PERDAMAN INDUSTRIES

CHEMICALS & FERTILISERS

Project Environmental Management Plan

Perdaman Urea Project

Burrup Peninsula, Western Australia

CW1055600

Prepared for Proponent:

Perdaman Chemicals and Fertilisers Pty Ltd.

ABN: 31 121 263 741

Date: 19 March 2020

Assessment No:

2184 (WA)

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Summary

Proposal Title	Perdaman Urea Project
Proponent name	Perdaman Chemicals and Fertilisers Pty Ltd.
Assessment Number	2184 (WA) & 2018/8383 (Commonwealth)
Purpose of the PEMP	The purpose of the PEMP is to document the strategic environmental controls and Project specific procedures, management plans and protocols that will be applied. The PEMP is provided for regulatory review and approval, and will be applied across all project areas, for the life of the project.
Key environmental factors and objectives	The key environmental factors and objectives relevant to the Project include: ▪ 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.
Condition clauses	To be determined.
Key provisions in the plan	The PEMP's key provisions included in Appendices 3 to 17 detail the outcome and management based protocols, or actions, that will be applied for the life of the Project.

Foreword

This Project Environmental Management Plan (PEMP) is the overarching environmental management plan for the Perdaman Urea Project and is supported by a series of issue specific sub-plans. An overview of the structure of the PEMP and sub-plans is illustrated in Figure 0-1.

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

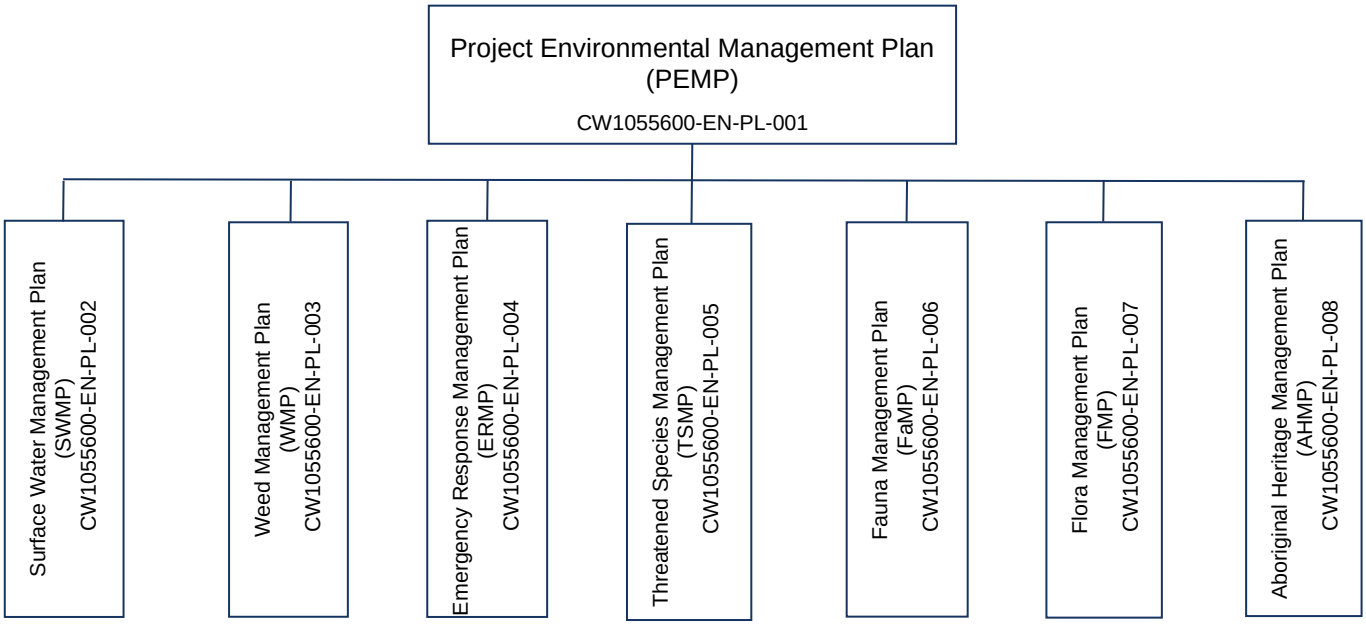

Figure 0-1: Structure of the Project Environmental Management Plan and supporting sub-plans.

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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 proposed Burrup Strategic Industrial Area, approximately 8 km from Dampier and 20 km north-west of Karratha on the north-west coastline of Western Australia.

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

The project has the potential to impact a range of environmental factors which include coastal processes, marine environmental quality, marine fauna, flora and vegetation communities, terrestrial fauna, inland waters, air quality and social surroundings. Included in these are a number of Matters of National Environmental Significance (MNES).

A suite of management strategies and actions will be implemented throughout the Project to minimise or abate its impacts, addressing environment and heritage issues such as native flora and fauna; surface and groundwater water management; emissions to air, ground and waterways; feral species invasion; fire; and impacts on rock art.

These strategies and actions form the core of this Project Environmental Management Plan (PEMP) and establish the key environmental management measures that establish the Project's legal requirements. A series of issue specific protocols relevant to the Project's environmental aspects and impacts are included in the attached appendices.

This PEMP is the overarching environmental management plan for the Perdaman Urea Project and is supported by a series of issue specific sub-plans addressing the management of surface water, weeds, emergency response, threatened species, fauna and flora.

Affective implementation of these plans' requirements are expected to result in the Project having a negligible impact on the neighbouring and regional environment.

1.1 Purpose

Perdaman is committed to minimising and where possible eliminating potential impacts to the environment, taking into consideration the applicable legislative and regulatory requirements. The purpose of the PEMP is to document the strategic environmental controls and Project specific procedures, management plans and protocols that will be used for the Project. It aims to provide an instrument to:

- Comply with permit and approval requirements for the Project granted under Part IV of the Environmental Protection Act 1986 (WA) (EP Act) and the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) and any other ancillary approvals;
- Address applicable legislative and regulatory requirements; and
- Provide a framework for continual improvement and application of best industry practice.

It is important that all Project activities undertaken are in accordance with environmental legislation, licensing conditions and in consideration of site-specific environmental aspects. In ensuring this document remains an effective tool for on-site implementation during the construction, operation and decommissioning phases (Phases) of the Project, the aspects addressed include:

- Allocating responsibilities to Project Personnel to ensure the documented controls are properly implemented, maintained and monitored;
- Identifying environmental hazards, risks and impacts of the Project;
- Allocating responsibilities to Project Personnel to ensure the documented controls are properly implemented, maintained and monitored;
- Identifying environmental hazards, risks and impacts of the Project;
- Defining details of environmental management and mitigation measures to be implemented;
- Outlining environmental monitoring and reporting requirements;

- Providing for compliance with relevant contractual, regulatory and legislative environmental requirements;
- Providing for environmental inductions and training so that all personnel engaged on the Project, including contractors, are made aware of the requirements of this PEMP;
- Setting out the process to assess, respond and report environmental incidents; and
- Outlining the mechanism for continual improvement through audit, review and corrective action.

1.2 Scope

This document provides the guidance to construction and operational personnel on the minimum environmental requirements of the Project and applies to all Project work sites.

This document incorporates current environmental approval conditions and proponent commitments made during the environmental approvals process, as well as sound industry practice. The requirements are aligned with the International Standard for Environmental Management Systems ISO14001:2015. Included in this document are directions outlining the requirements for identifying obligations, planning, auditing, monitoring, reviewing, reporting and managing environmental performance.

This document will be updated on a periodic basis as new approvals are received and compliance requirements are determined.

The scope of this PEMP does not include the construction of port facilities, including the jetty or infill of the coastal area for the provision of a wharf. These works will be managed by the Dampier Port Authority under a separate licensing and approvals process from that of the Project.

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 North West of Australia (Figure 1).

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). The estate's close 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.

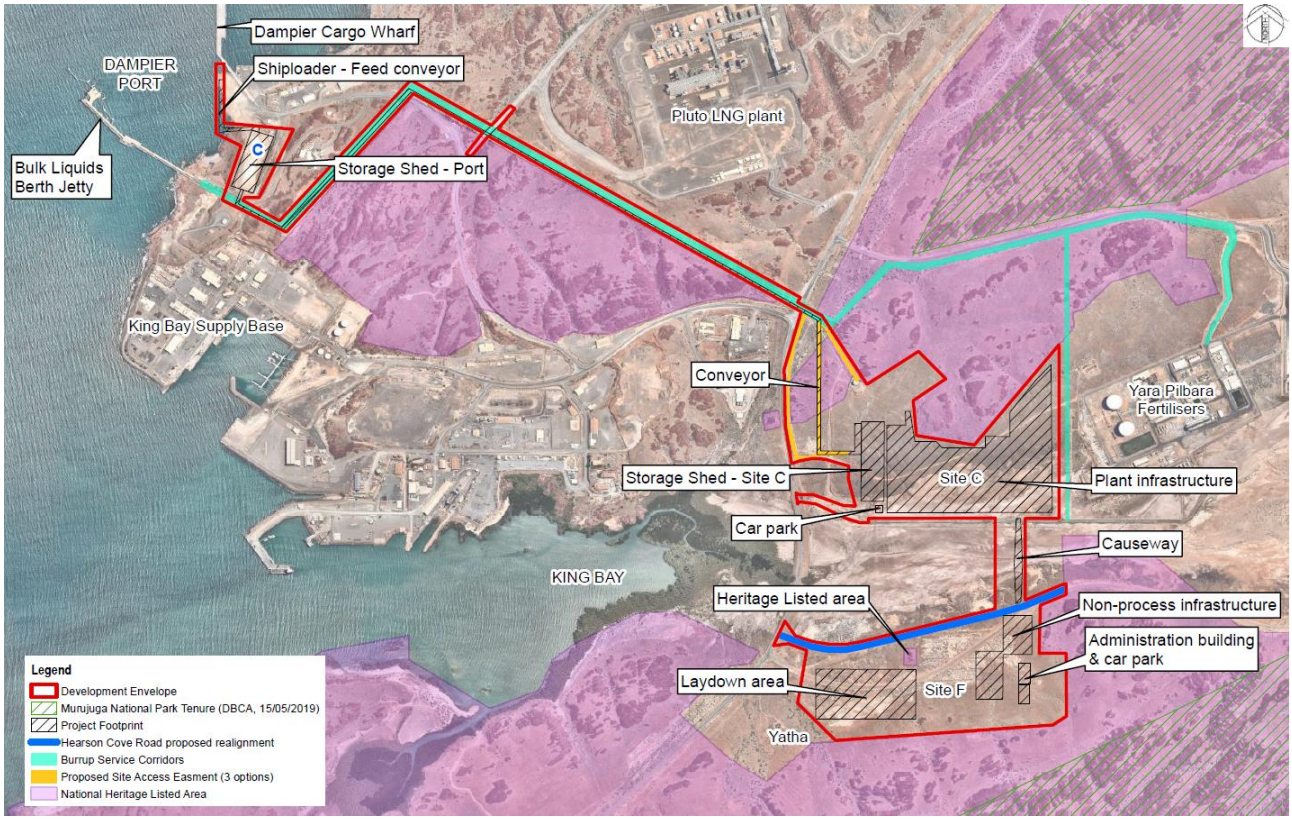

Figure 2-1 Project site layout and adjoining facilities.

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 sections are described in Figure 2-2.

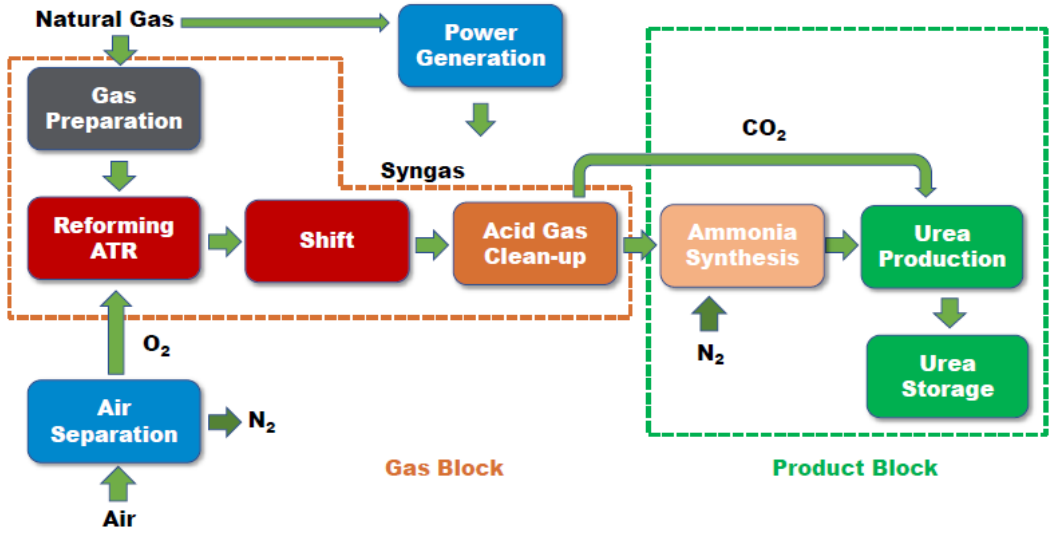

Figure 2-2 Process Block Diagram

3 Legal and Other Requirements

3.1 Project Approvals

The Project must comply with the relevant conditions outlined in the Project specific approvals granted. 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. 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 progress, achievement, renewal and surrender of all licenses throughout the life of the Project.

Table 3-1 Project statutory approvals and agreements.

Approval / Agreement	Purpose	Agency / Jurisdiction
EP Act 1986 - Part IV Approval - Ministerial Statement	EPA assessment of strategic proposal.	EPA
Environmental Protection and Biodiversity Conservation Act 1999 – s.87 accreditation provisions	Meeting Commonwealth requirements for controlled actions.	DOEE
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 52. Power generation	For construction and operation of electric power generation using fuel.	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat 54A or 85B. Desalination plant	For construction and operation of desalination plant.	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. 54 or 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. 77 Concrete batching	For construction and operation of concrete batching.	DWER
EP Act 1986 - Part V - Works Approval & Licence - Cat 58 or 86. 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 - Working near Water Corp assets	Approval required to work near or over the Water Corp seawater delivery line and Multi User Brine Release Line (MUBRL).	Water Corp
Approval / Agreement - working near gas pipeline.	Permission required to work near or over the Burrup Fertiliser Lateral Pipeline (BFL pipeline) runs on south side of Site C to Yara Fertilisers.	Santos
Dangerous Goods Safety Act 2004 - Dangerous Goods Site Licence (Construction)	Storage of fuel during the construction phase.	DMIRS

Approval / Agreement	Purpose	Agency / Jurisdiction
Dangerous Goods Safety Act 2004 - Major Hazard Facility License (Class A)	Storage of dangerous goods over threshold quantities during the operational phase.	DMIRS
WA Occupational Safety and Health Regulations 1996 - Design Verification and Independent Fabrication Certificates.	Obtain Independent Design Verification Certificates and Independent Fabrication Certificates for pressure equipment.	DMIRS
WA Occupational Health and Safety at Work Regulations 1996 - Design Registration of Plant	Obtain Design Registration of Plant.	DMIRS
WA Occupational Health and Safety at Work Regulations 1996 - Registration of Plant	Obtain Registration of Plant.	DMIRS
Land Administration Act 1997 - s91 Licenses	For any works on Crown Land.	DPLH
Land Administration Act 1997 - s79 Lease	Lease for all site locations under Crown.	DPLH
Local Government Act 1995 - Building Licence	Building approval for Port storage shed, loading facility, infrastructure on sites C&F and causeway, and conveyor.	City of Karratha
Mining Act 1978 - Mining proposals and letters of Intent - Overland conveyor / shiploader	Construction of overland conveyor / shiploader.	DMIRS
Biodiversity Conservation Act 2016 - Fauna Taking (Relocation) Licence	Fauna relocation associated with trenching operations.	DBCA
Aboriginal Heritage Act 1972 - Heritage Approvals - s18.	Disturbance of Aboriginal heritage sites in National Heritage Listed areas. Conveyor route running through NHL before reaching Burrup East West Services Corridor (EWSC).	DPLH
Approval for works "impacting on" the Bunbury Extension Pipeline (BEP).	Obtain approval to work in the area where the conveyor will cross over the BEP.	Australian Gas Infrastructure Group
Dampier to Bunbury Pipeline Act 1998 - s41. Minister's approval	To carry out activities or works within the DBNGP corridor.	DPLH

3.2 Port Approvals

All statutory approvals required for the construction of the port wharf will be managed by the Pilbara Ports Authority (PPA) under a separate approvals process. Once constructed by the PPA, Perdaman will place its storage and shiploading infrastructure on PPA managed land and new wharf.

Perdaman will develop a specific Port Operations Environmental Management Plan (OEMP) which will address Project relevant PPA approval conditions and procedures, and any other conditions specifically associated with Perdaman's own project approvals. This plan will be submitted to the PPA for review and approval.

3.3 Regulatory Obligations

Other regulatory obligations relevant to the scope of this PEMP, but may not be specified in the aforementioned approvals, are included in, but not limited to, the following legislation:

- Aboriginal Heritage Act 1972
- Biodiversity Conservation Act 2016
- Biosecurity Act 2015
- Dangerous Goods Safety Act 2004
- Dangerous Goods Safety (Explosives) Regulations 2007
- Dangerous Goods Safety (General) Regulations 2007

- Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007
- Dangerous Goods Safety (Security Risk Substances) Regulations 2007
- Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007
- Environment Protection and Biodiversity Conservation Act 1999
- Environmental Protection Act 1996
- Environmental Protection Regulations 1987
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004
- Environmental Protection (Concrete Batching and Cement Product Batching) Regulations 1998
- Environmental Protection (Controlled Waste) Regulations 2004
- Environmental Protection (Noise) Regulations 1997
- Environmental Protection (Unauthorised Discharge) Regulations 1997
- Land Administration Act 1997
- Mining Act 1978
- National Greenhouse and Energy Reporting Act 2007
- Planning and Development Act 2005
- Rights in Water and Irrigation Act 1914
- Waste Avoidance and Resource Recovery Act 2007

3.4 Other Obligations – BMIEA

Burrup Maitland Industrial Estates Agreement (BMIEA), reflects the agreed developable industrial sites and locations that would be subject to payments by eventual proponents developing those sites.

The BMIEA provides a variety of benefits to local Indigenous people through financial compensation; establishment of various employments; training; educational support; establishment of a Rock Art Study to monitor the industries emissions; and the development of a Roebourne Enhancement Scheme.

Perdaman have a Commercial Agreement with Murujuga Aboriginal Corporation (MAC) which, subject to financial close, identifies it as a future proponent under the BMIEA. Accordingly, Perdaman will have certain prescribed financial and social obligations to MAC and the contracting parties, as a result of its activities on land within the Burrup Strategic Industrial Area (BSIA).

3.5 Ground Disturbance Permit

A Ground Disturbance Permit (GDP) is a permit issued to Project Personnel, including Contractors, enabling Works within defined battery limits which will impact native vegetation, heritage or other environmentally sensitive values.

Activities include, but are not limited to, clearing and grubbing, grading open ground, movement of plant, equipment and vehicles and any other activity which will disturb or damage soil, waterways, habitat and, or vegetation.

A GDP could be issued either through a standalone process, or included in an overall approval to work procedure developed for the Project.

It is the responsibility of the party undertaking the ground disturbing activity, to ensure they submit to Perdaman's Environment and Heritage Manager an application form requesting a GDP at least two weeks prior to requiring access to the area being the subject of the GDP.

4 Environmental Policy

The Environmental Policy is the foundation for all of Perdaman's environmental management processes and includes a statement signed by the Chairman / Managing Director.

This policy is communicated to all Project Personnel and is freely available for all interested parties. A copy of the policy is included in Appendix 2.

5 Organisational Structure, Roles and Responsibilities

5.1 Organisational Structure

The key Project roles relating to environmental management are shown in the organisation chart included in Attachment C.

5.2 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; and
- 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.

5.2.1 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 PEMP;
- Be an emergency contact for the Project and provide required information to the Perdaman Board of Directors; and
- Endorse and support the Environment Policy and this PEMP.

5.2.2 Project Manager

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

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

5.2.3 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 PEMP 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 PEMP 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; and
- Attend and participate in regular Project meetings.

5.2.4 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 PEMP;
- 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; and

- Fulfilling the responsibilities of the Environment and Heritage Manager when they are on leave from site.

5.2.5 Construction Manager

The Construction Manager is accountable for implementation of the PEMP on site during the Project's construction phase. Their responsibilities include:

- Planning construction Works in a manner that avoids or minimises impact to environment in line with this PEMP;
- Ensuring a GDP application is submitted and a GDP Permit is issued in a timely manner prior to the commencement of any ground disturbing works or activities being undertaken;
- Ensuring any ground disturbing works or activities undertaken are within the limits specified in the Works specific GDP;
- Providing environmental leadership and ensuring adequate resources are allocated to effectively implement this PEMP;
- Stopping all work immediately if an unacceptable impact on the environment is likely to or has occurred;
- Ensuring that the appropriate level on induction and training has been provided to all site staff to minimise environmental impacts from Project works;
- Participate in investigations relating to construction related incidents resulting in breaches of environmental regulatory, licence or approval requirements; and
- Regularly liaise with the Environment and Heritage Manager regarding environmental aspects and impacts.

5.2.6 Operations Manager

The Operations Manager is responsible for the implementation of this PEMP during the construction and operational phases of the Project, including:

- Planning the commissioning and ongoing facility operations in a manner that avoids or minimises impact to environment in line with this PEMP;
- Providing environmental leadership and ensuring adequate resources are allocated to effectively implement this PEMP;
- Stopping all work immediately if an unacceptable impact on the environment is likely to or has occurred;
- Ensuring that the appropriate level on induction and training has been provided to all site staff to minimise environmental impacts of the Project's commissioning activities and ongoing facility operations;
- Participate in investigations relating to construction related incidents resulting in breaches of environmental regulatory, licence or approval requirements; and
- Regularly liaise with the Environment and Heritage Manager regarding environmental aspects and impacts.

5.3 Contractor Resourcing and Responsibilities

All Contractors will provide adequate, tertiary qualified (in environmental management or similar qualification) and experienced site-based personnel on site to coordinate the management of environmental issues for the Project, relevant to their scope of Works. This requires a suitably qualified Contractor Environmental Advisor, on site during any Works, for every 50 contractor personnel on site, or on a case by case basis in agreement with Environment and Heritage Manager. A minimum of one suitably qualified Contractor Environmental Advisor is required to be employed on site by the Contractor, unless otherwise agreed with the Environment and Heritage Manager.

The Contractor will demonstrate that responsibility for achieving sound environmental outcomes rests with senior Project and construction management personnel with support from a suitably qualified Contractor Environmental Advisor. Prior to mobilisation, an organisation chart and position responsibilities will be provided as part of the Contractor's Environmental Management Plan.

6 Environmental Objectives and Targets

The Project's objectives aim to minimise or avoid the environmental impacts associated with the proposed works. Table 6-1 below addresses the Project's objectives and the targets to be achieved.

Table 6-1 Environmental Objectives and Targets

Objective	Target
Construction of the project in accordance with environmental approvals and legal requirements.	Full compliance with statutory approvals.
Engage with affected stakeholders and the broader community and minimize complaints.	Respond to any complaints in a timely manner. Disseminate regular Project updates and other information through the Project website and other media where practicable.
Avoid discharge of contaminated stormwater water off site.	Zero emission of contaminated stormwater from site.
Minimise erosion within Project area and avoid off site erosion associated with the Project Works.	Any on site erosion is to not impact traffic and pedestrian movement, construction of operational activities in any way. All off site discharge of storm water to be controlled to avoid offsite erosion.
Minimise impact on native vegetation	Keep clearing within the Project's battery limits to a minimum and only clear area essential for Works.
Minimise impact on native marine and terrestrial fauna.	Zero fauna deaths associated with the Project.
Avoid any release of hydrocarbons, hazardous substances and other contaminants to ground or waterways.	Zero spills to any waterways and in quantities greater than 50L to ground.
Minimise impacts to hydrological regimes within the Project areas.	Maintain current hydrological regimes within the Project areas.
Manage the risk of uncontrolled fire within the Project areas.	Zero uncontrolled fires started within the Project area.
Minimise dust emissions from the Project areas.	Zero community complaints.
Minimise air emissions during commissioning.	Keep gas emissions below the Project's approval condition levels.
Minimise construction and operations noise.	Zero community noise complaints.
Avoid impacting any protected heritage areas.	Zero impact on any protected heritage areas.
Minimise solid waste from packaging into landfill.	Segregate recyclable and non-recyclable wastes on site prior to removal to corresponding facilities.
All liquid waste generated on site during construction is to be removed by a licensed controlled waste carrier.	All liquid waste removed will have waste tracking forms and volumes reported monthly.
Minimise impact of acid sulphate soils uncovered during construction works.	Zero impact from acid sulphate soils on site. No acid drainage plumes off site.
Ensure groundwater usage does not exceed project need during construction.	Zero exceedance of groundwater allocation.

Objective	Target
Rehabilitate any cleared areas at the conclusion of construction Works to restore habitat.	Rehabilitate all cleared areas not required for operational purposes.
Do not introduce weed species to site or neighboring properties.	No new weed cover in Project area.

7 Environmental Aspects and Impact

The environmental aspects and impacts of the Project are included in Attachment A. The highest ranked impacts with a significance score of 10 are:

- Air pollution – plant emissions (oxides of nitrogen, carbon dioxide, sulphur dioxide, methane, ammonia, urea particulates, methanol) resulting from the plant commissioning portion of the Project; and
- Damage to rock art associated with air emissions and during clearing, grubbing and earthworks.

The next highest ranked environmental impacts with a significance score of 8 are:

- Removal of endemic flora exceeding approval limits as a result of over or incorrect clearing;
- Restricted access for the community to Hearson Cove as a result of the Hearson Cove Road realignment;
- Restriction or redirection of surface water flows on the ephemeral flood plain as a result of constructing the access causeway between Area C and F; and
- A large volume of waste generation during construction may be greater than capacity at local and nearby landfill facilities.

Adequate control measures and effective implementation of these measures will be implemented to reduce the likelihood and or severity of these impacts.

7.1 Air Quality Management

The project's airborne emissions compare favourably to similar proposals and operating plants in the region. Perdaman's process will utilise an Autothermal Reforming process resulting in significantly less emissions compared to other technologies used for this application. The primary emissions anticipated include nitrogen dioxide (NO_x as NO_2), carbon dioxide (CO_2), carbon monoxide (CO), methane (CH_4), ammonia (NH_3), sulphur dioxide (SO_2), dust particulates and traces of hydrogen and methanol.

Contemporary best practice pollution control technology has been incorporated into the design of the plant. Further minimisation associated with the Project's air emissions will be sought through the adoption of future advances in air pollution control technology and improved process management.

Perdaman Urea Project Environmental Management Plan: Air Quality and Greenhouse Gas Emissions (AQGHGMP) provides a broad overview of the relevant key environmental factors, its rationale and approach, and the air quality / greenhouse gas management and mitigation measures that will be employed to ensure that residual impacts are not greater than predicted.

This plan will be reviewed and developed further to incorporate all future Project approval conditions. Commissioning and operational monitoring results will be considered when the AQGHGMP is reviewed and updated.

7.2 Impacts on Murujuga Rock Art

Perdaman recognises Murujuga (the Dampier Archipelago, including the Burrup Peninsula and surrounds) as a unique ecological and archaeological area containing one of the largest collections of Aboriginal engraved rock art in the world. The rock art (petroglyphs) are of immense cultural and spiritual significance to Aboriginal people, and of national and international heritage value. As such, in 2018, the state government and MAC agreed to progress a World Heritage nomination for Murujuga which would see its cultural heritage values recognised at the highest international level. Perdaman is aware of the public concerns about the effect that existing and future industrial emission sources may have in relation to Murujuga receiving World Heritage listing.

The risk of emissions impacting rock art is being considered in the Project's environmental management strategies. There are currently several existing industrial facilities that release air emissions into the Murujuga airshed. These include the Woodside Karratha Gas Plant, the Woodside Pluto LNG Plant, the Yara Pilbara Fertilisers Ammonia and TAN Plants. Shipping operations mainly associated with the loading and transport of iron ore and LNG also release emissions into the Murujuga airshed. The most significant sources of air emissions are the Karratha Gas Plant and the Pluto LNG Plant. Continual improvement and the implementation

of best available technology within the Perdaman urea plant will be considered within this broader cumulative context.

The risk of impacts associated with clearing, grubbing and earthworks will be managed to avoid damaging rock art within the project footprint and in adjacent areas. This will be achieved through a range of management strategies including on-site heritage surveys, pre-clearance checks, delineation of no-go-zones and effective implementation of the GDP process.

7.2.1 Murujuga Rock Art Strategy

The Minister for Environment released the Murujuga Rock Art Strategy in February 2019. The strategy establishes the framework for long-term management and monitoring of environmental quality to protect rock art on Murujuga from the impacts of anthropogenic emissions that is consistent with the Western Australian government's responsibilities under the EP Act. The strategy builds on previous work undertaken on Murujuga to deliver a scientifically rigorous approach to monitoring, analysis, and management. The strategy has been informed by the submissions received through consultation on the draft strategy and finalised in consultation with the Murujuga Rock Art Stakeholder Reference Group (MRASRG).

The Department of Water and Environmental Regulation (DWER) will be responsible for the day to day implementation of the strategy and will work in partnership with the MAC to implement the strategy, in consultation with stakeholders, including the community and industry.

7.2.2 Murujuga Rock Art Monitoring Program

The DWER is partnering with the MAC to oversee the development and implementation of a world best practice rock art monitoring program to determine whether the rock art on Murujuga is being subject to accelerated change. Through industry funding contributions, the development and implementation of the monitoring program will be undertaken by the DWER in partnership with the MAC in close consultation with a team of national and international experts in relevant disciplines.

The purpose of the Murujuga Rock Art Monitoring Program is to monitor, evaluate, and report on changes and trends in the integrity of the rock art, specifically to determine whether anthropogenic emissions are accelerating the natural weathering, alteration, or degradation of the rock art. This will enable timely and appropriate management responses by the state government, industry, and other stakeholders to emerging issues and risks. The objectives of the Murujuga Rock Art Monitoring Program are to:

- Obtain data for comparison against the Environmental Quality Criteria (EQC) to ascertain whether the Environmental Quality Objective is being achieved and the environmental value (the rock art) protected;
- Provide the state government, the MAC, industry, and the community with robust, replicable and reliable information on changes and trends in the integrity or condition of the rock art on Murujuga;
- Ensure decisions regarding the protection of the rock art are based on the best available science; and
- Inform the evaluation of the effectiveness of any measures taken to mitigate adverse effects on the rock art, including efforts to protect the rock art.

Perdaman, as an industry emitter to the Murujuga airshed, commits to contributing both financially and technically to the Murujuga Rock Art Monitoring Program. Perdaman's air quality monitoring program will include rock art specific monitoring, providing a good understanding of its own contribution to the local air shed and the potential impacts of air pollutants on rock art.

8 Environmental Management Protocols

This document includes a suite of environmental management protocols. They have been prepared in consideration of the key risks to the environment and community, and in accordance with the environmental standards adopted for the Project.

These protocols will be reviewed and developed further to ensure consistency with the Ministerial Conditions applied to the Project under Part V *Environmental Protection Act 1986* (WA), and other Project specific planning, construction and operational approvals, permits and conditions.

A brief description of the management protocols is included below with a copy of each included as an attachment to this document. Where a contradiction may occur between the body of this PEMP, including the individual management protocols, and issue specific sub-management plans (SWMP, WMP, ERMP, TSMP, FaMP, FMP or the HMP) the most current version of the relevant management plan(s) will take precedence.

8.1 Erosion and Surface Water Management Protocol

Soil erosion mitigation measures will be adopted to minimise the severity of erosion and surface flow, and avoid negatively impacting adjacent waterways and drainage structures. Erosion protection will be undertaken to manage stormwater within and entering all Project areas. The *Erosion and Surface Water Management Protocol* included in Appendix 3 outlines the controls and measures to be managed to meet these objectives.

8.2 Native Vegetation and Clearing Management Protocol

The *Native Vegetation and Clearing Management Protocol* details clearing limitations and measures that will be implemented, primarily during the construction phase, to minimise damage to native vegetation.

Perdaman will ensure the requirements for flora protection, site clearing and grubbing, as well as disposal of the materials produced by clearing and grubbing are within the limits specified by the plans and approval conditions for the Project.

The *Native Vegetation and Clearing Management Protocol* is included in Appendix 4.

8.3 Native Fauna Management Protocol

Environmental management practices for the protection of native fauna will be implemented across all areas of the Project. The *Native Fauna Management Protocol* included in Appendix 5 addresses the key elements the Project will need to apply.

8.4 Hydrocarbons and Hazardous Substances Management Protocols

Environmental management practices for the transport, storage and use of chemicals associated with the Project must ensure no uncontrolled releases to the environment. This includes managing exposure to and release of naturally occurring fibrous materials which may occur on the site.

The *Hydrocarbons and Hazardous Substances Management Protocol* included in Appendix 6 details the Project's responsibilities for the storage, segregation, transport and administration of hydrocarbons and hazardous substances.

8.5 Weed Management Protocol

Perdaman will ensure all Project activities do no result in the introduction of new weed species or spread of existing weed species within the Project's work areas. The *Weed Management Protocol* included in Appendix 7 addresses the key responsibilities of the Project including good weed hygiene and management of weed affected soil and vegetative matter.

8.6 Fire Management Protocol

The objectives of the *Fire Management Protocol* included in Appendix 8 is to minimise the risk of fire events related to Project activities. They key responsibilities of the Project outlined in the protocols include the development of emergency management plans, permit procedures, fire control, training and equipment maintenance.

8.7 Drill and Blast Activities Near Rock Art Management Protocol

The protection of rock art is a priority for the Project and the *Drill and Blast Activities Near Rock Art Management Protocol* in Appendix 9 addresses the Project's responsibilities including development of blast management plans, training and pre-blast inspections.

8.8 Asbestos and Fibrous Materials Management Protocol

Though considered to be of low likelihood, the exposure of personnel to naturally occurring asbestos and other fibrous materials remains a priority for the Project.

The *Asbestos and Fibrous Materials Management Protocol* in Appendix 10 addresses the Project's key responsibilities including training, site investigation and management of in situ and excavated materials.

8.9 Air Quality Management Protocol

Air quality impacts across all Project activities, including dust, gas and particulate emissions during the construction, commissioning and operational phases will be managed to minimise their impact on workers, neighbouring properties and the environment.

The *Air Quality Management Protocol* included in Appendix 11 addresses the Project's responsibilities including commissioning parameters, onsite management strategies and monitoring commitments.

8.10 Noise Management Protocol

Intrusive noise issues associated with the Project will be managed in compliance with relevant statutory standards and to ensure they do not negatively impact on workers and neighbouring noise sensitive receptors.

The *Noise Management Protocol* included in Appendix 12 provides guidance on how Perdaman will minimise noise emissions from a range of sources including construction equipment, drilling, blasting, piling and commissioning of plant, the conveyor and ship loader.

8.11 Heritage Management Protocol

The *Heritage Management Protocol* included in Appendix 13 includes the protocols that will need to be followed should an unexpected heritage find occur, or where operational activities have the potential to impact heritage values. This includes the discovery of skeletal remains, artefacts and rock art not previously identified.

The *Heritage Management Protocol* provides clarification of the Project's responsibilities in relation to managing known sites and unidentified finds. These protocols are to be implemented in conjunction with the Project's CW1055600-EN-PL-008 Heritage Management Plan.

8.12 Solid and Liquid Waste Management Protocol

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, tradewaste and dewatering discharge are released to the environment.

The *Waste Management Protocol* included in Appendix 14 addresses the Project's key responsibilities including the stockpiling and storage of wastes, reuse and recycling, management of controlled wastes, and wastewater.

8.13 Acid Sulphate Soils Management Protocol

The objective of the *Acid Sulphate Soils Management Protocol* is to minimise the risk of generating acid leachate from acid sulphate soils (ASS) and managing any ASS which may be exposed during the Project.

The protocols included in Appendix 15 outlines the Project's responsibilities including identifying ASS risk areas, development of an ASS and dewatering management plan, containment, treatment and reuse, and groundwater management.

8.14 Concrete Batching Management Protocol

The objective of the *Concrete Batching Management Protocol* in Appendix 16 is to minimise the environmental impacts of operating the temporary concrete batch plant during the initial construction phase.

The protocols address the Project's requirements for minimising dust emissions, spills to open ground, wastewater management, storage, containment and handling of materials, and the reuse or disposal of solid wastes.

8.15 Rehabilitation Management Protocol

Perdaman will demobilise all equipment from the site and rehabilitate all disturbed areas through a phased implementation strategy across the life of the Project. This includes throughout, and by the conclusion of the construction phase the removal of all temporary facilities and construction infrastructure not required for operational purposes.

Finally, at the conclusion of the Project, all operational equipment and associated infrastructure will be removed and all pre-construction undisturbed areas will be rehabilitated to the standard specified within the Project's approval conditions.

The *Rehabilitation Management Protocol*, included in Appendix 17, addresses the Project's key responsibilities including the minimum rehabilitation standards and close out of all outstanding actions.

9 Environmental Risk Identification and Management

Perdaman's environmental management approach is risk-based, systematic and responsive to change. This is accomplished by undertaking comprehensive risk assessments to ensure all hazards are identified, assessed and evaluated to effectively eliminate or control risk levels to an acceptable level.

At a minimum:

- All work environments containing hazards will be assessed;
- Perdaman's risk assessment tools will be utilised and associated documentation will be retained;
- Risk assessments will be performed regularly and in a timely manner by qualified personnel and with sufficient management representation;
- Risk assessments will be conducted whenever changes occur to the scope of work, equipment or materials used, or in the organisation of the work team (i.e. new shift). At a minimum, risk assessments will be conducted at the following stages:
  - Early stages of new projects and studies;
  - During detailed design of projects;
  - Critical decision points in current projects;
  - Both routine and non-routine operations;
  - Following modifications;
  - Supplier site inspections; and
  - Travel.
- Risk assessments will be reviewed at specified intervals with management involvement;
- Following the risk assessment, corrective actions will be taken to ensure that hazards are appropriately evaluated and controlled to levels as low as reasonably practicable (ALARP); and
- A follow-up of the risk assessment action items will be performed to ensure corrective measures are effective and sustainable.

10 Training and Awareness

All Project Personnel will be aware of and competent to implement the environmental requirements of the PEMP when performing their individual tasks. A competent person is a person who is qualified, because of knowledge, training and experience, to organise the work and its performance.

10.1 Project Inductions

All personnel working on the Project will undertake an environmental induction prior to commencing any work on site. The environmental induction developed by Perdaman, will be delivered to personnel by the Environmental Representative, or delegated person, and will include, but not be limited to the following:

- Project approvals and associated conditions;
- Key legal obligations;
- Regulatory penalties and impacts of non-compliance;
- Process for authorising ground disturbance via the GDP process;
- Land access restrictions;
- Aboriginal heritage sites and cultural awareness;
- Dust management;
- Identification of weeds, management measures and reporting requirements;
- Protection of fauna, identification of protected fauna species and reporting requirements (sightings and injuries);
- Identification of feral fauna species and reporting requirements;
- Water management and water use efficiency;
- Fire risk management and response;
- Erosion systems and management;
- Hazardous materials storage and use;
- Spill management including use of spill kits;
- Waste management;
- Asbestos materials management;
- Emissions management;
- Incident and hazard reporting;
- Any special requirements relevant to specific work locations eg: Port related aspects and impacts.

10.2 Training Records

Training records will be maintained on site and include the following as a minimum:

- Records of training attendance eg: induction training, toolbox meetings;
- Copies of training materials;
- Competency assessments (where relevant);
- Training matrix.

11 Communication

11.1 Internal and External Communication

Regular updates of environmental issues and related matters will be communicated to all Project Personnel. This communication will include the induction process, through regular team meetings and tool box talks, and via written communications including emails and newsletters disseminated electronically or in hard copy.

All external communications will be managed by the Project Director. No other Project Personnel are to provide comment or information to external organisations or individuals without the consent of the Project Director.

11.2 External Incident Notification

Only the Environment and Heritage Manager, in consultation with the Project Director, is authorised to notify external regulatory agencies of any Project related environmental incidents.

This communication will be in accordance with individual agencies' reporting and notification requirements.

12 Documentation and Records Management

The Project's documents and records data will be managed via the Project's document control protocols.

13 Non-Conformance and Incident Management

13.1 Environmental Incident Response

An environmental incident on the Project is any situation where there is unauthorised ground disturbance or a gas, liquid or solid emission release occurs that does, or could, pose a threat to environmental values, or be a breach of a Project approval or regulatory requirement. As a guide, this could include:

- Spill to open ground, waterway or marine system of a known or potentially contaminating liquid or solid material;
- Clearing or grubbing vegetation outside an approved area;
- Release of gas or vapours to atmosphere;
- Injury or death of fauna;
- Damage to rock art, Aboriginal artefacts or other heritage values;
- Introducing weed contaminated soil or vegetation into uninfected areas;
- Erosion or deposition of sediment outside the Project's battery limits;
- Any uncontrolled fire;
- Uncovering naturally occurring hazardous or contaminating materials such as asbestos and other fibrous materials and acid sulphate soils;
- Excessive dust generation;
- Excessive noise emissions resulting in worker or community complaints; and
- Wastes not being disposed of at an appropriately licensed facility.

The immediate response to all incidents is to make the area safe and undertake measures to prevent further environmental harm.

The process outlined in Figure 13-1 below will be followed by all Project Personnel should an environmental incident occurs:

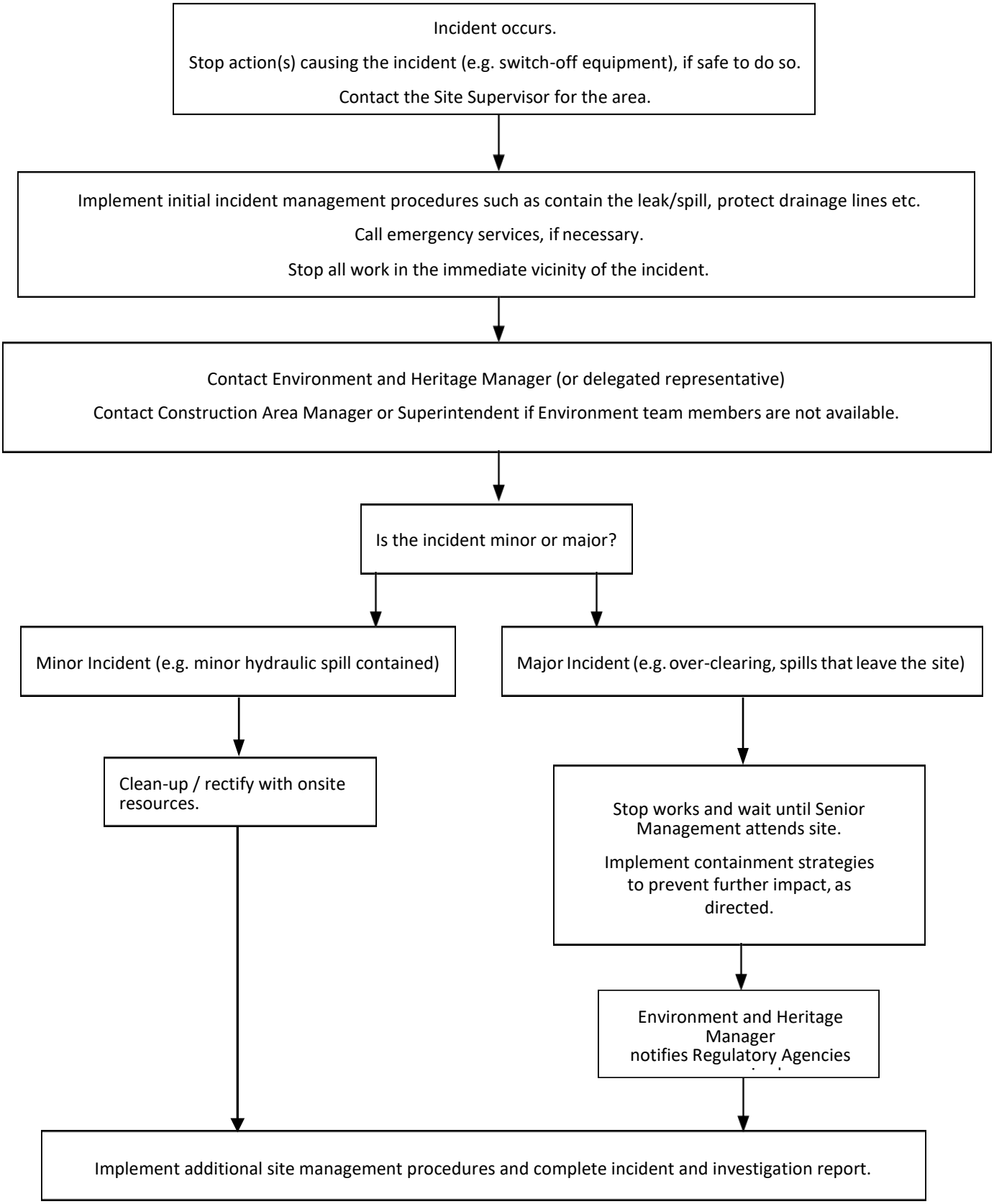

Figure 13-1 Flow Chart for Environmental Incident Response

13.2 Incident Reporting and Investigation

When an environmental incident occurs, regardless of its scale or nature, the Environment and Heritage Manager (or their representative) is to be notified of the incident as soon as possible.

The Environment and Heritage Manager will inform the Project Director of the incident, and actions taken to mitigate impact to the environment. Reporting to the Project Director must occur within 24 hours. The incident and response will be recorded in Perdaman's incident reporting system, within 24 hours of occurrence.

For externally reportable and / or high potential incidents, root cause(s) must be established using the Incident Cause Analysis Methodology (ICAM). The final incident investigation report must be submitted within 14 days, or as stipulated by the Project Director, depending on the level of investigation required.

In the event that an environmental incident results in the offsite discharge of contaminants to the environment, the Environment and Heritage Manager, in consultation with the Project Director, will contact the appropriate regulatory agencies.

All high-potential environmental releases must be reported to the Perdaman Chairman within 24 hours of occurrence, or sooner if practicable.

The site supervisor responsible for the area in which the incident occurred is to complete an incident report form and provide it to the Environment and Heritage Manager as soon as practicable after the incident.

Depending on the nature of the incident, reporting and notification of incidents may need to be provided to external agencies or Regulators.

All incidents will be investigated at a level commensurate with the actual or potential consequence. Incidents with an actual consequence of high and above, including those that breach regulations, licence or approval conditions will include the relevant Construction or Operations Manager in the incident's investigation.

13.3 Non-Conformance Management

Non-conformances may be identified from a number of sources, including but not limited to incident investigations, audits, inspections, monitoring programs and management reviews. Corrective actions will be systematically implemented and reviewed to ensure they adequately resolve the issue and minimise the risk of reoccurrence of the incident.

A corrective action register will be maintained on site by Perdaman and will record all corrective actions identified and implemented, including review of corrective actions and close out details. The close out details will include the date closed and the name of the person verifying completion of the required action.

Corrective actions where the initial risk level is high or extreme must be prioritised and closed in a timely manner.

Where relevant, corrective actions identified may be included in periodic revision of the PEMP.

13.4 Emergency Management

CW1055600-EN-PL-004 Emergency Response Management Plan will be implemented, addressing health, safety, environment and heritage issues. The plan will include methods for managing major environmental incidents, including but not limited to, large scale release of hazardous materials or gases, fire, cyclone and flood events.

14 Monitoring and Compliance

14.1 Monitoring

Perdaman will conduct regular inspections and audits of the Project's work sites and undertake monitoring of nominated emission sources.

All non-conformances identified will be managed through the Project's non-conformance management process outlined in section 13.3.

14.1.1 Environmental Inspections

Perdaman will undertake weekly environmental inspections of all Project work areas and activities.

These inspections will be specific to the work area and include relevant environmental aspects such as, but not limited to:

- Hazardous materials storage and handling;
- Dust and other emissions management;
- Refuelling activities;
- Land clearing and rehabilitation;
- Groundwater usage;
- Trench management;
- Noise management;
- Stormwater management including sediment basins and ponds;
- Spills, leaks and contaminated ground;
- Topsoil management;
- Waste management (liquid and solid); and
- Environmental incidents and corrective action close out.

14.1.2 Environmental Audits

Perdaman will conduct environmental audits of individual construction work packages and operational areas via an integrated audit schedule. This will be undertaken to ensure all Project activities and environmental management processes conform with the planned arrangements and whether the PEMP has been properly implemented. The key requirements to be reviewed may include:

- Performance against licensing and approvals conditions, project targets, objectives and policy statements;
- Adequacy of resources and training;
- Complaints and non-conformance management.

The audit schedule will be developed in consultation with relevant internal stakeholders and Contractors. Results of all audits will be communicated and discussed at management review meetings.

14.1.3 Emissions monitoring and reporting

Monitoring of emission sources will be undertaken periodically, to ensure compliance with the Project's licensing and approval conditions and other threshold requirements.

Prior to construction an Environmental Monitoring Plan will be developed to manage the Project's monitoring regime for air and water quality. This will include monitoring locations, monitoring frequency, measurement protocols, assessment protocols, discharge limits, management commitments and internal and external reporting requirements. This plan will address emission parameters such as:

- Air quality monitoring including stack emissions testing and monitoring of other process control

indicators.

- In accordance with obligations under the *National Greenhouse and Energy Reporting Act 2007,* undertake monitoring and publicly disclose emissions data.
- Undertake periodic water quality monitoring of plant process water and treated wastewater discharged from the sewage treatment plant, prior to discharge to the Multi User Brine Release Line (MUBRL).
- Monitoring of stormwater run-off from all project areas to onsite storage ponds and discharges to the supra-tidal flat and marine environment.
- Dust emissions from the conveyor, product storage sheds and ship loading operations will be monitored periodically.

As part of its air quality monitoring commitment, Perdaman will contribute to the development of an Environmental Quality Management Framework (EQMF) as detailed in the Murujuga Rock Art Strategy, then participate in the implementation of the EQMF.

14.2 Compliance

The requirements stated in this document are considered a minimum standard and compliance is mandatory.

The aforementioned audit, inspection and monitoring regime conducted by Perdaman will monitor compliance with these requirements.

The Project's suite of licenses and approvals will contain conditions that must be satisfied prior to the commencement and throughout Project construction, commissioning and operation. Non-compliance with these conditions could result in fines and penalties being levied against individuals and companies.

Perdaman will maintain a legal obligation register and implement systems to monitor and ensure compliance with these requirements.

14.3 Environmental Reporting

Perdaman is responsible for the preparation of overall Project related environment reports including compiling data from monitoring programs.

Perdaman will compile monitoring data and relevant environmental information on a monthly basis. Reporting to external stakeholders and regulators will be in strict accordance with the Project's approval conditions.

15 Review and Continual Improvement

Ongoing monitoring of the Project's environmental performance will ensure environmental risks are identified, monitored and addressed in a timely manner. This includes monitoring the key characteristics of all Project activities that may have significant environmental impacts, such as operational controls, conformance with objectives and periodic evaluation of compliance with legislation and regulations.

Findings of monitoring and measurement processes will be reviewed periodically and reported through monthly reports and a management review twice a year. The monthly reports will provide information to satisfy approval conditions while the management review will be a self-evaluation audit of conformity to Perdaman's corporate environmental management system requirements.

Regular environmental inspections conducted by the Environmental Representatives will provide assurance that all personnel and operating processes are continually addressing environmental issues through a process of continual improvement.

Additional monitoring may be required to understand potential exceedances or non-conformances, such as, but not limited to, excessive noise levels at sensitive receivers, weed establishment on site and discharge water quality.

16 Definitions

Bund

A bund is a structural system designed to prevent potentially contaminating materials from entering the environment.

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.

Contractor Environmental Advisor

A Contractor Environmental Advisor is the Contractor's tertiary qualified (in environmental management / science or similar qualification) and experienced site based representative who coordinatesthe management of environmental issues for the Project, relative to their contracted scope of Works.

Environmental Representative

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

Declared Plants

Declared plants are weeds which are listed under the *Biosecurity and Agriculture Management Act 2007.*

Ground Disturbance Permit

A Ground Disturbance Permit (GDP) is a permit issued to Project Personnel, including Contractors, enabling Works within defined battery limits which will impact native vegetation, heritage or other environmentally sensitive values.

No-Go Zones

No-go Zones are defined areas within the Project's footprint which are not to be entered and or disturbed by Project activities. These areas are established to protect environmental, cultural heritage, infrastructure and other values from damage or other detrimental impacts.

Perdaman

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

Phases

The Project will have three main periods (phases) that will involve different activities and impacts. This will begin with the construction phase of three to four years during which the project infrastructure is built and commissioned. The operational phase will be potentially twenty, or more, years when the plant will operate and urea will be exported. Finally, the decommissioning phase will end the Project, with all infrastructure removed off site and the Project area rehabilitated.

Project

The Project is as outlined in Section 2 of this PEMP and includes all Phases.

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 (including the East west Service Corridor) and the Port storage and wharf loading areas. It can also include any other Project relevant location under operational control of Perdaman.

Should

Indicates a recommendation that is not mandatory.

Will

Indicates that a statement is mandatory.

Works

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

17 Abbreviations

Abbreviation	Description
AQGHGMP	Air Quality and Greenhouse Gas Management Plan
ASS	Acid sulphate soils
ASSDMP	Acid Sulphate Soils and Dewatering Management Plan
BMIEA	Burrup Maitland Industrial Estate Agreement
BSIA	Burrup Strategic Industrial Area
Ca	Reference for Causeway works area in management protocols
CF	Reference for Site C & Site F Project areas in management protocols
Co	Reference for Conveyor site corridor in management protocols
DBCA	Department of Biodiversity, Conservation and Attractions
DMIRS	Department of Mines, Industry Regulation and Safety
DOEE	Department of Environment and Energy
DWER	Department of Water and Environmental Regulation
EPBC	Environment Protection and Biodiversity Conservation Act 1999
ERMP	Emergency Response Management Plan
FEED	Front End Engineering Design
FaMP	Fauna Management Plan
FMP	Flora Management Plan
GDP	Ground Disturbance Permit
HMP	Heritage Management Plan
NMP	Noise Management Plan
PASS	Potential Acid Sulphate Soils
PEMP	Project Environmental Management Plan
ppm	Parts per million
Pt	Reference for Port works area in management protocols
SWMP	Surface Water Management Plan
TRH	Total recoverable hydrocarbon
TSMP	Threatened Species Management Plan
WMP	Weed Management Plan

18 Reference Documents

Document Number	Document Title
CW1055600-EN-PL-002	Drainage Management Plan
CW1055600-EN-PL-003	Weed Management Plan
CW1055600-EN-PL-004	Emergency Response Management Plan
CW1055600-EN-PL-005	Threatened Species Management Plan
CW1055600-EN-PL-006	Fauna Management Plan
CW1055600-EN-PL-007	Flora Management Plan
CW1055600-EN-PL-008	Aboriginal Heritage Management Plan

19 Codes and Standards

Document Number	Document Title

Appendix 1 – Project Delivery Applicability

This PEMP applies across all phases of the Perdaman urea Project including during the construction. operation and decommissioning phases.

☐	Proposals	☒	EPC	☒	Construction
☐	Studies	☒	Project Management	☒	Commissioning
☒	Preliminary Engineering	☒	Technical Services	☒	Site Services
☒	FEED	☒	Procurement	☒	Ops and Maintenance
☒	Detailed Design	☒	Construction Management	☐	

Appendix 2 – Health, Safety and Environment Policy

PERDAMAN

CHEMICALS & FERTILISERS

Environmental Policy

Objectives

Perdaman Chemicals and Fertilisers Pty Ltd (PERDAMAN) is committed to demonstrating leadership in minimising the impact of its operations on the natural environment. PERDAMANS Environmental Management System provides the mechanisms that allow PERDAMAN to seek continuous improvement in performance through the application of best industry practice to meet community expectations.

Strategy

For the benefit of the natural environment, employees, stakeholders and the community PERDAMAN will:

- Comply with all relevant environmental laws, regulations, licenses, consents and standards that relate to the company's operations;
- Apply the principles of sustainable development, pollution minimisation and life cycle management;
- Establish and measure targets and milestones to continuously monitor and improve environmental performance;
- Maintain regular communications on environmental performance openly with local communities and regulators;
- Provide employees with training and clear accountabilities in relation to the achievement of environmental objectives and targets;
- Reduce, recover, recycle and re-use waste wherever efficient;
- Be proactive in anticipating potential environmental issues and in promoting environmental awareness

Implementation

All PERDAMAN employees and contractors are responsible for the implementation and maintenance of this policy.

Vikas Rambal
Chairman and Managing Director

Signed on 19 December 2018

Appendix 3 – Erosion, Sediment & Surface Water Quality Management Protocol

Item No.	Requirements	Project Area
1.	Disturbance to watercourses, riparian vegetation and flood plains will be avoided or minimised, wherever practicable, and managed in accordance with CW1055600-EN-PL-002 Surface Water Management Plan.	CF, Ca, Co, P
2.	Water emanating from disturbed areas will be treated to ensure discharge from these areas is clean and consistent with naturally occurring water quality from nearby creeks or surface runoff. Establish sediment, erosion and water quality control measures including silt fences, clean and dirty water diversions, sediment basins and stockpile areas down gradient of the disturbed areas. Where possible, diverted water is to be discharged into remnant sections of natural water courses downstream of the Project work area.	CF, Ca, Co, P
3.	Any disturbance of watercourses should be completed during dry, non-flow periods.	CF, Ca, Co, P
4.	Stockpiles including overburden, clean fill and topsoil are to be established to minimise erosion and prevent movement of material outside the stockpile footprint.	CF, Ca, Co, P
5.	Clearing of sloping ground is to be managed, where possible, to avoid wet periods, to minimise erosion of unstable ground.	CF, Ca, Co, P
6.	Natural drainage channels will be reinstated wherever possible following disturbance to a watercourse.	CF, Ca, Co, P
7.	Establish access routes for site vehicles and deliveries to minimise disturbance of cleared areas.	CF, Ca, Co, P
8.	Surface water diversion structures will be designed, installed and managed to enable non-contaminated water to be directed around disturbed and construction areas. Dispersion systems at discharge points of diversion drains will be engineered to reintroduce sheet flow minimising the impact on the downstream environment.	CF, Ca, Co, P
9.	Diversion channels will be constructed with similar gradients to the natural drainage systems in the Project area.	CF, Ca, Co, P
10.	Rock armouring and other erosion controls will be utilised in areas of high erosion potential (eg: steep gradients and bends).	CF, Ca, Co, P
11.	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 (eg: runoff which contains hydrocarbons) will not be discharged into the environment.	CF, Ca, Co, P
12.	Storm water collected from construction areas that is considered not to be at risk from hydrocarbon contamination will be kept separate from natural drainage and reused on site or discharged via sediment reduction controls.	CF, Ca, Co, P

Item No.	Requirements	Project Area
13.	Sedimentation controls will be constructed prior to the clearing of any large areas at risk of generating runoff.	CF, Ca, Co, P
14.	Equipment servicing will take place in designated areas. Field servicing will be undertaken in a manner that facilitates containment of all hydrocarbons and chemicals.	CF, Ca, Co, P
15.	Stabilisation of disturbed areas and new drainage lines will be completed prior to the wet season. Stabilisation of the banks of any open diversion channels is to be undertaken with direct seeding of native vegetation species endemic to water courses in the region, or through the use of weed free, excess topsoil from a similar area previously cleared from the project site.	CF, Ca, Co, P
16.	As far as practicable, Works in water ways will be conducted during the dry season to minimise environmental impacts.	CF, Ca, Co, P
17.	Causeway construction works will be completed over the shortest time practicable to minimise the period of environmental disturbance in the saline coastal flat.	Ca
18.	All sediment basins / ponds are to be regularly inspected and cleaned of debris and sludge so that their effective volume is maintained.	CF, Ca, Co, P
19.	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.	CF, Ca, Co, P
20.	A progressive erosion and sediment control plan (ESCP) will be developed for each project area and submitted for review and approval as part of the GDP process. The plan will consider the changes that will be required throughout the Project construction phase to ensure adequate management of surface water flows.	CF, Ca, Co, P
21.	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.	CF, P
22.	The Project's stormwater drainage system in the main process area (Site C) will direct stormwater from hardstand areas into two separate streams which enable the containment and use of the run off: • Stormwater that could be contaminated by spills or leaks from process activities will be directed to holding ponds for pre-treatment, prior to reuse as a component of the seawater used for the process plant's cooling systems; • Uncontaminated stormwater will not be treated, but will be pumped directly from the stormwater holding pond into the seawater used for cooling on site or used to dilute seawater at the inlet of desalination plant.	C

Item No.	Monitoring	Project Area
1.	Discharge from oily water separator will be monitored to ensure it contains less than 5ppm total recoverable hydrocarbon (TRH) and in compliance with Project approval conditions before it can be used for dust suppression or discharged. Written approval from the Environment and Heritage Manager must be obtained prior to reuse or discharge.	CF, Ca, Co, P
2.	Surface water and sedimentation control devices will be inspected for damage or blockages, maintained and repaired where required, and will be reported to the Environmental Representative.	CF, Ca, Co, P
3.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Oily water separator test results will be reported to the Environmental Representative prior to releasing tested water to the environment.	CF, Ca, Co, P

Project Areas = CF – Site C & F / CA – Causeway / Co – Conveyor / P – Port

Appendix 4 – Native Vegetation Clearing Management Protocol

Item No.	Requirements	Project Area
1.	Clearing will be minimised as far as practicable. Ground Disturbance Permits (GDPs) must be obtained before any clearing or grubbing can commence. GDPs are to be authorised by the Environment and Heritage Manager (or delegate).	CF, Ca, Co, P
2.	The limits of each GDPs will be pegged on site by a qualified surveyor before clearing or grubbing takes place. The area beyond the authorised limit will be flagged as No-Go Zones.	CF, Ca, Co, P
3.	Any Priority flora or habitat within the authorised GDP area is to be flagged and recorded for reporting purposes.	CF, Ca, Co, P
4.	Pre-clearance surveys will be completed for areas of identified habitat. Any wildlife encountered will be managed in accordance with the Native Fauna Management Protocol.	CF, Ca, Co, P
5.	Areas of weed within authorised GDP limits will be flagged and managed in accordance with the Weed Management Protocol.	CF, Ca, Co, P
6.	Areas of weed-free cleared vegetation will be stockpiled for later reuse in stabilisation and/or rehabilitation.	CF, Ca, Co, P
7.	Weed-free topsoil material will be stockpiled for later re-use in rehabilitation.	CF, Ca, Co, P
8.	Topsoil, cleared vegetation and mulch will be appropriately sign posted and stockpiled within designated areas. Ideally, material intended for re-use should be stockpiled as close to the original source as possible.	CF, Ca, Co, P
9.	Locations of Priority flora close to, but outside the development footprint will be demarcated as “No-Go Zones”. Access to No-Go Zones will be prevented and no Works are to take place within these designated areas.	CF, Ca, Co, P
10.	All vehicle movements to remain on defined tracks and roads.	CF, Ca, Co, P
11.	All project Works will comply with the management strategies included in CW1055600-EN-PL-007 Flora Management Plan.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P
2.	Priority flora identified in pre-clearance surveys.	CF, Ca, Co, P
3.	The condition of Priority flora in the Project area will be monitored in accordance with Project Approvals.	CF, Ca, Co, P
4.	No-Go Zone fencing will be included on regular inspections and damage is to be repaired within 1 day of being identified / reported.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Location and extent of vegetation cleared in each monthly reporting period.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 5 – Native Fauna Management Protocol

Item No.	Requirements	Project Area
1.	Disturbance to habitat will be minimised as far as practicable and will be in accordance with authorised GDPs. No-Go Zones will be defined, as required.	CF, Ca, Co, P
2.	Inspections and removal of native fauna from all habitat / microhabitats prior to clearing. This could include starting up machinery 10 minutes before disturbance activities commence and bumping / shaking of habitat trees to encourage fauna to vacate area.	CF, Ca, Co, P
3.	Native fauna to be allowed to make its own way from the construction footprint. Any fauna capture, handling and relocation will be conducted in accordance with Department of Biodiversity, Conservation and Attractions Parks and Wildlife Service Standard Operating Procedures, by a licensed fauna handler.	CF, Ca, Co, P
4.	Salvage and re-use habitat elements (for example hollow logs) in rehabilitation where practicable.	CF, Ca, Co, P
5.	Open trenches to be managed during day and night-time hours to prevent ingress and trapping risks to native fauna. Trenches to be left open for shortest period practicable.	CF, Ca, Co, P
6.	Site vehicle speed limits to be obeyed to avoid vehicle / fauna interactions. Vehicles to yield right-of-way to fauna at all times.	CF, Ca, Co, P
7.	Waste will be stored in a way that does not attract vermin or native fauna. Bins and skips will have lids and be labelled and maintained so as to hold the intended waste stream securely.	CF, Ca, Co, P
8.	Fauna will not be fed, harassed or intentionally harmed.	CF, Ca, Co, P
9.	Measures will be developed and implemented to reduce the risk of fire impacting on fauna habitat.	CF, Ca, Co, P
10.	Perdaman will employ a licensed fauna handler for the duration of works.	CF, Ca, Co, P
11.	Light pollution impacts around the Port area will be managed to avoid impact on marine turtles. This includes temporary lighting plant will be oriented away from the water; Turtle sensitive lighting is to be installed around the wharf area that is in the turtle's low visual sensitivity range (ie: 580 nanometers or longer), such as amber, yellow or red in colour. Avoid the use of white lights; Where practicable, lighting should be kept low, shielded and directional, away from water where possible, to minimize horizon glow; as far as practicable, minimize light intensity in nearshore areas.	Co, P
12.	All project Works will comply with the management strategies included in CW1055600-EN-PL-006 Fauna Management Plan.	CF, Ca, Co, P
13.	Where practicable avoid the use of larvicides and adulticides for chemical control of mosquitoes and other pest species. Should larvicide or adulticide be applied, Perdaman will develop a management plan to ensure the protection of native fauna. This plan will include the chemical make-up to be applied, the impacted areas, the seasons and timeframes for application, the potential impact of the chemicals on listed threatened and migratory species and mitigation measures for species' protection.	CF

Item No.	Requirements	Project Area
14.	To ensure the protection of listed threatened species and listed migratory species, Perdaman will employ, prior to commissioning, structures and apparatus to deter birds from entering the contaminated storm water pond, clean storm water pond, saline water pond and sea/storm water backup pond.	CF
15.	Develop a Cane Toad Control Program for potential future implementation. It should include a Project area monitoring program and actions that eradicate populations and prevent new populations from establishing. It should also consider a consultation strategy involving neighboring landowners and other relevant stakeholders.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P
2.	Native fauna identified in pre-clearance surveys.	CF, Ca, Co, P
3.	Open trenches to be inspected for fauna.	

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Outcomes of pre-clearance fauna surveys.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 6 – Hydrocarbons and Hazardous Substances Management Protocol

Item No.	Requirements	Project Area
1.	Up to date Safety Data Sheets for all chemicals used on site will be readily accessible to all Project Personnel.	CF, Ca, Co, P
2.	A register of all hydrocarbon and hazardous substances stored on site will be prepared and will be readily accessible to all Project Personnel.	CF, Ca, Co, P
3.	A Major Hazard Facility safety report is to be developed and approved by Department of Mines, Industry Regulation and Safety (DMIRS). It must consider the location, facility layout, equipment and processes and include a risk assessment and safety management system for the site.	CF, Ca, Co, P
4.	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.*	CF, Ca, Co, P
5.	Hydrocarbon and chemical storage sheds must be located where they will not pose a risk to the environment.	CF, Ca, Co, P
6.	Hydrocarbon and chemical storage areas will include appropriate signage and labels, in accordance with relevant legislation and Australian Standards.	CF, Ca, Co, P
7.	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.	CF, Ca, Co, P
8.	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.	CF, Ca, Co, P
9.	Spill response procedures will be developed, communicated to all Project Personnel and implemented across the site.	CF, Ca, Co, P
10.	Disposal of hydrocarbons and hazardous substances to be managed in accordance with the Waste Management Protocol.	CF, Ca, Co, P
11.	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.	CF, Ca, Co, P
12.	Refueling mobile plant and equipment is to be undertaken within bunded refueling areas suitably designed and operated to capture any spill or overflow associated with the refueling 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.	CF, Ca, Co, P

Item No.	Requirements	Project Area
13.	Mobile refueling 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 refueled and any joins in fuel delivery hoses to capture any spills or leaks associated with the refueling process. The mobile refueling procedure must form part of the induction for plant machinery operators and fuel delivery operators.	CF, Ca, Co, P
14.	Only manual trigger fuel nozzles are to be used during refueling 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.	CF, Ca, Co, P
15.	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.	CF, Ca, Co, P
16.	All appropriate licenses 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.	CF, Ca, Co, P
17.	Containment systems will be established to prevent spillages of urea product and fugitive urea dust during ship loading and conveying of urea from the storage shed to the shiploader. This will include a fully enclosed product conveyor and shiploader to prevent ingress of water and loss of product to ground and the marine environment.	CF, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Monthly log of the fuel quantities consumed reported in Monthly Environmental Report	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 7 – Weed Management Protocol

Item No.	Requirements	Project Area
1.	Areas of known weed-infestation within authorised GDP limits will be flagged. Where this material is to be disturbed or cleared, it is to be stockpiled separately from weed-free material intended for re-use in rehabilitation.	CF, Ca, Co, P
2.	Any soil or vegetative material containing weeds is to be stockpiled and managed to prevent the spread to uninfected areas. These stockpile areas should be signposted and covered, runoff managed via drainage channels, and sediment fences at stormwater discharge points to restrict movement of weed seeds and propagating material.	CF, Ca, Co, P
3.	Weed infested material will not be used in rehabilitation.	CF, Ca, Co, P
4.	Good weed hygiene practices must be followed throughout the Project in compliance with CW1055600-EN-PL-003 Weed Management Plan. This includes vehicle/plant inspection and, where relevant, wash down procedures for all construction plant, light vehicles, scraper bowls and truck trays carrying soil, which are entering and leaving the Project areas. Dedicated vehicle inspection and wash down areas are to be positioned at site entry / exit points.	CF, Ca, Co, P
5.	All heavy vehicles and plant involved in earthworks and civil works are at risk of carrying contaminated soil and weeds onto the Project site. To minimise this risk they will be washed down, inspected and accompanied by an independent certificate of verification of weed hygiene prior to site entry. Upon arrival on site, they will be inspected at the site gate by the Environmental Representative, or delegate, and documented using the Contractor's Vehicle and Mobile Equipment Weed Inspection Form, a copy of which will be kept in the vehicle and in the Project Office at all times for audit and inspection purposes. These requirements do not apply to goods delivery vehicles and light vehicles.	CF, Ca, Co, P
6.	Prior to the importation of any fill material to Project sites, the supplier must provide written verification certifying that the material is weed free and meets the criteria of clean fill as defined in the DWER Landfill Waste Classification and Waste Definitions 1996 (as amended 2018).	CF, Ca, Co, P
7.	A suitably qualified weed control contractor will be consulted to develop a plan for control or eradication of Declared Plants (weeds) identified within the Project area prior to and during construction.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P
2.	Post-construction monitoring will be undertaken and follow-up control of any areas of weed infestation for construction areas that warrant control.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 8 – Fire Management Protocol

Item No.	Requirements	Project Area
1.	Refer to CW1055600-EN-PL-004 Emergency Response Management Plan for further details on the management of fire in context of broader health, safety and environmental issues.	CF, Ca, Co, P
2.	A hot work permit procedure will be developed and implemented by the Project Personnel and will include the following requirements; • Risk assessment will be completed before commencement of any hot work. • Exemptions sought from *Bushfires Act 1954* for hot work on fire ban days • Daily weather check for fire ban status prior to conducting hot works. • The procedure will be submitted to the Environmental Representative and approved prior to hot works commencing on site.	CF, Ca, Co, P
3.	Smoking will be confined to designated smoking areas only. Perdaman will provide sufficient designated smoking areas and communicate their location to site personnel.	CF, Ca, Co, P
4.	All vehicles, buildings, machinery and drill rigs will be fitted with serviced fire extinguishers.	CF, Ca, Co, P
5.	Fire control equipment will be available in fire-risk areas including but not limited to hazardous material storage areas, hot works areas and service trucks.	CF, Ca, Co, P
6.	An adequate number of personnel will be trained in basic fire awareness, fire response and use of fire suppression equipment and on site at all times during Project Works.	CF, Ca, Co, P
7.	No open fires will be permitted on site at any time.	CF, Ca, Co, P
8.	The Contractor will liaise regularly with the local government authorities regarding fire danger status.	CF, Ca, Co, P
9.	Maintenance on hot machinery will be undertaken in designated cleared areas whenever possible.	CF, Ca, Co, P
10.	Fire breaks must be established and maintained around key infrastructure and active construction sites.	CF, Ca, Co, P
11.	A dust suppression vehicle will be equipped such that it is capable of also being used as a fire response vehicle.	CF, Ca, Co, P
12.	Flammable and combustible materials are to be appropriately stored and isolated at all times in accordance with AS1940:2017.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections of work areas to ensure potential fuel loads are minimised.	CF, Ca, Co, P
2.	Regular inspections and testing of firefighting equipment will be conducted to ensure it is maintained in working order and in test.	CF, Ca, Co, P
3.	Vehicle undersides are to be regularly (e.g. at daily pre-starts, during and after use in spinifex areas etc.) checked for any material stuck around the exhaust system, and any identified material removed.	CF, Ca, Co, P
4.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 9 – Drill and Blast Near Rock Art Management Protocol

Item No.	Requirements	Project Area
1.	All drill and blast personnel will have undertaken the Aboriginal heritage induction before commencing work.	CF, Ca, Co, P
2.	Where possible, drill and blast should commence in areas where there is no rock art, to allow experience and knowledge to be gained of the geology and suitable methods of protection.	CF, Ca, Co, P
3.	The Drill and Blast Supervisor will submit a blast plan / management plan to the Environment and Heritage Manager at least 14 days in advance of proposed Works. The plan will cover issues such as: • Timeframes of drilling program (start and completion); • Locations for drill and blast operations; • Any access tracks, entry / egress points required; • Reference to a GDP which has been lodged / approved for the Works; • Drill and blast methods / techniques being used and a provision for recording of vibration levels (if located within 100 m of an Aboriginal heritage site); • Suitable protective measures to be used for any rock art or Aboriginal heritage sites located in the vicinity of the drill / blast zone. The Environment and Heritage Manager will review the blast plan and seek additional information if required.	CF, Ca, Co, P
4.	Maps will be made available to the Drill and Blast Supervisor by Perdaman which detail rock art and other Aboriginal heritage sites and the potential area of impact.	CF, Ca, Co, P
5.	Intrusion of blast material, or any alteration of a rock art or Aboriginal heritage site, constitutes an incident, and will be investigated accordingly.	CF, Ca, Co, P
6.	All effort must be made to avoid breaches of Aboriginal heritage areas. This includes: • Ensuring any area within an Aboriginal heritage site is not damaged, disturbed, altered, modified or impacted. This includes the entire site area, and is not restricted to cultural materials within the site; • An Aboriginal heritage site being entered without authorisation; • An Aboriginal heritage site is photographed without the consent of Perdaman's Indigenous Relations representative; • Any breach of this procedure must immediately be reported as an incident by the Drill and Blast Supervisor or the Indigenous Relations representative.	CF, Ca, Co, P

Item No.	Requirements	Project Area
7.	All drilling, blasting and associated civil works to be undertaken in compliance with CW1055600-EN-PL-008 Aboriginal Heritage Management Plan.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Prior to the date of the blast, the Contractor will inspect relevant rock art to ensure the protection detailed in the blast plan is in place. Rock art and Aboriginal heritage sites in the vicinity of the Works will be photographed. When the photographs are taken, the GPS coordinates of the photographer's position and the direction of the photograph will be recorded.	CF, Ca, Co, P
2.	Following the blast's "all clear", the Contractor will inspect the heritage area and make a photographic record, noting the camera position with the GPS coordinates and photograph direction.	CF, Ca, Co, P
3.	Compliance audits and inspections	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 10 – Asbestos and Fibrous Materials Management Protocol

Item No.	Requirements	Project Area
1.	All Project Personnel will be made aware of areas that have the potential to contain fibrous minerals, and in particular asbestiform minerals.	CF, Ca, Co, P
2.	All Project Personnel responsible for construction and excavation Works will be trained in the identification of fibrous minerals, appropriate management measures and use of personal protective equipment.	CF, Ca, Co, P
3.	A risk assessment will be undertaken prior to commencing any ground disturbing works on site to determine likelihood of occurrence based on known geological information for the area and the consequence of exposure.	CF, Ca, Co, P
4.	Undertake a site inspection to determine further potential for fibrous minerals to occur within areas ranked as medium risk or higher.	CF, Ca, Co, P
5.	If disturbance of fibrous minerals is deemed moderate to high risk and excavation is not recommended, then in situ management or avoidance should be implemented. In situ management primarily involves the isolation of the contaminated area with barriers and covers (eg: clean fill material) so that it cannot be readily disturbed and therefore will not generate airborne fibres.	CF, Ca, Co, P
6.	If in situ management is not appropriate then the fibrous minerals must be: • Excavated, stockpiled and reburied in situ; or • Excavated and disposed of at an appropriate licensed landfill facility.	CF, Ca, Co, P
7.	Implement dust management measures, such as the application of water or synthetic stabilisers, prior to any excavation to minimise dust emissions and the risk of airborne fibres.	CF, Ca, Co, P
8.	Isolate fibrous minerals from topsoil and subsoil during excavation and stockpile with covers or synthetic seals.	CF, Ca, Co, P
9.	Prevent the spread of contamination by using wash down facilities.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Regular inspection of fibrous mineral stockpiles by a competent person to ensure minimal disturbance of fibrous minerals.	CF, Ca, Co, P
2.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Any discovery of fibrous minerals on Project sites is to be reported to the Contractor's Construction Manager as soon as practicable.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 11 – Air Quality Management Protocol

Item No.	Requirements	Project Area
1.	A Dust Management Procedure will be developed and submitted to and approved by the Environment and Heritage Manager prior to commencing Works likely to generate dust emissions.	CF, Ca, Co, P
2.	Dust suppression techniques will be used on unsealed roads and access tracks, cleared areas and at locations of high dust risk.	CF, Ca, Co, P
3.	Dust suppression measures will be implemented where dust is visible, except during topsoil stripping.	CF, Ca, Co, P
4.	Saline water (> 5000 mg/L TDS) will not be used for dust suppression unless approved by the Environment and Heritage Manager.	CF, Ca, Co, P
5.	Where the use of saline water for dust suppression (> 5000 mg/L TDS) is approved, dribble bars will be used to control overspray onto adjacent vegetation.	CF, Ca, Co, P
6.	A log of water used for dust suppression will be maintained and reported in the Monthly Environmental Report. Information reported will include, where relevant, the source of the water (eg: bore reference number or standpipe reference), date and time, volume removed (including meter reading at start and finish), location where water was used.	CF, Ca, Co, P
7.	Vegetation clearing and exposed surfaces will be kept to a minimum wherever practicable.	CF, Ca, Co, P
8.	Vehicle speeds on access tracks and around work sites will be reduced where necessary to minimise dust emissions.	CF, Ca, Co, P
9.	Vehicles will remain within designated roads and park only in allocated areas.	CF, Ca, Co, P
10.	Dust suppressant additives or methods that reduce overall water consumption should be used wherever practicable. This will include restricting traffic within cleared areas until access is needed.	CF, Ca, Co, P
11.	Vegetation clearing, grubbing and earthworks during high winds (>40 km/hr) should be avoided. Where these works are required to be conducted during high winds, additional management measures must be implemented to minimise and control dust emissions.	CF, Ca, Co, P
12.	Where community complaints are received regarding dust emissions Perdaman may install dust monitors.	CF, Ca, Co, P
13.	Air emissions during operation of process plant and equipment will be within the Project's approved thresholds. Where monitoring results indicate higher emissions than those stated in the Project's approval conditions, corrective actions must be implemented as soon as practicable to reduce emissions below the permitted level.	CF
14.	Dust emissions from the conveyor, product storage sheds and shiploading operations will be monitored and minimised throughout the life of the Project. Should emissions exceed the Project's approval conditions, corrective actions must be implemented, as soon as practicable, to reduce emissions to the permitted level.	CF, Co, P
15.	Continually evaluate emission control technology and trends as they become commercially available to further limit air emissions.	CF
16.	Comply with all requirements of the Air Quality and Greenhouse Gas Management Plan (AQGHGMP).	CF, Co, P

Item No.	Requirements	Project Area
17.	The AQMP will address greenhouse gas management, as per the EPA draft Environmental factor Guideline for Greenhouse Gas Emissions (Dec 2019), and alignment with Commonwealth requirements, as it specifically relates to the Project. This includes: • Strategies to avoid, reduce, mitigate and offset the Project's scope 1 emissions. • Take account of opportunities at facility level that reduce greenhouse gas emissions. • Timeframes and targets assigned to management strategies. • Public reporting commitments.	CF, Ca, Co, P
18.	During the Project's commissioning phase, Perdaman will fully characterise and verify emissions performance. The methodology to be applied in the stack testing will be in accordance with the appropriate Australian Standards.	CF
19.	Incorporate Project design features to optimize energy efficiency and minimise greenhouse gas emissions intensity.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Visual dust monitoring is to be conducted on site during dust generating activities.	CF, Ca, Co, P
2.	Airborne emissions associated with the Project are to be measured throughout the operational phase with results reported as per the project's approval conditions to relevant external stakeholders.	CF
3.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	All airborne emissions exceeding the Project's approval conditions are to be reported to the Environment and Heritage Manager, as soon as practicable, and logged as an incident.	CF, Ca, Co, P
2.	All community complaints regarding dust levels are to be reported to the Environment and Heritage Manager and logged in the Project's community complaints register.	CF, Ca, Co, P
3.	Reporting all emissions data as required under the Project's state and federal approval conditions.	

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 12 – Noise Management Protocol

Item No.	Requirements	Project Area
1.	All Project activities will be conducted in accordance with the Environmental Protection (Noise) Regulations 1997, and *Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites.*	CF, Ca, Co, P
2.	A Noise and Vibration Management Procedure will be developed by Perdaman and implemented on site.	CF, Ca, Co, P
3.	Operating noise, vibration and potential mitigation measures, such as sound absorption devices, will be specified when selecting equipment for the Project.	CF, Ca, Co, P
4.	Where relevant, equipment will be fitted with appropriate noise reduction devices to ensure compliance with Project and regulatory requirements.	CF, Ca, Co, P
5.	Blasting will be restricted to daylight hours and conducted to set schedules, with an air blast limit of 115 dB Linear at the nearest noise sensitive dwelling.	CF, Ca, Co, P
6.	Blasting and piling activities will be undertaken in accordance with *Mines Safety Inspection Regulations 1995* and *Environmental Protection (Noise) Regulations 1997*.	CF, Ca, Co, P
7.	Noise disturbances at neighboring properties and public spaces from blasting and piling activities will be minimised as far as practicable.	CF, Ca, Co, P
8.	Regularly inspect, maintain and replace mobile equipment so that noise levels are minimised during the life of the equipment.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting	CF, Ca, Co, P
2.	Any external noise complaints received will be promptly forwarded to the Environmental Manager and entered into the Project's community complaints register.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 13 – Heritage Management Protocol

Item No.	Requirements	Project Area
1.	In the event that items of heritage significance are discovered, work will cease in the immediate area and the Construction Manager and Environment and Heritage Manager will be immediately notified.	CF, Ca, Co, P
2.	If any suspected human remains are found during any activity, Works must cease immediately and the remains must be left in place, and protected from further disturbance or damage. The Environment and Heritage Manager will notify the appropriate authorities.	CF, Ca, Co, P
3.	In the event of any heritage or unexpected find, work must not recommence without the approval of the Environment and Heritage Manager, who will consult with the appropriate authorities and external stakeholders.	CF, Ca, Co, P
4.	For previously unidentified items of potential Aboriginal heritage significance, an assessment of the significance of the item(s) and determination of appropriate mitigation measures, including when Works can re-commence, should be undertaken by a suitably qualified and experienced archaeologist in consultation with the Murujuga Aboriginal Corporation. Assessment of the consistency of any Aboriginal heritage impacts against the approved impacts of the project must also be undertaken.	CF, Ca, Co, P
5.	Ground disturbance will be minimised as far as practicable and will be in accordance with authorised GDPs. No-Go Zones will be defined to protect items or areas of heritage that are to be undisturbed.	CF, Ca, Co, P
6.	Locations of heritage items / area close to, but outside the development footprint will be demarcated as “No-Go Zones”. Access to No-Go Zones will be prevented and no Works are to take place within these designated areas.	CF, Ca, Co, P
7.	Places of potential Aboriginal heritage significance to be retained within the Project’s battery limits are to be demarcated as No-Go-Zones and protected by chain mesh fencing of at least 2.5m in height around its perimeter. Signs of at least 1m^2 will be attached to the entrance of the fenced area and at no less than 50m intervals along the fence. No persons are to enter the No-Go-Zone without the written consent of the Environment and Heritage Manager.	CF, Co
8.	All vehicle movements to remain on defined tracks.	CF, Ca, Co, P
9.	All Project activities to be undertaken in accordance with the CW1055600-EN-PL-008 Heritage Management Plan and, where emission activities could impact rock art, the AQGHGMP.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting	CF, Ca, Co, P
2.	Provide Project data and technical information to the Murujuga Rock Art Monitoring Program.	CF, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 14 – Solid and Liquid Waste Management Protocol

Item No.	Requirements	Project Area
1.	To minimise and manage the creation of solid and liquid wastes, a waste management plan will be prepared for the Project. The waste minimisation procedures in the plan will be designed around the waste hierarchy in order of preference, that is Waste avoidance (most preferred); Reduction; Reuse; Recycling: Disposal (least preferred).	CF, Ca, Co, P
2.	Liquid wastes will be securely stored in bunded areas that will contain leaks or spills from all containers.	CF, Ca, Co, P
3.	Solid waste storage areas will be provided on site. All waste will be segregated to maximise reuse and recycling.	CF, Ca, Co, P
4.	Solid wastes will be stored in a way that does not attract vermin or native fauna. Bins and skips (with lids) will be labelled and maintained so as to hold the intended waste stream securely.	CF, Ca, Co, P
5.	Ensure that facilities used for the receiving of waste from the site are appropriately licensed to accept the classified waste type.	CF, Ca, Co, P
6.	If not treated or reused on site, liquid and controlled wastes will be removed off site by a licensed controlled waste carrier.	CF, Ca, Co, P
7.	Solid wastes will be removed off site by an appropriately licensed contractor.	CF, Ca, Co, P
8.	The project site will be kept clean and tidy at all times and litter and waste will be deposited into appropriate litter or recycling bins and the Project's nominated waste collection areas.	CF, Ca, Co, P
9.	During the construction phase, temporary wastewater storage systems are to be appropriately bunded and located a minimum of 100m from any watercourse	CF, Ca, Co, P
10.	The design of the wastewater management systems will be sufficient to handle the anticipated loads of the project's peak number of construction and operational staff.	CF, Ca, Co, P
11.	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 Water Corporation's MUBRL.	CF, Ca, Co, P
12.	Desalination brine generated as part of the desalination plant will be discharged to one of two locations, depending on the salt content of the brine stream: • 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; • Brine which does not meet the MUBRL discharge specification will be sent to the brine evaporation pond. Solid waste from this area will be removed off site by an appropriately licensed waste contractor and disposed of at a licensed waste facility, suitable for this waste's classification.	CF, Ca, Co, P
13.	Any discharge to the water Corporation's MUBRL must comply with the conditions, including water quality standards, in Ministerial Statements 567 and 594 under Part IV of the EP Act.	C

Item No.	Requirements	Project Area
14.	Seawater will be continuously recirculated, with a small component (approximately 1%) blown down which will be discharged off site via the MUBRL.	C
15.	Process condensate will be polished before being added back into the demineralised water and reused within the process system.	C
16.	All requirements of CW1055600-EN-PL-002 Surface Water Management Plan are to be implemented throughout the life of the Project.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections	CF, Ca, Co, P
2.	All waste removed off-site will be recorded in a Waste Management and Tracking Register.	CF, Ca, Co, P
3.	A monitoring and maintenance schedule, approved by the Environment and Heritage Manager, will be established and implemented based on the specifics of the wastewater management system chosen.	CF, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting	CF, Ca, Co, P
2.	Monthly reporting of Waste Management and Tracking Register in the Monthly Environmental Report.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 15 – Acid Sulphate Soils Management Protocol

Item No.	Requirements	Project Area
1.	Undertake a geotechnical investigation to determine whether the soil profile in the area of project excavations contain Acid Sulphate Soil (ASS) or Potential Acid Sulphate Soil (PASS), which may be exposed to air as a result of Project construction.	CF, Ca, Co, P
2.	If ASS or PASS is identified and could be disturbed by Project construction, including dewatering, an Acid Sulphate Soils and Dewatering Management Plan (ASSDMP) will be developed. This will include site investigations, sampling and analysis, monitoring, materials management and treatment.	CF, Ca, Co, P
3.	Where relevant, a post-closure monitoring and close-out report for endorsement by DWER will be developed at the conclusion of the construction process.	CF, Ca, Co, P
4.	If groundwater extracted during dewatering comes from potential ASS areas, it is to be treated to an appropriate water quality standard, including pH and total titratable acidity, and monitored prior to discharge.	CF, Ca, Co, P
5.	Where practicable, disturbance of ASS should be minimised or avoided.	CF, Ca, Co, P
6.	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. This approval will include development of an ASS Treatment Plan which will detail the methods used for soil excavation and dewatering, containment, treatment and reuse. 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. Other potential contaminants, including but not limited to heavy metals, must be at a concentration no greater than 10% above the maximum background levels established for the site.	CF, Ca, Co, P
7.	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.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P
2.	Groundwater extracted during dewatering within potential ASS areas is to be monitored for water quality including pH and total titratable acidity.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting	CF, Ca, Co, P
2.	The results of any field testing in ASS or PASS areas will be provided to the Environment and Heritage Manager immediately on their receipt and prior to the commencement of ground disturbing activities.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 16 – Concrete Batching Management Protocol

Item No.	Requirements	Project Area
1.	A Concrete Batching Procedure will be developed that identifies opportunities for recycling, which incorporates the requirements of the *Environmental Protection (Concrete Batching and Cement Product Manufacturing) Regulations 1998* and these protocols. The procedure will be submitted to the Environment and Heritage Manager and approved prior to works being undertaken on site.	CF, Ca, Co, P
2.	Concrete batching will be managed to avoid visible dust escaping onto any place to which the public has access.	CF, Ca, Co, P
3.	Material spilled during concrete batching or transport will be immediately cleaned up.	CF, Ca, Co, P
4.	Dust suppression techniques (eg: water) will be applied to trafficable areas within the batch plant as often as necessary.	CF, Ca, Co, P
5.	Vehicles carrying concrete, or any of the ingredients of concrete, will not leave the site until they have been washed free of cement slurry and dust.	CF, Ca, Co, P
6.	All aggregate and sand will be stored in storage bins or bays (or where not practicable, in stockpiles on the ground) which minimise airborne dust.	CF, Ca, Co, P
7.	The height of aggregate or sand in a storage bin or bay will not exceed the height of the bin or bay (including any windshields fitted to it).	CF, Ca, Co, P
8.	Where aggregate or sand is stored in a stockpile on the ground it will be kept covered or damp, or otherwise treated, so as to minimise airborne dust.	CF, Ca, Co, P
9.	If, during the unloading of aggregate or sand, excessive visible dust is generated, unloading will stop immediately and will not resume until appropriate measures have been taken to prevent excessive visible dust generation.	CF, Ca, Co, P
10.	All cement on-site will be stored in either bags or in a cement silo.	CF, Ca, Co, P
11.	Cement storage silo(s) will be fitted with an air cleaning system through which all air extracted from the silo while it is being filled must pass before it is discharged into the environment.	CF, Ca, Co, P
12.	The air cleaning system fitted to a cement storage silo will be either: • A mechanical rapping air cleaning system with a minimum filter area of 23 m^2, or • A reverse pulse air cleaning system which reduces dust emissions to less than 50 mg of particulate matter per cubic metre.	CF, Ca, Co, P
13.	The air cleaning system fitted to a cement storage silo will discharge air from the system into a weigh hopper or to an outlet which is within one metre of the ground.	CF, Ca, Co, P
14.	Air cleaning system filters will be inspected, or if the air cleaning system is fitted with pressure gauges for the detection of	CF, Ca, Co, P

Item No.	Requirements	Project Area
	blockages or leaks, gauges will be checked, at least weekly.	
15.	Air cleaning system filters which are blocked, damaged, or have excessive build-up of dust will be immediately cleaned, repaired or replaced.	CF, Ca, Co, P
16.	Cement storage silo air cleaning systems will be tested at least weekly.	CF, Ca, Co, P
17.	In the event that cement storage silo air cleaning systems are not working efficiently, unloading of cement into the silo will cease until the system is repaired.	CF, Ca, Co, P
18.	Sufficient spare filters to replace all such bags or cartridges used in the air cleaning system of all cement storage silos will be kept on site in a readily accessible place.	CF, Ca, Co, P
19.	Cement storage silo(s) will be fitted with either a compliant level indicator or a compliant relief valve.	CF, Ca, Co, P
20.	Level indicator systems will include an audible alarm which sounds if cement stored in the silo reaches: • 0.6 m below the inlet to the silo's air cleaning system; or • 2 tonnes less than the silo's maximum capacity.	CF, Ca, Co, P
21.	Level indicator systems will include a test circuit which indicates whether the level indicator and alarm are working correctly.	CF, Ca, Co, P
22.	The test circuit will be activated before a load of cement is unloaded into the silo.	CF, Ca, Co, P
23.	In the event that the test circuit is not working correctly, no cement will be unloaded into the silo until rectified.	CF, Ca, Co, P
24.	Relief valves for cement storage silo(s) will be designed to automatically prevent the level of cement in the silo reaching: • 0.6 m below the inlet to the silo's air cleaning system; or • 2 tonnes less than the silo's maximum capacity.	CF, Ca, Co, P
25.	Relief valves for cement storage silo(s) will be designed so that any excess cement is piped into a weigh hopper or to an outlet which is within one metre of the ground.	CF, Ca, Co, P
26.	All inspection ports, hatches and other openings to a cement storage silo will be sealed while cement is being unloaded into the silo.	CF, Ca, Co, P
27.	If, during the filling of a cement storage silo, any visible cement dust escapes from the silo, silo filling will immediately cease until appropriate measures have been taken to prevent the escape of cement dust from the silo.	CF, Ca, Co, P
28.	A hopper, conveyor, chute, bucket elevator or transfer point will not be used to move material around the site or load agitators unless enclosed, fitted with wind shields, water sprays or a dust extraction system or otherwise designed and operated so as to prevent the escape of visible dust.	CF, Ca, Co, P
29.	All wind shields, water sprays, dust extraction systems and other devices used will be maintained in good working order.	CF, Ca, Co, P

Item No.	Requirements	Project Area
30.	All inside areas which may be affected by cement product manufacturing will be regularly cleaned to prevent the accumulation of dust on any surface.	CF, Ca, Co, P
31.	Water will not be used to carry out cleaning referred to in item 30, unless all fittings and electrical installations in that area are waterproof or otherwise designed to withstand water.	CF, Ca, Co, P
32.	All water draining from any area where agitators, mixers or moulds are loaded or where concrete is batched will drain into a slurry pit.	CF, Ca, Co, P
33.	All water used to wash out agitators, mixers or moulds or to clean up spilt materials will drain into a slurry pit.	CF, Ca, Co, P
34.	All other water that drains off sealed or paved areas and which are likely to contain waste materials will drain into a slurry pit or settling pond.	CF, Ca, Co, P
35.	Any water removed from, or which might overflow from, a slurry pit will drain into a settling pond.	CF, Ca, Co, P
36.	Water used in concrete batching or cement product manufacturing will not be discharged from site until it has been through a silt trap or contained in a settling pond for long enough to allow all particulate matter to settle out.	CF, Ca, Co, P
37.	Water that is likely to contain hydrocarbons will be passed through an oil interceptor prior to being reused for dust suppression.	CF, Ca, Co, P
38.	Settled material in a slurry pit will not be allowed to dry out (except when the pit is dried out to allow the settled material to be removed).	CF, Ca, Co, P
39.	Settled material in a slurry pit, will not be higher than 30 cm below the top of the slurry pit walls.	CF, Ca, Co, P
40.	Settling ponds will be large enough to contain all water which might drain into it for long enough to allow all particulate matter to settle out.	CF, Ca, Co, P
41.	Slurry pits, settling ponds, silt traps and oil interceptors are maintained, and emptied or cleaned as often as necessary, to ensure their efficient operation.	CF, Ca, Co, P
42.	All waste created during concrete batching or cement product manufacturing (including material removed from slurry pits, settling ponds, silt traps and oil interceptors) is recycled or disposed of at an appropriate licensed landfill site or waste treatment facility.	CF, Ca, Co, P
43.	Excess concrete waste will be reused wherever possible, otherwise disposed of in onsite bins and transported to an appropriate off-site facility on a periodic basis.	CF, Ca, Co, P

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections	CF, Ca, Co, P
2.	Continuous visual dust monitoring will be undertaken.	CF, Ca, Co, P
3.	The oil water interceptor discharge water will be monitored to ensure it contains less than 5 ppm TRH if water is to be reused.	CF, Ca, Co, P
4.	Air cleaning system filters will be inspected, or if the air cleaning system is fitted with pressure gauges for the detection of blockages or leaks, gauges will be checked, at least weekly.	CF, Ca, Co, P
5.	Cement storage silo air cleaning systems will be tested at least weekly and documented.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting	CF, Ca, Co, P
2.	Copies of records including controlled waste certificates will be provided to the Environment and Heritage Manager through the Monthly Environmental Report.	CF, Ca, Co, P
3.	Waste weights disposed to landfill will be reported to the Environment and Heritage Manager through the Monthly Environmental Report.	CF, Ca, Co, P
4.	Weights of recycled materials will be reported to the Environment and Heritage Manager through the Monthly Environmental Report.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Appendix 17 – Rehabilitation Management Protocol

Item No.	Requirements	Project Area
1.	A Land Rehabilitation Procedure will be developed prior to commencement of construction activities and implemented. The procedure will include inspection and sign off by the Environmental Representative to confirm rehabilitation is adequate.	CF, Ca, Co, P
2.	Rehabilitated areas will be contoured to encourage infiltration and reduce flows, thereby reducing erosion potential.	CF, Ca, Co, P
3.	Progressive rehabilitation will be undertaken at the earliest opportunity using topsoil (up to 100mm thick where available) previously cleared on the same site and natural materials to provide habitat to suit local native fauna.	CF, Ca, Co, P
4.	Compacted surfaces not required for operational purposes will be ripped to a depth of approximately 1m along contour lines where ground conditions and hydrology allow.	CF, Ca, Co, P
5.	Fauna habitat materials (e.g. boulders / hollow logs etc.) are to be stockpiled during clearing and will be placed in rehabilitated areas following the willow ripping of replaced topsoil.	CF, Ca, Co, P
6.	All rehabilitated areas will be: • Erosion resistant, not form permanent water bodies and minimise ponding of water following rainfall events. • Landscaped to be consistent with surrounding landforms and have a final shape, stability, surface drainage, resistance to erosion and ability to support local native vegetation.	CF, Ca, Co, P
7.	Access roads not required for operational purposes will be willow ripped with topsoil spreading as the final stage of rehabilitation.	CF, Ca, Co, P
8.	Where available, vegetation should be dragged across ripped areas using an excavator or similar equipment with a long reach to minimise compaction of the ripped topsoil.	CF, Ca, Co, P
9.	All temporary infrastructure, waste and materials, including flagging tape and survey pegs associated with construction Works will be removed from site at the completion of construction.	CF, Ca, Co, P
10.	Sumps and other costean type temporary installations will be backfilled and rehabilitated as soon as practicable.	CF, Ca, Co, P
11.	Concrete wash out and waste areas will be removed to an approved landfill site.	CF, Ca, Co, P
12.	Hydrocarbon contaminated soil and other material (e.g. blue metal and aggregate) present within the dedicated work area will be removed and disposed to an appropriate facility.	CF, Ca, Co, P
13.	Depressed areas will be landscaped and battered to blend in with the surrounding landform. Batter angles will not be steeper than 1V:5H and in all area's slopes must be stable, safe and will not exacerbate erosion risks.	CF, Ca, Co, P
14.	Rehabilitated areas will be sign posted with "Rehabilitation Area – Do not enter".	CF, Ca, Co, P
15.	A record will be kept of all rehabilitated areas, including GPS coordinates.	CF, Ca, Co, P

Item No.	Requirements	Project Area
16.	Rehabilitation of all temporary work areas will involve reinstatement of surface flow patterns through removal of any temporary causeways required for construction, restoration of the pre-existing contours and revegetation.	CF, Ca, Co, P
17.	Only endemic plant species will be used during revegetation.	CF, Ca, Co, P
18.	Prior to demobilising from site, all Contractors must complete all open corrective or preventative actions, close all GDPs and provide all required information to Perdaman.	CF, Ca, Co, P
19.	Prior to operation of the plant, Perdaman will prepare a plan for a care and maintenance phase and management of noxious materials following closure.	CF, Ca, Co, P
20.	At least six months prior to the anticipated date of closure, Perdaman will ensure the following decommissioning criteria are met: • Removal or, if agreed in writing by the state government and/or local government land use planning authorities, and in consultation with relevant stakeholders / adjacent land-holders, retention of, plant and infrastructure; and • Rehabilitation of all disturbed areas to a standard suitable for the new land uses(s) subject to any agreement and consultation.	

Item No.	Monitoring	Project Area
1.	Compliance audits and inspections.	CF, Ca, Co, P
2.	Rehabilitation areas will be inspected following heavy rains.	CF, Ca, Co, P

Item No.	Reporting	Project Area
1.	Incident, near miss and hazard reporting.	CF, Ca, Co, P
2.	Rehabilitated areas will be identified using survey data which will be supplied to the Environment and Heritage Manager along with the Monthly Environmental Report.	CF, Ca, Co, P

Project areas = CF – Site C & F / Ca – Causeway / Co – Conveyor / P – Port

Attachment A. Environmental Aspects and Impacts Register

Environmental Aspects and Impacts Register

Activity	Environmental Aspect	Environmental Impact (adverse and beneficial)	Normal / Abnormal / Emergency	Control / Influence	Aspect Likelihood	Impact Severity	Significance (Aspect Likelihood x Impact Severity)	Environmental Control Measures	Compliance Obligations (legal & other requirements)
Clearing and Grubbing	Loss of natural habitat	Removal of endemic flora exceeding limits.	Normal	Control	2	4	8	Set up ground disturbance permit process and implement strict clearing controls to prevent over clearing.	EP Act 1986 - Part IV Approval
	Loss of natural habitat	Spread weed species.	Abnormal	Control	3	2	6	Establish washdown facilities for all equipment and vehicles entering and departing work areas.	EP Act 1986
	Loss of natural habitat	Loss of fauna habitat exceeding limits.	Normal	Control	2	3	6	Set up ground disturbance permit process and implement strict clearing controls to prevent over clearing.	EP Act 1986 - Part IV Approval
	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
	Heritage	Damage to rock art exceeding limits set on project.	Abnormal	Control	2	5	10	Set up ground disturbance permit process and implement strict clearing controls to prevent over clearing. Preclearing clearance of rock art and artefacts by qualified personnel.	Aboriginal Heritage Act 1972, Burrup and Maitland Industrial Estates Agreement and EPBC Act 1999.
Earthworks - Cut and Fill	Loss of natural habitat	Spread weed species.	Abnormal	Control	3	2	6	Establish washdown facilities for all equipment and vehicles entering and departing work areas.	EP Act 1986
	Loss of natural habitat	Loss of fauna habitat exceeding limits.	Normal	Control	2	3	6	Set up ground disturbance permit process and implement strict clearing controls to prevent over clearing.	EP Act 1986 - Part IV Approval
	Atmospheric emission	Air pollution (dust).	Abnormal	Control	3	2	6	Establish dust control measures and review regularly to ensure effectiveness.	EP Act 1986
	Noise and vibration generation	Nuisance noise and vibration.	Abnormal	Control	1	2	2	Set earthwork operational hours to minimise impact on any noise sensitive premises	Environmental Protection (Noise) Regulations 1997
	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
	Heritage	Damage to rock art exceeding limits set on project.	Abnormal	Control	2	5	10	Set up ground disturbance permit process and implement strict clearing controls to prevent over clearing. Preclearing clearance of rock art and artefacts by qualified personnel.	Aboriginal Heritage Act 1972, Burrup and Maitland Industrial Estates Agreement and EPBC Act 1999.
Crushing and screening	Atmospheric emission	Air pollution (dust).	Abnormal	Control	3	2	6	Establish dust control measures around crushing and screening plant and inspect weekly to ensure effectiveness.	EP Act 1986
	Noise and vibration generation	Nuisance noise and vibration.	Abnormal	Control	1	2	2	Set crushing and screening operational hours to minimise impact on any noise sensitive premises.	Environmental Protection (Noise) Regulations 1997, EP Act 1986 Part V approval conditions.
Concrete batching	Atmospheric emission	Air pollution (dust).	Abnormal	Control	3	2	6	Establish dust control measures and review regularly to ensure effectiveness.	EP Act 1986 Part V approval conditions.
	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
Storage of hazardous materials and dangerous goods	Hazardous material release	Ground / stormwater contamination.	Emergency	Control	1	3	3	Establish suitable bunding and transfer systems to ensure no spills or leaks to open ground.	EP Act 1986, Dangerous Goods Safety Act 2004,

Activity	Environmental Aspect	Environmental Impact (adverse and beneficial)	Normal / Abnormal / Emergency	Control / Influence	Aspect Likelihood	Impact Severity	Significance (Aspect Likelihood x Impact Severity)	Environmental Control Measures	Compliance Obligations (legal & other requirements)
Moving Hearson Cove Road	Restricted or limited access to public open space	Social impacts.	Emergency	Control	2	4	8	Do not close access at any time to Hearson Cove. Establish near route / road around facility prior to closing down existing road.	Local government authority supporting local residence objections.
Causeway - install and operation	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
	Water flow	Restrict or redirect water flows on ephemeral flood plan.	Abnormal	Control	2	4	8	Design causeway to ensure minimal restriction to existing flow rates across the flood plain	EP Act 1986 - Part IV Approval
Construction of Project	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
	Noise and vibration generation	Nuisance noise and vibration.	Abnormal	Control	1	2	2	Set construction operational hours to minimise impact on any noise sensitive premises.	Environmental Protection (Noise) Regulations 1997, EP Act 1986 Part V approval conditions.
	Waste generation	Large volume of solid waste generation, greater than capacity at nearby facilities.	Normal	Control	4	2	8	Where possible minimise packaging associated with works and direct all recyclable and reusable waste streams away from landfill.	EP Act 1986
Commissioning and normal plant, conveyor and loading facility operations	Atmospheric emission	Air pollution - plant emissions (NOx, CO2, SO2, CH4, NH3, urea particulates, methanol)	Abnormal	Control	5	2	10	Design system to minimise emissions and meet approval conditions. Ongoing monitoring of plant, conveyor and loading facility during commissioning.	EP Act 1986 - Part IV Approval
	Hazardous material release	Uncontrolled release of process inputs stored on site - anhydrous ammonia (10 KT), Urea formaldehyde (411T), natural gas (130TJ/day via pipeline).	Emergency	Control	1	5	5	Design major hazard facility storage and safety systems to minimise likelihood of catastrophic failure.	EP Act 1986, Dangerous Goods Safety Act 2004,
	Hazardous material release	Uncontrolled release of urea during transfer and loading.	Emergency	Control				Design conveyor and loading safety systems to minimise likelihood of catastrophic failure.	EP Act 1986
	Hazardous material release	Stormwater runoff / silt.	Emergency	Control	3	2	6	Establish erosion and sediment controls to manage off site runoff of stormwater.	EP Act 1986
	Noise generation	Nuisance noise and vibration.	Abnormal	Control	1	2	2	Design system to minimise operational noise emissions on neighbouring noise sensitive premises.	Environmental Protection (Noise) Regulations 1997, EP Act 1986 Part V approval conditions.
	Water storage ponds	Chemical poisoning of fauna.	Abnormal	Control	1	3	3	Avoid use of larvicides and adulticides for the control of mosquitoes in water holding ponds.	EP Act 1986 EPBC Act 1999

Attachment B. Monthly Environmental Report

Table 1: General monthly report data

Contractor Company Name: **Completed by:**

Work site location(s) ☐Site C ☐Site F ☐Causeway ☐Conveyor ☐Port ☐Other (specify):

Reporting period (specify dates):

Reporting category	Notes	Amount	Units
Waste Management (Offsite disposal/recycling)			
Landfill	Facility name: Receipt attached: Y N		Tonnes
Controlled waste disposal	Used oil Receipt attached: Y N		Litres
	Other liquids (specify): Receipt attached: Y N		Litres
	Solid material (specify): Receipt attached: Y N		Tonnes
Wastewater / sludge	Source of material: Receipt attached: Y N		Litres
Recycle / Reuse	Metals Receipt attached: Y N		Tonnes
	Paper / Cardboard Receipt attached: Y N		Tonnes
	Glass Receipt attached: Y N		Tonnes
	Other (specify): Receipt attached: Y N		Tonnes
Wastewater Treatment Plant Discharge			
Discharge from WWTP	Location (specify):		Litres
Environmental Incidents, Hazards, Near Misses and Corrective Actions			
Environment incident	Notification attached: Y N		Number
Heritage incident	Notification attached: Y N		Number
Community incident & complaint	Notification attached: Y N		Number
New corrective actions	*Number for this reporting period only.*		Number
Corrective actions closed	*Number for this reporting period only.*		Number
Corrective actions outstanding	*Total number currently open including from previous reporting period.*		Number
Leading environmental indicators			
Environment site inductions	*Number of personnel inducted.*		Number
Environment training sessions	Topic: *Number of personnel trained.*		Number
Audits completed	*Number completed (ie: reports issued) in this reporting period.*		Number
Audits forecast	*Number of audits forecast for <u>next</u> reporting period.*		Number
Inspections completed	*Number completed (ie: reports issued) in this reporting period.*		Number
Inspections forecast	*Number of inspections forecast for <u>next</u> reporting period.*		Number
NGERS Reporting			
Fuel or gas used on site	☐ Yes – Complete *NGERS Data Report Sheet* ☐ No		
Soil management			
Topsoil, soil/spoil managed	☐ Yes – Complete *Ground Disturbance & Rehabilitation Log* ☐ No		
Water Use			
Water use for construction	☐ Yes – Complete *Construction Water Usage Log* ☐ No		
Site / Vegetation Clearing			
Land clearing and earthworks	☐ Yes – Complete *Ground Disturbance & Rehabilitation Log* ☐ No		
Land rehabilitation			
Site rehabilitated	☐ Yes – Complete *Ground Disturbance & Rehabilitation Log* ☐ No		
Comments / additional information			

Table 2: National Greenhouse and Energy Reporting Scheme (NGERS) Report Template

Contractor Company Name: **Completed by:**

Work site location(s) ☐Site C ☐Site F ☐Causeway ☐Conveyor ☐Port ☐Other (specify):

Reporting period (specify dates):

		Complete these columns with relevant receipts recorded in the *NGERS Receipt Log (Table 3)*		
Reporting category	**Notes**	**Amount**	**Units**	**Receipt attached?**
Fuel - Diesel				
Stationary	Includes small gensets (<5MH combined capacity), drill rigs, pumps, light towers.		Litres	☐ Y ☐ N
Transport – On road	Registered road vehicles including LV's, buses etc.		Litres	☐ Y ☐ N
Transport – Off road	Non-road registered vehicles including dozers, graders, excavators, haul trucks.		Litres	☐ Y ☐ N
Other:			Litres	☐ Y ☐ N
Fuel - Petrol				
Stationary	Used in small engines, gensets, petrol power tools.		Litres	☐ Y ☐ N
Mobile	Used in road vehicles.		Litres	☐ Y ☐ N
LPG				
Stationary	Kitchens, BBQs, camp, water heating		kg	☐ Y ☐ N
Mobile	LPG fuelled forklifts or LPG fuelled road vehicles.		kg	☐ Y ☐ N
Other petroleum products				
Motor engine oil	Only those delivered to site.		Litres	☐ Y ☐ N
Lubricants – non-synthetic	Only those delivered to site.		Litres	☐ Y ☐ N
Grease	Only those delivered to site.		Litres	☐ Y ☐ N
Hydraulic oil – non-synthetic	Only those delivered to site.		Litres	☐ Y ☐ N
Bitumen	Only what's prepared on site.		Tonnes	☐ Y ☐ N
Acetylene				
Acetylene	Cylinders		kg	☐ Y ☐ N
	Cylinders (Type D)		Number	☐ Y ☐ N
	Cylinders (Type E)		Number	☐ Y ☐ N
	Cylinders (Type G)		Number	☐ Y ☐ N
Power generation				
Large generators with meters	Diesel usage		Litres	☐ Y ☐ N
	Metered electricity production		MWh	
Large generators without meters	Diesel usage		Litres	☐ Y ☐ N
Sodium Hexafluoride (SF_6)				
Use in transformers	Only that delivered to site for use in transformers.		Litres	☐ Y ☐ N
Other sources of greenhouse gas during plant commissioning				
Carbon dioxide			Tonnes	
Oxides of Nitrogen (NO_x)			Tonnes	
Methane			Tonnes	
Comments / additional information				

Table 3: NGERS Receipt Log

Contractor Company Name:			**Completed by:**		
Work site location(s) ☐Site C ☐Site F ☐Causeway ☐Conveyor ☐Port ☐Other (specify):					
Reporting period (specify dates):					
Date	**Invoice / Receipt Reference**	**Product**	**Supplier**	**Amount / units**	**End use(s)**

Table 4: Ground Disturbance and Rehabilitation Log

Contractor Company Name:				**Completed by:**		
Work site location(s) ☐Site C ☐Site F ☐Causeway ☐Conveyor ☐Port ☐Other (specify):						
Reporting period (specify dates):						
				Topsoil stockpile management		
GDP Ref No.	**Site** *(C,F, Port, Causeway)*	**Area cleared** *(ha)*	**Area rehabilitated** *(ha)*	**Topsoil stockpile managed** *Stockpile created, moved or used?*	**Volume** *(m^3)*	**Location details** *Where used or moved to. Include shape file / GPS coords.*

Table 5: Construction Water Usage Log

Contractor Company Name:				**Completed by:**			
Work site location(s) ☐Site C ☐Site F ☐Causeway ☐Conveyor ☐Port ☐Other (specify):							
Reporting period (specify dates):							
		Meter reading for month					
Source / Bore ID	**Source / Bore location**	**Start date**	**Meter reading**	**End date**	**Meter reading**	**Total volume**	**Gauge DTW (end of month)**

Attachment C. Organisational Chart

PERDAMAN INDUSTRIES
CHEMICALS & FERTILISERS

Perdaman Urea Project (PUP) - Organisational Structure