulations 2015

In addition to the above legislation, this SWMP will be developed and regularly reviewed to comply with the commitments and legal obligations arising from the Project's environmental approvals process.

3.2 Project Approvals

The Project must comply with all of the conditions included in its granted approvals. Perdaman will be responsible for ensuring all statutory approvals required for activities or infrastructure specific to Project needs are attained in a timely manner.

Table 3-1 below includes indicative licenses and approvals potentially required for the Project, which may apply or contain conditions specifically related to solid and liquid waste management. This list is provided as a guide only and is subject to change throughout the life of the Project.

A detailed approval register will be maintained by Perdaman to monitor the implementation and progress of conditions, and the achievement, renewal and surrender of all licenses throughout the life of the Project.

Table 3-1 Project statutory approvals and agreements relevant to solid & liquid waste management.

Approval / Agreement	Purpose	Agency / Jurisdiction
EP Act 1986 - Part IV Approval - Ministerial Statement	EPA assessment of strategic proposal.	EPA
EP Act 1986 - Part V - Works Approval & Licence - Cat 12. Screening plant	For establishment and operation of screening plant.	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat 31. Chemical manufacturing.	Chemical manufacturing (Operations).	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat 73. Chemical storage	For construction and operation of bulk storage of chemicals.	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat. 85 Sewage facility	For construction and operation of sewage facility with discharge to land or waters.	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat 58. Material loading.	For construction and operation of bulk material loading onto vessels by material loading system.	DWER
Department of Health - Apparatus for treatment of sewage - installation and permit to use	Needed to install and operate sewage system.	City of Karratha and Department of Health
Approval – Discharge into Water Corporation's Multiuser Brine Release Line (MUBRL).	Approval required to discharge into the MUBRL	Water Corporation
Dangerous Goods Safety Act 2004 - Dangerous Goods Site License (Construction)	Storage of fuel during the construction phase.	DMIRS
Dangerous Goods Safety Act 2004 - Major Hazard Facility License (Class A)	Storage of dangerous goods over threshold quantities during the operational phase.	DMIRS

4 Performance Objectives

The objective of waste management on the Project is to minimise generation of solid and liquid wastes and maximise opportunities to reuse or recycle material in preference to disposal.

The generation of waste will occur throughout the Project. The management measures which will be employed during the construction and then operational phases will ensure that the disposal and management of wastes do not adversely affect environmental values or the health, welfare and amenity of people and land uses, by meeting statutory requirements and acceptable standards.

5 Key Environmental Factors

In its assessment, the EPA identified Key Environmental Factors to be preserved for the Project as Flora & Vegetation; Terrestrial Fauna; Inland Waters; Air Quality; Greenhouse Gas Emissions; Coastal Processes; Social Surroundings; and Marine Environmental Quality.

The key environmental factors and objectives, as they relate to solid and liquid waste management for the Project, are outlined in Table 5-1. The potential impacts of solid and liquid waste management on key environmental factors are presented in Table 5-2.

Table 5-1 Key Environmental Factor & Objective

Key Environmental Factor	Objective
Inland Waters	“To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.”
Flora and Vegetation	“To protect flora and vegetation so that biological diversity and ecological integrity are maintained.”
Terrestrial Fauna	“To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.”
Coastal Processes	“To maintain geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.”
Marine Environmental Quality	“To maintain the quality of water, sediment and biota so that environmental values are protected.”
Marine Fauna	“To protect marine fauna so that biological diversity and ecological integrity are maintained.”
Social Surrounds	“To protect social surroundings from significant harm.”

Table 5-2 Potential Environmental Impacts from Solid and Liquid Wastes

Project Activities	Key Environmental Factor	Potential Impact
Management of controlled waste.	Inland waters	Management of controlled wastes is required in accordance with the Environmental Protection (Controlled Waste) Regulations 2004 to ensure protection of the surrounding environment.
Management of putrescible waste.	Inland waters and terrestrial fauna.	Management of putrescible waste is required to ensure maintenance of hygiene and to limit attraction of vermin or native fauna.
Management of liquid waste.	Inland waters	Management of liquid waste is required to ensure limited contamination of the ground and subsequent contamination of surface and groundwaters.
Management of non-hazardous solid waste.	Inland waters	Management of non-hazardous solid waste including spent catalysts, resins, dewatered sludge and construction waste is required to ensure appropriate containment to limit the potential for contamination of surface and groundwaters.

Contaminated washout water from concrete agitator truck drums.	Inland Waters and Marine Environmental Quality	Contaminated wastewater from concrete batching activities may be highly alkaline.
Clean and contaminated stormwater management.	Inland Waters and Marine Environmental Quality	Separation of clean and contaminated stormwater is required to ensure protection of inland water quality and receiving ecosystems.
Stormwater management via natural and unlined channels.	Inland Waters and Marine Environmental Quality	Erosion, scouring and sedimentation may occur with increased flow velocities in natural and unlined channels.
Domestic sewage generation.	Marine Environmental Quality	Domestic sewage is to be discharged via the MUBRL in accordance with Water Corporation water quality criteria to ensure protection of receiving marine waters of King Bay.
Generation of non-saline water effluent, saline water effluent and process condensate.	Marine Environmental Quality	Effluent and condensate is to be discharged via the MUBRL in accordance with Water Corporation water quality criteria to ensure protection of receiving marine waters of King Bay.

5.1 Management Actions & Targets

The Fauna Management Plan (PCF-PD-EN-FaMP), Threatened Species Management Plan (PCF-PD-EN-TSMP) and Surface Water Management Plan (PCF-PD-EN-SWMP) include management actions and targets that relate to waste management on the Project. The FaMP and SWMP provide objective based management provisions to minimise direct and indirect impacts to native species and surface waters within the development envelope in accordance with Conditions 5-2 (1) and 8-1(1) of MS 1180. The TSMP differs in that all management measures are outcome-based, and thus triggers and thresholds are detailed in place of management targets for these actions.

The management actions, targets, triggers and thresholds specifically relating to solid and liquid waste management for the Project are provided in Table 5-3.

For management actions, triggers and targets relating to waste management during the construction phase, refer to the Construction Environmental Management Plan (0000-ZA-E-09071) and Solid & Liquid Waste Management Sub-Plan (0000-ZA-E-09738).

Table 5-3 Management Actions, Triggers and Targets – Management Plans

Management Action	Management Target / Trigger Criteria
<i>Fauna Management Plan Actions & Targets</i>	
<p>Accidental Poisoning <u>Construction and Operations:</u> All toxic and hazardous substances will be stored as per the Hydrocarbons and Hazardous Substances Management Protocol. Spills will be contained immediately upon identification. Waste receptacles are to remain closed and secured at all times.</p>	<p>FaMP Management Target 9 No evidence of conservation significant fauna injury (including poisoning) or death as a result of the Project implementing environmental chemical controls or improper storage.</p>
<p>Introduced Fauna Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. This will include provisions for: - Waste storage. - Bins and skips appropriately sealed and labelled (including possible fencing off of waste receptables).</p>	<p>FaMP Management Target 10 No new introduced/ pest species within the Project footprint and in adjacent area as a result of the Project activities (i.e., waste management).</p>
<i>Threatened Species Management Actions and Limiting Criteria (Triggers & Thresholds)</i>	
<p>MA 20 All wastes (putrescible, recyclable, non-reusable) will be sent offsite for recycling or disposal.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Increase in introduced/pest species on site attracted by solid and liquid wastes. Solid and liquid wastes not managed in accordance with requirements. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Increase in introduced/pest species at the Project area compared with baseline survey recordings.
<p>MA 21 All general-purpose bins will be lidded and emptied regularly to ensure the lids remain completely shut.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Waste receptacles nearing or breaching capacity weekly. Spills from bins due to improper concealment. Fauna opportunistically feeding from waste receptables. Waste receptacles attracting nuisance species.
<p>MA 37 The Project will avoid, where possible, and otherwise use best practice technology and risk-based management actions to minimise threatened fauna poisoning caused by entrapment within contaminated holding</p>	<p>Threshold Criterion:</p> <ul style="list-style-type: none"> Fauna death associated with poisoning.

<p>ponds or exposure to chemicals used in the control of mosquitoes.</p>	
<p>MA 38 The Project will avoid, where possible, use best practice technology and risk-based management actions to minimise debris deposition (including litter and Urea dust) within the marine environment.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Debris is not contained within the Project area and is deposited in the marine environment. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Fauna death associated with debris deposition in the marine environment.
<p>MA 39 Spills of chemicals, hazardous materials and wastewater will be prevented from impacting the marine and terrestrial environments.</p>	<p>Trigger criteria:</p> <ul style="list-style-type: none"> Spills or seepage of urea, ammonia, acid gas products in air emissions or liquid forms that are contained within the Project area and do not impact marine and terrestrial environments. <p>Threshold Criteria:</p> <ul style="list-style-type: none"> A spill or seepage of chemicals, hazardous materials and wastewater, including urea, ammonia, acid gas products to air or terrestrial or marine environments that exceed threshold criteria in the Air Quality Management Plan or the Surface Water Management Plan.
<p>MA 40 Spills (overflow) and seepage from brine storage pond and evaporative storage pond will be prevented from impacting the marine and terrestrial environments.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Water leaks threatening contamination of urea product. Hold ponds nearing capacity limits. Daily inspection checklist not completed. Monitoring not conducted / missing. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Spills and / or seepage from brine and / or evaporative storage pond.
<p>MA 41 Spills of hydrocarbons will be prevented from impacting the marine and terrestrial environments.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Spill of hydrocarbons that is contained within the Project area and does not impact marine and terrestrial environments. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Spills of hydrocarbons that impacts the marine or terrestrial environments.
<p>MA 43 Monitoring of Multi User Brine Return Line water quality.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Saline water (Brine) does not meet the MUBRL discharge specification. Liquid waste not treated or reused on site requiring disposal. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Exceedance of Indicative Wastewater Acceptance Criteria to MUBRL for the Project.

<p>MA 45</p> <p>Brine which does not meet the MUBRL discharge specification will be sent to the brine evaporation pond.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Saline water (Brine) does not meet the MUBRL discharge specification. <p>Threshold Criterion: Exceedance of Indicative Wastewater Acceptance Criteria to MUBRL for the Project.</p>
<p>MA 46</p> <p>The Project will avoid, where possible, and otherwise use best practice technology and risk-based management actions to prevent contaminated stormwater discharging off site. Where practicable, the site's clean stormwater will be reused within the process plant. Stormwater potentially contaminated by spills or leaks from process activities (first flush) will be directed to a dedicated sump and then pumped to the saline water pond for pre-treatment, prior to being discharged to the MUBRL or evaporated in an evaporation pond.</p>	<p>Trigger Criterion:</p> <ul style="list-style-type: none"> Notable hydrocarbon iridescent sheen within stormwater collection ponds and ponds reaching 75% capacity. <p>Threshold Criterion:</p> <ul style="list-style-type: none"> Exceedance of water quality trigger levels as provided in the Surface Water Management Plan, stormwater ponds reached 100% capacity and discharging via the emergency spillway / perimeter drains.
<p><i>Surface Water Management Actions & Targets</i></p>	
<p>Surface Water Quality</p> <ul style="list-style-type: none"> Undertake quarterly monitoring of surface waters and compare against baseline results. Implement the surface water monitoring program throughout construction and operation of the Project to ensure there are no adverse impacts attributable to Project activities to surface water quality, including indications of excess nutrients, hydrocarbons, and ASS indications (i.e. Aluminium etc) and other COPC, identified in samples taken. Water will be treated to ensure discharge from hold ponds is clean and consistent with naturally occurring water quality from nearby creeks or surface runoff (compare monitoring results against baseline). Hold pond water to be treated and tested to ensure compliance with water quality requirements prior to discharge. 	<p>SWMT 3</p> <p>During and after works, the physical parameters of surface water are not to significantly vary or fall below the values that exist onsite, prior to the works commencing.</p>
<p>Pollution Control and Prevention</p> <ul style="list-style-type: none"> All surface water discharges on site shall be diverted to a purpose-built facility to treat (if required) and be contained by implementing the following actions: External water flows entering the Project's battery limits will be diverted around the construction footprint, using drainage structures such as catch drains and bunds. 	<p>WMT 5</p> <p>Pollution caused by site activities will be avoided through appropriate containment, diversion and treatment of surface water run-off.</p>

<ul style="list-style-type: none"> • All drainage lines likely to receive run-off from disturbed areas, such as those downstream of worksites, will be fitted with geotextile silt fences. Rock checks should also be used in drains to slow flows and provide a lining to prevent scouring of underlying surfaces. • Sediment basins will be added to drainage lines as necessary. Basins shall be designed relative to the catchment and likely flow levels for higher rainfall events. For water containing very fine sediment a longer detention period may be necessary to prevent turbid discharge. • All stormwater proposed for discharge will first be contained in an appropriately lined sediment or attenuation basin, to encourage sediment to settle out. • Where possible, stormwater will be captured and used for construction activities and will be treated to meet regulatory discharge requirements before it leaves the Project boundary. Potentially contaminated stormwater (e.g., runoff which contains hydrocarbons) will not be discharged into the environment. • Storm water collected from construction areas that is considered not to be at risk from hydrocarbon contamination will be kept separate from natural surface water and reused on site or discharged via sediment reduction controls. • Run-off collected from hardstand surfaces, conveyor and product storage sheds in the production plant and the port areas will be managed to minimise impacts on surrounding environments, including marine environmental quality. <p>During operation of the Urea Plant:</p> <ul style="list-style-type: none"> • Revegetate and rehabilitate areas no longer in use and implement landscaping where possible around site facilities to act as a filter for potential offsite contamination. 	
<p>Spill Management</p> <ul style="list-style-type: none"> • Accidental spills will be prevented where possible, and emergency response actions to remediate accidental spills will be enacted immediately upon discovery. • Spill Contingency and Emergency Response Plans and Procedures will be developed and implemented to address environmental risks and potential impacts specifically related to the operational phase. 	<p>SWMT 9</p> <p>All spills onsite will be reported and remediated upon discovery.</p>

<ul style="list-style-type: none"> • Spill kits are to be maintained and kept in areas designated for refuelling activities and storage areas for dangerous goods. • Ensure spill response training is provided to personnel. • Ensure proper bunding and storage (110% containment) is provided for fuels and chemicals during construction. • Equipment servicing will take place in designated areas. Field servicing will be undertaken in a manner that facilitates containment of all hydrocarbons and chemicals • Containment bunds around facilities such as vehicle servicing facilities, chemical / fuel storage areas and concrete batch plants will be designed to minimise flood water entry and be inspected on a regular basis. • Management of hydrocarbons and hazardous substances must be undertaken in accordance with the requirements of PCF-PD-EN-PEMP Project Environmental Management Plan (PEMP). 	
<p>In the event ASS disturbance occurs:</p> <ul style="list-style-type: none"> • Excavated materials that contain potentially acid-forming materials will not be reused for construction purposes unless approved prior to site mobilisation by the Environment and Heritage Manager. • Reuse of treated soils is not to cause long-term impacts i.e. ensure the soils are geotechnically suitable, monitor for leach reaction products to the environment, will require capping and long-term management (not to be disturbed). • Excavated materials that contain potentially acid-forming materials will be treated and disposed at an appropriate landfill. • Treated ASS and PASS material not suitable for reuse on site is to be disposed of as soon as practicable to avoid further risks associated with stockpiling and storage. • For all ASS neutralisation, soil validation sampling should be conducted in accordance with (DER 2015) to ensure effective treatment and neutralisation of ASS. If soil validation sampling fails then soils should be retreated and re-validated until results show Net Acidity <0.03 %S. • Following treatment of ASS soils, the target is to achieve 50% or more 	<p>SWMT 19</p> <ul style="list-style-type: none"> • ASS material treated and reused on site must have a field soil pH of +/-0.5 when compared to field soil pH of naturally occurring background levels. pH is not to increase by 1 unit. • Other potential contaminants, including but not limited to heavy metals, must be at a concentration no greater than 25% above or below the baseline levels established for the site.

- neutralising capacity than the sum of existing and potential acidity (i.e. confirmed by collection and analysis of verification samples).
- Determine locations where excess spoil requires ASS treatment and whether this will be disposed of on-site or removed from site and determine where this spoil will be treated and reused.
 - All soils not suitable for reuse on site will be transported in accordance with the Environmental Protection (Controlled Waste) Regulations 2004 and disposed of at an appropriately licensed facility.

Treatment Pad Construction:

- Construct suitably sized ASS treatment pad based on anticipated throughput requirements and verification testing turnaround times.
- Bund pad to comprise well-compacted alkaline material such as limestone (to minimise infiltration), minimum thickness of 300 mm to be maintained as per Department of Water and Environmental Regulation guidelines.

Transferring excavated material to treatment pad will include:

- Place excavated ASS directly into a truck for carting to treatment pad.
- Stockpile material from different excavations separately and identify with signage.
- Ensure stockpiling method is consistent with Management Action 20.
- Complete daily material tracking sheets.

Neutralising ASS on treatment pad will include the following:

- Blend excavated ASS stockpiles with an appropriate quantity of finely divided neutralising material (likely using an excavator fitted with a screening bucket).
- Record treatment rate and date on material tracking logs and signage.
- Collection of verification samples to confirm treatment has been effective.
- Treatment through a processing unit would include blending of lime with excavated soil and collection of verification samples to confirm treatment has been effective.

Verification may include:

- Collect representative composite samples of well-blended soil and neutralising agent to represent treatment batches. Rate of sampling to be as per DER 2009 (Landfill

<p>Waste Classification and Waste Definitions 1996, as amended 2019).</p> <ul style="list-style-type: none"> • Quality control duplicate samples to be collected. • Samples to be analysed by a NATA accredited laboratory for pHKCl, pHf, and pHfox soil pH, and SPOCAS/Scr (i.e. acidity trail, and sulfur trail). • Analysis for concentrations of metals (As, Al, Cd, Cr, Cu, Hg, Ni, Pb, Zn) if offsite disposal is required. • Verification results will be tabulated and reviewed, for onsite use they will be verified for geotechnical suitability and for offsite use to assess classification for disposal. 	
<p>Stormwater Ponds</p> <ul style="list-style-type: none"> • For paved areas of the urea processing plant, there will be stormwater collection pits (epoxy coated concrete pit) where the first 15mm of stormwater can be collected. Stormwater collected will be treated by steam stripping or other means to bring ammonia (Total Kjeldahl Nitrogen) in water within limit, prior to reuse within the process plant. • The stormwater pond includes an oil skimmer for removal of oil traces. These are sent to the oily water collection pit/processing. • The Project's stormwater surface water system in the main process area (first flush) (Site C) will direct stormwater from hardstand areas into two separate streams which enable the containment and use of the runoff: • Stormwater that could be contaminated by spills or leaks from process activities will be directed for pre-treatment, prior to being discharged by the MUBRL or evaporated in an evaporation pond; • Uncontaminated stormwater will not be treated but will be pumped directly from the stormwater holding pond into the seawater used for cooling on site. • In Site C uncontaminated stormwater runoff will be collected in a sediment basin and used for dust suppression and other construction needs. This measure will be implemented as part of the early works once the site's fill works have been completed. • Where practicable, water reuse opportunities will also be sought in other project areas. 	<p>SWMT 10</p> <ul style="list-style-type: none"> • Stormwater ponds and collection pits will be managed / treated with relevance to their source of diversion, concerning potential contaminants contained within. • Stored and treated water will be reused on site where applicable, and to the standards provided by DWER.

<ul style="list-style-type: none"> • Written approval from the Contractor's HSSE Manager must be obtained prior to reuse or discharge to the environment. 	
<p>Unexpected ASS Disturbance Where ASS are unexpectedly disturbed during the implementation of the proposal the proponent shall treat and manage ASS in Department of Water and <i>Environmental Regulation's guideline on the treatment and management of soil and water in acid sulfate soil landscapes</i> (DER, 2015) as per Condition 7-2 (MS1180).</p>	<p>SWMT 16</p> <ul style="list-style-type: none"> • Implement design and construction methods that minimise and eliminate the potential disturbance of PASS/ASS. • Implement an unexpected finds procedure for ASS. • Comply with Environmental Regulation's guideline on the Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER, 2015) and Condition 7-2 in the event ASS are disturbed during the Project.

6 Roles and Responsibilities

All personnel undertaking Project Works on site have the following responsibilities:

- Attending a Project Environmental Induction prior to commencing any work on site.
- Ensuring they are aware of the Project's environmental requirements as stipulated in the most current version of the PEMP and supporting documents.
- Reporting any environmental hazards, incidents, near misses and community complaints to their Supervisor.

In addition to these, role specific environmental responsibilities for the Perdaman Project team are outlined below.

6.1 Project Director

The Project Director will be responsible for and will have the authority to:

- Provide environmental leadership and ensure adequate resources are provided to effectively implement this SLWMP.
- Be an emergency contact for the Project and provide required information to the Perdaman Board of Directors.
- Endorse and support the Environment Policy and this SLWMP.

6.2 Project Manager

The Project Manager is accountable for implementation of the SLWMP on site. Responsibilities include:

- Ensuring that the requirements of the SLWMP are implemented, maintained and communicated.
- Provide environmental leadership and ensure adequate resources are provided to effectively implement this SLWMP.
- Participate in investigation of incidents and non-conformances and SLWMP reviews.
- Ensure work is planned and executed in compliance with environmental requirements.

6.3 Environment and Heritage Manager

The Environment and Heritage Manager is a site based Environmental Representative who has the authority and responsibility for reporting the implementation, compliance and effectiveness of the SLWMP to the Management Team. The Environment and Heritage Manager will:

- Be an emergency contact and available to be contacted by Perdaman's other senior representatives.
- Communicate the requirements of the SLWMP to site personnel.
- Provide documentation and support to managers and supervisors.
- Ensure project inductions are undertaken as per the PEMP.
- Managing the Project's environment and heritage monitoring programs.
- Review and monitor corrective and preventative actions resulting from audits, incidents and non-conformances.
- Ensure identified risks are analysed and evaluated according to agreed criteria. Regularly review identified risks and controls and maintain a risk register.
- Oversee the implementation and management of the Ground Disturbance Permit (GDP) process.
- Ensure regular inspections, observations, monitoring and audits are conducted to check the effectiveness of controls and that compliance is maintained.

- Review Project performance and compliance with site environmental and heritage requirements.
- Lead investigation and reporting of environmental and heritage incidents, non-conformances and response to community complaints.
- Inform external stakeholders of any relevant non-conformances, environmental and heritage incidents or public complaints and assist with regulator liaison, if required.
- Identify and implement corrective and preventative actions after incidents and share lessons learned within the Project team.
- Manage the submission and attainment of environmental and heritage approvals.
- Prepare a monthly Project environment and heritage report, presenting an update on key performance indicators, project outcomes, issues and incidents.
- Oversee review of existing and preparation of additional environmental management documentation, as required.
- Assure all Project activities are in accordance with statutory, approval and Project environmental and heritage requirements.
- Attend and participate in regular Project meetings.

6.4 Environment Coordinator

The Environment Coordinator is a site based Environmental Representative of Perdaman responsible for:

- Coordination of the Ground Disturbance Permit (GDP) process on site including preparing GDPs in consultation with the relevant Managers, issuing and releasing GDPs, verifying clearing boundaries, monitoring clearing works, and closing out GDP permits.
- Presenting Project environmental inductions to Project Personnel.
- Conducting regular inspections and audits in accordance with this SLWMP.
- Consolidating emissions, consumption and monitoring data into a Monthly Environmental Report.
- Verifying rehabilitation works have been completed in accordance with the Rehabilitation Management Protocol.
- Providing environmental advice and information to the Project management team.
- Supporting the Environment and Heritage Manager with environmental incident investigations.
- Providing advice to the Environment and Heritage Manager about implementing, maintaining and reviewing this PEMP and associated documents.
- Fulfilling the responsibilities of the Environment and Heritage Manager when they are on leave from site.

7 Waste Types

This section provides waste types generated with reference to Landfill Waste Classification and Waste Definitions 1996 (as amended 2019) and the Environmental Protection (Controlled Waste) Regulations 2004 (Controlled Waste Regulations) for solid wastes, and the Controlled Waste Regulations for liquid wastes.

7.1 Clean Fill

Clean fill is defined as raw excavated natural material such as clay, gravel, sand, soil or rock fines that has been excavated or removed from the earth in areas that have not been subject to potentially contaminating land uses including industrial, commercial, mining or intensive agricultural activities (DWER, 2019).

7.2 Inert Waste

Inert wastes are defined as wastes that are largely non-biodegradable, non-flammable and not chemically reactive. Inert wastes are subdivided into three separate classes: Inert waste type 1, 2 or 3, depending on contaminant concentrations, biodegradability, flammability or material from a secondary waste treatment plant (DWER, 2019).

All inert wastes generated at the Project will be segregated and stored on site until removed by a waste handler for off-site disposal.

7.3 Putrescible Waste

Putrescible waste is likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily bio-degrade within the environment of a landfill (DWER, 2019).

The Project will generate putrescible waste including food waste, office and packaging waste (paper, cardboard, plastics), drained and mechanically crushed oil filters, and rags and oil absorbent materials (not containing free liquids) from the workshop area, sanitary napkins etc.

7.4 Hazardous Waste

Hazardous waste is waste which by its characteristics poses a threat or risk to public health, safety or the environment (includes substances which are toxic, infectious, mutagenic, carcinogenic, teratogenic, explosive, flammable, corrosive, oxidising and radioactive).

7.5 Intractable Waste

Intractable waste is waste that is a management problem by virtue of its toxicity or chemical or physical characteristics which make it difficult to dispose of or treat safely and is not suitable for disposal in a Class I, II, III or IV landfill.

The Project will produce spent catalysts and resins, which may be defined as intractable or hazardous. Details of catalyst types, quantities and frequencies of replacement will be determined at a later date. Perdaman will consult with an appropriately licensed waste handler to determine the appropriate classification and disposal requirements on an as-needed basis.

7.6 Controlled Waste

7.6.1 Acids

The Project will utilise sulfuric acid during commissioning and operation, used within the Ammonia Acid Scrubbers. Acid waste (acidic solutions or acids in solid form) may be produced as a result of the production of urea.

7.6.2 Bases

The urea and ammonia plants are likely to result in low ammonia concentration effluent streams, including the off-spec condensate within the ammonia plant; the process off-spec common condensate tank in the urea production plant; and ammonia water stored within the utilities block.

Wastewater containing ammonia will be pumped to the saline water pond for subsequent disposal via the MUBRL or subsequently pumped to the brine evaporation pond for evaporation.

7.6.3 Inorganic Chemicals

The Project may generate used lead acid batteries as part of the operation of the equipment and vehicle maintenance area.

7.6.4 Oils

Waste mineral oils unfit for their intended purpose will be generated as part of the operation of the equipment and vehicle maintenance areas and throughout the construction and operation of the urea production plant. Mineral oils including lubricating and hydraulic oils, hydrocarbons and emulsions, petroleum-based grease, rags and absorbent material wet/saturated with oil, diesel, waste mineral oil and coolant mixtures, and used oil filters containing free liquids may be generated.

Drained and mechanically crushed oil filters, and rags and oil absorbent materials (not containing free liquids) will also be generated but treated as putrescible waste.

Waste oil sludge will be generated in the oil separators and stormwater oil skimmer.

7.6.5 Putrescible and Organic Waste

The Project will generate sewage waste from the sewage treatment plant located in Site C.

7.6.6 Industrial Washwater

An equipment and vehicle wash bay will be located within the workshop area of the Project, within Site F, which will generate wash waters.

7.6.7 Soils & Sludge

Containers and drums contaminated with residues of controlled waste will be generated at the Project both during construction and operational phases.

Any soils contaminated with a controlled waste, such as oil, during construction activities will be treated as controlled waste.

7.6.8 Miscellaneous

Used tyres may be generated at the Project, however this is unlikely as all vehicle tyre changes will occur off-site.

The brine evaporation pond will have to periodically be cleaned of sediment and residual salts.

Dewatered sludge from seawater treatment will be generated.

7.7 Liquid Waste

7.7.1 Sewerage

The Project will generate domestic sewage and waste based on an average of 80-120 staff and other site workers per day on site.

7.7.2 Effluent and Condensate

Liquid effluents from the Project, excluding stormwater, can be grouped into the following main categories:

- Non-saline water effluent streams: These streams include continuous Steam/turbines condensates and Boiler blowdowns. Steam condensate, including discharge from the traps will be mostly recovered and reused in the de-aerator for steam generation. Boiler blowdowns, generated by waste heat boilers of Ammonia Plant and by Power Generation Unit, will be treated where feasible, for re-use in cooling or other duties.

- Saline water effluent streams: Saline streams includes different continuous and intermittent streams. In terms of contributions the main flows consist of Sea Cooling Water blowdown, Brine from sea water desalination, and Polishing water eluate, and Sea water filters back wash.
- Process condensate: The stream consists of stripped process condensates from Ammonia unit (including contribution of CO₂ compressors interstage condensate) and process condensate from Urea units (stripped and treated). A dedicated condensate treatments (polishing packages) is foreseen to treat Process condensate in order to recover these aqueous streams as Boiler Feed Water.

8 Management Measures

The objective of waste management on the Project is to minimise generation of solid and liquid wastes and maximise opportunities to reuse or recycle material in preference to disposal.

The management measures that will be implemented, namely the stockpiling and storage of wastes, reuse and recycling, management of controlled wastes, and wastewater are outlined in the following sections.

8.1 Procurement Policy and Strategy

To reduce the generation and impact of wastes, the Project will adopt a procurement Policy which applies a proactive decision-making approach to product purchases by considering factors of environmental preferability.

Consequently, where practicable a purchasing preference will be given to products which:

- Are recyclable or contain recycled content.
- Have longer lifespans in terms of performance and durability.
- Are biodegradable and/or non-toxic.
- Have been endorsed as a “Good Environmental Choice” from a whole of product life perspective, via an accredited lifecycle assessment process.

The price, quality and availability of alternative product choices shall be utilised as pertinent criteria when assessing the practicability of product choices. Preferred product choices shall be recorded and updated in a ‘preferred product’ log.

Project staff and contractors shall be trained in this Procurement Policy and the procurement measures detailed in this SLWMP.

8.2 Recycling

In addition to procurement strategies, a large part of the solid waste minimisation process is appropriate diversion of recyclable or re-usable materials from the waste stream.

The Projects general recycling strategy relies on management measures aimed at separating, recycling and/or re-using ‘waste’ materials generated by the construction, operation and decommissioning phases of the Project.

Table 8-1 summarises the recycling mitigation measures that will apply to all areas during operation of the Project.

Table 8-1 Recycling mitigation measures during operation

Requirements	Project area
Identify recyclable or re-usable materials.	Site C, Site F, Port
Segregate recyclable and re-usable material from the general waste stream.	Site C, Site F, Port
Induction of employees and contractors will involve training as to which items are to be recycled.	Site C, Site F, Port
Separate general solid waste from recyclable items placed at the initial point of disposal via signage and physical separation of bins.	Site C, Site F, Port
Identify practicable recycling opportunities whenever they exist and commit to becoming involved in any viable regional recycling programs that are initiated.	Site C, Site F, Port

8.3 Controlled Waste

Table 8-2 summarises the controlled waste mitigation measures that will apply to all areas during operation of the Project. These mitigation measures are in accordance with the Environmental Protection (Controlled Waste) Regulations 2004.

Table 8-2 Controlled waste mitigation measures during operation

Requirements	Project area
Ensure the controlled waste is properly contained on premises to prevent discharge into the environment.	Site C, Site F, Port
Ensure a licenced Carrier is engaged to transport-controlled waste to an approved location of disposal.	Site C, Site F, Port
Ensure the controlled waste meets specific criteria for transportation before the Carrier transports the waste.	Site C, Site F, Port
Provide accurate information to the carrier regarding the category, quantity and type (bulk or packaged) of controlled waste.	Site C, Site F, Port
Ensure a receipt is obtained from the driver prior to the controlled waste being transported and kept for a period of three years.	Site C, Site F, Port
Ensure that Packaged Controlled Waste is provided to the carrier in a container compatible with the waste being transported.	Site C, Site F, Port
Wherever practicable, separate receptacles and signage for individual types of controlled waste will be placed at the initial point of disposal. Further segregation of controlled wastes shall occur at the central waste processing facility. Bulk receptacles, bins or stockpile areas will be designated and appropriately managed to allow storage of controlled wastes prior to collection for disposal.	Site C, Site F, Port
Batteries will be stored on-site in bunding prior to being removed and disposed of at an appropriately licensed facility.	Site C, Site F, Port
Wash down water and high salt water will be routed to the brine water pond. This contaminated water pond will be sized to be able to cope with the flow of wastewater as well as excess from a 1 in 100-year rain event from the site.	Site C, Site F, Port
Equipment servicing and wash-downs will take place in designated areas. Field servicing will be undertaken in a manner that facilitates containment of all hydrocarbons and chemicals. All facilities and operations should be compatible with the recommendations in DEWR WQNP 28 Mechanical Servicing and Workshops & WQPN 68 Mechanical Equipment Wash-down.	Site C, Site F, Port
Any soils contaminated with a controlled waste, such as oil, during construction activities will be treated as controlled waste.	Site C, Site F, Port
Tyres not mixed with other waste streams and will be removed by a licensed contractor for recycling. No greater than 100 tyres will be on-site at any time.	Site C, Site F, Port

8.4 Putrescible Waste

To prevent potential health and environmental issues, specific measures for putrescible waste are mainly aimed at:

- Hygiene
- Containment
- Avoidance of the attraction of animals to food scraps

Table 8-3 summarises the putrescible waste mitigation measures that will apply to all areas during operation of the Project.

Table 8-3 Putrescible waste mitigation measures during operation

Requirements	Project area
Solid wastes will be stored in a way that does not attract vermin or native fauna.	Site C, Site F, Port
Bins and skips (with lids) will be labelled and maintained so as to hold the intended waste stream securely.	Site C, Site F, Port
Putrescible waste bins (fitted with secure lids) will be made available for easy access within, office, workshop and plant areas.	Site C, Site F, Port
Office, workshop, other applicable plant areas and/or the central waste management facility will have designated bins or stockpiles for recyclable or re-useable materials.	Site C, Site F, Port
Signage will be provided to indicate appropriate segregation of waste bins/receptacles.	Site C, Site F, Port
Upon collection by a licenced waste handler, the putrescible waste will be disposed of at a landfill facility.	Site C, Site F, Port

8.5 Wastewater

The water management guiding philosophy for the Project is to maximise its recycling and reuse. Project design is based on a continuous supply of seawater from the Water Corporation's supply pipeline which itself abstracts seawater from King Bay.

Within the cooling system, seawater will be continuously recirculated. Only a small quantity, the concentrated seawater cooling stream blowdown, is foreseen to be continuously discharged off site to MUBRL (expected to be about 3.5% of circulating).

Concentrated seawater cooling stream blowdown mixed with rejected stream from desalination water treatment, polishing water eluate, cooling tower pit and treated black and grey waters will constitute the Saline water (brine).

The Saline Water Pond will not receive organic (grey water), amine or oil-containing wastewater.

Table 8-4 summarises the wastewater mitigation measures that will apply to all areas during operation of the Project.

Table 8-4 Wastewater mitigation measures during operation

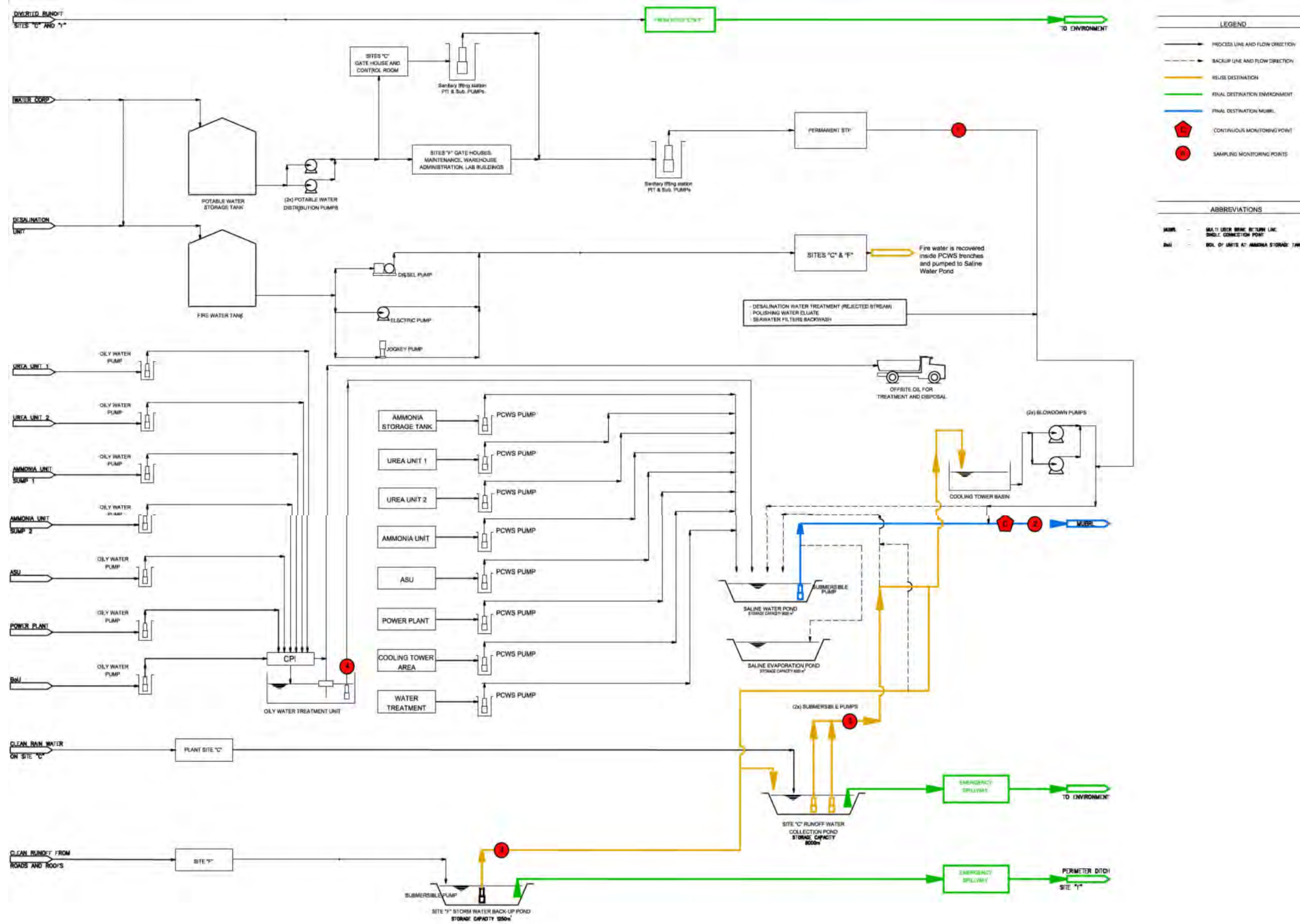
Requirements	Project area
Black / grey water from staff amenities including toilets, shower, washing and kitchen facilities, after onsite treatment, be discharged to the MUBRL for offsite disposal. No untreated domestic wastewater shall be discharged to the MUBRL.	Site C, Site F
Desalination brine generated as part of the desalination plant can be discharged to two locations, depending on the salt content of the brine stream: <ul style="list-style-type: none"> - Brine from the desalination plant will normally be discharged to the MUBRL for offsite disposal after being diluted and mixed with the seawater blowdown stream from the plant cooling tower which meets the discharge specifications. - Brine can also be sent to the brine evaporation pond for local disposal through evaporation if brine/seawater does not meet the MUBRL 	Site C

specification.	
Seawater will be recirculated with a small component (approximately 3.5%) blown down intermittently and discharged off site via the MUBRL.	Site C
Process condensate will be polished before being added back into the demineralised water and reused.	Site C
Stormwater from process areas that could be contaminated by spills or leaks from process activities (i.e. first flush from paved areas) will be directed to dedicated sump and then to the Saline Water Pond.	Site C
Potentially oil-contaminated stormwater from curbed areas shall be segregated, collected in dedicated sumps and sent to treatment package (CPI). Treated water will be temporarily stored within the Treated Water Pond. Discharge from Treated Water Pond to Saline Water Pond shall be monitored to ensure water streams will contain less than 5 ppm wt of total recoverable hydrocarbons.	Site C

Clean stormwater is not considered “wastewater”, and is therefore not considered in this SLWMP.

Wastewater generated during operation of the urea processing plant is provided in the indicative schematic in Figure 8-1.

Figure 8-1 Wastewater Schematic



8.6 Liquid Waste

Liquid waste (excluding wastewater as discussed in section 8.5) will be managed with respect to the specific project areas' sensitive receptors.

Table 8-5 summarises the liquid waste mitigation measures that will apply to all areas during operation of the Project.

Table 8-5 Liquid waste mitigation measures during operation

Requirements	Project area
Liquid wastes will be securely stored in bunded areas that will contain leaks or spills from all containers.	Sites C and F, and Port
Equipment servicing and wash-downs will take place in designated areas. Field servicing will be undertaken in a manner that facilitates containment of all hydrocarbons and chemicals. All facilities and operations should be compatible with the recommendations in DEWR WQNP 28 Mechanical Servicing and Workshops & WQPN 68 Mechanical Equipment Wash-down.	Site C and Port
Facilities used for the receiving of waste from the site are appropriately licenced to accept the classified waste type.	Off-site
Liquid wastes will be removed off site by a licenced controlled waste carrier.	Site C and Port
Signage will be provided to indicate appropriate segregation of receptacles.	Sites C and F, and Port
All waste removed off-site will be recorded in a Waste Management and Tracking Register.	Site C and Port
Employees and contractors inductions to outline key aspects of the SLWMP, including waste definitions, recyclables, reuse and disposal.	Sites C and F, Conveyor and Port
Black / grey water from permanent staff amenities including toilets, shower, washing and kitchen facilities will be treated via a sewage treatment plant prior to discharge to the MUBRL.	Sites C and F
Discharge to the MUBRL will comply with the conditions, including water quality standards, in Ministerial Statements 567 and 594 under Part IV of the EP Act.	MUBRL
Saline water (Brine) which does not meet the MUBRL discharge specification will be sent to the brine evaporation pond.	Site F
A small component (approximately 3.5%) of seawater blown down will be discharged off site via the MUBRL.	MUBRL
Process condensate will be polished before being added back into the demineralised water and reused within the process system.	Site F

8.7 Solid Waste

Solid wastes that are not specifically categorised as controlled waste, putrescible waste or recyclable waste, including spent catalysts and resins, dewatered sludge from seawater treatment, concentrated brine/solids (sediment and salt), waste from maintenance, operations, and offices, and ongoing construction waste at the Project sites will be managed with respect to the specific project areas' sensitive receptors. Wastes will be disposed of at a landfill licenced to receive that waste.

8.8 Hazardous Waste

In many cases, hazardous waste will also be classified as dangerous goods (dangerous goods waste). The key difference between hazardous chemicals and dangerous goods is that dangerous goods are classified according to their immediate hazards and associated risks, which includes fire,

explosion, corrosion and poisoning that can affect property, the environment or people. On the other hand, hazardous chemicals are classified based on their immediate or prolonged effect on a person's health.

Sound dangerous goods waste management practices are essential for safe operations within the waste industry and this involves understanding and assessing the risks presented from dangerous goods waste.

Dangerous goods waste is primarily administered and managed by the Department of Mines, Industry Regulation and Safety under the *Dangerous Goods Safety Act 2004* and relevant regulations. Any licensing requirements for dangerous goods waste are separate to licensing requirements set by the Department of Water and Environmental Regulation.

Prior to receiving, storing or handling dangerous goods waste, always ensure it is correctly identified and classified. Proper identification will alert workers and others about the hazards and potential risks.

Dangerous goods waste may include solvents, paints, or adhesives that are typically Class 3 flammable liquids. Most herbicides and pesticides commonly used in the agricultural industry are classified as toxic (Division 6.1) or corrosive (Class 8) substances.

Ways to identify the waste include:

- seeking information about the product from the waste producer
- obtaining safety data sheets (SDS) for all waste and/or original products
- having samples of waste product identified via laboratory testing – refer to the Australian Dangerous Goods Code for product classification.

The quantity of dangerous goods held on any business site may change regularly. Gauging the quantity of the waste on site is necessary because holding specific quantities may be subject to different regulatory requirements.

There are three levels of quantity: minor (small quantity), placard and manifest. Refer to Schedule 1 of the Dangerous Goods Safety (Storage and handling of non-explosives) Regulations 2007 for more information to ascertain if quantities are limited, placarding requirements, licensing, manifest, emergency plan and risk assessment are required.

8.8.1 Placarding and labelling

Placards and labels inform employees, visitors and emergency services of the types of dangerous goods at a site. For sites storing above placard quantities, the following measures apply:

- a HAZCHEM sign is to be affixed on every entrance to the site
- all dangerous goods storage areas must be correctly signposted with the relevant class label (i.e. class diamonds)
- all packaging containing dangerous goods waste must be labelled with the relevant class label.

Containers must be properly cleaned prior to removing its labels. In cases where containers are not properly cleaned or contain residue they are deemed as being 'full'. These 'full' containers must be labelled properly and will contribute to the total quantity of dangerous goods waste inventory.

8.8.2 Segregate incompatibles

Dangerous goods must be segregated correctly to avoid possible hazardous reactions that can result in the release of heat and toxic gases.

Some chemicals may belong to the same dangerous goods class or division but still can react dangerously when mixed together.

8.8.3 Decanting and transferring

Decanting and transferring of dangerous goods waste are considered to be high risk. Depending on the type of dangerous goods, decanting or other transfer operations can create a hazardous environment susceptible to fires, explosions and toxic releases.

Key considerations for the safe transfer and decanting of dangerous goods waste are:

- always decant away from offices, crib rooms and neighbouring properties and businesses
- ensure sufficient ventilation to avoid the creation of hazardous atmospheres
- provide fire protection in proximity of the decanting area
- manage ignition sources especially when handling flammable gases and liquids:
 - check if equipment is adequately earthed and bonded during flammable liquid transfer
 - use fit-for-purpose equipment for transfers or decanting, e.g. flameproof forklift, pumps certified to operate in hazardous areas
 - identify and isolate ignition sources, e.g. power switches, cooling fans, or radios in proximity of the decanting area.
 - avoid splash filling (free fall of liquid) by bottom filling via an earthed conductive fill pipe, which will also help to dissipate static charge on the liquid.

8.9 Plant Sewage

During operation, domestic wastewater, primarily black and grey water from staff amenities including toilets, shower, washing and kitchen facilities is not discharge separately to the MUBRL. It is treated with any excess in those streams forming part of the saline water that is ultimately disposed of to the MUBRL.

Solid wastes from the treatment plant will be disposed offsite by an appropriately licenced waste contractor.

8.10 Hydrocarbons Management

Table 8-6 summarises the hydrocarbon mitigation measures that will apply to all areas during operation of the Project.

Table 8-6 Hydrocarbon mitigation measures during operation

Requirements	Project area
Up to date Safety Data Sheets for all chemicals used on site will be readily accessible to all Project Personnel and emergency services authorities.	Site C, F, Port
A register of all hydrocarbon and hazardous substances stored on site will be prepared and will be readily accessible to all Project Personnel and reviewed regularly.	Site C, F, Port
Develop a Major Hazard Facility safety report, submitted to and approved by Department of Mines, Industry Regulation and Safety (DMIRS).	Site C, F, Port
Chemicals are to be stored on or within a bunded structure – capacity 110% of largest container, impermeable walls and floor (soil floors not sufficient) and roofed in accordance with Australian Standard AS1940:2004 The storage and handling of flammable and combustible liquids.	Site C, F, Port
Hydrocarbon and chemical storage sheds must be located where they will not pose a risk to the environment.	Site C, F, Port
Hydrocarbon and chemical storage areas will include appropriate signage and labels, in accordance with relevant legislation and Australian Standards.	Site C, F, Port

The amount of fuels and chemicals that are stored on-site will be minimised as far as practicable. Chemicals that are no longer required will be removed from site by approved transport and disposal methods.	Site C, F, Port
Spill kits will be located around the site, in particular at chemical storage locations and where fuels are transferred or decanted. The contents of the spill kit will be relevant to the area and the potential spill.	Site C, F, Port
Spill response procedures will be developed, communicated to all Project Personnel and implemented across the site.	Site C, F, Port
Disposal of hydrocarbons and hazardous substances to be managed in accordance with this Solid and Liquid Waste Management Protocol (45826-HSE-PL-G-1017).	Site C, F, Port
Fuel to support mobile plant and equipment at the site will be stored in bunded areas and or in self bunded tanks. Appropriate licensing will be sought prior to operation of fuel storage systems. Volumes will not exceed threshold limits specified in relevant legislation without appropriate licensing.	Site C, F, Port
Refuelling mobile plant and equipment is to be undertaken within bunded refuelling areas suitably designed and operated to capture any spill or overflow associated with the refuelling process. The system must be installed to ensure surface water is excluded from the bund and any rain falling into the bund is safely held, without the risk of overflow, before being decanted and disposed of at a suitable waste management facility.	Site C, F, Port
Mobile refuelling procedures will be developed and implemented to minimise risk of harm to the environment. This includes but is not limited to ensuring mobile bunding is placed under the fuel delivery vehicle, the plant / machinery being refuelled and any joins in fuel delivery hoses to capture any spills or leaks associated with the refuelling process. The mobile refuelling procedure must form part of the induction for plant machinery operators and fuel delivery operators.	Site C, F, Port
Only manual trigger fuel nozzles are to be used during refuelling of plant and equipment. The operator is to manually hold the delivery trigger in the open position and must not lock the trigger to prevent it from automatically shutting off when the trigger is released.	Site C, F, Port
Any spills or leaks into bunded areas will be decanted and cleaned from the bund immediately after they occur. No further fueling, transfer or decanting is to occur until the spill is cleaned up and reported.	Site C, F, Port
All appropriate licences and permits, including but not limited to those required for the storage of fuel and chemicals, will be achieved prior to site storage of those products.	Site C, F, Port
All removals shall be recorded, and receipts will be kept as per methods in non-hazardous waste controls. Also, Controlled Waste Tracking Forms/Controlled Waste Tracking numbers shall be kept and recorded for the removal of each load of controlled waste. All controlled waste documentation shall be obtained for a period of at least 7 years.	Site C, F, Port
Hazardous waste materials and dangerous goods will be disposed of in accordance with the relevant legislation and Project requirements at approved and certified facilities.	Site C, F, Port
Appropriate licences and management controls shall be in place for the transport, handling, storage and disposal of DGs in Minor Storage, Placarding and Manifest quantities prior to the delivery and activity being undertaken. All DGs shall be handled and transported in accordance with the Dangerous Goods Safety Act 2004, Australian Dangerous Goods Code and other supporting regulations. The driver and vehicle must be	Site C, F, Port

licenced to carry HazMat's and DG (if applicable volumes are reached).

Liaise with, obtain approvals from and keep all relevant Authorities fully informed of any hazardous materials stored on the site and of the contingency plans to be adopted for any spills.	Site C, F, Port
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When selecting materials for the Project, least hazardous substances will be selected in preference for the project, and risk assessments will be required for substances posing potential risk during use, as per the ChemAlert rating.	Site C, F, Port
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All HazMat's will be correctly labelled in compliance with National Code of Practice for the Labelling of Workplace Substances NOHSC 2012:1994 to allow substances to be used in the safest manner that shall protect the environment. Signage shall be in accordance with Australian standard AS 1319	Site C, F, Port
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Adherence to Safety Data Sheets for all handling, use and storage of chemicals and hazardous materials.	Site C, F, Port
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SDS will be issued with Australian emergency contact details and be less than 5 years old, in addition to being supplied to waste contractors as per Guidelines of Controlled Waste Generators (DoE, 2004).	Site C, F, Port
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When handling chemicals, the SDS will be in the immediate work area of the corresponding SWMS/JHA (SWMS/JHA must also be in the immediate work area). The SWMS/JHA document must consider environmental risks of using the chemical or DG (if applicable).	Site C, F, Port
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A hard copy of SDS's will be kept in the immediate work area and the location for Hazardous Substances or Dangerous Goods storage, and electronic copies of SDS's will also be kept in the Project HSE office.	Site C, F, Port
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HazMats and DG storage areas to be restricted access.	Site C, F, Port
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If the contents of a container are unknown, it shall be tagged as out-of-service until it can be identified and labelled.	Site C, F, Port
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Concrete may not be washed out onto laydown areas or drainage lines and must be captured and disposed of in wastewater collection sumps designed to capture runoff from the washing down plant, vehicles and equipment.	Site C, F, Port
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Concrete loading pads will drain to wastewater collection sumps.	Site C, F, Port
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Wastewater collection sumps will be sized sufficiently to allow for particulate matter to settle out. Wastewater (after particulates settle out) to be pumped to a recycled water tank for reuse in batching and washing concrete truck agitators. Excess wastewater will be disposed of offsite at an approved licenced facility.	Site C, F, Port
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All storage sites for oil and other contaminant materials and plant maintenance areas will be confined to specially designed areas, bunded and away from drains, water courses, wetlands and floodplains in accordance with Law. These areas will be constructed to ensure that any spillage is confined in accordance with Law. In addition, all fuels and lubricants must be stored in a bunded area under laid with plastic. Adequate quantities of suitable material to counteract spillage must be kept on relevant premises.	Site C, F, Port
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All oily or contaminated products such as rags, filters, grease cartridges etc. are to be disposed into hydrocarbon bins or relevant containment and removed off-site by licenced contractor.	Site C, F, Port
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Wastes that are not suitable to be disposed into provided waste receptacles i.e., product liquids, incompatible materials, impacted soils etc. will be containerised separately.	Site C, F, Port
Septic waste is to be pumped into a licenced liquid waste transport vehicle and taken to a licenced facility.	Site C, F, Port
Batteries will be stored on-site in bunding prior to being removed and recycled.	Site C, F, Port
Used engine coolant and lubricating oils will be containerised (IBC), for recycling at licenced waste facility.	Site C, F, Port
Waste oil to be stored on-site in a secure bunded area and periodically removed by a licenced waste contractor to a licenced waste facility.	Site C, F, Port
Empty printer and toner cartridges will be segregated and removed to a recycling service provider.	Site C, F, Port
Tyres not mixed with other waste streams and will be removed by a licenced contractor for recycling. No greater than 100 tyres will be on-site at any time.	Site C, F, Port
Ensure hydrocarbon and hazardous waste skips are appropriate to the waste type (i.e., fitted with lid and sealed).	Site C, F, Port
Spills kits, drip-trays and other preventative devices shall be kept within fuel delivery vehicles at all times.	Site C, F, Port
Mobile refuelling activities must only be from trailers fitted with twin skinned tanks and separately bunded. All refuelling must be conducted using spill protection (i.e., drip trays).	Site C, F, Port
Spill trays and spill kits will be maintained on-site, available near fuel and other hazardous material storage and refuelling areas and be utilised to contain and clean-up any spills. Where inadequate stock in spill kits; immediately replace materials and stock in spill kits.	Site C, F, Port
Spills to be controlled prior to entering drainage lines and watercourses through spill clean-up and Erosion and Sediment Controls.	Site C, F, Port
All personnel working with hazardous materials to be familiar with procedures, spill control and clean-up. Personnel will be trained in spill response procedures through inductions, Toolbox talks and additional training where required. Where spill is inadequately cleaned up, leaving unreported contaminated soils / water or improper disposal; provide additional training to personnel on clean-up and notification procedures, update incident report, rectify spill remediation and the handling of HazMats and DGs.	Site C, F, Port
No vehicle or mobile plant refuelling shall occur within 50 m of a watercourse or intertidal zone.	Site C, F, Port
Stationary plant (e.g., generators) shall be self-bunded. Bunds are to be inspected weekly and after heavy rains and emptied as required.	Site C, F, Port
Fuel truck/trailer operators shall not leave area whilst refuelling equipment or filling a tank in case there is a need for emergency shut-off.	Site C, F, Port
No ignition sources within at least a 10m radius of the fill point will be observed during refuelling	Site C, F, Port
Petroleum products and used filters shall be drained into an appropriate container to remove any leftover product prior to disposal as solid hydrocarbon waste.	Site C, F, Port
Soils contaminated by spills are to be removed to an appropriate stockpile location for remediation or disposal.	Site C, F, Port
Spills are to be contained immediately and remediated within 24 hours to	Site C, F, Port

minimise the potential for contaminants to enter groundwater.

Leaking vehicles must be reported and serviced before returning to the construction area. Where vehicles, equipment or containment showing evidence of leakage or wear; record in pre-start checklist, record as correction action, service vehicles, equipment and plant as per manufacturers specifications, repair and containment where applicable.	Site C, F, Port
Inspections are to be undertaken of storage areas regularly. Where general containment standards and storage requirements are not being met; record as a corrective action or incident, rectify the issue with the responsible party.	Site C, F, Port
No major vehicle or plant servicing shall be undertaken on-site, except in designated servicing areas. Servicing of mobile plant will be conducted within a designated and contained area to minimise risk to surrounding environment on-site. The area shall be identified on environmental control maps and site maps.	Site C, F, Port
Servicing of vehicles must be kept up to date at all times, and in the case of a vehicle or plant being overdue for servicing, it is to be tagged out of operation until a service has been conducted.	Site C, F, Port
Where evidence of maintenance or refuelling of vehicles, plant machinery and equipment not occurring in designated areas or with adequate controls; record as corrective action or incident if required, reiterate to personnel involved in this aspect of works, tag out of operation until servicing is complete.	Site C, F, Port
All contaminated stormwater (levels exceeding nominated criteria) i.e. runoff containing hydrocarbons >5ppm Total Petroleum Hydrocarbons (TPH) shall not be discharged into the environment without treatment under any circumstance.	Site C, F, Port
Minimize the use of products containing CFCs, or products manufactured by processes in which CFCs are used.	Site C, F, Port
Comply with conditions within the Marine Oil Pollution Contingency Plans where they apply.	Port
Minimise impacts of contamination to marine water.	Port
Ensure personnel working within the PPA jurisdiction are competent in Oil Spill Incident Response Training (OSIRT).	Port

8.11 Spill Management

Table 8-7 summarises the spill management measures that will apply to all areas during operation of the Project.

Table 8-7 Spill management measures during operation

Requirements	Project area
Accidental spills will be prevented where possible, and emergency response actions to remediate accidental spills will be enacted immediately upon discovery.	Site C, F, Port
Spill Contingency and Emergency Response Plans and Procedures will be developed and implemented to address environmental risks and potential impacts specifically related to the operational phase.	Site C, F, Port
Spill kits shall be maintained and kept in areas designated for refueling activities and storage areas for dangerous goods.	Site C, F, Port

Spill response training shall be provided to personnel.	Site C, F, Port
Proper bunding and storage (110% containment) shall be provided for fuels and chemicals during construction.	Site C, F, Port
Equipment servicing will take place in designated areas. Field servicing will be undertaken in a manner that facilitates containment of all hydrocarbons and chemicals	Site C, F, Port
Containment bunds will be located around facilities such as vehicle servicing facilities, chemical / fuel storage areas and concrete batch plants will be designed to minimise flood water entry and be inspected on a regular basis.	Site C, F, Port
Monitoring of the Project will include weekly spills and water quality checks.	Site C, F, Port

9 Monitoring and Maintenance

Perdaman shall undertake regular reviews of construction and environmental management systems. Site inspections to assess the effectiveness of all mitigation measures will be undertaken and corrective actions are to be implemented accordingly.

9.1 Review of Procedures

This SLWMP will be reviewed periodically throughout the life of the Project (approximately every 12 months) to assess the effectiveness of its measures and maintain relevance to current works or operations. Should the performance of controls be inadequate then the measures will be updated to achieve performance objectives. Additional review will be required in the event of an environmental incident or change in activities.

9.2 Inspections, Monitoring and Maintenance

9.2.1 General

Regular inspections and audits are required to assure the environmental protection outcomes outlined in this SLWMP are achieved. Inspection and maintenance activities will follow the Monitoring and Compliance requirements outlined in the PEMP.

9.2.2 Solid & Liquid Waste

The following monitoring and reporting must be undertaken:

- Annual review of preferred products log to verify assessment of product alternatives and preference to 'green' products were practicable and verify minimisation of disposable products.
- Procurement/Logistics Manager to ensure:
 - All purchasing/procurement staff are trained in Procurement Policy
 - Preferred products log has been established and maintained.
 - Annual review of preferred products log.
 - Site bins are included in weekly inspections, including appropriate provision of receptacles for recyclables/putrescible waste and signage.
- Environmental/Logistics Manager to ensure:
 - Monitor monthly volumes of waste streams, all recycled/re-used materials
 - Induction and training modules on types of waste and appropriate disposal
 - Annual review has been completed.
 - Audits for compliance that controlled wastes are being disposed in accordance with Controlled Waste Regulation.

9.2.3 Wastewater

The following monitoring and reporting need to be undertaken:

- Treatment systems testing should reliably achieve design quality in more than 90% of samples in a 12-month period. Performance testing should be routinely conducted using the designers'/suppliers' recommendations.
- Adequate training of Project staff and contractors in the practices designed to nullify or minimise the loss of contaminated wastewater into the environment. Records and results of the monitoring program should be retained on-site for a minimum of two years for inspection or as requested by regulators.

- Project operators shall routinely monitor wastewater quality, assessing the concentration of contaminants to ensure approved/licensed performance. All monitoring should be conducted in accordance with Australian Standards 2031 and 5667 by appropriately trained personnel
- Cleaning of storage ponds when the accumulated sediment has reduced the basin capacity by more than 30%, as indicated by depth pegs;
- Approval from the Environment and Heritage Manager must be obtained prior to recirculation, reuse/recycling or discharge.

9.2.4 Effluent Discharge Monitoring

As detailed at section 8.5, Project Ceres shall only discharge wastewater to the MUBRL in compliance with Water Corporation acceptance criteria.

Two monitoring procedures are incorporated in the design to control effluent quality: continuous monitoring and scheduled monitoring.

The effluent continuous monitoring will be carried out through online (in-stream) monitoring devices.

Detail of positioning of monitoring points is provided in the indicative schematic in Attachment 8, *Saline Water Pond and Evaporation Pond Schematic*.

The continuous monitoring point will be considered on the line directed to the MUBRL in order to monitor effluent the final stream exiting Project Ceres and resulting from the mixing of the streams summarised in the Table 9-1.

Table 9-1 Effluent streams constituting the mixed aqueous stream continuously monitored

Effluent Steam	Stream description
Cooling water blowdown	It represents the greatest contribution to the overall stream. It is essentially seawater with increased TDS. The TDS is result of the 1.4 Cycles of Concentration in the cooling tower system
Desalination water treatment (reject stream)	The desalination plant concentrate is typically 80-84,000 mg/L TDS, for the RO system to operate effectively.
Polishing neutralised effluent and ultrafiltration concentrates	Polishing neutralized effluent and Ultrafiltration concentrates are collected in Final Observation Basin and then disposed to MUBRL. Polishing neutralized effluent is essentially water with less than 10,000 mg/L TDS (mostly sodium sulphate). Ultrafiltration concentrates is essentially sea water with TSS removed from feed sea water and small amounts of cleaning chemicals salts (sodium sulphate).
Collection pit	The Collection pit collects: <ul style="list-style-type: none"> - Seawater Filter back wash water - PHE Seawater Filter back wash and blowdown water - (Possible minor drift/spillage of seawater, therefore essentially circulating seawater by composition, with possibly some dirt) - During cooling tower basin maintenance, it will be used to finalise basing emptying Blowdown Cooler back wash water (season-based contribution)
Black and grey water after treatment	Black and grey water will be pre-treated in a dedicated treatment package to meet the bacterial count target (E. Coli and Thermotolerant coliforms). Moreover, the stream from the treatment package will widely dilute being a very secondary stream in terms of volume if compared to the mixed overall stream.

Table 9-2 summarises the features of continuous monitoring that will be carried out through online (in-stream) monitoring devices. The set of parameters continuously monitored is defined considering quality criteria that could be correlated/impacted by upstream processes.

In addition to the continuous monitoring, scheduled monitoring at below listed sampling locations will be carried out to monitor the pollutant levels. It will be ensured that the required compliance at MUBRL entry will be met at all times.

- Monitoring Point 1 – at tie-in with MUBRL
- Monitoring Point 2 – at Saline Water Pond outlet
- Monitoring Point 3 – at STP outlet (Package 3971-PK-001)
- Monitoring Point 4 – at Oily Water Treatment outlet (Pump 3950-P-003A/B Discharge)

Details of parameters considered for these monitoring points also are summarized in Table 9-2.

Monitoring at point 1 will be carried out on weekly basis. This monitoring will be carried out in parallel to the continuous monitoring in order to fully cover the set of parameters required to be monitored by Water Corporation for the discharge to the Multi-User Brine Return Line (MUBRL).

Monitoring at point 2 will be carried out before scheduled discharge in order to fully assess quality of brine stored in the Saline Water Pond and to assure MUBRL criteria will be fully met after mixing with other continuous streams directed to MUBRL during normal operation.

In case of monitoring carried out at point 2 shows a high level of pollutant concentration that cannot allow final discharge to comply with MUBRL discharge limits, Saline Water Ponds brine will be sent to the Saline Evaporation Pond where this will be disposed of by means of evaporation.

Table 9-2 Effluent monitoring parameters for continuous and scheduled monitoring

Parameter	Continuous Monitoring	Scheduled Monitoring			
		Monitoring Point 1	Monitoring Point 2	Monitoring Point 3	Monitoring Point 4
	at tie-in with MUBRL		At Saline Water Pond outlet	at STP outlet	at Oily Water Treatment outlet
	Continuous	Weekly	Before discharge to MUBRL	Weekly	Before to discharge from oily water treatment unit
Temperature	✓	✓	✓	-	-
pH	✓	✓	✓	-	-
Conductivity	✓	✓	✓	-	-
Oxidation-Reduction potential	✓	✓	✓	-	-
Ammonia	✓	✓	✓	-	-
Arsenic III	-	✓	✓	-	-
Arsenic V	-	✓	✓	-	-
Cadmium	-	✓	✓	-	-
Chromium III	-	✓	✓	-	-
Chromium VI	-	✓	✓	-	-
Cobalt	-	✓	✓	-	-
Copper	-	✓	✓	-	-
Lead	-	✓	✓	-	-
Mercury	-	✓	✓	-	-
Nickel	-	✓	✓	-	-
Selenium	-	✓	✓	-	-
Silver	-	✓	✓	-	-
Vanadium	-	✓	✓	-	-
Zinc	-	✓	✓	-	-

E.Coli	-	✓	✓	-	-
Thermotolerant coliforms	-	✓	✓	✓	-
Free Chlorine ¹	✓	✓	✓	✓	-
BOD	-	-	-	✓	-
COD	-	-	-	✓	-
TSS (turbidity)	✓	-	-	✓	-
THR (Total Recoverable Hydrocarbons)	-	-	-	-	✓

(1) Free Chlorine is not among parameter included in MUBRL agreement with the Water Corporation but it is monitored since existing Ministerial Statement 594 specifies the limit of 0.1 mg/L for oxidising biocide in the effluent discharge.

10 Reporting

Compliance with this SLWMP as outlined in Sections 0 will be reported in a timely manner to the Environment and Heritage Manager after each inspection and audit. Corrective actions will be recorded and monitored as per the non-conformance tracking system to ensure continual improvement and enable the closeout of incidents.

Any solid or liquid waste and wastewater incidents resulting in offsite impacts will be reported to the Environment and Heritage Manager (or their representative) as soon as possible.

Annual compliance and environmental reports will be prepared by Perdaman for submission to the appropriate Regulators (i.e., DWER) in accordance with MS 1180 and corresponding confirmed Surface Water Management Plan (PCF-PD-EN-SWMP) and any applicable Part V Works Approvals and Licenses. These will include general conformance with management actions, new risks and hazards identified, corrective actions implemented, sampling results and incident and investigation reports..

11 Changes to SLWMP

This plan has been amended from the previous version PCF-PD-EN-SLWMP_PCF1 to update formatting, spelling and grammar, and updating of information to reflect the current design of the Project. Changes to the design of the Project do not substantially change management actions.

Table 11-1 Changes to Solid & Liquid Waste Management Plan

Complexity of changes					
Minor revisions		<input type="checkbox"/>	Moderate revisions	<input type="checkbox"/>	Major revisions <input checked="" type="checkbox"/>
Number of Key Environmental Factors		One	<input type="checkbox"/>	<input type="checkbox"/>	> 3 <input checked="" type="checkbox"/>
			2-3		
Item no.	section no.	page no.	Summary of change	Reason for change	
1.	Summary	1	Proposed Construction & Operation Commencement Dates	Updated	
2.			Purpose of the SLWMP	Updated	
3.	Forward	2	Forward	Updated	
4.	Forward	4	Figure 0-1	Updated	
5.	1	8	Introduction	Updated	
6.	1.1	8	Purpose and Scope	Updated	
7.	2.1	12	Location and Regional Setting	Added	
8.	3	13	Legislation, Commitments and Other Obligations	Added	
9.	3.2	14	Project Approvals	Updated	
10.	Table 3-1	14	Project statutory approvals and agreements relevant to solid & liquid waste management	Updated	
11.	5	16	Environmental Factors	Added	
12.	5-1	17	Management Actions & Targets	Added	
13.	Table 5-3	18	Management Actions, Triggers and Targets – Management Plans	Added	
14.	6	26	Roles and Responsibilities	Added	
15.	7	28	Waste Types	Added	
16.	8.2	31	Recycling	Updated	
17.	8.3	32	Controlled Waste	Updated	
18.	8.4	33	Putrescible Waste	Updated	
19.	8.5	34	Wastewater	Updated	
20.	Figure 8-1	38	Wastewater Schematic	Updated	
21.	8.6	39	Liquid Waste	Added	

22.	8.7	39	Solid Waste	Added
23.	8.8	39	Hazardous Waste	Added
24.	8.9	41	Plant Sewage	Added
25.	8.10	41	Hydrocarbons Management	Added
26.	8.11	45	Spill Management	Added
27.		47	Summary of Solid & Liquid Waste Mitigation Measures	Deleted
28.	9	49	Monitoring and Maintenance	Updated
29.		50	MUBRL	Deleted
30.	9.2.4	51	Effluent Discharge Monitoring	Added
31.	10	53	Reporting	Updated
32.	11	54	Changes to SLWMP	Added

12 Definitions

Bund

A bund is a barrier constructed from material that is able to adequately contain contaminated material such that, should a spill, leak or loss occur, it prevents contamination of the environment. It will serve the dual purpose of containing contaminated material or wastewater within a confined area, whilst excluding external uncontaminated stormwater runoff.

Contractor

The Contractor on the Project is any individual or party engaged directly or indirectly by Perdaman, that is not an employee of Perdaman, to carry out the Project.

Controlled Waste

Waste types listed in Schedule 1 of the Environmental Protection (Controlled Waste) Regulations 2004. Controlled wastes include many hazardous wastes and are generally defined as all liquid waste, and any waste that cannot be disposed at a Class I, II or III landfill site.

Environmental Representative

The Environmental Representative includes Perdaman's Environment and Heritage Manager, the Environmental Coordinator or their delegated representative.

Environment and Heritage Manager

The Environment and Heritage Manager is Perdaman's site based Environmental Representative who has the authority and responsibility for managing the implementation, compliance and effectiveness of the Project's environmental and heritage requirements.

EPC

Engineering and Procurement Contractor. For the purposes of the construction and commissioning phase, Saipem, Clough Joint Venture.

Hazardous Waste

Component of the waste stream which by its characteristics poses a threat or risk to public health, safety or the environment. Hazardous wastes are generally unsuitable for landfill disposal and would only be accepted after appropriate treatment and/or in accordance with specific license conditions.

Landfill

A site used for disposal of solid material (i.e., spadeable) by burial in the ground that is licensed as a landfill under the *Environmental Protection Act 1986*.

May

Indicates that the Subcontractor is permitted to do something, or the Contractor reserves the right to do something according to the text.

Perdaman

Perdaman Chemicals and Fertilisers Pty Ltd is the proponent of the Project.

Project Personnel

Project Personnel includes all persons working on the Project directly employed by Perdaman, or its Contractors.

Project Work Sites

The Project work sites include Area C, Area F, the causeway linking these two areas, the conveyor corridor to the Port and the Port storage and loading infrastructure. It can also include any other Project relevant location under operational control of Perdaman.

Putrescible Waste

Component of the waste stream likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily biodegrade within the environment.

SCJV

Saipem, Clough Joint Venture. EPC that are delivering the construction and commissioning phase of the Project.

Sewage

Waste containing faecal matter or urine. An “apparatus for the treatment of sewage” means any apparatus for the bacteriolytic or anaerobic/aerobic treatment of sewage or any other apparatus for the treatment of sewage approved under the *Health Act 1911*.

Should

Indicates a recommendation.

Subcontractor

A Subcontractor is any organisation, consultant or supplier engaged, or to be engaged by SCJV.

For the purpose of this management Plan, any discarded, rejected, surplus or abandoned substance intended for sale or recycling, reprocessing, recovery, purification or disposal by a separate operation from that which produced the substance.

Wastewater (Industrial)

Industrial wastewater includes contaminated stormwater, cooling water, process water and wash-down waters.

Will

Indicates that a statement is mandatory.

Works

Works includes all work which Perdaman and or its Contractors are required to perform to comply with its obligations under their relevant scope of works pertaining to the Project.

Water Corporation

Water Corporation is the principal supplier of water, wastewater and surface water services throughout the state of Western Australia. It will provide potable water during construction, and seawater and brine disposal facilities for the commissioning and operations phase.

13 Abbreviations

Abbreviation	Description
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
ATR	Autothermal Reforming
BSIA	Burrup Strategic Industrial Area
BFW	Boiler Feed Water
CEMP	Construction Environmental Management Plan
CO	Carbon Monoxide
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EPC	Engineering, Procurement and Construction
ESCP	Erosion and Sediment Control Plan
ESD	Environmental Scoping Document
EWSC	East West Services Corridor
FEED	Front End Engineering and Design
HSSE	Health, Safety, Security & Environment
MAC	Murujuga Aboriginal Corporation
MeOH	Methanol
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
Mtpa	Million tonnes per annum
MUBRL	Multi-User Brine Release Line
NATA	National Association of Testing Authorities
PASS	Potential Acid Sulfate Soils
PEMP	Project Environmental Management Plan
PPA	Pilbara Ports Authority
PPM	Parts per million
SCJV	Saipem Clough Joint Venture
SWMP	Surface Water Management Plan
SLWMP	Solid & Liquid Waste Management Plan
TLO	Time Limited Operations
TRH	Total Recoverable Hydrocarbons



USEPA	United States Environmental Protection Agency
WQPN	Water Quality Protection Note

14 Reference Documents

In text citation	Document Title
CEMP	Construction Environmental Management Plan (SCJV_CEMP_45826-HSE-PL-G-1005)
Coffey 2022a	Perdaman Urea Project – Project Destiny: Baseline Hydrogeological Assessment.
Coffey 2022b	Perdaman Urea Project – Project Destiny: Detailed Site Assessment for Acid Sulfate Soil
DWER-053a	ASS Risk Map, Pilbara Coastline
ESD	Perdaman Urea Project – Environmental Scoping Document
HHSMP	Hydrocarbons and Hazardous Substances Management Protocol (45826-HSE-PL-G-1009).
PEMP	Project Environmental Management Plan (PCF-PD-EN-PEMP)
SNC-Lavalin 2019	Perdaman Urea Project – Project Destiny: Geotechnical Desktop Study.
SWMP	Surface Water Management Plan (PCF-PD-EN-SWMP_PCF3)
S&LWMP	Solid and Liquid Waste Management Protocol (45826-HSE-PL-G-1017).
WQESC	Water Quality, Erosion and Sediment Control Construction Management Sub-Plan (45826-HSE-PL-G-1006)

15 Guiding Documents and Standards

Document Number	Document Title
AGBT08-19	<i>Austrroads Waterway Design Guidelines and Australian Standards. Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures.</i>
AGRD05-13	<i>Austrroads Waterway Design Guidelines and Australian Standards. Guide to Road Design Part 5: Drainage-General and Hydrology Considerations</i>
ARR 2019	<i>Australian Rainfall and Runoff: A Guide to Flood Estimation (Ball J et al, 2019)</i>
AS 1319	<i>Safety Signs for the Occupational Environment - Western Australia</i>
AS 1940:2004	<i>The storage and handling of flammable and combustible liquids.</i>
AS/NZS 2031	<i>Australian Standard 2031 - Water quality - Sampling for microbiological analysis (ISO 19458:2006, MOD)</i>
AS/NZS 5667	<i>Australian Standard 5667 - Water quality - Sampling Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (Reconfirmed 2016)</i>
Controlled waste fact sheet 2	<i>Guideline for Controlled Waste Generators - Requirements of waste holders</i>
Controlled waste fact sheet 3	<i>Guideline for Controlled Waste Generators - Controlled waste tracking</i>
DER2015001427	<i>Identification and investigation of acid sulfate soils and acidic landscapes (DER 2015).</i>
DER2015001427	<i>Treatment and management of soils and water in acid sulfate soil landscapes (DER 2015).</i>
DWER 2017, 3 rd Edition	<i>Stormwater management manual for Western Australia, Chapter 4: Integrating stormwater management approaches, Decision process for stormwater management in WA (the former Department of Water 2004–07)</i>
FIRST 115848	<i>Waste Categorization for Controlled Waste Guideline (DWER 2020)</i>
CORP-HSE-PR-G-0066	<i>HSSE Incident Notification, Investigation and Reporting Procedure</i>
CORP-HSE-FO-G-0036	<i>HSSE Risk Matrix</i>
MS 567	<i>Ministerial Statement No. 567 – Statement that a Proposal May be Implemented – Desalinated Water and Seawater Supplies Project, Burrup Peninsula, Shire of Roeburne</i>
MS 594	<i>Ministerial Statement No. 567 – Statement to Amend Conditions Applying to a Proposal - Desalinated Water and Seawater Supplies Project, Burrup Peninsula, Shire of Roeburne</i>
MS 1180	<i>Ministerial Statement No. 1180 – Statement that a Proposal May be Implemented – Perdaman Urea Project</i>
WQPN 28	<i>Mechanical Servicing and Workshops.</i>
WQPN 52	<i>Stormwater management at industrial sites.</i>
WQPN 68	<i>Mechanical Equipment Wash-down.</i>

16 Project Delivery Applicability

<input type="checkbox"/> Proposals	<input checked="" type="checkbox"/> EPC	<input checked="" type="checkbox"/> Construction
<input type="checkbox"/> Studies	<input checked="" type="checkbox"/> Project Management	<input checked="" type="checkbox"/> Commissioning
<input checked="" type="checkbox"/> Preliminary Engineering	<input checked="" type="checkbox"/> Technical Services	<input type="checkbox"/> Site Services
<input checked="" type="checkbox"/> FEED	<input type="checkbox"/> Procurement	<input checked="" type="checkbox"/> Ops and Maintenance
<input checked="" type="checkbox"/> Detailed Design	<input checked="" type="checkbox"/> Construction Management	<input type="checkbox"/>