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Fauna Management Plan

Perdaman Urea Project

Burrup Peninsula, Western Australia

PCF-PD-EN-FaMP

Proponent:

Perdaman Chemicals and Fertilisers Pty Ltd

ABN: 31 121 263 741

Date: 20 July 2023

EPA Ministerial Statement No:1180

Assessment No:

2184 (WA)

2018/8383 (Commonwealth)

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Contact Information

Perdaman Chemicals and Fertilisers Pty Ltd.
ABN 31 121 263 741

58 Mounts Bay Road
Perth WA 6000 Australia

www.perdaman.com.au
Phone +61 8 9429 5111

Fax

+61 8 9429 5100

Review conducted by:

Name: Saipem Clough Joint Venture

Approved by:

Name:

Job Title: Chairman

Document Information

Prepared by:

Perdaman Chemicals and Fertilisers Pty Ltd.

Project Name:

Project CERES

File Reference: PCF-PD-EN-FaMP

Job Reference: PCF-PD

Date: 20 July 2023

Version Number: PCF5

Effective Date: 10 October 2023

Date Approved: 10 October 2023

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
A	15/03/20	Developed for DMA review	BR	DH
PCF 1	15/04/2021	Response to Submissions	Cardno	Cardno
PCF 2	07/02/2022	Submission to EPA	SCJV/Bennelongia	Perdaman
PCF 3	22/02/2022	Response to EPA, DWER & DCCEEW review – inclusion of SRE survey results.	SCJV/Bennelongia	Perdaman
PCF 4	12/05/2022	Submission to EPA with Peer Review	SCJV/Bennelongia	
PCF 5	20/07/2023	Annual review July 2023. Minor amendments and addressing typos. Additional incident reporting, roles and responsibilities, training and awareness added. New information regarding Regulation 28, Biodiversity Conservation Regulations has been added.	SCJV	Perdaman

Executive Summary

Proposal Title	Project CERES
Proponent name	Perdaman Chemicals and Fertilisers Pty Ltd.
Assessment Number	2184 (WA) & 2018/8383 (Commonwealth)
Ministerial Statement No.	Ministerial Statement Number 1180
Construction & Operations Commencement Dates.	Bulk earthworks is scheduled to commence in September 2023. Construction is scheduled to commence June 2024. Operation of the facility is proposed to commence 2027.
Purpose of the FaMP	This Fauna Management Plan (FaMP) has been prepared to comply with the conditions for the Proposal implementation set out in the Ministerial Statement 1180 (MS 1180). Condition 5 provides the provisions required to be addressed within the FaMP. The FaMP addresses the requirements of the Biodiversity Conservation Regulations 2018, Regulation 28 Fauna Taking (Relocation) Licence FR280000358. The FaMP provides a framework which describes how the Project will address, manage, monitor and mitigate impacts on native fauna species and short-range endemic fauna species, including impacts to habitat. This FaMP provides monitoring actions for habitat values in accordance with the outcomes of conditions 5-1 of MS 1180. This plan supplements the PCF-PD-EN-PEMP Project Environmental Management Plan (PEMP) and PCF-PD-EN-TSMP Threatened Species Management Sub-Plan (TSMP) and PCF-PD- PN-FMP Flora Management Plan.
Key environmentalfactors and objectives	The environmental outcomes for terrestrial fauna are associated with the EPA Factor: To protect terrestrial fauna so that biological diversity and ecological integrity are maintained. The Environmental Outcomes (as provided in the Ministerial Statement (Condition 5--1)) are as follows: • clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed **0.16 ha**; • clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed **49.17 ha**; • clearing in the fauna habitat type identified as Samphire Shrublands / Supratidal flats shall not exceed **11.97 ha**; • clearing in the fauna habitat type identified as Drainage Lines shall not exceed **2.7ha**; and • impacts to short-range endemic fauna species are avoided, unless it is demonstrated, and the CEO confirms in writing that the species occurs in a self-sustaining population outside the development envelope. The Environmental Objective (as provided in the Ministerial Statement (Condition 5-2)) is as follows: • minimise direct and indirect impacts to the **northern quoll**, **Pilbara olive python** and the **ghost bat** within the development envelope.

Condition clauses	Condition requirements related to Ministerial Statement 1180 for the management of Terrestrial fauna species have been detailed in Appendix 1 of this Plan.
Key provisions inthe plan	The FaMP's key provisions are included in Section 6, Table 7-1 and Table 7-2. This Section details the outcome and management-based actions, that will be applied for the life of the Project against each of the potential impacts.

Foreword

This Fauna Management Plan (FaMP) is a sub-plan of the overarching Project Environmental Management Plan (PEMP) for the Project CERES. An overview of the structure of the PEMP and associated management plans is illustrated in Figure 0-1.

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

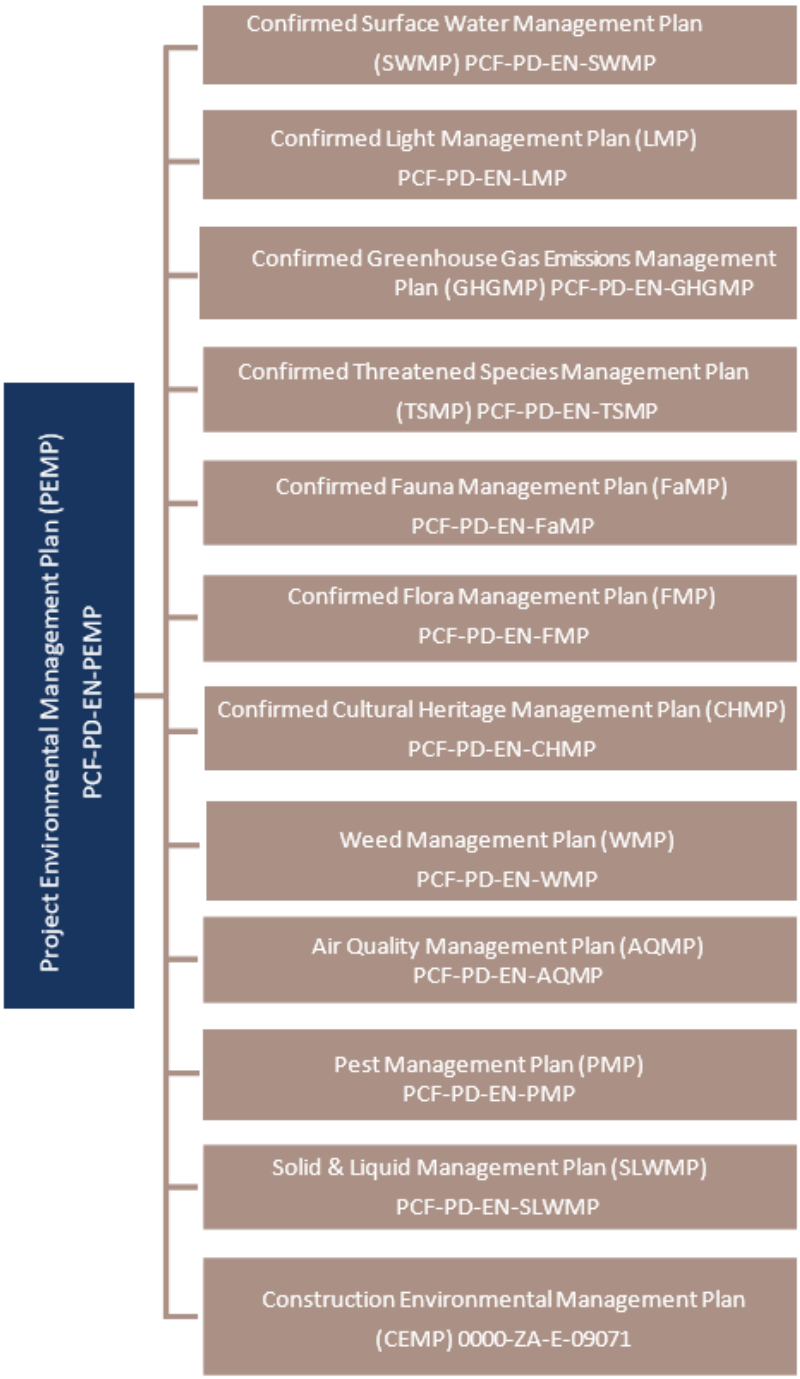

Figure 0-1 Structure of the Project Environmental Management Plan and supporting management plans

Table of Contents

1 Context, Scope & Rationale 1
1.1 Proposal Description 1
1.2 Scope & Requirement of the Plan 4
1.3 Responsibility 5
1.4 Key Environmental Factors 5
2 Legislative Framework 6
2.1 Environment Protection and Biodiversity Conservation Act 1999 6
2.2 Environmental Protection Act 1986 7
2.3 Biodiversity Conservation Regulations 2018 7
2.4 Policy and Guidance 8
3 Roles and Responsibilities 9
3.1 Project Director 9
3.2 Manager 9
3.3 Environment and Heritage Manager 9
3.4 Environment Coordinator 10
3.5 Construction Manager 10
3.6 Operations Manager 10
4 Rationale & Approach 12
4.1 Survey & Study Findings 12
4.1.1 Terrestrial Fauna 12
4.1.2 Avifauna 16
4.1.3 Short Range Endemic Fauna 20
4.2 Index of Biodiversity Surveys for Assessments 24
4.3 Management Approach 24
4.4 Monitoring Approach 25
4.5 Risk Assessment 25
4.6 Rationale for Choice of Provisions 26
4.6.1 Terrestrial Fauna Indicators – Outcome based 26
4.6.2 Terrestrial Fauna Management Actions – Outcome based 27
4.7 Key Assumptions & Uncertainties 27
5 Fauna Habitat 29
5.1 Rocky Outcrops 29
5.2 Hummock Grasslands on Mid-Slopes 29
5.3 Samphire Shrublands & Salt Plains 30
5.4 Drainage Lines 30
6 Risks to Fauna 30
6.1 Reduction and / or Fragmentation of Terrestrial Fauna Habitat 31
6.2 Vehicle Strike 31
6.3 Increase in Introduced Terrestrial Fauna and Weeds 31

6.4 Light Pollution 31
6.5 Noise and Vibration 31
6.6 Fauna Entrapment and Poisoning 32
6.7 Marine Environmental Quality 32
6.8 Inland Water Flows and Water Quality 32
6.9 Waste Management 33
6.10 Fire 33
6.11 Dust 33
6.12 Short-Range Endemic Fauna 33
7 Fauna Management Plan Provisions 34
7.1 Outcome-based Provisions 34
7.2 Objective-based Provisions 44
7.3 Pre-clearance survey 64
7.4 Environmental Monitoring 64
7.4.1 Fauna Monitoring Trigger & Threshold Levels 65
7.4.2 Monitoring Fauna Management Targets 66
7.4.3 Monitoring Fauna Management Actions 66
7.4.4 Environmental Inspections 66
7.4.5 Environmental Audits 67
7.5 Submission and Publication of Management Plan 68
8 Training and Awareness 68
8.1 Project Inductions 68
8.2 Training Records 69
8.3 Ground Disturbance Permits 69
9 Non-Conformance and Incident Management 70
9.1 Environmental Incident Response 70
9.2 Incident Reporting and Investigation 72
9.3 Non-Conformance Management 72
9.4 Emergency Management 73
10 Environmental Reporting and Compliance Requirements 74
10.1 Environmental Reporting 74
10.2 Ministerial Statement 1180 Compliance Assessment Report 77
10.3 Ministerial Statement 1180 Environmental Performance Report 77
10.4 BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358 77
11 Stakeholder Consultation 79
11.1 Internal and External Communication 82
11.2 External Incident Notification 83
12 Fauna Management Plan Review 84
13 Changes to the FaMP 85
14 References 86
15 Definitions 89
16 Abbreviations 91

17 Project Delivery Applicability 92
Appendix 1 – Ministerial Statement 1180 Conditions Compliance Table 93
Appendix 2A - Environmental Risk Assessment Process & Risk Matrix 96
Appendix 2B – Terrestrial Fauna Risk Assessment 101
Attachment A – Pre and Post - Wet Season Biological Survey 107
Attachment B – Marine Fauna Desktop Assessment 108
Attachment C – Letter to EPA for MAC Consultation on Project Destiny 109
Attachment D – MAC Consultation 24th Jan 2022 110
Attachment E – Significant Impacts Against Guidelines 111
Attachment F – DWER Review 112
Attachment G – Bennelongia SRE Report 113
Attachment H – SRE Peer Reviews 114

Tables

Table 1-1 Key Environmental Factors & Objectives 6
Table 4-1 Records of Non-valant Mammal Species Across two APM Surveys 13
Table 4-2 Number of Nights in which Bat Species were Recorded in Each Habitat 14
Table 4-3 Records of Reptile Species Across APM Surveys 14
Table 4-4 Avifauna Survey Records and Associated Habitat Types within the Project area. 17
Table 4-5 Species of SRE groups collected during the Bennelongia field survey for the Perdaman Urea Project N.B. Grey denotes higher order identifications that might belong to other listed species (not viewed as unique species); blue represents species complexes. 22
Table 4-6 Overview of Management Approach 24
Table 4-7 Ministerial Statement No. 1180 Fauna Outcomes 27
Table 4-8 Ministerial Statement No. 1180 Terrestrial Fauna Objectives 27
Table 7-1 Native Fauna Outcome-Based Conditions (Triggers, Thresholds, Contingency Actions) 35
Table 7-2 Native Fauna Objective-Based Management Actions & Targets 45
Table 10-1 Reporting Requirements 75
Table 11-1 Stakeholder Consultation Register 79
Table 13-1 Changes to FaMP 85

Figures

Figure 1-1 Process Block Diagram 1
Figure 1-2 Project Site Layout and Adjoining Facilities 3
Figure 9-1 Flow Chart for Environmental Incident Response 71

1 Context, Scope & Rationale

1.1 Proposal Description

Perdaman plans to construct and operate a state-of-the-art urea plant with a production capacity of approximately 2 million tonnes per annum (Mtpa) on the Burrup Peninsula in the Northwest of Australia (Figure 1-2) (the Project).

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

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

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

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

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

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

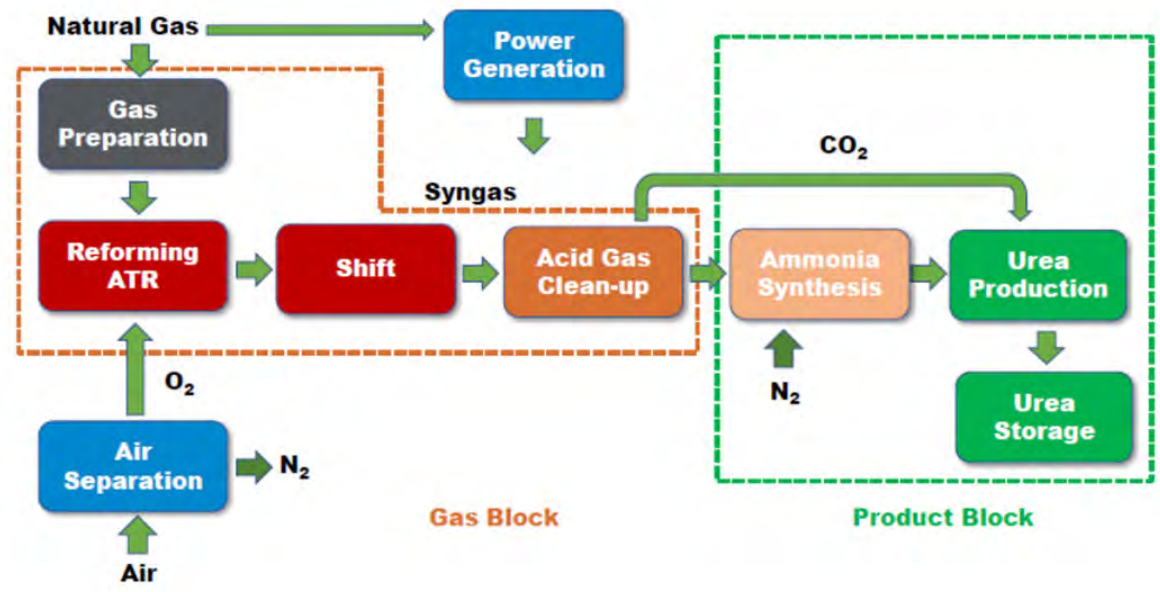

Figure 1-1 Process Block Diagram

The Project area, including Sites C and F, the causeway, conveyor and Port storage and loading facilities, extends east-west approximately 3.4km covering approximately 105 hectares in area. As illustrated in Figure 1-2 the Project area can be separated into five key areas, as follows:

Site C

Site C is relatively undeveloped with the only visible disturbance being a few access tracks. The site is situated adjacent to the Yara Pilbara Fertilisers ammonia plant to its east, to the north are steep rocky outcrops (P1 Priority Environmental Community (PEC)) and to the south the saline coastal flat area. Drainage from the site flows in a southerly direction towards the saline coastal flat between Hearson Cove and King Bay.

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

Site F

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

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

Causeway

The causeway, which links Sites C and F, extends across the saline coastal flat. The causeway will be built up above the flat and will include several hydrological and fauna friendly culverts to ensure the structure does not impede natural drainage, tidal action or the movement of wildlife.

Conveyor

The 3.5km conveyor will transport urea from the storage shed at Site C to the Port loading shed. From Site C the conveyor will be constructed on relatively undisturbed land, to the west of the existing Water Corp pipeline corridor. It will extend north, connecting to the existing Burrup East West Services Corridor (EWSC).

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

Port Area

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

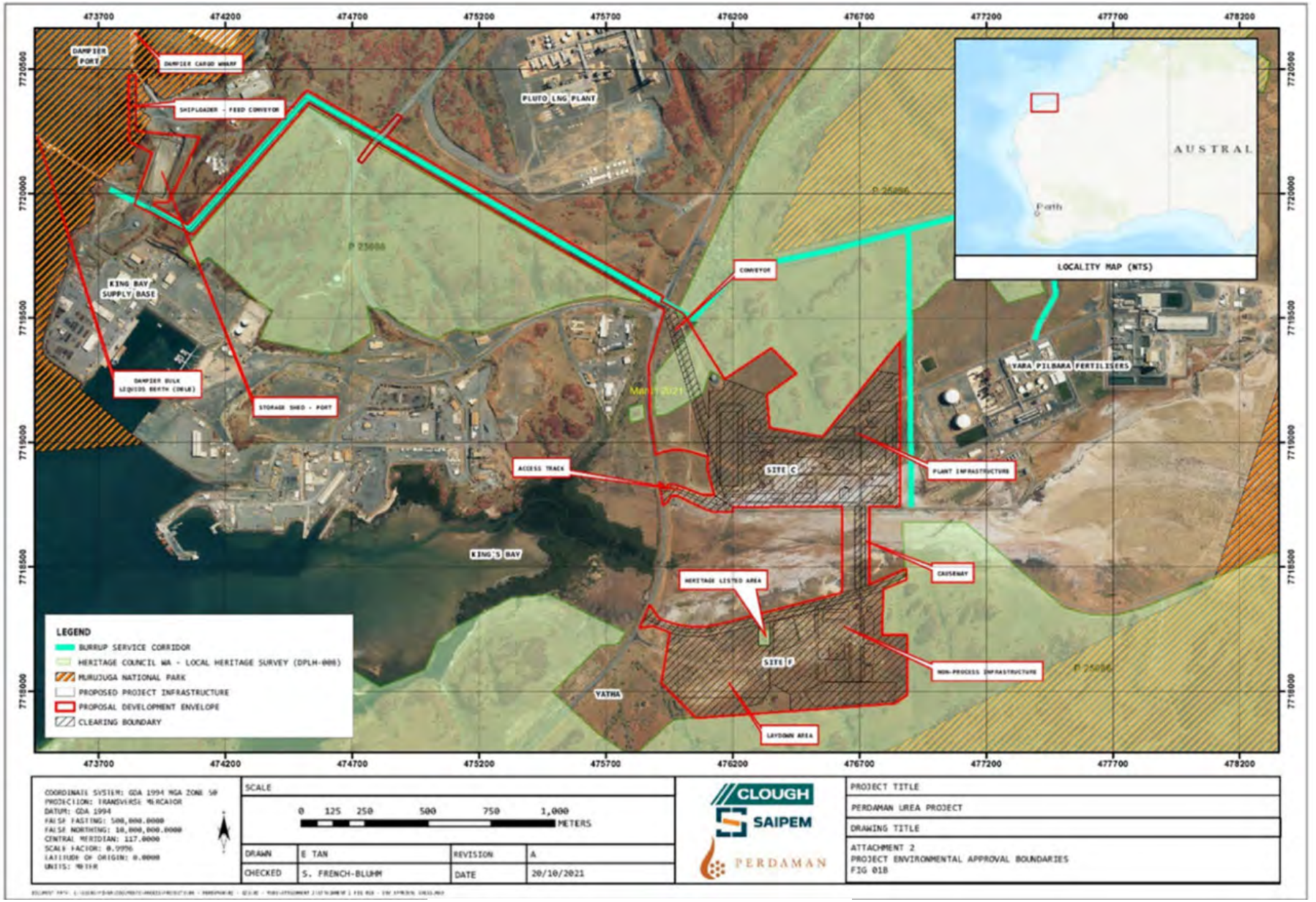

Figure 1-2 Project Site Layout and Adjoining Facilities

1.2 Scope & Requirement of the Plan

The purpose of this FaMP is to meet the approval conditions under the State *Environmental Protection Act 1986* (WA) and *Biodiversity Conservation Act 2016* and regulations and to provide a framework which describes how the Project will address, manage, monitor and mitigate impacts on native fauna species, including threatened species within the Project area and achieve the environmental outcomes for native fauna species and habitat stated within the Ministerial Statement 1180. This plan supplements the Project Environmental Management Plan (PEMP) (PCF-PD-EN-PEMP), the Confirmed Threatened Species Management Plan (TSMP) (PCF-PD-EN-TSMP) and the Confirmed Flora Management Plan (FMP) (PCF-PD-EN-FMP).

The FaMP was been prepared to meet the requirements of the EPA's "***Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plan***" (2021). In accordance with ministerial Condition 5-3, this Plan shall demonstrate it has met the requirements detailed within Conditions 5-3 (1) through to 5-3 (9).

In accordance with Condition 5-3 (MS 1180) the Confirmed Fauna Management Plan (PCF-PD-EN-FaMP-PC4) was provided to the CEO and the Department of Agriculture Water and Environment (DAWE) (now Department of Climate Change, the Environment, Energy and Water, DCCEEW) on 12 May 2022 as a revised version of the Fauna Management Plan (Version PCF 1, 12 January 2021), which was prepared in consultation with the Murujuga Aboriginal Corporation (MAC). The CEO confirmed in writing on 7 July 2022 that the Fauna Management Plan (PCF-PD-FMP-PCF4) satisfies the requirements of Condition 5 of MS1180.

On 8 February 2022, the EPA Director requested Perdaman to engage a suitably qualified professional to conduct a Peer Review of the FaMP. The EPC Contractor (Clough and Saipem Joint Venture) engaged GHD who subsequently engaged Dr Timothy Moulds from Invertebrate Solutions to conduct this review. A copy of the Draft and Final Peer Reviews provided by Dr Moulds is presented as Attachment H.

In accordance with Section 12 of the FaMP, an annual review of the plan has been undertaken.

This Fauna Management Plan (FaMP) includes the requirements for management and monitoring of environmental performance against prescribed fauna outcomes and objectives during the construction and operational activities at Site C, Site F, the causeway, the conveyor corridor, Port side storage, transfer and ship loading areas.

This document applies to all phases of the Project including but not limited to, Planning, Design, Construction, Commissioning and Operations.

This FaMP has the following objectives:

- Minimise clearing and other environmental impacts on fauna habitat;
- Comply with the outcomes stated within MS1180 5-1(1) to 5-1(5)
- Comply with the objective stated within the MS1180 5-2(1)
- Measures to be implemented to protect fauna for life of Project;
- Provide No-Go Zone fencing to control access to protected fauna habitat;
- Signage requirements for the protection of habitat; and
- Document the Project's responsibility, reporting and compliance guidelines.

The scope of this FaMP does not include the construction of port facilities such as the wharf or any infill that may be required of the coastal area for the provision of a wharf. These works are to be managed by the Pilbara Port Authority (PPA) under separate approval and management systems.

The FaMP is to be read in conjunction with Project Environmental Management Plan (PEMP) (PCF-PD-EN-PEMP) and the Confirmed Threatened Species Management Plan (TSMP) (PCF-PD-EN-TSMP). The management requirements for threatened species are addressed specifically in the TSMP, however are also included to some extent within this Plan as they are considered together in the outcomes stated within Ministerial Statement 1180.

Should there be any contradiction in threatened species-specific requirements between the FaMP and the TSMP, then the TSMP shall take precedence, as it is a Federal approved Plan.

Project Ceres's construction and operational activities have the potential to impact listed threatened species under sections 18 and 18A, and migratory species under sections 20 and 20A of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and threatened fauna and ecological communities under the Western Australian Biodiversity Conservation Act 2016 (BC Act).

It is noted that MS 1180 does not require the development of a specific management plan for the protection

of migratory species, however as migratory species are a protected matter under the EPBC Act, they have been included in this TSMP.

The TSMP includes management strategies for the following species:

1) Listed threatened species and communities (sections 18 and 18A) EPBC Act 1999
    a) Ghost Bat (*Macroderma gigas*)
    b) Northern Quoll (*Dasyurus hallucatus*)
    c) Pilbara Olive Python (*Liasis olivaceus barroni*)
2) Listed migratory birds (sections 20 and 20A) EPBC Act
3) Conservation significant species BC Act 2016
    a) Northern Coastal Free-tailed Bat (also known as North-western Free-tailed Bat) (*Mormopterus cobourgianus*)
    b) Bilby (*Macrotis lagotis*)
    c) Night parrot (*Pezoporus occidentalis*)
    d) Pilbara leaf-nosed bat (Pilbara form) (*Rhinonicteris aurantia*)

1.3 Responsibility

The responsibility for native terrestrial fauna management and compliance with this plan sits primarily with Perdaman.

It is the responsibility of the EPC Contractor (Saipem, Clough Joint Venture) (SCJV) and personnel to understand their scope of works and how fauna management applies to their activities during the construction program.

All personnel undertaking Project activities have the following responsibilities as they relate to terrestrial fauna management and the Project's broader environmental requirements:

- 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 FaMP and PCF-PD-PN-PEMP Project Environmental Management Plan (PEMP) and supporting documents.
- Reporting any environmental hazards, incidents, near misses and community complaints to their Supervisor.

Role specific environmental management responsibilities have also been assigned to relevant Perdaman personnel including the Project Director, Project Manager, Environment and Heritage Manager, the Environment Coordinator, Construction Manager and Operations Manager. The specific responsibilities for each of these roles are included in the PEMP.

In addition to these Perdaman personnel, Contractors engaged by Perdaman will provide adequate, tertiary qualified (in environmental management or similar qualification) and experienced site-based personnel to coordinate the management of environmental issues relevant to their scope of works.

For specific roles and responsibilities related to terrestrial fauna management during the relevant phase of the Project, refer to Section 5 of the Perdaman Project Environmental Management Plan (PCF-PD-EN-PEMP) and Section 9 of the SCJV Construction Environmental Management Plan (0000-ZA-E-09071) for responsibilities during the construction phase.

1.4 Key Environmental Factors

Perdaman has identified six key environmental factors relevant to terrestrial fauna species including; Flora & Vegetation, Terrestrial Fauna, Marine Fauna, Inland Waters, Coastal Processes, Social Surroundings and Marine Environmental Quality. Table 1-1 below outlines the environmental factors and corresponding EPA objectives.

This plan addresses these key environmental factors throughout as they specifically relate to native fauna. Flora and Vegetation have been included in this plan as a requirement of the Terrestrial Fauna Conditions 5-1, 5-3(3) and 5-3(3)(a) of the Ministerial Statement (1180) and is detailed in **Appendix 1** of this Plan.

Perdaman recognises the overlap of terrestrial fauna species and other key environmental factors due to association by ecological process, this Plan has been developed to meet the EPA's Objectives across these

factors.

Table 1-1 Key Environmental Factors & Objectives

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

Section 6 describes the potential impacts of the Project that relate to each of the Key Factors.

2 Legislative Framework

Project CERES sought approvals both under State and Commonwealth legislative frameworks. The three main pieces of legislation that relate to this Project and provide the overall framework for environmental management of fauna for the Project are as follows:

- *Environment Protection and Biodiversity Conservation Act 1999* – Commonwealth
- *Environmental Protection Act 1986* – State
- *Biodiversity Conservation Act 2016* and Regulations – State.

This Plan will be developed and regularly reviewed to comply with the commitments and legal obligations arising from the Project approvals process.

2.1 Environment Protection and Biodiversity Conservation Act 1999

The Australian Government's key environmental legislation is the *Environmental Protection and Biodiversity Conservation Act 1999*. The EPBC Act protects and manages matters of national environmental significance (MNES) which include nationally and internationally important flora, fauna, ecological communities, and heritage places.

The Project was also referred to the Commonwealth Department of the Environment and Energy (DoEE) under the EPBC Act on the 21st of December 2018 (Reference: 2018/8383) through the s.87 accreditation provisions. The DoEE determined on 28th March 2019 that the Proposed Action was a "Controlled Action" under s.75 of the EPBC Act. The EPBC Act referral 2018/8383 considered the relevant controlling provisions to be National Heritage Places, Listed Threatened Species and Communities; Listed Migratory Species and Commonwealth Marine Species.

On the 11 February 2022, the Proposal was provided with an approval decision, as being an approved action subject to conditions. The decision was made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act). The **Approved Action** under the decision being; *To construct and operate a urea plant and associated infrastructure on the Burrup Peninsula, Western Australia [See EPBC Act referral 2018/8383, the variation accepted on 26 July 2019 and the variation request accepted on 10 February 2021].* The EPBC approval has affect until the 24th January 2102.

Condition 2 of the EPBC 2018/8383 approval requires the implementation of the Confirmed Threatened Species Management Plan (PCF-PD-EN-TSMP), prepared in accordance with the *Environmental Protection Act 1986* approval, as detailed in Section 2.2.

The protection of nationally and internationally important fauna is addressed through the Confirmed Threatened Species Management Plan (PCF-PD-EN-TSMP).

2.2 Environmental Protection Act 1986

The *Environmental Protection Act 1986* provides for "the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing".

Project CERES was referred to the Environmental Protection Authority (EPA) under the *Environmental Protection Act 1986* in accordance with Section 38 Part IV. Pursuant to Section 45 of the EP Act, it has been agreed that this proposal may be implemented under the Conditions of Ministerial Statement 1180 (MS 1180), as of the 24th of January 2022.

Appendix 1 of this Plan includes the Conditions related to native fauna and conservation significant species as per the Ministerial Statement 1180 and where in this FaMP the condition has been addressed.

MS 1180 requires Perdaman to meet the following environmental outcomes (Condition 5-1) to protect native fauna species for the Project:

(1) Clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed 0.16 ha;
(2) Clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed 49.17ha;
(3) Clearing in the fauna habitat type identified as Samphire Shrublands / Supratidal flats shall not exceed 11.97ha;
(4) Clearing in the fauna habitat type identified as Drainage Lines shall not exceed 2.7 ha; and
(5) Impacts to short-range endemic fauna species are avoided, unless it is demonstrated, and the CEO confirms in writing that the species occurs in a self-sustaining population outside the development envelope.

In addition to the outcomes, the proponent is required to implement the proposal to achieve the following environmental objective (Condition 5-2):

(1) Minimise direct and indirect impacts to the Northern Quoll, Pilbara Olive Python and the Ghost Bat within the development envelope.

2.3 Biodiversity Conservation Regulations 2018

During Project construction and normal plant operations relocation of fauna may be required as part of any clearing or grubbing works, and where fauna could enter a work area / trench and needs to be safely removed and relocated to a suitable location outside the Project's battery limits.

The Project requires a licence under Regulation 28 of the Biodiversity Conservation Regulations 2018 to take, disturb, possess, transport and / or release fauna for relocation. Fauna means any animal native to Australia, and any animal that periodically migrates to and lives in Australia and includes any animal declared to be fauna by the Department of Biodiversity, Conservation and Attractions.

The Contractor has obtained a Regulation 28 licence, Licence Number FR28000358 (issued by Department of Biodiversity, Conservation and Attractions on 29 June 2023), which allows the following:

- Take and disturb fauna using hand capture techniques (Hook & Bag) as part of the Perdaman Urea Plant construction (approved under Ministerial Statement 1180) including the establishment of a boundary fence, trenches, clearing and grubbing and the construction of roadways. Fauna may become entrapped and require relocation to alternative areas.
- Relocate (transport and release) captured fauna will be released as soon as possible after capture into nearby suitable habitat outside of the construction envelope.

The licence prohibits:

- The release any fauna in any area where it does not naturally occur.
- The transfer fauna to any other person or authority unless approved in writing by the CEO, or
- The disposal of the remains of fauna in any manner likely to confuse the natural or present day distribution of the species.

2.4 Policy and Guidance

To ensure compliance with the EPA guidelines for Project approval, the following policies and guidance have been considered when developing this FaMP:

- EPA (2018) Statement of Environmental Principles, Factors and Objectives
- EPA (2018) Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual
- EPA (2016) Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016
- EPA (2016) Environmental Factor Guideline: Terrestrial Fauna
- EPA (2016) Technical Guidance: Terrestrial Fauna Survey
- EPA (2016) Technical Guidance: Sampling Methods for Terrestrial Vertebrate Fauna
- EPA (2016) Technical Guidance: Sampling of short-range endemic invertebrate fauna
- Commonwealth of Australia (1996) The National Strategy for the Conservation of Australia's Biological Diversity
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005
- Government of Western Australia (2014) Environmental Offsets Guidelines
- Government of Western Australia (2011) Environmental Offsets Policy
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra. Available from:http://www.environment.qov.au/biodiversity/threatened/publications/tap/predation-european-red- fox.
- Department of the Environment (2015). Threat abatement plan for predation by feral cats. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environmentAov.au/biodiversity/threatened/publications/tap/threat-abatement-planferal-cats.
- Department of Sustainability, Environment, Water, Population and Communities (20' 1). Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/resource/threat-abatement-plan-biolcqical-effects-includinq-lethal-toxicingestion-caused-cane-toads.

3 Roles and Responsibilities

Role specific environmental responsibilities for the Perdaman Project team are outlined below.

3.1 Project Director

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

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

3.2 Manager

Project Ceres Manager is accountable for implementation of this plan on site. Responsibilities include:

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

3.3 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 this plan 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 this plan to site personnel;
- Provide documentation and support to managers and supervisors;
- Ensure project inductions are undertaken as per the this plan;
- Managing Project Ceres'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 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 Project Ceres 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.

3.4 Environment Coordinator

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

- Coordination of the 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 plan;
- 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 Project Ceres 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 plan and associated documents; and
- Fulfilling the responsibilities of the Environment and Heritage Manager when they are on leave from site.

3.5 Construction Manager

- The Construction Manager is accountable for implementation of this plan on site during Project Ceres's construction phase. Their responsibilities include:
- Planning construction Works in a manner that avoids or minimises impact to environment in line with this plan;
- 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 plan;
- 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.

3.6 Operations Manager

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

- Planning the commissioning and ongoing facility operations in a manner that avoids or minimises impact to environment in line with this plan;
- Providing environmental leadership and ensuring adequate resources are allocated to effectively implement this plan 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 Project Ceres's commissioning activities and ongoing facility

operations;

- Participate in investigations relating to construction related incidents resulting in breaches of environmental regulatory, license or approval requirements; and

Regularly liaise with the Environment and Heritage Manager regarding environmental aspects and impacts. In addition to these Perdaman personnel, Contractors engaged by Perdaman will provide adequate, tertiary qualified (in environmental management or similar qualification) and experienced site-based personnel to coordinate the management of environmental issues relevant to their scope of works.

4 Rationale & Approach

4.1 Survey & Study Findings

Several environmental studies have been undertaken within the development envelope. These studies have been used to infer the management provisions of this Plan. The most recent of these surveys were carried out by Animal Plant Mineral Pty Ltd in 2019, and by Bennelongia in 2022; providing information on terrestrial vertebrate fauna and short-range endemic fauna, respectively.

As part of the Project's environmental assessment process, Animal Plant Mineral (APM) was engaged to undertake:

- Desktop fauna studies of the Study Area; and
- Multi-season (pre and post-wet season) and terrestrial vertebrate fauna surveys of the Study Area.

Two fauna surveys were conducted by APM at the Project Area; an initial level 1 fauna survey prior to the wet season of 2018 / 2019 and a level 2 survey conducted immediately after that wet season. A full bird census, camera trapping, spotlight surveys, and bat surveys were carried out in both surveys, while a full terrestrial fauna trapping survey was conducted in the post-wet season survey. Four broad fauna habitats are present within the Project Area; rocky outcrops, hummock grasslands on mid-slopes, drainage lines, and samphire shrublands/ supra-tidal flats.

The APM post-wet season field surveys followed the passage of Cyclone Veronica which crossed Karratha in March 2019. The Karratha Aero weather station (BOM station 00408310, 10 km to the south of the Survey Area) recorded 70 mm of rainfall associated with the passage of the cyclone. This rainfall created sufficient post-wet season survey conditions.

The full report for this survey, Perdaman Urea Project – Pre- and Post-wet season Biological Survey (APM, 2019) is included in Attachment B of the Threatened Species Management Plan (PCF-PD-EN-TSMP).

In October 2021, Bennelongia were engaged to conduct short-range endemic fauna surveys in accordance with Condition 5-3 (2) of MS No. 1180. For reliable results, the survey team were required to await a large-scale rain event so that conditions were suitable to record SRE species. The field survey was conducted from 14–17 February 2022, one week after 17.5 mm was recorded in the area over four days (Dampier Salt station; BOM 2022). Only 0.6 mm of rain was recorded between trap setting in February and trap collection four weeks later on 16 March 2022. This survey has been undertaken in accordance with *Technical Guidance: Sampling of short-range endemic invertebrate fauna* (EPA 2016d).

This SRE report consists of both a desktop review of likely occurrences and impacts from Project activities on SRE species (using data from Western Australian Museum (WAM) and Bennelongia databases, published research papers and available environmental reports), and the results of a field survey designed to collect SRE species at the Project Site. The survey methods used by Bennelongia were chosen in consultation with Perdaman and the Wildlife Protection Branch of DBCA. Four methodologies were applied during the survey. These were habitat characterisation, active foraging, litter samples and wet pitfall trapping. The field survey collected 424 specimens of at least 28 different species from SRE Groups. These included spiders (one species), pseudoscorpions (at least 12 species), scorpions (one species), centipedes (two species), millipedes (three species), isopods (at least six species) and snails (three species) across four habitat types; hummock grassland on mid slopes with scattered shrubs of Acacia, marine alluvial flats (samphire shrubland/supratidal flats), drainage lines fringed with well-established eucalypts, and isolated rocky outcrops (Bennelongia, 2022).

Findings of this survey are detailed in Section 4.1.3, with the full report included in this document as **Attachment G.**

4.1.1 Terrestrial Fauna

4.1.1.1 Mammals

APM recorded 15 mammal species over the two surveys; 7 non-volant mammals and 8 bat species. The mammal assemblage at the site is typical of many areas in the Pilbara region, with Euros (*Osphranter robustus*) being the largest and most common species, while various small and medium sized mammals are also present, including the Short-Beaked Echidna (*T. aculeatus*), Delicate Mouse (*Psuedomys delicatulus*) and Desert Mouse (*P. desertor*). A range of naturalised (i.e., Dingo/dog, *Canis familiaris*) and introduced (i.e. Feral cat, *Felis catus*; Black rat, *Rattus rattus*), were also recorded.

In total, 21 non-volant mammals have been recorded on the Burrup Peninsula, inclusive of APM and other published report survey results (years 1994-2002) (Worley Astron, 2006). Many of these species, however, are likely to inhabit the unique and diverse rocky outcrops present throughout the region. The APM surveys

targeted areas that were likely to be disturbed by the proposed construction, which are on the mid-slope and samphire areas. *Psuedomys desertor* was recorded in the 2019 APM survey, but had not been recorded in either database searches, or during the Worley Astron (2006) survey.

Targeted spot surveys were conducted, looking for the Northern Quoll *(Dasyurus hallucatus)*, Rock Wallaby *(Petrogale lateralis)*, and Rothschild's rock wallaby *(Petrogale rothschildi)*, in the rocky outcrops within, and immediately adjacent to, the Study Area. These species were not recorded during APM surveys, however, have been recorded in the broader area (Worley Astron, 2006). The Northern Quoll is discussed in a later Section.

While Rothschild's rock wallaby *(Petrogale rothschildi)* is present on islands of the Dampier Archipelago, any mainland populations south of Withnell Bay are now rare or completely absent (Pearson & Eldridge, 2008). At sites in the northern parts of the Burrup Peninsula, rock wallaby populations are recovering in response to fox baiting operations. While foraging habitat is present in creek lines containing diverse grasses and shrubs, the absence of deep caves required by this species for diurnal shelter make it highly unlikely that this species will be present in the Study Area (Department of Parks and Wildlife, 2013). Plains of small-sized rocks may represent appropriate habitat for the Western pebble-mound mouse *(Pseudomys chapmani)*, however the species has not been recorded in the Study Area. Recent work has suggested that the species is only patchily distributed in the central and southern Pilbara (Western Wildlife, 2008). The outcrops within the Study Area are small and isolated, and likely to be less important than the larger outcrops to the south, which provide greater connectivity and opportunity for secure and productive habitat.

Table 4-1 Records of Non-valant Mammal Species Across two APM Surveys

Scientific Name	Common Name	Record Type					Habitat			Total
		Camera	Scat.	Cage	Elliot	Pit	Mid Slopes	Rocky Outcrop	Samphire	
Osphranter robustus	Euro	23					13	7	3	23
Pseudomys delicatulus	Delicate Mouse					1			1	1
Pseudomys desertor	Desert Mouse				1				1	1
Tachyglossus aculeatus	Echidna		1					1		1
Canis familiaris	Dog/Dingo		1				1			1
Felis catus	Cat	3	1	2			1	3	2	6
Rattus rattus	Black Rat	1						1		2

During the APM surveys, eight bat species were recorded on acoustic bat detectors, deployed throughout the Study Area (Table 4-2) The most common species, recorded on multiple occasions across all habitat types at the site, were the Northern Coastal Free-tailed Bat *(Mormopterus cobourgianus)*, Little Broad-nosed Bat *(Scotorepens greyii)*, Common Sheath-tailed Bat *(Taphozous georgianus)*, and Finlayson's Cave Bat *(Vespadelus Finlayson's)*. In addition, flying foxes *(Pteropus sp.)* have been observed in the mangroves to the west of the Study Area during the APM 2018 survey and in previous surveys (Worley Astron, 2006). The most frequent records were on detectors deployed in rocky outcrop habitats, suggesting that these areas, and the adjacent rockpiles, may provide important habitat for many bat species.

During the 2019 APM survey, Ghost Bats *(Macroderma gigas)* were detected on two nights in rocky outcrop and mid-slope habitats (Table 4-2). The Ghost Bat, in addition to the White-striped Free-tailed Bat *(Austronomus australis)*, Greater Northern Free-tailed Bat *(Chaerephon jobensis)* and the Little Broad-nosed Bat *(S. greyii)* have not been recorded in database searches or previous surveys adjacent to the Study Area. This may reflect recent developments in sensitivity of technology used in modern bat detectors more than any lack of previous survey effort, or a shift in species occurrence.

Table 4-2 Number of Nights in which Bat Species were Recorded in Each Habitat

Scientific Name	Common Name	Habitat		
		Mid Slopes	Rocky Outcrop	Samphire
Austronomus australis	White-striped Free-tailed Bat		1	1
Chaerephon jobensis	Greater Northern Free-tailed Bat		1	2
Chalinolobus gouldii	Gould's Wattled Bat			1
Macroderma gigas	Ghost Bat	1	1	
Mormopterus cobourgianus	Northern Coastal Free-tailed Bat	6	14	7
Scotorepens greyii	Little Broad-nosed Bat	8	21	8
Taphozous georgianus	Common Sheath-tailed Bat	13	23	8
Vespadelus finlaysoni	Finlayson's Cave Bat	8	18	8

4.1.1.2 Reptiles

Twenty-eight species of reptiles and amphibians were recorded by APM, all of which were identified during the post wet season trapping survey (Table 4-3). Despite the low diversity and density of amphibians on the Burrup Peninsula (likely due to the absence of permanent fresh water), the Mains Burrowing Frog (*Cyclorana maini*) was recorded eight times, all on only 2 nights at the beginning of the survey, just after a major rainfall event.

The reptile assemblage on the Burrup Peninsula is generally consistent with the nearby mainland. The most common species were the North-western Sand slider (*Lerista bipes*), Rock Ctenotus (*Ctenotus saxatillis*), Spotted Dtella (*Gehyra punctata*), and Western Dwarf Skink (*Menetia surda*) (Table 4-3). Two of the species recorded by APM, the Pygmy spiny-tailed Skink (*Egernia depressa*) and Mitchell's Bearded Dragon (*Pogona minor mitchelli*), have not been recorded in previous surveys (Worley Astron, 2006) and were not present in database searches of the Study Area. Worley Astron (2006) recoded 50 reptile and two amphibian species in surveys adjacent to the Study Area.

Spotlight surveys were conducted during both APM surveys in rocky outcrop areas in an effort to record the Pilbara Olive Python *(Lialis olivaceus barroni)*. However, this species was not sampled in either survey.

Table 4-3 Records of Reptile Species Across APM Surveys

Scientific Name	Common Name	Record Type					Habitat			Total
		Cam.	Opp	Elliot	Funnel	Pit	Mid Slopes	Rocky Outcrop	Samphire	
Frog										
Cyclorana maini	Mains Frog				3	5	5	3		8
Gecko										
Gehyra punctata	Spotted Dtella		1		11		1	11		12
Strophorus elderi	Jewelled Gecko					1	1			1
Heteronotia binoei	Bynoe's Gecko				5			1	4	5
Skink										
Lerista bipes	North-Western Sandslider		1		10	26	21		16	37

Carlia tricantha	Desert rainbow-skink				2			2		2
Cryptoblepharus plagiocephalus	Péron's snake-eyed skink					1	1			1
Ctenotus leonhardii	Leonhards Ctenotus				5	2	5	1	1	7
Ctenotus rubicundus	Ruddy Ctenotus			1			1			1
Ctenotus saxatillis	Rock Ctenotus				44	6	12	23	15	50
Egernia depressa	Pygmy Spiny-tailed Monitor		2		1			1	2	3
Eremiascincus isolepis	Northern Bar-lipped Skink				1	2			3	3
Menetia surda	Western Dwarf Skink				5	4	2	2	5	9
Morethia ruficauda exquisita	Lined Firetail Skink		1		15	1	1	14	2	17
Pygopod										
Delma borea	Rusty-topped Delma				1		1			1
Delma pax	Peace Delma					1	1			1
Lialis burtonis	Burton's Legless Lizard				1	1	1		1	2
Dragon										
Ctenophorus caudicinctus	Ring-tailed Dragon				2	3	1		4	5
Scientific Name	**Common Name**	**Record Type**					**Habitat**			**Total**
		Camera	**Opp.**	**Elliot**	**Funnel**	**Pit**	**Mid Slopes**	**Rocky Outcrop**	**Samphire**	
Ctenophorus isolepis isolepis	Central Military Dragon					1	1			1
Lophognathus gilbertii	Gilbert's Dragon					1			1	1
Pogona minor mitchelli	Western Bearded Dragon				4	3	7			7
Varanid										

Varanus acanthurus	Spiny-tailed Monitor				3	1		2	2	4
Varanus panoptes	Yellow-spotted Monitor	1						1		1
Snake										
Anilios ammodytes	Sand-diving Blind Snake				1	2		2	1	3
Anilios grypus	Long-beaked Blind Snake				1	1	1	1		2
Antaresia perthensis	Pygmy Snake		7					5	2	7
Pseudechis australis	Mulga Snake		1		1			2		2
Pseudonaja mengdeni	Western Brown Snake		1		1		2			2

4.1.2 Avifauna

APM recorded 63 bird species across the pre-wet and post-wet season surveys (see Attachment A). In total, 150 bird species have been recorded on the Burrup Peninsula in surveys conducted in 1994, 1998, 2002, 2005 (WorleyAstron, 2006) and the two surveys by APM. Six of the species recorded by APM were not recorded in previous surveys or database searches including the migratory species, the Pacific Golden Plover (*Pluvialis fulva*).

While survey timing was appropriate to target migratory species, late 2018 and early 2019 was an unseasonably dry period on the Burrup Peninsula. In the week leading up the March 2019 survey, a large cyclone in the region resulted in a moderate rainfall event (71 mm total). As such, the March survey represented a time where total seasonal rainfall was below average, but the recent cyclonic rainfall in March alone was above average. In addition, the recent rainfall had resulted in areas of available surface water on the floodplain areas (often due to raised earthworks for infrastructure stopping drainage). The availability of fresh water is likely to have increased the use of the site by migratory waders and shorebirds, therefore increasing the probability of being recorded during surveys.

The avifauna records from APM's surveys, and the associated habitat types these records were made within the Project area, are listed in Table 4-4..

Supra-tidal flats within the Project area and mangrove vegetation surrounding King Bay to the west provide locally important habitat for a range of species, especially waders and shorebirds. The Project, however, will avoid direct disturbance of this habitat type. In addition, the vehicle access that crosses the supra-tidal flats will be designed with culverts to avoid alteration of surface water flows, mitigating potential indirect impacts to downstream habitats.

The waters of the Dampier Archipelago may provide foraging habitat during non-breeding periods or for juvenile birds yet to reach sexual maturation. The proximity of the sites to beaches and mangroves suggests that migratory sea birds and shorebirds may also be seasonally present within the Project area, or in the adjacent areas. The Burrup Road, a busy road providing access to the many processing facilities and Port, is situated immediately to the west of the supra-tidal flats. As a result, this area is already subject to noise disturbance from traffic, and the avifauna species observed during the fauna surveys, are present despite this disturbance. While further disturbance to this area should be minimised, it is unlikely to present a significant increase to that already created by the Burrup Road.

Many, but not all of the migratory bird species are expected to utilise the Project area at some time during their periodic visits. However, based on survey work to date the Project area is not likely to be used by large numbers of any of these species. This is primarily to do with the small size of the habitats and the level of local disturbance. Moreover, there are other larger and less disturbed areas of habitat available nearby, such as the Murujuga National Park protected area.

Table 4-4 Avifauna Survey Records and Associated Habitat Types within the Project area.

Order	Family	Species	Common Name	Mid-slope	Rocky Outcrop	Samphire
ANSERIFORMES	Anatidae	*Anas gracilis*	Grey Teal		x	x
CHARADRIIFORMES	Charadriidae	*Charadruis ruficapillus*	Red-capped Plover	x	x	x
		Pluvialis fulva	Pacific Golden Plover			x
CHARADRIIFORMES	Laridae	*Chlidonias hybrida*	Whiskered Tern	x	x	x
		Chroicocephalus novaehollandiae	Silver Gull			x
		Hydroprogne caspia	Caspian Tern			x
		Thalasseus bengalensis	Lesser Crested Tern		x	
	Recurvirostridae	*Himantopus leucocephalus*	Pied Stilt		x	x
	Scolopacidae	*Calidris ruficollis*	Red-Necked Stint			x
		Numenius phaeopus	Whimbrel			x
		Tringa brevipes	Grey-tailed Tattler		x	x
		Tringa nebularia	Common Greenshank	x	x	x
CICONIIFORMES	Ardeidae	*Egretta garzetta*	Little Egret	x	x	x
		Egretta novaehollandiae	White-faced Heron			x
COLUMBIFORMES	Columbidae	*Geopelia cuneata*	Diamond Dove	x	x	
		Geopelia placida	Peaceful Dove	x		x
		Geophaps plumifera	Spinifex Pigeon	x	x	x
		Ocyphaps lophotes	Crested Pigeon	x	x	x
CORACIIFORMES	Alcedinidae	*Todiramphus pyrrhopygius*	Red-Backed Kingfisher	x	x	x
	Meropidae	*Merops ornatus*	Rainbow Bee-eater	x		
CUCULIFORMES	Cuculidae	*Cacomantis pallidus*	Pallid Cuckoo	x	x	
		Chalcites osculans	Black-Eared Cuckoo	x	x	
FALCONIFORMES	Accipitridae	*Accipiter fasciatus*	Brown Goshawk	x		
		Aquila audax	Wedge-Tailed Eagle	x		
		Circus assimilis	Spotted Harrier	x		x
		Elanus axillaris	Black-shouldered Kite	x	x	x

Order	Family	Species	Common Name	Mid-slope	Rocky Outcrop	Samphire
		Haliaeetus leucogaster	White-bellied Sea-Eagle		x	
		Haliastur indus	Brahminy Kite	x		x
		Haliastur sphenurus	Whistling Kite	x	x	x
		Pandion haliaetus	Eastern Osprey		x	
	Falconidae	*Falco berigora*	Brown Falcon	x	x	x
		Falco cenchroides	Nankeen Kestrel	x	x	x
		Milvus migrans	Black Kite		x	
GALLIFORMES	Phasianidae	*Coturnix ypsilophora*	Swamp Quail	x		
PASSERIFORMES	Acanthizidae	*Smicrornis brevirostris*	Weebill	x	x	
	Alaudidae	*Mirafra javanica*	Horsfield's Bushlark	x		
	Artamidae	*Artamus cinereus*	Black-faced Woodswallow	x	x	x
		Cracticus nigrogularis	Pied Butcherbird	x	x	x
	Campephagidae	*Coracina papuensis*	White-bellied Cuckooshrike	x	x	x
		Lalage tricolor	White-Winged Triller	x	x	
	Corvidae	*Corvus orru*	Torresian Crow	x	x	x
	Estrildidae	*Emblema pictum*	Painted Finch	x	x	x
		Neochmia ruficauda	Star Finch	x	x	
		Taeniopygia guttata	Zebra Finch	x	x	x
	Hirundininae	*Hirundo neoxena*	Welcome Swallow		x	x
		Petrochelidon ariel	Fairy Martin	x	x	
		Petrochelidon nigricans	Tree Martin			x
	Locustellidae	*Megalurus mathewsi*	Rufous Songlark	x	x	x
	Maluridae	*Malurus leucopterus*	White-Winged Fairy-wren	x		
	Meliphagidae	*Epthianura tricolor*	Crimson Chat	x	x	
		Gavicalis virescens	Singing Honeyeater	x	x	x

Order	Family	Species	Common Name	Mid-slope	Rocky Outcrop	Samphire
		Lichmera indistincta	Brown Honeyeater	x	x	x
		Manorina flavigula	Yellow-Throated Miner	x	x	x
		Ptilotula penicillata	White-Plumed Honeyeater	x	x	
	Monarchidae	*Grallina cyanoleuca*	Magpie-Lark		x	x
	Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	x	x	x
	Pardalotidae	*Pardalotus rubricatus*	Red-Browed Pardalote	x		
		Pardalotus striatus	Striated Pardalote	x	x	
	Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	x	x	x
PELECANIFORMES	Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant			x
PSITTACIFORMES	Cacatuidae	*Cacatua sanguinea*	Little Corella	x	x	x
		Eolophus roseicapilla	Galah	x	x	x
	Psittacidae	*Melopsittacus undulatus*	Budgerigar		x	
	Total	**45**	**45**	**41**		

4.1.3 Short Range Endemic Fauna

Short-range endemics (SRE) typically inhabit relatively mesic, sheltered environments that were isolated during the aridification of Australia. SREs are defined as terrestrial and freshwater invertebrates that have naturally small distributions of less than 10,000 km2. Within this distribution, the actual areas occupied may be small, discontinuous or fragmented (EPA, 2016). Within Western Australia (WA), classification of SRE is predicated on Harvey's (2002) seminal review of short-range endemism, in which he noted that SRE fauna have characteristics that include:

- poor dispersal abilities;
- confinement to discontinuous habitats;
- seasonal activity patterns (especially during cooler, wetter periods); and
- low levels of fecundity.

The relictual nature of these environments has contributed to the small distributions of the species that evolved in isolation. SRE habitats may include vine thickets, rock piles, isolated hills, and dense vegetation (EPA, 2016). In Western Australia, SREs are mainly within the Phylum's of Mollusca (mussels and snails), Annelida (Earthworms), Onychophora (Velvet worms) and Arthropoda (spiders, pseudoscorpions, mites, crayfish and millipedes). Due to their restricted ranges, SRE are at greater risk to extirpations than other, less-restricted taxa, and may experience more frequent changes in conservation status.

Short-range endemic (SRE) species surveys in the wider Project region by Worley Astron (2006) have identified three species of Camaenidae, three species of Pupillidae and one species belonging to the Helicodiscidae family. Therefore, Western Australian Museum was commissioned to perform database searches for SRE fauna occurring within the main study area. An aggregated database does not exist, and, as such, four separate databases were searched – "Arachnids/Myriapods", "Crustacea and Worms", "Insects", and "Molluscs". The database search area was a rectangle, with the northwest corner co-ordinates: -20.614468, 116.761546, and southeast corner co-ordinates: -20.648286, 116.789698.

The WA Museum database searches are automated for the SRE filter, returning results for any species/taxa within the defined area that have distributions of less than 100 x 100 km (i.e. any potential SRE taxa). For taxa that are identified as occurring within the search area, all records of that taxa within WA are returned. Additionally, the Department of Biodiversity, Conservation and Attractions (DBCA) Database for Threatened and Priority Ecological Communities was searched for the location of PECs known to be important habitat for SRE snails. Priority Ecological Communities identified from APM (2019) Biological Survey were also searched.

The SRE species-specific Camaenid land snails survey was conducted immediately post Tropical Cyclone Veronica as part of the pre- and post-wet season biological survey by APM, 2019. In total, 18 quadrats (10 x 10 m) were searched. 12 quadrats were within the study area, and an additional six control quadrats were searched outside the study area. Quadrats were located on rockpiles and creeklines and were searched by two people for 20 minutes. Searchers focused on cooler and humid microclimates, including under spinifex hummocks, within rockpiles, and beneath rocks.

The proponent engaged Bennelongia to undertake further detailed SRE surveys of the potential rockpile communities within the Project development footprint prior to construction activities (Cardno 2021a). However, the EPA notes that several species of conservation significant SRE listed under the BC Act are known from the Burrup Peninsula, and there is the potential for Arachnids and Myriapods to occur in addition to Molluscs. A total of 424 specimens belonging to at least 28 species of SRE groups were collected. Groups represented include trapdoor spiders (one species), pseudoscorpions (12 species), scorpions (one species), centipedes (two species), millipedes (three species), isopods (six species) and snails (three species).

Twenty-one species are considered to be potential SREs, one an unlikely SRE, and six species are widespread. At least 19 of the 21 potential SRE species are only known from the Project area. They comprise 11 species of pseudoscorpion, six species of isopod, one centipede species and one millipede species. Whilst 16 of these potential SRE species were recorded from multiple different microhabitats, three species (two pseudoscorpions and one isopod) were recorded from single microhabitats (*Chernetidae* 'BPS432', *Indohya* 'BPS433' and *Buddelundia* 'BIS473 – see Table 4-5). Because it is unknown whether these species exist in multiple habitat types, the likelihood of occurrences outside the PDE is low and thus demonstration of their distribution must be provided to satisfy Condition 5-1(5) of MS 1180.

Buddelundia and *Indohya* species were sampled within sites that are not scheduled to be impacted by construction works (sites 3 and 6 respectively), while *Chernetidae* was sampled at site 19, where the laydown area is proposed to be constructed. In consideration of this, *Chernetidae* will require additional survey efforts to confirm their presence outside of the PDE prior to construction works commencing, in order to satisfy Condition 5-1(5) of the Ministerial Statement.

Based on the size of the Project area, what is known of the biology of the SRE Groups and the continuous connections of habitat inside the development envelope with similar habitat outside, it is likely that all species exist in self-sustaining populations outside the PDE. Therefore, it is unlikely that the Project development will have significant detrimental effect the conservation status of any species (to be confirmed upon determination of *Chernetidae* distribution).

Condition 5-1(5) of MS 1180 requires that the proponent avoids impacting SRE species, unless it is demonstrated, and the CEO confirms in writing that the species occurs in a self-sustaining population outside the development envelope. Mitigation of impacts will be focused on species with a limited distribution (e.g., occurring at one survey site) or unknown distributions that indicate the potential for these species to be SREs. From the data collected, pseudoscorpions and isopods are the most abundant order of potential SRE species found on the Project, and thus efforts to mitigate impacts to SREs will focus on these taxonomic groups.

As for the other recorded potential SRE species in the development envelope such as Chilopods, Diplopods and Scorpions; all potential SRE species share common microhabitat elements such as leaf litter, bark, small cracks and crevices etc. confirmed by being sampled from similar habitat types across genera (see Table 1 of Attachment G). Table 4-5 below provides a summary of the species recorded during the SRE survey by Bennelongia. Mitigation of impacts to these less abundant SRE species in the development envelope will be achieved through the avoidance of impacts to pseudoscorpions, as common habitat elements will be protected.

Chernetidae was found in a minor drainage line that continues outside the PDE. It is almost certainly found elsewhere on the Burrup and probably further afield as very small range species are highly unusual (pers. comm. Stuart Halse). To verify this assumption, Bennelongia conducted an additional Museum Survey to check whether there is a record of the same animal from elsewhere in the Pilbara. Results concluded that a 0.1% to 2.7% level of variation in both the CO1 and 12S gene between two Chernetidae specimens (Chernetidae `BPS431` and Chernetidae `BPS432`) exists, which is more consistent with intraspecific rather than interspecific variation. The Chernetidae specimens can therefore be assigned the species code Chernetidae `BPS431`, a species that occurs outside of the Project footprint.

Table 4-5 Species of SRE groups collected during the Bennelongia field survey for the Perdaman Urea Project
N.B. Grey denotes higher order identifications that might belong to other listed species (not viewed as unique species); blue represents species complexes.

Higher Classification	Lowest Identification	Specimens	Sites	Known only from the Project?	Distribution and SRE status
Arthropoda					
ARACHNIDA					
Araneae					
Mygalomorphae					
Anamidae	*Aname mellosa*	4	14, 18, 19	No	Widespread
Pseudoscorpiones					
Chernetidae	Chernetidae `BPS431`	11	5, 6	Yes	**Potential SRE**; multiple habitat types
	Chernetidae `BPS432`	5	19	Yes	**Potential SRE;** singleton
Chthoniidae	*Tyrannochthonius aridus*	1	22	No	**Potential SRE**; found elsewhere in the Pilbara
Hyidae	*Indohya* `BPS433`	2	6	Yes	**Potential SRE**; singleton
Olpiidae	*Beierolpium* 8/2 `BPS427`	6	3, 16, 21	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS428`	33	3, 7, 8, 18	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS429`	27	3, 4, 6, 12, 16, 18	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS430`	5	5, 11	Yes	**Potential SRE**; multiple habitat types
	Beierolpium sp.	4	3, 12, 18	Uncertain	Likely represents the species above
	Indolpium `BPS423`	6	4, 11	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS424`	2	4, 14	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS425`	12	3, 5, 7, 14, 19, 21	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS426`	4	11, 16	Yes	**Potential SRE**; multiple habitat types
	Indolpium sp.	4	8, 18, 21	Uncertain	Likely represents the species above
	Olpiidae sp.	12	3, 4, 8, 14, 21, 22	Uncertain	Likely represents the species above
Scorpiones					
Urodacidae	*Urodacus armatus s.l.*	2	14	No	**Potential SRE**; found elsewhere in the Pilbara
MALACOSTRACA					
Isopoda					

Higher Classification	Lowest Identification	Specimens	Sites	Known only from the Project?	Distribution and SRE status
Armadillidae	*Buddelundia* `BIS468`	7	18, 19	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS469`	6	3, 8, 18	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS470`	5	4, 5, 21	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS471`	5	3, 7, 16	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS472`	4	7, 8	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS473`	1	3	Yes	**Potential SRE**; singleton
	Buddelundia sp.	2	12	Uncertain	Likely represents the species above
	Armadillidae sp.	1	11	Uncertain	Likely represents the species above
CHILOPODA					
Geophilida					
Geophilidae	Geophilidae sp.	1	19	Uncertain	Data deficient **Potential SRE**; singleton
Scolopendrida					
Scolopendridae	*Scolopendra morsitans*	32	3, 4, 5, 6, 7, 8, 12, 18, 19, 21	No	Widespread
DIPLOPODA					
Polydesmida					
Paradoxosomatidae	Paradoxosomatidae sp.	1	16	Uncertain	Data deficient **Potential SRE**; singleton
Polyxenida					
Polyxenidae	*Unixenus* sp.	3	7, 18	Uncertain	Data deficient unlikely SRE
Synxenidae	*Phryssonotus novaehollandiae*	44	3, 4, 5, 7, 8, 22	No	Widespread
MOLLUSCA					
GASTROPODA					
Stylommatophora					
Camaenidae	*Rhagada convicta*	161	1, 3, 4, 5, 6, 8, 12, 14, 19, 22	No	Widespread
Pupillidae	*Pupoides contrarius*	9	11, 19	No	Widespread
	Pupoides lepidulus	2	12, 16	No	Widespread

4.2 Index of Biodiversity Surveys for Assessments

In the event that Perdaman is required to undertake any land-based biodiversity surveys (i.e. short-range endemic fauna survey) to support this FaMP, Perdaman will submit any required Index of Biodiversity Surveys for Assessments (IBSA) data packages in accordance with *Preparation of data packages for the Index of Biodiversity Surveys for Assessments* (IBSA) guidelines in the annual compliance assessment report (CAR) provided to the EPA.

4.3 Management Approach

Perdaman has taken a 'hierarchical approach' to the mitigation of potential impacts associated with the Project, and in the first instance, has sought to avoid areas of conservation significant fauna and native fauna habitat through design refinement. Where impacts cannot be avoided, Perdaman has designed the Project to reduce the intensity and / or extent of impacts on conservation significant and native fauna individuals and habitat.

To ensure that management provisions are comparable to the risks, Perdaman has adopted an outcome-based and objective based approach to achieve the desired environmental outcome for fauna species.

Table 4-6 Overview of Management Approach

Management Approach	Key Elements of the Approach
Outcome – Based	Trigger criteria, threshold criteria, response actions (trigger level actions and threshold contingency actions), monitoring (including indicators), timing/ frequency of monitoring, and reporting.
Objective - Based	Management actions, management targets, monitoring and reporting.

A suite of strategies in the form of management actions will be implemented throughout the construction and operational phases of the Project to minimise or abate these impacts the management actions focus the greatest management effort on reducing habitat loss and impacts to individual conservation significant fauna. These management actions were specifically developed to ensure that impacts are minimised as far as practicable during the final design, construction and operation of the Project. They have been informed by the results of field studies, best practice and recent experience on similar projects in Western Australia.

Where the impacts are unavoidable, the management approach includes provisions to identify triggers to detect when fauna is at risk; threshold criteria to quantify the maximum allowable impact before the environmental outcomes presented in Condition 5-1 are exceeded and management actions to minimise the duration, intensity or extent of the potential impact to terrestrial fauna (including conservation significant species).

In addition, implementation of an Environmental Management System (EMS) Framework provides a structure for achieving the key environmental objectives during the construction and operational phases of the Project. Implementation of the EMS Framework ensures environmental performance is achieved through environmental management practices that are consistent with the Perdaman Environmental Policy and Objectives. Management measures and actions are specifically detailed within this Plan (Section 7.2). In addition, Environmental Management Protocols have been developed to address the environmental risks posed by construction activities of the Project are presented within the EPC Construction Environmental Management Plan (CEMP) (0000-ZA-EN-09071).

Management and mitigation approach focuses on:

- Pre-Clearing Surveys.
- Inspections and removal of species from entrapment.
- Avoid impacts to significant native vegetation communities that provide habitat refuge for native fauna species.
- Risk Assessment and the internal use of early response indicators and criteria with performance indicators to track impacts.
- The establishment of spatially defined Project areas, as per the Areas discussed in Section 1.1 of this Plan and shown in Figure 1-2 (i.e. Site F, Site C, Causeway etc)
- Timing of clearing.

- Monitoring during clearing works by qualified Fauna spotter.
- Traditional Owners invited to observe clearing and ground disturbance.
- During rehabilitation works, fauna habitat for nesting, breeding or foraging will be established.
- Suite of supporting environmental management plans (i.e., Light Management Plan, Threatened Species, Flora & Vegetation Management Plan).
- Consideration and investigation of use of new technologies and techniques that will inform updates to monitoring parameters, monitoring sites, and management measures.
- Regular review and update of the monitoring program based on changes to proposal, timings of construction and operations, hydrological and surface water flood models, and groundwater monitoring data etc.
- Review of management measures to be implemented in the event of trigger criteria being exceeded.
- Measurement and review of effectiveness of implemented management measures, and
- Assessment of other effects or impacts not related to mining activities such as rainfall, fire, climate change, grazing and historic degradation from previous land use.

The Performance criterion, proposed management, targets and outcomes are identified in Table 7-1 and Table 7-2 of this Plan.

All proposed management actions, monitoring, performance indicators, triggers, thresholds and corrective actions are aligned with the performance targets / outcomes identified.

4.4 Monitoring Approach

The purpose of fauna monitoring is to inform, through the environmental criteria, if the environmental outcomes are being achieved and if required, to determine when trigger level or threshold levels are exceeded. The exceedance of trigger or threshold criteria then informs which response actions and contingency management measures need to be implemented. This is discussed further in Section 7.3 of this document, outlining how Perdaman will undertake monitoring to determine performance against the environmental criteria outlined in the outcome and objective-based provisions (see Sections 7.1 and 7.2).

Due to the outcomes required in Condition 5-1 of MS 1180, monitoring during clearing will be undertaken along the clearing boundary as per the timing and methodology detailed in Table 7-1 of Section 7.1. As for the details and methodology for the monitoring of objective-based controls, see Table 7-2 of Section 7.2.

A statistical approach based on a BACI (before – after - control – impact) design will be used to provide objectivity and rigor to thresholds and triggers. The BACI approach is to sample ‘Before’ and ‘After’ an impact activity has commenced, to determine how the activities will change the condition of a site from its historical condition, whilst Control and Impact sampling will enable the effects of activities to be discerned from natural variation and other events. BACI designs are useful where there are large potential changes after impact and where changes may be permanent after impact. This approach is consistent with rigorous monitoring programs and for monitoring programs undertaken elsewhere in the Pilbara.

With intentions to undertake monitoring under a BACI approach, baseline surveys (APM Surveys, 2019) will be used in comparison to monitor results gained after ground disturbing activities commence.

Monitoring approach will include (however is not limited to);

- Pre-construction, construction and post – construction monitoring of habitat quality and condition, water quality, habitat connectivity, feral fauna.
- Verification of clearing boundaries.
- Standard weekly monitoring to verify management of potential ignition sources, erosion and sediment controls, sources of light pollution and waste.
- Standard construction monitoring to verify groundwater abstraction.

Details of the timing and methods of monitoring terrestrial fauna is described in Section 7.3 below.

4.5 Risk Assessment

Perdaman applied a standard risk assessment matrix to its operations, whereby the ‘likelihood’ and ‘consequence’ of events is considered, with management and mitigation actions identified to control the level of risk.

Perdaman completed a risk assessment for each of the relevant conservation significant fauna in preparation of this FaMP. The risk assessment, with the resulting 'risk outcome', has been based upon the residual risk levels (as indicated by the risk matrix and HSSE Consequence severity table in **Appendix 3A**). after management and mitigation activities are implemented. The assessments have applied the definitions for both likelihood and consequence as prescribed within DOE (2014) and are presented in **Appendix 3B.**

Detailed management and mitigation actions and performance targets can be found in Section 6.

4.6 Rationale for Choice of Provisions

The rationale for the choice of management including the trigger and threshold criterion, response actions, monitoring and reporting has been made partly based on the Ministerial Statement Condition 5 requirements.

The EPA report (1705) (Assessment No. 2184) also provides recommendations pertaining to management actions in alignment with s.44 of the *Environmental Protection Act 1986* (WA). In addition, the Environmental Review Document and associated surveys and investigations for the Proposal have informed the specific conservation significant and native fauna species triggers and thresholds to ensure that the environmental outcomes stated in Condition 5-1 of MS 1180 are achieved, and the environmental objective stated in Condition 5-2 is achieved.

The proponent has also considered the *EP Act* environmental protection principals for the proposal. These principles provide a guideline for decision making and advice to government on matters of environmental protection, and the principles considered for the terrestrial fauna factor will be the 'Principle of the conservation of biological diversity and ecological integrity', and the 'Principles relating to improved valuation, pricing and incentive mechanisms', as recommended by the EPA (EPA 2021a). In 2003, the *EP Act* was amended to include these principles and as such, it is now the object of the Act to protect the environment of the State having regard to these principles.

The surveys and studies conducted for the Project (See Appendix B of the ERD) have identified the relevant fauna and habitat values within the Project Development Envelope (PDE) and have been detailed in Section 4.1 above. To summarise, the following fauna & associated habitat values will be directly or indirectly impacted by the Project:

- Native vegetation communities with local and national conservation significance.
- The Burrup Peninsula (Rocky Outcrops) Rock Pile Community PEC (Priority 1).
- Hummock Grasslands.
- Samphire Shrublands.
- Drainage Lines.
- Rocky outcrops and Dunes.
- Short-range endemic Fauna
- Visual amenity.
- Habitat values for local species.

These fauna values have the potential to be impacted by the activities identified and summarised in Section 1.4 and Section 4.1. Conservation of the values provided by the native fauna and associated habitat will be managed through a hybrid approach of both Objective and Outcome-based implementations, as outlined in the following sections.

Exceedances of trigger and threshold criteria, summarized in Table 7-1, will indicate the response action required to manage said exceedance. Exceedances will also warn management of associated rates of change in the environment as caused by the impact. Understanding environmental rates of change can assist in developing early warning indicators or predetermining potential exceedances during monitoring of trigger and threshold criteria.

It should be noted that consideration of impacts external to functions of the proposal will be important, as natural impacts independent of the proposal activity should not implicate the responsibility of the Proponent. However, awareness of external impacts may require mitigation through alignment with the Proponents interests and/or environmental policy. These could include impacts from external land-use activities including tourism/recreation, industrial or cultural activities, as well as external environmental processes, such as weathering from heavy rains, dust as a result of high winds etc.

4.6.1 Terrestrial Fauna Indicators – Outcome based

Indicators are the measurable and quantifiable characteristics that can provide specific indication to the health

of condition of the Environment. The EPA has required the proponent to meet the Fauna outcomes for the Project presented in Table 4-7 below. The indicators used within this FaMP have been selected as they are the best possible measure to determine whether the outcomes are being achieved. Indicators include a trigger and a threshold level as presented in Table 7-1.

Table 4-7 Ministerial Statement No. 1180 Fauna Outcomes

Condition	Outcome
5-1 (1)	clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed **0.16 ha**
5-1 (2)	clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed **49.17 ha**
5-1 (3)	clearing in the fauna habitat type identified as Samphire Shrublands /Supratidal flats shall not exceed **11.97 ha**
5-1 (4)	clearing in the fauna habitat type identified as Drainage Lines shall not exceed **2.7 ha**
5-1 (5)	impacts to short-range endemic fauna species are avoided, unless it is demonstrated, and the **CEO** confirms in writing that the species occurs in a self-sustaining population outside the development envelope

Threshold and trigger criterion for each Fauna outcome specified has been detailed in Section 7.1 of this Plan. Monitoring and management will assist with measuring potential and actual exceedances. Through the implementation of trigger criterion, the Proposal will have forewarning that the threshold criteria may be reached, and in doing so, the Proposal can implement response actions well in advance of the threshold criteria being reached, therefore avoiding non-compliance with the fauna outcomes.

4.6.2 Terrestrial Fauna Management Actions – Outcome based

Management actions target the identified potential impacts and key threats to terrestrial fauna within and adjacent to the Project site. The EPA has required the proponent to meet the Fauna objective for the Project presented in Table 4-8 below.

Table 4-8 Ministerial Statement No. 1180 Terrestrial Fauna Objectives

Condition	Objective
5-2 (1)	Minimise direct and indirect impacts to the northern quoll, Pilbara olive python and the ghost bat within the development envelope.

This objective will be achieved through implementation of the Confirmed Threatened Species Management Plan (PCF-PD-EN-TSMP) during the construction, commissioning and operation phases of the Project (life of the Project).

4.7 Key Assumptions & Uncertainties

Key assumptions in relation to native fauna include:

- That fauna surveys conducted to-date have accurately recorded the presence of all marine, terrestrial and conservation significant species, and accurately identified fauna habitat values.
- The fauna surveys undertaken to date accurately report the distribution and status of all marine, terrestrial and conservation significant fauna.
- That conditions experienced during fauna survey programs were ideal for recording native fauna, unless specified otherwise.
- That all fauna has been identified correctly during survey.
- That applicable surveys have been completed as per relevant EPA technical guidance survey methods for terrestrial vertebrate fauna.
- The likelihood and severity of predicted impacts are described accurately; and
- Avoidance and protection of fauna habitat will in turn result in the protection of conservation significant fauna within associated habitats.
- A lack of data around the short-range endemic fauna present within the PDE, therefore it is not

possible to determine the exact number of species recorded in the search area. Some recorded species may contain multiple taxa and, conversely, some specimens assigned to different taxa may actually represent the same species.

5 Fauna Habitat

As discussed in Section 4.1, APM was engaged to carry out desktop and field surveys of terrestrial flora and fauna. APM (2019) identified Four broad fauna habitats are present within Project Ceres Area; rocky outcrops, hummock grasslands on mid-slopes, drainage lines, and samphire shrublands and supra-tidal flats.

Each fauna habitat type and their importance to conservation significant species is summarised in the following sections (summarising the findings of the Perdaman Urea Project – Pre and Post-wet season Biological Survey (APM, 2019), provided in Attachment A).

5.1 Rocky Outcrops

Characteristic of the Burrup Peninsula, the formation of Proterozoic igneous rock outcrops (Gidley Granophyre) found within the Project Area (Figure 1-2), weathered over time and resistant to extensive erosion, produce aggregates of split boulder screes. These formations create good cover for reptiles in the pockets for adequate shade and protection, and also caves for bats and other small terrestrial mammals. This habitat type is also suitable to the Pilbara Olive Python (*Liasis olivaceus barroni*), and though not recorded during the APM survey, it is highly likely this species may occur in the area due to the availability of suitable habitat.

Weathering has also created exposed granophyre bedrock, providing extensive plains of small-sized rocks, dominating the topsoil layer. While this may represent appropriate habitat for the Western pebble-mound mouse (*Pseudomys chapmani*), the species was not recorded in the Project Area and is likely now locally extinct, as it is currently only patchily distributed in the central and southern Pilbara. The outcrops within the Project Area are small and isolated, and likely to be less important than the larger outcrops to the south, which provide greater connectivity and opportunity for secure and productive habitat.

The Project Area may be occupied by the Rothschild's rock wallaby (*Petrogale rothschildi*), though records suggest the species exists on the islands of the Dampier Archipelago at low densities, and any populations south of Withnell Bay are now rare or completely absent. At sites in the northern parts of the Burrup Peninsula, rock wallaby recovered in response to fox baiting operations. The sub-species could use the rocky outcrops and creek lines nearby that contain diverse grasses and shrubs for foraging, though the species is not likely to be present as it requires deep caves for shelter during the heat of the day, and most of the rock piles are not significant enough to provide this. It is more likely the species would utilise rock piles on islands interspersed by areas of spinifex and soft grasses around beaches which are undisturbed by humans and enables them to venture short distances from their shelter sites to forage.

Evidence of Echidnas (*Tachyglossus aculeatus*) (scats found atop rockpiles) were located at the Project Area in reasonable quantities suggesting a persisting population on the Burrup Peninsula. The Finlayson's Cave Bat (*Vespadelus finlaysoni*) was recorded within this habitat type northwest of the Project Area, close to the boundary. It was also recorded at the south-eastern boundary of the Project Area, suggesting it was likely roosting somewhere in the extensive rocky outcrops adjacent the site, that spread east to southeast and using the hummock grasslands for foraging. Similarly, the Little Broad-nosed Bat (*Scotorepens greyii*) was recorded in the same sites, which is unusual for this species, as it is not a cave-dweller. It is likely a reflection of the survey season, as the creek beds are dry and during this time, the species would switch to foraging within the grasslands, instead of the tree-lined and water-filled drainage lines you would expect during the wet.

5.2 Hummock Grasslands on Mid-Slopes

The Project Area and wider Burrup Peninsula contain coastal and subcoastal plains with mixed savannah hummock and tussock grasslands, and scattered shrubs of *Acacia pyrifolia* and *Acacia inaequilatera*. Upland areas are dominated by Triodia hummock-forming grasses which are present in the Project Area. A range of bird species are likely to use this grassy habitat for both foraging and nesting, especially given the proximity of the grassland to the ephemeral drainage lines. These include the Star Finch (*Neochmia subclarascens*), Swamp Quail (*Coturnix ypsilophora*), Painted Finch (*Emblema pictum*), and Crimson Chat (*Epthianura tricolor*).

This habitat type will also provide foraging habitat for grazers; primarily Euros (*Osphranter robustus*), but also potentially Rothschild's rock wallaby, especially given that the species feeds on both native and non-native grasses (e.g. Buffel), which are present in this habitat type.

Small rodents such as the Delicate Mouse (*Pseudomys delicatulus*) which has not suffered dramatic range declines like most of Australia's native rodents, may occur in the Project Area as the expanse of this habitat type would provide grass seeds that make up majority of the species diet. The Sandy Inland Mouse (*Pseudomys hermannsburgensis*) may also occur, as the species resides within hummock and tussock grasslands creating shallow burrows or using pre-existing burrows and foraging close to cover. The species population fluctuates greatly in response to rainfall. Similarly, varanids (e.g. Short-tailed Monitor, *Varanus brevicauda*), elapids (e.g. Western Brown Snake, *Pseudonaja mengdeni*) and dragons (e.g. Military Dragon, *Ctenophorus isolepis*) are likely to use this habitat, as it provides both cover from predators and suitable

substrate for excavating their burrows.

Evidence of Echidna (*T. aculeatus*) was recorded in this habitat type, as well as wild dog/dingo (*Canis* sp.) and feral cat (*Felis catus*) scats. The Northern freetail bat (*Chaerephon jobensis*) was recorded in this habitat type on only one of the trap nights and on one recorder only.

5.3 Samphire Shrublands & Salt Plains

The Burrup Peninsula contains marine alluvial flats and river deltas that support Samphire and mangal ecosystems (mangroves). Although not extensive in a regional context, the intertidal flats around the Burrup contain a variety of marine waders, and these flats are locally significant. The mangrove community is not forecast for disturbance based on the current site layout.

Such areas are important for migratory shorebirds and those that rely on seasonal water availability or opportunistic foraging, such as predatory birds like the Peregrine Falcon, (*Falco peregrinus)*, Eastern Osprey, (*Pandion cristatus)*, and Wedge-tailed Eagle (*Aquila audax)*.

Fauna diversity and density is likely to be low during the dry and pre-wet seasons as there is a lack of canopy cover of this habitat type in the Project Area. This habitat will become increasingly important at times of inundation during high tide when waders and shorebirds use the area for feeding, roosting and potentially nesting (e.g., Red-capped Plover, (*Charadrius ruficapillus*)).

The supra-tidal flats between King Bay and Hearson Cove, including those within the Project area, contain mangal systems that could support a diverse range of fauna. This includes birds that may use the rich organic marine sediment to forage and potentially nest including Brahminy Kite, (*Haliastur indus))* and Mangrove Golden Whistler, (*Pachycephala melanura*).

Mammals such as the Water-Rat *(Hydromys chrysogaster)* could also reside and forage at low tide among the extensive mangal system. This includes the mouth of King Bay which flows into the tidal flats and smaller mangrove habitat just outside the Project area.

The Northern Coastal Free-tailed Bat (*Ozimops cobourgianus*) is a user of mangroves for roosting, particularly those in adjacent forest and along large waterways. This species was recorded six times on three separate nights according to the bat analysis (Table 4-2). It was recorded on 3 of the 4 bat detectors placed around site.

When the area is not inundated, the most common fauna to use the area is the Euro (*O. robustus*). Frequent evidence of this species was found across the flats (tracks and scats).

5.4 Drainage Lines

Rapid weathering of the geology of the area has formed deeply incised narrow valleys amongst the exposed bedrock. These channels trend southwest to northeast and east to west throughout the Burrup Peninsula. The drainage channel present in the southwest of the Project is quite significant. This area has been excised from the Project Development Envelope due to its significance.

The Eucalyptus communities within and beside the watercourses contain large, tall trees that may provide hollows suitable for birds such as the Galah *(Cacatua roseicapilla)* and Little Corella *(Cacatua sanguinea).* Similarly, this habitat provides general roosting, nesting, perching and foraging habitat for the Red-browed Pardalote *(Pardalotus rubricatus),* Red-backed Kingfisher *(Todiramphus pyrrhopygius)* and Black-faced Woodswallow *(Artamus cinereus).* If trees are large enough and have many hollows, some bats such as the Northern freetail bat (Chaerephon jobensis), Beccari's freetail bat *(Mormopterus beccarii),* Yellow-bellied sheathtail bat *(Saccolaimus flaviventris*) and Common sheathtail *(Taphozous georgianus)* may seek refuge within this habitat. *C. jobensis* and *T. georgianus* were both recorded during the pre-wet season survey. *T. georgianus* was recorded on all 4 of the bat detectors, on each trap night.

6 Risks to Fauna

The following sections provide an overview of the potential impacts to fauna, and **Appendix 3A** and **Appendix 3B** of this plan provides a more comprehensive risk assessment of potential impacts to fauna during the Perdaman construction and operational activities, including associated mitigation measures to reduce the impacts.

It should be noted that the EPA considers it unlikely that the proposal would have a significant impact on Marine Fauna and that the impacts to this factor are manageable. Accordingly, the EPA did not consider marine fauna to be a key environmental factor at the conclusion of its assessment.

6.1 Reduction and / or Fragmentation of Terrestrial Fauna Habitat

Supra-tidal flats within Project Ceres area and mangrove vegetation surrounding King Bay to the west provide locally important habitat for a range of species, especially waders and shorebirds. Project Ceres, however, will avoid direct disturbance of this habitat type. In addition, the vehicle access that crosses the supra-tidal flats will be designed with culverts to avoid alteration of surface water flows, mitigating potential indirect impacts todownstream habitats.

6.2 Vehicle Strike

Impacts with moving vehicles can cause injury or death of native terrestrial fauna. The establishment of new roads and introduction of additional vehicles, particularly during the construction phase, have the potential to adversely impact on fauna. Dusk and dawn periods when some fauna is more active are times when these interactionscould be more prevalent.

Marine fauna, especially turtles, could be impacted by increased shipping movements and marine vessel strikes.

6.3 Increase in Introduced Terrestrial Fauna and Weeds

The introduction of pest species has the potential to increase competition for limited food resources or impact neighbouring roosting sites from endemic species. The importation of modular units has the potential to carry pest species from outside the region.

Similarly, some feral species such as mice, rats, dogs, cats, pigs and foxes could be attracted to the facility if food scraps are not managed or disposed of appropriately. The attraction of feral predators such as foxes (*Vulpesvulpes*) and cats (*Felis catus*) could result in predation of native species.

While the population of Cane Toads (*Rhinella marina*) is continuing to spread, to date, they have not yet been recorded on the Burrup Peninsula. The potential for lethal toxic ingestion of Cane Toad toxin, though not likely at this time, needs to be considered for the life of Project.

6.4 Light Pollution

Artificial light is known to adversely affect many species and ecological communities, it can change the behaviour and/or physiology, reducing survivorship or reproductive output. It can also have the indirect effect of changing the availability of habitat or food resources. It can attract predators and invasive pests, both of which may pose a threat to listed species (DOEE, 2020).

Although they spend most of their lives in the ocean, female turtles nest on sandy tropical and subtropical beaches, predominantly at night. They rely on visual cues to select nesting beaches and orient on land. Artificial night lighting on or near beaches has been shown to disrupt nesting behaviour. Beaches with artificial light have lower densities of nesting turtles than dark beaches. Hatchling sea finding behaviour may be disrupted by artificial lights, which interfere with natural lighting and silhouettes (DOEE, 2020).

All species of seabirds are vulnerable to the effects of lighting. Seabirds active at night while migrating, foraging or returning to colonies are most at risk. Fledglings are more affected by artificial lighting than adults due to the synchronised mass exodus of fledglings from their nesting sites. They can be affected by lights up to 15 km away. Similarly, migratory shorebirds can be impacted by artificial light. Artificial light can disorient flying birds, affect stopover selection, and cause their death through collision with infrastructure. Birds may starve as a result of disruption to foraging, hampering their ability to prepare for breeding or migration (DOEE, 2020).

Artificial light emanating from the site could attract fauna and alter foraging patterns, increase predation risks, disrupt biological clocks and disrupt dispersal movements impacting breeding and roosting regimes. Project Ceres may impact on nesting turtles and turtle hatchlings through disorientation and misorientation. Artificial light from Project Ceres can disorient seabirds causing collision, entrapment, stranding, grounding, and interference with navigation (being drawn off course from usual migration route), and migratory seabirds may also be impacted through disorientation.

Potential sources of light pollution associated with Project Ceres would be the afterhours security lighting and night-time lighting needed during construction and in key operational areas.

6.5 Noise and Vibration

Noise and vibration acts as a general stressor, masks acoustic signals, and can disturb ecosystem balance.

Noise emissions during the construction phase such as large mobile plant movements and blasting associated with earthworks could have a potential impact on fauna. Similarly, during Project Ceres's operational phase, noiseemissions from plant, conveyor and loading facilities could impact terrestrial and marine fauna.

The prevention of, and reduction of impacts from noise and vibration is managed through the implementation of the Construction Environmental Management Plan Noise Management Protocol 0000-ZA-E-09071.

6.6 Fauna Entrapment and Poisoning

During the construction phase open pits and trenches will be established and kept open temporarily. During this time, fauna can become trapped and if not removed quickly have the potential to die due to exposure during hot daytime temperatures.

The collision of ghost bats into wire fences is a key threat for this species.

Stormwater and brine storage ponds could attract fauna, particularly birds. The use of chemical larvicides or adulticides to control mosquitoes has the potential to adversely impact these species.

6.7 Marine Environmental Quality

Marine Levels of Ecological Protection (LEPs) in the Pilbara region were set out and updated in the Pilbara Coastal Water Quality Consultation Outcomes – Environmental Values and Environmental Quality Objectives Marine Series Report No 1 (DoE 2006). The majority of Mermaid Sound has been assigned with high to maximum LEPs (DoE, 2006). The areas surrounding the various industrial facility jetties and wharves in Mermaid Sound and Dampier Port have moderate LEPs. Brine and process water discharge areas for industrial facilities including the 1 ha area surrounding the ocean outfall of the Water Corporation's Multi-User Brine Return Line (MUBRL) in King Bay have low LEPs.

Operation of Project Ceres has the potential to impact on marine environmental quality due to:

- the discharge of saline water (brine) and wastewater into King Bay via the existing Water Corporation MUBRL.
- deposition of air emissions (urea dust from Site C) and spillages of urea product and fugitive urea dust during ship loading and conveying of urea from the storage shed to the ship loader entering the marine environment
- surface water from stormwater run-off from hardstand areas which has the potential to cause erosion and the transport and deposition of sediments into King Bay via the supratidal flats.

6.8 Inland Water Flows and Water Quality

Project Ceres impacts on inland waters may cause indirect impacts to fauna.

The EPA considered the likely residual impacts of Project Ceres on inland waters were:

- impacts to surface water quality from stormwater run-off and project infrastructure, which is unlikely to be material.
- impacts to groundwater from potential abstraction and saline wastewater discharge to the Water Corporation's Multi-User Brine Return Line (MUBRL), which is likely to be consistent with the EPA objective for inland waters, provided appropriate management measures are implemented.
- potential impacts to surface water and groundwater from the disturbance of acid sulfate soils, which is likely to be consistent with the EPA objective for inland waters, provided appropriate management measures are implemented.

Project Ceres's location within a coastal area supports a distinct correlation between the surface waters and groundwater environment. The main aquifer bodies are overlain with supratidal deposits and both are considered to be unconfined in nature and in hydraulic connection with groundwater discharge within the intertidal zone. Groundwater levels are particularly shallow within the supratidal areas and are expressed as surface waters during periods of high rainfall.

The following activities may impact on inland waters, causing an indirect impact on fauna:

- Clearing, grubbing, excavations, cut and fill.
- Construction of access tracks, laydown and hardstand areas.
- Infrastructure construction.
- Construction of the causeway.
- Acid sulfate soil management.

Due to this distinct correlation between groundwater and surface water and in consideration of the EPA Environmental Factor for "Inland Waters" groundwater and surface water impacts are considered and

addressed through the Confirmed Surface Water Management Plan PCF-PD-EN-SWMP.

6.9 Waste Management

Potential direct impacts on threatened species caused by waste generation and management is putrescible waste hygiene and the attraction of vermin or native fauna.

Indirect impacts include controlled waste, liquid waste, hazardous and non-hazardous solid waste management, concrete washout, and stormwater management impacting on inland waters and marine environmental quality.

The management of waste at Project Ceres is through the implementation of the Solid and Liquid Waste Management Plan PCF-PD-EN-SLWMP.

6.10 Fire

Fires as a result of construction or operational activities may impact fauna through the following methods:

- Altered fire regimes negatively impacting vegetation, and associated values, including injury or death of native fauna caused by fire.
- Loss of habitat from fires.
- Fauna displacement and increased competition.

The prevention of, and reduction of impacts from fires is managed through the implementation of the Construction Environmental Management Plan Fire Management Protocol 0000-ZA-E-09071.

6.11 Dust

Dust generated by site activities, particularly clearing, ground disturbing works and transportation of urea during operations causing dust deposition on vegetation may impact the health and overall condition of fauna habitat.

Dust during construction activities is managed through implementation of the Construction Environmental Management Plan Air Quality Management Protocol 0000-ZA-E-09071.

6.12 Short-Range Endemic Fauna

A short-range endemic (SRE) species survey has been completed in accordance with requirements stated in Condition 5-3(2) of MS 1180. Based on the size of the Project area, what is currently understood about the biology of the SRE Groups and the continuous connections of habitat inside the development envelope with similar or corresponding habitat outside and adjacent to the envelope, it is likely that all species have distributions that extend beyond the Project boundary and areas proposed to be disturbed. Therefore, it is unlikely that the Project development will have significant detrimental effect on the conservation status of any species (Bennelongia, 2022).

Three SRE species have been found to occur at only one habitat type within the PDE. These species include *Chernetidae* ‘BPS432’, *Indohya* ‘BPS433’ and *Buddelundia* ‘BIS473; two pseudoscorpions and one isopod, respectively (see Table 4-5) and recorded from Hummock grasslands (*Chernetidae* and *Buddelundia)* and rocky outcrops (*Indohya*). Both *Chernetidae* and *Buddelundia* were sampled from hummock grasslands over stony plains (sample sites 19 and 3), with *Indohya* sampled from rocky outcrops in Site C. Due to the extensive range of Hummock grasslands over stone mediums, it is unlikely that these species are restricted to these areas. In addition, sample site 3 is outside of the development footprint, and thus direct impacts to the habitat is unlikely as construction elements avoid this area of the PDE.

As for *Indohya* recorded from rocky outcrops, additional measures to determine whether or not this species occurs in a self-sustaining population outside of the PDE will not need to be implemented to satisfy Condition 5-1 (5) of MS 1180, as disturbance to these rocky outcrops will be avoided by design.

In light of this summary of results from Bennelongia, it can be concluded that the identified SRE’s within the development envelope are likely present in self-sustaining populations outside the development envelope. However, *Chernetidae* is an exception to this, as this species was recorded at one site that is subject to construction impacts. It is likely that the low levels of rainfall (0.6mm) during the 4 weeks of trapping surveys hindered the distribution and abundance of potential SREs in the PDE. *Chernetidae* was found in a minor drainage line that continues outside the PDE. It is almost certainly found elsewhere on the Burrup and probably further afield as very small range species are highly unusual (pers. comm. Stuart Halse). Additional surveys are discussed in Section 2.3.1.

7 Fauna Management Plan Provisions

This Section of the FaMP sets out the provisions that will be implemented for the Proposal. This Plan outlines both outcome-based (Section 7.1) and management-based (Section 7.2) provisions. All requirements will be carried out during construction and operations and until the Project Ceres is decommissioned and closed.

This FaMP will be implemented in conjunction with the Confirmed Threatened Species Management Plan (PCF-PD-EN-TSMP) and the Confirmed Flora Management Plan (PCF-PD-EN-FMP).

7.1 Outcome-based Provisions

The provisions within this Section are outcome based as specified by the Ministerial Statement (1180) detailed within Condition 5-1. Outcome – based provisions are performance based and are used where a potential impact on the environment is conducive to objective measurement and reporting.

The following Sections and Table outline the legal requirements for the proposal and the provide detail of the Environmental Criteria, Response Actions, Monitoring and Reporting required to ensure compliance with the specified outcomes.

Table 7-1 provides details of the trigger criteria, threshold criteria, response actions, monitoring and reporting in relation to the Conditions (outcomes) set out in 5-1 of Ministerial Statement 1180. These triggers and contingency actions will be adopted to monitor and track impacts to applicable fauna and associated habitat where controls and management measures are not employed or are effective. Exceedances to the threshold criteria presented in Table 7-1 require the response actions to be implemented to reduce the impact and potential damage to native habitat and fauna and to maintain fauna objectives.

The triggers pre-empt a potential threshold exceedance. Trigger Level Actions including but not limited to the below Table 7-1 and inspections/investigations on-site will be utilised where practicable to reduce the risk of reaching a threshold and the need to implement the contingency actions.

Table 7-1 Native Fauna Outcome-Based Conditions (Triggers, Thresholds, Contingency Actions)

EPA Factors and Objectives	Terrestrial Fauna: "To protect terrestrial fauna so that biological diversity and ecological integrity are maintained".
Outcome/s	• Clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed 0.16 ha • Clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed 49.17 ha • Clearing in the fauna habitat type identified as Samphire Shrublands /Supratidal flats shall not exceed 11.97 ha • Clearing in the fauna habitat type identified as Drainage Lines shall not exceed 2.7 ha
Key Environmental Values	Terrestrial fauna and short range endemic fauna.
Key Impacts and Risks	Removal, fragmentation and modification of habitat, vehicle strike, increased light spill, introduced species, noise and vibration, dust, altered fire regimes, alterations to water regimes.

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	**RESPONSE ACTIONS** *Trigger Level Actions* *Threshold Contingency Actions*	**MONITORING** *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	**REPORTING** *Under EPBC Act* *Under EPA Act*
Trigger Criterion 1: Actual and planned clearing within the development envelope exceeds 90% (65.75 ha) of the approved clearing limit. **Threshold Criterion 1:** Actual clearing within the development envelope exceeds the approved clearing limit (73.05ha)	**Trigger Level Actions 1:** Confirm extent of existing approved ground disturbance via audit of clearing records, boundary flagging. Stop the authorisation of GDPs if threshold criterion would be exceeded. Notify Environment & Heritage Manager for future planning options.	**Monitoring Indicator**: Actual clearing carried out (existing ground disturbance). Clearing authorised by GDP's but not yet conducted. Clearing under GDP applications. **Method**: **Clearing** – determine the extent of clearing and ground disturbance. Use GIS to determine extent of clearing authorised against GDPs not yet undertaken.	The EPC contractor will compile a monthly clearing report and compare the progress against the clearing limits both visually (using GIS data) and numerically. Performance against Criteria Annually within the EPBC Impacts Reconciliation procedure. Where threshold criteria is exceeded: • Report the exceedance in writing to the CEO and the DCCEEW within **seven days** of the exceedance being identified as per Condition 5-6 (1).

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	Threshold Contingency Actions1 : Cease all clearing activities Check flagging, boundary fencing and signage of areas to be cleared/ not cleared has been undertaken and is obvious to those on the ground. Identify likely cause of incident. Investigate and determine cause of threshold criteria. Report to relevant government authorities (DWER, EPA and DCCEEW) with investigation information so that they can determine potential environmental harm or alteration of the environment. Undertake corrective rehabilitation, and/or seek amendment to approvals, in consultation with EPA, DWER and DCCEEW. Undertake further education and awareness training to personnel Seek consultation with MAC.	Extent of clearing under pending GDP applications. **Locations**: Within the development envelope (Site C and Site F and between the two sites) **Timing & Frequency** For actual clearing – monthly survey of cleared areas. For planned clearing – every time a GDP is applied for or closed out.	• Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; • Provide a further report to the CEO and DCCEEW within 21 days of the exceedance being report as required by condition 5-6(1) which shall include details specified in Condition 5-6(5). Compliance Assessment Report to the EPA as per Condition 15-6, upon EPA request or if threshold criteria is exceeded (see Section 10.2). Impacts Reconciliation Report Environmental Performance Report.
Trigger Criterion 2: Actual clearing within Rocky Outcrops habitat type exceeds 90 %	**Trigger Level Actions 2:** Confirm extent of existing approved ground disturbance via	**Monitoring Indicator**: Actual clearing carried out (existing ground disturbance) within the Rocky Outcrops.	The EPC contractor will compile a monthly clearing report and compare the progress

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
(0.144 ha) of the approved clearing limit. **Threshold Criterion 2:** Actual clearing in the fauna habitat type identified as Rocky Outcrops exceeds approved clearing limit of 0.16 ha.	audit of clearing records, boundary flagging. Do not authorise additional GDPs if the threshold will be exceeded. Notify Environment & Heritage Manager for future planning options. Survey team to reinvestigate area and re-establish survey markers to peg out and indicate the authorised extent of clearing Site team to establish temporary star picket and wire fence as a primary visual and physical aid. Fencing / site boundary and early warning markers to be installed as per the Confirmed Flora Management Plan (PCF-PD-EN-FMP). **Threshold Contingency Actions 2:** Cease all clearing activities and / ground disturbance. Check flagging, boundary fencing and signage of areas to be cleared/ not cleared has been undertaken and is obvious to those on the ground. Identify likely cause of incident.	Clearing authorised by GDP's but not yet conducted. Clearing under GDP applications. **Method**: Clearing – determine the extent of clearing and ground disturbance that has occurred (records, visual inspection and GDPs) Use GIS to determine extent of clearing authorised against GDPs not yet undertaken. Extent of clearing under pending GDP applications. **Locations**: Within the development envelope (Site C and Site F and between the two sites) **Timing & Frequency** For actual clearing – monthly survey of cleared areas. For planned clearing – every time a GDP is applied for or closed out Survey markers to be inspected daily by site supervisors and weekly by the PER. Inspections to confirm presence of 3m warning zone survey markers denoted by pink and black flagging and 5m buffer survey markers denoted by white flagging.	against the clearing limits both visually (using GIS data) and numerically. Where threshold criteria is exceeded: • Report the exceedance in writing to the CEO and the DCCEEW within **seven days** of the exceedance being identified as per Condition 5-6 (1). • Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; • Provide a further report to the CEO and DCCEEW within 21 days of the exceedance being report as required by condition 5-6(1) which shall include details specified in Condition 5-6(5). Impacts Reconciliation Report Compliance Assessment Report to the EPA as per Condition 15-6, upon EPA request or if threshold criteria is exceeded (see Section 10.2). Environmental Performance Report.

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	Report to relevant government authorities (DWER, EPA and DCCEEW). Undertake corrective rehabilitation, and/or seek amendment to approvals, in consultation with EPA, DWER and DCCEEW. Undertake further education and awareness training to personnel Seek consultation with MAC.	All survey markers shall be maintained throughout construction and commissioning or until replaced by permanent fencing. The correct location of boundary markers is to be checked and confirmed onsite by a suitably qualified surveyor prior to commencement of GDAs.	
Trigger Criterion 3: Actual clearing within Hummock Grasslands on mid-slopes habitat type exceeds 90 % (44.25 ha) of the approved clearing limit. **Threshold Criterion 3:** Actual clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes exceeds the approved clearing limit of 49.17 ha.	**Trigger Level Actions 3:** Confirm extent of existing approved ground disturbance via audit of clearing records, boundary flagging. Do not authorise additional GDPs if the threshold will be exceeded. Notify Environment & Heritage Manager for future planning options. Survey team to reinvestigate area and re-establish survey markers to peg out and indicate the authorised extent of clearing Site team to establish temporary star picket and wire fence as a primary visual and physical aid.	**Monitoring Indicator**: Actual clearing carried out (existing ground disturbance) within the Hummock Grasslands on mid-slopes. Clearing authorised by GDP's but not yet conducted. Clearing under GDP applications. **Method**: Clearing – determine the extent of clearing and ground disturbance that has occurred (records, visual inspection and GDPs) Use GIS to determine extent of clearing authorised against GDPs not yet undertaken. Extent of clearing under pending GDP applications. **Locations**:	The EPC contractor will compile a monthly clearing report and compare the progress against the clearing limits both visually (using GIS data) and numerically. Where threshold criteria is exceeded: • Report the exceedance in writing to the CEO and the DCCEEW within **seven days** of the exceedance being identified as per Condition 5-6 (1). • Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; • Provide a further report to the CEO and DCCEEW within 21 days of the exceedance being report as required by condition 5-6(1) which

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	Fencing / site boundary and early warning markers to be installed as per the Confirmed Flora Management Plan (PCF-PD-EN-FMP). **Threshold Contingency Actions 3:** Cease all clearing activities and / ground disturbance. Check flagging, boundary fencing and signage of areas to be cleared/ not cleared has been undertaken and is obvious to those on the ground. Identify likely cause of incident. Report to relevant government authorities (DWER, EPA and DCCEEW). Undertake corrective rehabilitation, and/or seek amendment to approvals, in consultation with EPA, DWER and DCCEEW. Undertake further education and awareness training to personnel Seek consultation with MAC.	Within the development envelope (Site C and Site F and between the two sites) **Timing & Frequency:** For actual clearing – monthly survey of cleared areas. For planned clearing – every time a GDP is applied for or closed out Survey markers to be inspected daily by site supervisors and weekly by the PER. Inspections to confirm presence of 3m warning zone survey markers denoted by pink and black flagging and 5m buffer survey markers denoted by white flagging. All survey markers shall be maintained throughout construction and commissioning or until replaced by permanent fencing. The correct location of boundary markers is to be checked and confirmed onsite by a suitably qualified surveyor prior to commencement of GDAs.	shall include details specified in Condition 5-6(5). Impacts Reconciliation Report Compliance Assessment Report to the EPA as per Condition 15-6 of MS 1180, upon EPA request or if threshold criteria is exceeded (see Section 10.2). Environmental Performance Report.

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
Trigger Criterion 4: Actual clearing of Samphire Shrublands /Supratidal flats habitat exceeds 90% (10.77 ha) of the approved clearing limit. **Threshold Criterion 4:** Clearing in the fauna habitat type identified as Samphire Shrublands /Supratidal flats exceeds approved clearing limit of 11.97 ha	**Trigger Level Actions 4:** Confirm extent of existing approved ground disturbance via audit of clearing records, boundary flagging. Do not authorise additional GDPs if the threshold will be exceeded. Notify Environment & Heritage Manager for future planning options. Survey team to reinvestigate area and re-establish survey markers to peg out and indicate the authorised extent of clearing Site team to establish temporary star picket and wire fence as a primary visual and physical aid. Fencing / site boundary and early warning markers to be installed as per the Confirmed Flora Management Plan (PCF-PD-EN-FMP). **Threshold Contingency Actions 4:** Cease all clearing activities and / ground disturbance. Check flagging, boundary fencing and signage of areas to be cleared/ not cleared has been	**Monitoring Indicator**: Actual clearing carried out (existing ground disturbance) within the Samphire Shrublands /Supratidal flats. Clearing authorised by GDP's but not yet conducted. Clearing under GDP applications. **Method**: Clearing – determine the extent of clearing and ground disturbance that has occurred (records, visual inspection and GDPs) Use GIS to determine extent of clearing authorised against GDPs not yet undertaken. Extent of clearing under pending GDP applications. **Locations**: Within the development envelope (Site C and Site F and between the two sites) **Timing & Frequency:** For actual clearing – monthly survey of cleared areas. For planned clearing – every time a GDP is applied for or closed out Survey markers to be inspected daily by site supervisors and weekly by the PER.	The EPC contractor will compile a monthly clearing report and compare the progress against the clearing limits both visually (using GIS data) and numerically. Where threshold criteria is exceeded: • Report the exceedance in writing to the CEO and the DCCEEW within **seven days** of the exceedance being identified as per Condition 5-6 (1). • Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; • Provide a further report to the CEO and DCCEEW within 21 days of the exceedance being report as required by condition 5-6(1) which shall include details specified in Condition 5-6(5). Impacts Reconciliation Report Compliance Assessment Report to the EPA as per Condition 15-6, upon EPA request or if threshold criteria is exceeded (see Section 10.2). Environmental Performance Report.

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	undertaken and is obvious to those on the ground. Investigate and determine cause of threshold criteria. Report to relevant government authorities (DWER, EPA and DCCEEW) with investigation information so that they can determine potential environmental harm or alteration of the environment. Undertake corrective rehabilitation, and/or seek amendment to approvals, in consultation with EPA, DWER and DCCEEW. Undertake further education and awareness training to personnel Seek consultation with MAC.	Inspections to confirm presence of 3m warning zone survey markers denoted by pink and black flagging and 5m buffer survey markers denoted by white flagging. All survey markers shall be maintained throughout construction and commissioning or until replaced by permanent fencing. The correct location of boundary markers is to be checked and confirmed onsite by a suitably qualified surveyor prior to commencement of GDAs.	
Trigger Criterion 5: Actual clearing of Drainage Lines habitat exceeds 90% (2.43 ha) of the approved clearing limit. **Threshold Criterion 5:** Clearing in the fauna habitat type identified as Drainage Lines exceeds approved clearing limit of 2.7 ha	**Trigger Level Actions 5:** Confirm extent of existing approved ground disturbance via audit of clearing records, boundary flagging. Do not authorise additional GDPs if the threshold will be exceeded. Notify Environment & Heritage Manager for future planning options.	**Monitoring Indicator**: Actual clearing carried out (existing ground disturbance) within the Drainage Lines. Clearing authorised by GDP's but not yet conducted. Clearing under GDP applications. **Method**:	The EPC contractor will compile a monthly clearing report and compare the progress against the clearing limits both visually (using GIS data) and numerically. Where threshold criteria is exceeded: • Report the exceedance in writing to the CEO and the DCCEEW within **seven days** of the exceedance being identified as per Condition 5-6 (1).

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	Survey team to reinvestigate area and re-establish survey markers to peg out and indicate the authorised extent of clearing Site team to establish temporary star picket and wire fence as a primary visual and physical aid. Fencing / site boundary and early warning markers to be installed as per the Confirmed Flora Management Plan (PCF-PD-EN-FMP). **Threshold Contingency Actions 5:** Cease all clearing activities and / ground disturbance. Check flagging, boundary fencing and signage of areas to be cleared/ not cleared has been undertaken and is obvious to those on the ground. Investigate and determine cause of threshold criteria. Report to relevant government authorities (DWER, EPA and DCCEEW) with investigation information so that they can determine potential environmental harm or alteration of the environment.	Clearing – determine the extent of clearing and ground disturbance that has occurred (records, visual inspection and GDPs) Use GIS to determine extent of clearing authorised against GDPs not yet undertaken. Extent of clearing under pending GDP applications. **Locations**: Within the development envelope (Site C and Site F and between the two sites) **Timing & Frequency:** For actual clearing – monthly survey of cleared areas. For planned clearing – every time a GDP is applied for or closed out Survey markers to be inspected daily by site supervisors and weekly by the PER. Inspections to confirm presence of 3m warning zone survey markers denoted by pink and black flagging and 5m buffer survey markers denoted by white flagging. All survey markers shall be maintained throughout construction and commissioning or until replaced by permanent fencing. The correct location of boundary markers is to be checked and confirmed onsite by a suitably qualified surveyor prior to commencement of GDAs.	• Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; • Provide a further report to the CEO and DCCEEW within 21 days of the exceedance being report as required by condition 5-6(1) which shall include details specified in Condition 5-6(5). Impacts Reconciliation Report Compliance Assessment Report to the EPA as per Condition 15-6, upon EPA request or if threshold criteria is exceeded (see Section 10.2). Environmental Performance Report.

ENVIRONMENTAL INDICATORS *Trigger Criteria* *Threshold Criteria*	RESPONSE ACTIONS *Trigger Level Actions* *Threshold Contingency Actions*	MONITORING *Monitoring Indicators, Methods and Locations* *Timing & Frequency*	REPORTING *Under EPBC Act* *Under EPA Act*
	Undertake corrective rehabilitation, and/or seek amendment to approvals, in consultation with EPA, DWER and DCCEEW. Undertake further education and awareness training to personnel Seek consultation with MAC.		

7.2 Objective-based Provisions

An objective is the proposal-specific desired state for an environmental factor to be achieved from the implementation of management actions and must relate to the EPA's environmental objective for a particular factor.

This Section of the FaMP provides details of the objective based provisions to implement on the Project. Management-based provisions relate to management actions and are used where it is not practical, efficient or necessary to implement outcome-based provisions because the priority for protection is lower. Management actions are the actions implemented to achieve the environmental objective which generally relate to the 'minimise' and 'rehabilitate' steps of the mitigation hierarchy, while management targets are a type of indicator defined to demonstrate that the objective is being met.

The management actions presented in Table 7-2 below have been prioritized using a risk-based approach (see risk assessment **Appendix 3B**), so that the greatest effort will be placed on the proposal activities that have the highest likelihood of causing environmental impacts where the consequence of the impact is likely to be severe and irreversible.

The Project has included management targets and management actions that will aid the Project in achieving the objective stated within Condition 5-2 of MS 1180 and these are outlined in Table 7-2 below.

Table 7-2 Native Fauna Objective-Based Management Actions & Targets

EPA Factors and Objectives	Terrestrial Fauna is "To protect terrestrial fauna so that biological diversity and ecological integrity are maintained".
Key Environmental Values	Native Fauna of the Burrup Peninsula. Native Fauna habitat.
Key Impacts and Risks	Removal, fragmentation and modification of habitat, vehicle strike, increased light spill, introduced species, noise and vibration, dust, altered fire regimes, alterations to water regimes.

MANAGEMENT ACTIONS	MANAGEMENT TARGET	MONITORING	REPORTING
Training All personnel (construction, sub-contractors, consultants, operational etc) are provided with appropriate training and awareness education to ensure conservation significant fauna and associated critical habitat are identifiable and protected, and reporting requirements are communicated. Communicate with personnel regarding conservation significant fauna species presence onsite and encourage personnel to report all sightings. Increase personnel awareness & knowledge in relation to fauna management measures, conservation significant fauna and critical habitat in association with personnel responsibilities. • SRE molluscs, arthropods and isopods (including potential SRE species – see Table 4-5). All conservation significant species included in training packages will detail risks associated with the species, in	**FaMP Management Target 1** 100% Environmental Induction attendance compliance for all personnel onsite and all personnel to undertake a competency assessment following induction.	**Indicator:** Environmental Induction and competency assessment includes conservation significant fauna identification (including SREs), habitat, management and reporting requirements. Personnel induction status and competency. **Method:** Review Environmental Induction. Review the attendance records and competency assessment against each personnel. Pre-start records meetings and risk assessments undertaken prior to works being carried out by crews. Toolbox meeting and other training materials / registers and records. Training materials to explicitly include conservation significant taxa (including SREs) and associated habitats. Conservation significant fauna sightings will be reported on the Fauna Sightings register. Records from the Fauna Sightings Register, indicating both the sightings and the deaths. **Location:**	Reported through Monthly Project Environmental Reporting by Environment Team. Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Exceedance of management target – annually in the CAR and the EPBC compliance report. Reported through EMS Any conservation significant vertebrate fauna deaths will be reported to the Department of Biodiversity, Conservation and Attractions (DBCA).

addition to detailing their habitat and behavioural patterns – assisting staff in exercising caution and diligence in reporting and management actions.		Project Area **Timing & Frequency:** <u>Construction:</u> Prior to personnel engaging in works during construction. Upon identification of non-competency. Employee Engagement Environmental Induction. Training ongoing during construction. <u>Operations:</u> Prior to personnel engaging in operational activities. Upon identification of non-competency. Training ongoing during operations. <u>Ongoing:</u> Monthly Toolbox talk. Daily Pre-start Reminders. Posters and notifications.	
Pre-clearance Survey <u>Pre-construction:</u> Conduct a preclearance survey to establish baseline data demonstrating the condition or status of environmental values prior to disturbance. The preclearance survey will include: • Location and Extent of habitat. • Location and extent of threatened fauna habitats and individuals sighted. • Location and type of habitat	**FaMP Management Target 2** The pre-clearance survey will be undertaken 0 to 6 months prior to clearing activities and within the development envelope and will be undertaken by a qualified ecologist.	**Indicator:** Pre – Clearance Survey conducted by qualified ecologist. **Method:** Pre-clearance survey Review of Pre – Clearance Survey Report Review Qualified Ecologist CV. GIS Mapping Survey will include potential microhabitats available to SRE populations (in percent groundcover). Review monitoring program.	**Pre-clearance report.** The pre-clearance report will include as a minimum: • the location and extent of threatened flora individuals and/or habitat • the location and extent of threatened fauna habitats and individuals sighted • the location, extent and abundance of invasive weeds • the total area of disturbance

features within the Project Footprint.		**Location:** Project Area **Timing & Frequency:** <u>Pre-construction:</u> 0-6 months Pre-Clearing Once prior to clearing. <u>Operations:</u> Not applicable.	required for the Project works • the location and type of habitat features within the Project Footprint • the location of designated stockpile areas for soil and vegetation management Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report
Trapping Program <u>Pre-Construction:</u> If required, implement a trapping and relocation program for native fauna including conservation significant species prior to commencing GDA's. <u>Operations:</u> Where native fauna is identified and not moving on from the project site, conduct trapping and relocation.	**FaMP Management Target 3** Engage a suitably qualified Ecologist, prior to clearing, to conduct a trapping and relocation program for conservation significant fauna in accordance with DBCA's Standard Operating Procedures (SOPs) and permit/licence conditions as required under the BC Act.	**Indicator:** Incident or sighting of fauna conservation significant fauna within the development envelope prior to GDA commencing. **Method:** Visual observations during weekly environmental inspections. Visual inspections for native fauna (fauna spotters) during vegetation clearing. Review Trapping and Relocation Program against DBCA'sStandard Operating Procedures (SOPs) and permit/licence conditions as required under the BC Act. Review Qualified Ecologist CV. **Location:** Project Area **Timing & Frequency:** <u>Construction</u>	Reported through Monthly Project Environmental Reporting by Environment Team. Reporting as required under the BC Act. Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report

		Each time a trapping and relocation program is implemented. Prior to Ground Disturbing Activities. <u>Operations</u> Each time a trapping and relocation program for native fauna is implemented.	
Ground Disturbance Permit <u>Construction:</u> Ensure all vegetation clearing and ground disturbance works are undertaken under a Ground Disturbance Permit (GDP) which assesses proposed works against potential significant fauna habitat areas and approved clearing boundaries (defined by the outcomes 5-1(1) to 5-1 (4)). Clearing of habitat values will not exceed the extents as follows: Rocky Outcrops shall not exceed **0.16** ha. Hummock Grasslands on Mid-slopes shall not exceed **49.17** ha. Samphire Shrublands /Supratidal flats shall not exceed **11.97** ha. Drainage Lines shall not exceed **2.7** ha. The site Environmental Officer is to review and approve GDP provisions to ensure achievement of the Condition requirements. <u>Operations:</u> No clearing is to be undertaken following the construction period unless deemed absolutely	**FaMP Management Target 4** No clearing is undertaken without a GDP in place, and all clearing will commence in accordance with GDP conditions and within the defined battery limits.	**Indicator:** GDP Process implemented. Clearing or GDA conducted with a GDP in place. Clearing extent exceeded. Visual observation of GDP in place during clearing activities. **Method:** Audit GDPs on record against works undertaken. Monitor GDPs in place and those pending. Inspection of clearing boundary pegging, and fencing is intact and visible to clearing contractor. Visual inspections for native fauna (fauna spotters) during vegetation clearing. Weekly inspections of work areas (GDA and Clearing) to ensure GDP has been approved for the activity. Inspection of clearing extents during clearing activities to confirm no unauthorised clearing or earthworks Review GDP procedure and training around GDP Process awareness. **Location:** Project Area **Timing & Frequency:** <u>Construction</u> Daily clearing inspections during construction	Reported through Monthly Project Environmental Reporting by Environment Team (Non-conformance and how many GDPs issued, pending, active and closed out). Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

necessary (with notable evidence in writing by the CEO), and any further clearing must have a GDP in place.		period. Daily fencing inspections for first 3 months of erection, then weekly. Weekly Inspections Monthly Audit of GDPs Audit in response to an exceedance of clearing limit. Audit in response to breach of GDP process i.e. Ground disturbing works being carried out without permit. <u>Operations</u> Not applicable unless further clearing / ground disturbance is required to be undertaken.	
Fauna Spotters <u>Construction:</u> Fauna spotters are required on site during vegetation clearing activities to supervise dispersal and relocation of any native fauna. Native fauna identified within the demarcated clearing areas unable to move away from the clearing areas without intervention are be moved to a location deemed appropriate for the safety and survival of the fauna individual/s. Clearing to be undertaken progressively in one direction to allow fauna to move on. Where practicable, prior to commencing vegetation clearing activities, machinery will idle for at least half an hour. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site.Land clearing to commence no more than six months prior to commencement of construction.	**FaMP Management Target 5** Authorised Fauna Handler to remove, handle and relocate fauna (license holder under DBCA).	**Indicator:** Visual observation of GDP in place during clearing activities. Qualified Fauna Spotter engaged for clearing activities. **Method:** Visual inspections (qualified person) for native fauna (fauna spotters) during vegetation clearing. Fauna Interaction Register (for fauna removed or handled during spotting event). Fauna removal handlers licensed under DBCA **Location:** Project Area **Timing & Frequency:** <u>Construction</u> Daily clearing inspections during construction period. <u>Operations</u> Fauna removal upon notice of a conservation	Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Reporting in accordance with DBCA'sStandard Operating Procedures (SOPs) and permit/Licence conditions as required under the BC Act.

Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation. Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. <u>Operations:</u> Any instances where the removal of fauna from the Project area is required will be undertaken by a qualified fauna handler, in accordance with DBCA SOP's and license conditions.		significant or pest species sighting in the Fauna Interaction Register or the Feral and Pest Animal Register.	
Fauna Entrapment <u>Construction:</u> Trenching activities and excavations will be carried out to minimise impacts to fauna during construction. Excavations will be checked for trapped fauna. All excavations that must be left open for more than 12 hours must have gentle ramped egress that all fauna are capable of using. Structures and apparatus will be constructed prior to commissioning to deter birds from entering the sites water hold ponds. <u>Operations:</u> If excavations are left open as operations commence, monitoring of these areas and their design will occur as above.	**FaMP Management Target 6** No evidence of native fauna injury or death from entrapment within water holding ponds, trenches or excavations. **FaMP Management Target 7** Trenches must be inspected daily as per the Fauna Management Protocol - within three hours of sunrise if left open overnight.	**Indicator:** Increased number of native fauna found in water holding ponds, trenches and excavations. **Method:** Visual inspections of water holding ponds, trenches, fauna egress, and excavations. Visual inspections for Pilbara Olive Python and Northern Quoll within plant, equipment and machinery prior to activities being carried out onsite each morning, following rain events and during hot weather. Monitored through environmental inspections and incident records. Fauna Interaction / sightings / translocation Register (for fauna removed or handled during inspection). Daily pre-start checks by personnel. License under DBCA for removal of conservation species. **Location:** Project Area (trenching, excavations, storage water ponds)	All vertebrate fauna deaths to be entered as an incident into the Perdaman incident management system. All inspection non-conformances will be tracked and reported through Perdaman incident management system. Report sightings of threatened and priority fauna - To submit the report form, email it to fauna@dbca.wa.gov.au Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Reporting in accordance with DBCA'sStandard Operating Procedures (SOPs) and permit/licence conditions as required under the BC Act. ▪ All vertebrate fauna deaths to be entered as an incident

		Timing & Frequency: Construction Daily inspections during construction period. Within 3 hours of sunrise for open trenches. Monitored through environmental inspections and incident records. Monitored through license records and fauna sightings / translocation register. Operations Only applicable if excavations are left open on site following the construction period.	into the Perdaman incident management system. ▪ All inspection non-conformances will be tracked and reported through Perdaman incident management system. ▪ Report sightings of threatened and priority fauna - To submit the report form, email it to fauna@dbca.wa.gov.au
Fencing Construction and Operations: Barb wire fences will not be used on site during or following construction. If the site must be fenced for security, barbed/razor wire should be placed at the base of the fence on the ground and the fence itself must be cyclone mesh.	**FaMP Management Target 8** No death or injury to bats caused by fencing.	**Indicator:** Bats found in fencing. Barb wire fences found onsite. **Method:** Visual inspections of fencing. Monitored through environmental inspections and incident records. Fauna Interaction / sightings / translocation Register (for bat deaths or injuries). License under DBCA for removal of conservation species. **Location:** Project Area perimeter (fenced boundaries). **Timing & Frequency:** Construction Daily inspections of fencing for first 3 months of erection, then weekly. Operations Weekly during operations.	Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Report sightings of threatened and priority fauna - To submit the report form, email it to fauna@dbca.wa.gov.au

Accidental Poisoning Construction and Operations: Avoid using (where practicable) larvicides and adulticides for chemical control of mosquitoes in on-site storage ponds. Avoid using chemical controls for weeds where possible. All toxic and hazardous substances will be stored as per the Hydrocarbons and Hazardous Substances Management Protocol. Spills will be contained immediately upon identification. Waste receptacles are to remain closed and secured at all times.	**FaMP Management Target 9** No evidence of native fauna injury (including poisoning) or death as a result of the Project implementing environmental chemical controls or improper storage.	**Indicator:** Reports of native fauna deaths in storage ponds. **Method:** Visual inspections of storage ponds Monitored through environmental inspections and incident records. Fauna Interaction / sightings / translocation Register (for native fauna deaths or injuries) Review ccompliance with the Pest Management Plan (PCF-PD-EN-PMP). **Location:** Project Area **Timing & Frequency:** Construction Weekly during environmental inspections. As soon as possible following report of injury or death. Operations Weekly during environmental inspections. As soon as possible following report of injury or death.	Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Report sightings of threatened and priority fauna – To submit the report form, email it to fauna@dbca.wa.gov.au
Introduced Fauna Construction and Operations: Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. This will include provisions for: - Waste storage.	**FaMP Management Target 10** No new introduced/ pest species within the Project footprint and in adjacent area as a result of the Project activities (i.e. waste management).	**Indicator:** Increase in introduced fauna sightings onsite. (recorded via camera traps (if being utilised); scats and tracks and visual observations). Increase in conservation significant fauna deaths or injuries from predation of introduced species. **Method:** Reports from the pest management program. Visual inspections of waste areas.	Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Report sightings of threatened and priority fauna - To submit the report

- Bins and skips appropriately sealed and labelled (including possible fencing off of waste receptables). - Personnel are not to feed fauna. - Ensure no pets, traps or firearms are permitted within the site. Predator control (wild dogs (*Canis lupus familiaris)*, feral cats (*Felis catus)*, red foxes (*Vulpes Vulpes)*) has been identified as an absolute priority to minimise the impact of the Project. Initiate a feral fauna trapping and euthanasia program to reduce the number of feral fauna around the site. Develop and implement an introduced predator control program. Liaise with PPA and YACMAC Rangers and participate in existing and/or planned catchment wide pest animal management programs (i.e. Feral Cat control). Develop a Cane Toad Control Program for potential future implementation, where required.		Monitored through environmental inspections and incident records. Site inspection to assess project associated food waste or other waste within or adjacent to Project area not disposed in the demarcated areas. Feral and Pest Animal Register (for pest species sightings and interactions). Review compliance with the Pest Management Plan (PCF-PD-EN-PMP). **Location:** Project Area **Timing & Frequency:** <u>Construction</u> Weekly during clearing and construction. Weekly during environmental inspections. As soon as possible following report of injury or death as result of introduced species. Pest management program conducted annually. <u>Operations</u> Monthly during operations. Weekly during environmental inspections. As soon as possible following report of injury or death as result of introduced species. Pest management program conducted annually.	form, email it to fauna@dbca.wa.gov.au
Vehicle Strike <u>Construction and Operations:</u> Vehicle speeds will be managed on site (including entry and exit points) by enforcing speed limits in construction areas to reduce the potential for vehicle strikes. Vehicle operators must yield right-of-way to fauna, unless unsafe to do so.	**FaMP Management Target 11** No roadkill incident of native fauna.	**Indicator:** Reports of conservation fauna collisions and actions taken. **Method:** Review Incident reports. Visual inspections of roadways and verges. Photographic record of roadkill.	All vertebrate fauna deaths will be entered as an incident in Perdaman's incident management system within 24 hours of being reported by the Environmental Team. Any conservation significant vertebrate fauna deaths and injuries will be reported to the Department of Biodiversity, Conservation and

Non-essential movements onsite will be scheduled for the daylight hours. Fauna Deaths via vehicle strike will be reported. Off-road (4wding) is not permitted. Vehicles are only permitted on approved access and haul roads. Where practicable, prior to commencing vegetation clearing activities, machinery will idle for at least half an hour. Project Induction will include emphasis that native fauna have right of way where safe to do so and the key risk times for vehicle strike (e.g. dusk and dawn) and promoting driver awareness to speed restrictions. Road signage will be installed within the construction and operational areas to raise driver awareness to reduce the potential for vehicle strikes (particularly for slow moving species such as the snakes). Signage identifying conservation significant fauna will be installed along the roads, where they intersect suitable habitat (specifically Drainage Line Habitat; Samphire flats, Hummock grasslands and mid slopes, Rocky Outcrops etc.) Night-time vehicle movements will be restricted where possible to minimise potential vehicle strikes. Roadkill will be removed at least 10 m into surrounding vegetation, when safe to do so, by designated personnel to avoid further strikes of fauna feeding on carcasses		Monitored through environmental inspections and incident records. Fauna Interaction / sightings / translocation Register (for conservation significant fauna deaths or incidents by vehicle strike). **Location:** Project Area **Timing & Frequency:** <u>Construction</u> Ongoing reporting of vehicle collisions with fauna and observations of dead/injured fauna. As soon as possible following report of injury or death. <u>Operations</u> Ongoing reporting of vehicle collisions with fauna and observations of dead/injured fauna. As soon as possible following report of injury or death.	Attractions (DBCA) within one week of being recorded. Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Exceedance of management target – annually in the CAR and the EPBC compliance report.
Lighting <u>Construction and Operations:</u>	**FaMP Management Target 12**	**Indicator:** Reports of conservation fauna incidents relating	Any conservation significant vertebrate fauna deaths and injuries will be reported to the Department of

Lighting will be designed in accordance with AS 4282-1997: Control of Obtrusive Effects of Outdoor Lighting Guidelines. Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe construction and/oroperation, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over. Lighting will be minimum wattage, whilst not compromising safety or OH&S requirements. Lighting being used during construction on temporary and mobile equipment, plant and vehicles will be directed away from sensitive fauna habitats (i.e. Ghost Bat habitat).	Lighting design and orientation must not negatively or adversely impact conservation significant fauna roosting or nesting or cause indirect impacts through disorientation or displacement.	to lighting orientation. Changes to Ghost Bat activity and typical patterns relating to lighting design. Changes to Northern Quoll behaviours **Method:** Review Incident reports. Monitored through weekly environmental inspections and incident records, particularly during night works or where lighting is in heavy use. Fauna Interaction / sightings / translocation Register (for conservation significant fauna deaths or incidents by lighting). **Location:** Project Area **Timing & Frequency:** <u>Construction</u> Ongoing. <u>Operations</u> Ongoing	Biodiversity, Conservation and Attractions (DBCA) within one week of being recorded. Reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.
Noise & Vibration <u>Construction and Operations:</u> Maintain equipment such that all noise emitting equipment is fully serviceable and working to the correct specifications. High noise and vibratory works will be scheduled for hours least likely to affect conservation significant fauna species (If necessary, the EPC will develop construction specific Noise and Vibration Management Plan).	**FaMP Management Target 13** No reports or incident of noise & vibration emissions and orientation negatively or adversely impacting conservation significant fauna roosting or nesting or causing indirect impacts through disorientation or displacement.	**Indicator:** Reports of conservation fauna incidents (deaths, injuries, unusual behaviours) relating to noise and vibration activities. Changes to Ghost Bat activity and typical patterns relating noise and vibration. Changes to Northern Quoll behaviours **Method:** Review Incident reports. Monitored through weekly environmental	Any conservation significant vertebrate fauna deaths and injuries will be reported to the Department of Biodiversity, Conservation and Attractions (DBCA) within one week of being recorded. Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management

Where possible, all non-essential movement will be scheduled to take place during the day. Noisy equipment, plant and activities will be directed away from known fauna locations or habitats.		inspections and incident records. Daily pre-starts of equipment. Fauna Interaction / sightings / translocation Register (for conservation significant fauna deaths or incidents by noise and vibration). Review of maintenance records for noise / vibratory equipment following an incident. **Location:** Project Area **Timing & Frequency:** Construction Ongoing. Operations Ongoing.	target – annually in the CAR and the EPBC compliance report.
Fire Risk Construction: Designated smoking areas will be provided during the Project construction and operations for personnel. During Hot Works, ensure best practice management is utilized – Supervisor to ensure during pre-starts and take-5s that the risks of fire to surrounding vegetation are considered and mitigated as far as practicable. Operations: Implement the Weed Management Plan (PCF-PD-EN-WMP). Implement the Emergency Response Management Plan (PCF-PD-EN-ERMP). Implementation of the Ground Disturbance Permit Procedure (45826-	**FaMP Management Target 14** No record of Project related fires.	**Indicator:** Record of a Project-related fire. **Monitoring:** Review of incident reports for fires. Inspections of the operational integrity (use-by date) and presence of fire response equipment in all applicable locations. Inspections of fire breaks. Inspection of Project area for evidence of fire. Inspections of fire risk material storage areas. Inspection of the water cart equipped for fire suppression purposes. **Locations:** Project area **Timing & Frequency:** Construction	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

HSE-PL-G-1024 & 45826-HSE-TPL-G-1001_GDP) . Implementation of the Hazardous Substance and Dangerous Goods Management Protocol.		Monthly inspections. Inspection following and fire related incidents. <u>Operations</u> Monthly inspections. Inspection following and fire related incidents.	
Weed Species <u>Construction:</u> Implementation of the Ground Disturbance Permit Procedure (45826-HSE-PL-G-1024 & 45826-HSE-TPL-G-1001_GDP). Implement the Erosion, Sediment and Surface Water Management Protocol. All vehicles entering/exiting weed risk areas to be washed down and inspected of weed material. All vehicles entering site to be washed down and inspected of weed material. <u>Operations:</u> Implement the Weed Management Plan (PCF-PD-EN-WMP). Implement **Confirmed** Flora Management Plan (PCF-PD-EN-FMP). Maintenance of the Material Tracking System. All vehicles entering/exiting weed risk areas to be washed down and inspected of weed material. All vehicles entering site to be washed down and inspected of weed material.	**FaMP Management Target 15** No new species of weeds recorded within the development envelope and specifically within fauna habitats (Rocky Outcrops, Hummock Grasslands on Mid-slopes, Samphire Shrublands / Supratidal flats, Drainage Lines).	**Indicator:** Area of weed infestation in the Project Area. **Monitoring:** Visual Inspection of selected indicators. Site walkover to assess distribution, and abundance of weed species. Inspections of stockpiles. Weed Inspection Hygiene Forms in all vehicles to be maintained and monitored. Ongoing by all staff during construction and operation activities in areas of disturbed ground. **Locations:** Project area **Timing & Frequency:** <u>Construction</u> Site walkover annually in spring following commencement of construction. Weekly stockpile and hygiene form review and inspections. Ongoing. <u>Operations</u> Site walkover annually in spring following commencement of operations. Weekly stockpile and hygiene form review and inspections. Ongoing.	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

Pilbara Olive Python	**FaMP Management Target 16** Managed through implementation of Threatened Species Management Plan (PCF-PD-EN-TSMP)		
Ghost Bat	**FaMP Management Target 17** Managed through implementation of Threatened Species Management Plan (PCF-PD-EN-TSMP)		
Northern Quoll	**FaMP Management Target 18** Managed through implementation of Threatened Species Management Plan (PCF-PD-EN-TSMP)		
Providing habitat <u>Construction:</u> Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by conservation fauna (including potential SRE species) following clearing. Construction of the processing facility on the slopes of Site C and F will require significant cut and fill to bring levels up. The scheduling for materials dumped to fill could be manipulated to ensure large boulders are utilized. Ensure large boulders are grouped as conglomerates around the periphery of	**FaMP Management Target 19** Salvage and reuse habitat elements across the Project (i.e., hollow logs, rocky outcrops) where practicable.	**Indicator:** Records of Construction program including habitat provisions. Pre-clearance survey % groundcover. **Monitoring:** Visual Inspection of selected indicators. Rehabilitation Plans and procedures. Construction program. **Locations:** Fauna Habitat **Timing & Frequency:**	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

the retaining batters to offer potential cave and crevice habitat for the Pilbara Olive Python contributing to the availability of secure refuge in the local area. Operations: Applicable when area of site completes its operational purpose, decommissioning and requires rehabilitation.		Construction Throughout construction and clearing activities. Operations Upon completion of the purpose for an area due for rehabilitation and decommissioning.	
Erosion & Sediment Control Construction and Operations: Implement the Confirmed Surface Water Management Plan (PCF-PD -EN-SWMP). Implement appropriate control to reduce or rectify impact from visible signs of erosion. Where required, re-educate personnel on the importance of erosion management. Revise and update risk assessment and management actions where applicable	**FaMP Management Target 20** No erosion or deposition of sediment within the surface water courses beyond natural fluctuations.	**Indicator:** Evidence of erosion and sedimentation on site and particularly around fauna habitats. **Monitoring:** Visual Inspection of selected indicators. Investigate the cause. Ensure erosion control measures are being implemented and are appropriate. Weekly environmental inspections Inspections as per Confirmed Surface Water Management Plan (PCF-PD -EN-SWMP). **Locations:** Fauna Habitat and within the development envelope. **Timing & Frequency:** Construction Weekly. Opportunistically and following heavy rain events and strong winds. Operations Weekly. Opportunistically and following heavy rain events and strong winds.	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

Habitat Connectivity & Hydrological Regimes to Fauna Habitat values. <u>Construction:</u> Installation of arch shaped culverts to prevent tidal water flows being impeded within the King Bay / Hearson Cove supratidal to intertidal flat area and allow fauna to pass through safely. Ensure that Culvert outflow velocities of less than 1.0 m/s. <u>Operations:</u> The causeway (between sites C and F) on the tidal flats will contain large culverts to maintain hydrological and tidal flows and allow fauna, including migratory bird species to freely move through the structure and utilise the Samphire Shrublands/ Supratidal Flats habitat.	**FaMP Management Target 21** Construct the causeway so that it does not impede fauna movement (including the potentially occurring migratory bird species) through the Samphire Shrublands / Supratidal flats habitat type and so that the tidal and surface water flows are not altered in a manner that will adversely impact the habitat and the associated fauna species that are dependent on Samphire Shrublands / Supratidal flats habitat.	**Indicators:** Visual evidence that surface water and tidal flows are unimpacted through the causeway culverts. Evidence of increased inundation levels and/or periods of inundation in the intertidal flats area. Samphire shrublands / Supratidal Flats habitat (i.e. spatial distribution and health of vegetation located on tidal flats) are in stress. Evidence of any significant erosion, sedimentation and deposition. Evidence of trapped fauna and/or fauna fatalities, including migratory bird species within structure, at the outlets or inlet of culverts or along causeway. **Monitoring:** Weekly inspections during construction of causeway to monitor fauna deaths, injuries or entrapment. Weekly inspections during construction of causeway to visually monitor tidal exchange and surface water runoff is not being impacted adversely during the construction activities (i.e. evidence of erosion or sedimentation, vegetation deaths or stress, altered inundation levels). Visual Inspection of selected indicators weekly during construction. Visual Inspection of selected indicators quarterly during operations or on a as needs basis following rain, flood or unusual tide patterns.	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report. Reporting of fauna deaths in the Fauna Interaction / sightings / translocation Register.

		Investigate the cause. Ensure culvert design is effectively facilitating tidal exchange and surface water runoff flows (i.e. inspection following high tide event, rain event and flood/potential flood event). Inspections as per Confirmed Surface Water Management Plan (PCF-PD -EN-SWMP). **Locations:** The causeway (between sites C and F) – Samphire Shrublands / Supratidal flats habitat. **Timing & Frequency:** <u>Construction:</u> Throughout construction and clearing activities. Throughout the construction of causeway construction (weekly monitoring). Opportunistically and following heavy rain events and strong winds. <u>Operations:</u> Monitoring indicators during operations quarterly. Opportunistically and following heavy rain events and strong winds.	
SRE species Management <u>Construction and Operation:</u> Do not disturb P1 PEC rock piles to protect SRE species. Restrict access to habitats hosting SRE populations outside the clearing boundary. Ensure SRE habitat types and associated species are communicated to	**FaMP Management Target 22** Disturbance to populations of SRE species is to be minimised during construction, operations and decommissioning.	**Indicator:** SRE population decline, noticeable deaths during monitoring events. **Method:** Weekly environmental inspections Daily inspections during clearing Inspections following rain events Records of deaths in register. Determine the cause for loss of microhabitat elements. Use GIS to determine the extent of the impacted area as potential SRE habitat.	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

personnel during training and inductions. Provide awareness of risks associated with SRE species and their habitat.		Survey (site walkover) the area for damaged / disturbed microhabitat elements and determine the extent of the SRE distribution potentially impacted. **Location:** Project site, particularly SRE Fauna habitat (i.e. Rocky outcrops, drainage lines). **Timing & Frequency:** Construction: Throughout construction activities clearing activities and ground disturbance. Operations: Inspection of P1 PEC rock piles and evidence of disturbance.	
Dust management Construction and Operations: Manage dust during clearing and ground disturbing works, as well as transportation of Urea and other materials through the Air Quality and Dust Management Protocol and Construction Environmental Management Plan (CEMP) (0000-ZA-E-09071). Where required implement further dust controls to protect Dust deposition and smothering of burrows, crevices and small spaces where SRE's take refuge.	**FaMP Management Target 23** No evidence during monitoring that SRE species have been adversely impacted by Project attributable activities.	**Indicator:** SRE population decline, noticeable deaths during monitoring. Dust deposits in SRE Species habitat. **Method:** Weekly environmental inspections Daily inspections during clearing Inspections following rain events Records of deaths in register. **Location:** Project site, particularly SRE Fauna habitat **Timing & Frequency:** Construction: Ongoing throughout construction.	Incidents reported through Monthly Project Environmental Reporting Reporting on the review and revision of management actions – annually in the CAR and the EPBC compliance report. Performance against management target – annually in the CAR and the EPBC compliance report.

		Operations: Ongoing throughout operations	

7.3 Pre-clearance survey

Animal Plant Mineral (APM) was engaged to carry out desktop and field surveys of terrestrial flora and fauna. The survey is provided in Attachment B of the Threatened Species Management Plan (PCF-PD-EN-TSMP).

The aims of the desktop survey were to:

- Establish the fauna assemblage previously determined for the site and the region;
- Identify species previously determined as present on site including Threatened and Priority Fauna under the provisions of the BC Act and EPBC Act);
- Identify species previously determined as present on site regarded as being “significant” at both local and regional scales;
- Identify habitat types previously determined as present on site regarded as being “significant” at both local and regional scales; and
- Identify introduced species previously determined as present on site.

The desktop study included database searches, including:

- Australian Government Protected Matters Search Tool (DCCEEW)
- Atlas of Living Australia
- NatureMap (DBCA)
- Threatened Fauna Database (DBCA)
- Review of existing fauna surveys and investigations within the Burrup Peninsula and Surrounds Relevant to Project Ceres.

Trace Archaeology and Ecology (Trace) carried out a Supplementary Baseline Flora and Vegetation Survey in March 2023 (Trace, 2023) to establish baseline data consistent with the requirements of the Perdaman management plans and to confirm the findings of the APM (2019) survey. The Trace (2023) survey is provided with the revised Confirmed Flora Management Plan (PCF-PC-EN-FMP).

The survey included an assessment of vegetation condition, weeds and verification of locations of stockpiles for soil and vegetation. As these environmental factors have been identified as risks to native fauna, and mitigated through management actions provided in Sections 7.1 and 7.2, this supplementary baseline survey contributes to the status of environmental values prior to disturbance.

Key monitoring and reporting requirements prior to construction relate to the identification and avoidance of impacts to habitat, habitat features, native fauna and weed species. The Trace (2023) survey revisited and assessed the 34 retained monitoring sites residing outside of Project Ceres clearing boundaries. The weed species across Project Ceres clearing area were assessed by surveying weeds present 10 meters either side of the transect lines, where the transects line were approximately 100 meters apart. Where weed species were present, the density and size of the populations were recorded spatially. Where it was not possible to record individual weed points due to the population extent, the weed populations were recorded using polygons.

7.4 Environmental Monitoring

Perdaman shall conduct regular inspections and audits of the Project’s work sites and undertake monitoring of specific environmental aspects and impacts. Additionally, Perdaman shall conduct monitoring to assess whether the management actions are effective against the environmental objectives for terrestrial fauna, flora and vegetation (specific to habitat) and inland waters (specific to water quality).

All non-conformances identified will be managed through the Project’s non-conformance management process outlined in Section 7.5.

The guiding objectives of the Projects monitoring program include:

- Measure adverse impacts of activities during construction and operations on native habitat within the sites and areas under Perdaman’s controls.
- Monitor and measure success of the management measures implemented to ensure clearing extents (of habitat values) specified in Condition 5-1 are achieved.
- Monitor and measure compliance with trigger and threshold criterion and document the instances of exceedance (if any).

- Monitor and measure the success of management measures to inform an adaptive management approach (refer to Section 11).
- Identify if habitat changes are impacting or threatening to impact the species identified.
- Determine if changes to habitat within the areas and sites Perdaman has control over are as a direct or indirect result of Perdaman activities during construction and operations.

Operational monitoring will be informed by findings of the monitoring program implemented by Perdaman as the data becomes available and the exceedances in outcomes (if any). These findings may lead to ongoing changes and refinements of this FaMP and its associated management actions and measures to ensure adaptive management is applied. The following Sections detail the monitoring activities and reporting requirements for the Project.

7.4.1 Fauna Monitoring Trigger & Threshold Levels

The purpose of monitoring is to assess performance, collate data and evidence. Monitoring results will be recorded/reported and used to determine the effectiveness of this Plan and if the outcomes are or are not being achieved.

The overall objective of the monitoring Program implemented by Perdaman is to measure performance against the environmental outcomes and whether trigger level actions or threshold contingency actions need to be implemented. Triggers and Threshold criterion associated monitoring is detailed in Table 7-1 and monitoring related to environmental objectives is detailed in Table 7-2.

Perdaman is to submit to the CEO of the EPA the first Compliance Assessment Report (CAR) fifteen (15) months from the date of issue of MS 1180, with additional CAR's required annually from the date of submission of the first CAR, as required by Condition 15-6 of MS 1180. These reports will demonstrate compliance with the applicable ministerial Conditions through reporting the monitoring results in comparison to the established trigger and threshold criteria. This will assist to identify non-compliances and describe the corrective and preventative actions to be taken to maintain compliance.

The CAR shall be provided as per direction given in the Compliance Assessment Plan (CAP) (PCF-PD-EN-CAP), which is to be submitted to the CEO at least 6 months prior to the first CAR or prior to ground disturbing activities; whichever is sooner.

7.4.1.1 Triggers & Threshold Criteria

The magnitude of change for outcome-based provisions is assessed via the use of trigger and threshold Criteria. Trigger and Threshold Criteria, along with the associated management action/contingency actions have been summarised in Section 7.1. Table 7-1 additionally provides the respective monitoring and reporting requirements for each trigger and threshold.

The trigger criteria are set at levels to forewarn of the approach of the threshold criteria and trigger response actions and are set at a conservative level to ensure trigger level actions can be implemented well in advance of the environmental outcome being compromised.

Threshold criteria represent the limit of acceptable impact beyond which there is likely to be significant impact on the environment. Exceedance of the threshold criteria signals the environmental outcome is not being met, implies non-compliance and requires threshold contingency management measures to be implemented.

7.4.1.2 Trigger Level Actions

Where a trigger and threshold criteria are exceeded and the associated management/or contingency actions implemented, Perdaman will record and investigate the cause including a review of the associated fauna outcomes, sampling and collection of data methods, equipment calibration and documentation to confirm or dismiss the trigger level exceedance.

Review will also include a gap analysis of current early response actions, trigger response actions and threshold contingency actions to identify non-compliances and where necessary any additional actions that may be required to minimise risk of further exceedance.

Any exceedance of a trigger level will trigger a review of the **Confirmed Fauna Management Plan** (PCF-PD-EN-FMP) outcomes and management-based provisions to determine any correlation.

Where the above confirms trigger level exceedance is present an Investigation which aims to determine the following will be carried out:

- Determine the cause of the exceedance (i.e. Ground Disturbance Permit provided to clearing contractor did not specify clearing limit/boundary of fauna habitats; pre-clearance survey not conducted).

- Cause and Effect, particularly with respect to construction and or operational related causes versus external causes (i.e. cyclone).
- Rate of Change (i.e. risk of a threshold exceedance).

Responses are then based on the outcome of the investigation and the risk of the threshold being exceeded. If risk of exceedance is low, monitoring of appropriate variables at an increased frequency is to be implemented. If risk of exceedance is moderate or above, appropriate contingency management measures are to be implemented to arrest the decline in conjunction with an increase in monitoring frequency of appropriate variables.

An appropriate management response will be determined and will enable exceedances of trigger levels to be reduced back to acceptable levels within a reasonable timeframe.

The most appropriate management measure will be implemented dependent on the cause and the severity of the impact. Ongoing monitoring of the effectiveness of the trigger level contingency management measures will be undertaken to ascertain if the adopted measure/s are effective in mitigating impacts to the affected area, and if further investigations and/or management measures are required to arrest the impact.

Results shall be provided as information for the CEO (EPA) to determine potential environmental harm or alteration of the environment that occurred due to any threshold criteria being exceeded on the Proposal.

In instances where thresholds and triggers are exceeded the event will be recorded as an incident as per Section 13.2 and Figure 13-1 in the PEMP and as reiterated within Section 10.1 of this Plan. If Threshold criteria are found to be exceeded this shall be considered an incident of Major classification. Where a Trigger Criteria is not detected prior the exceedance of Threshold criteria it will automatically be recorded as an incident also.

7.4.1.3 Threshold Level Actions

If the threshold level is exceeded, then additional management measures will be undertaken. Threshold level contingency management measures may include a combination of actions, and this will be dependent on the location of the impact identified through the monitoring program. The most appropriate management measure will be implemented dependent on the cause and the severity of the impact.

7.4.2 Monitoring Fauna Management Targets

The magnitude of change for management-based provisions is assessed via management targets. Management Targets are focussed on the retention of native vegetation that is suitable for native fauna habitat and minimising the direct and indirect impacts to the Northern Quoll, Pilbara Olive Python and the Ghost Bat, and are outlined in Table 7-2.

7.4.3 Monitoring Fauna Management Actions

In the event a management action for terrestrial fauna aspects is not implemented and or met, the Perdaman Environment & Heritage Management will be notified immediately with all relevant information. All reasonable actions to implement the management action will be undertaken to rectify the non-compliance.

If a management action requires adjustment following evaluation of monitoring data, review of assumptions and uncertainties, re-evaluation of risk assessment, increased understanding of the environmental setting, or changes to the proposal scope or technology, Perdaman must seek formal approval from the EPA and DCCEEW and may require consultation with MAC as per Condition 5-8 of MS1180 if the plan is reviewed and updated on account of these changes.

7.4.4 Environmental Inspections

Perdaman shall undertake weekly environmental inspections of all Project work areas and activities of their Project Personnel.

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.

7.4.5 Environmental Audits

Perdaman shall conduct annual 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 and supporting sub-plans have 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; and
- 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.

7.5 Submission and Publication of Management Plan

In accordance with Condition 16 of MS 1180, and subject to condition 16-2, for the remainder of the life of the proposal, Perdaman shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

If any data referred to in condition 16-1 contains particulars of:

(1) a secret formula or process; or

(2) confidential commercially sensitive information;

> the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.

8 Training and Awareness

All Project personnel shall be aware of and competent to implement the environmental requirements of the FaMP 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.

8.1 Project Inductions

Prior to commencing any work on site, all personnel working on Project Ceres will undertake an environmental induction which will include Project Ceres's aspects, impacts and mitigations for the protection of threatened species. The environmental induction developed by Perdaman, will be delivered to personnel by the Environmental Representative, or delegated person, and shall 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 threatened fauna species and reporting requirements (sightings andinjuries);
- 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 e.g.: Port related aspects and impacts.

8.2 Training Records

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

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

8.3 Ground Disturbance Permits

A Ground Disturbance Permit (GDP) is a permit issued by Perdaman for enabling works within defined battery limits, which have the potential to impact native vegetation, fauna, heritage or other environmentally sensitive values.

The GDP provides Project Ceres personnel responsible for managing the ground disturbing activities with a summary of the key approval commitments and obligations obtained by or issued to Perdaman by regulators, tenure holders and other third parties.

Activities covered in the GDP 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 through a standalone process or included in an overall approval to work procedure developed for Project Ceres.

It is the responsibility of all project Personnel to ensure they submit to Perdaman an application form requesting a GDP at least two weeks prior to requiring access to the area being the subject of the GDP.

9 Non-Conformance and Incident Management

9.1 Environmental Incident Response

An environmental incident on Project Ceres that could impact native fauna, is any situation where 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 solidmaterial.
- Clearing or grubbing vegetation outside an approved area.
- Release of gas or vapours to atmosphere.
- Injury or death of fauna.
- Introducing weed contaminated soil or vegetation into uninfected areas.
- Erosion or deposition of sediment outside Project Ceres's battery limits.
- Any uncontrolled fire.
- Uncovering naturally occurring hazardous or contaminating materials such as acid sulphate soils.
- Excessive dust generation.
- Excessive noise emissions.
- Wastes not being stored, managed or disposed of appropriately.

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 9-1 below will be followed by all Project personnel if an environmental incident occurs.

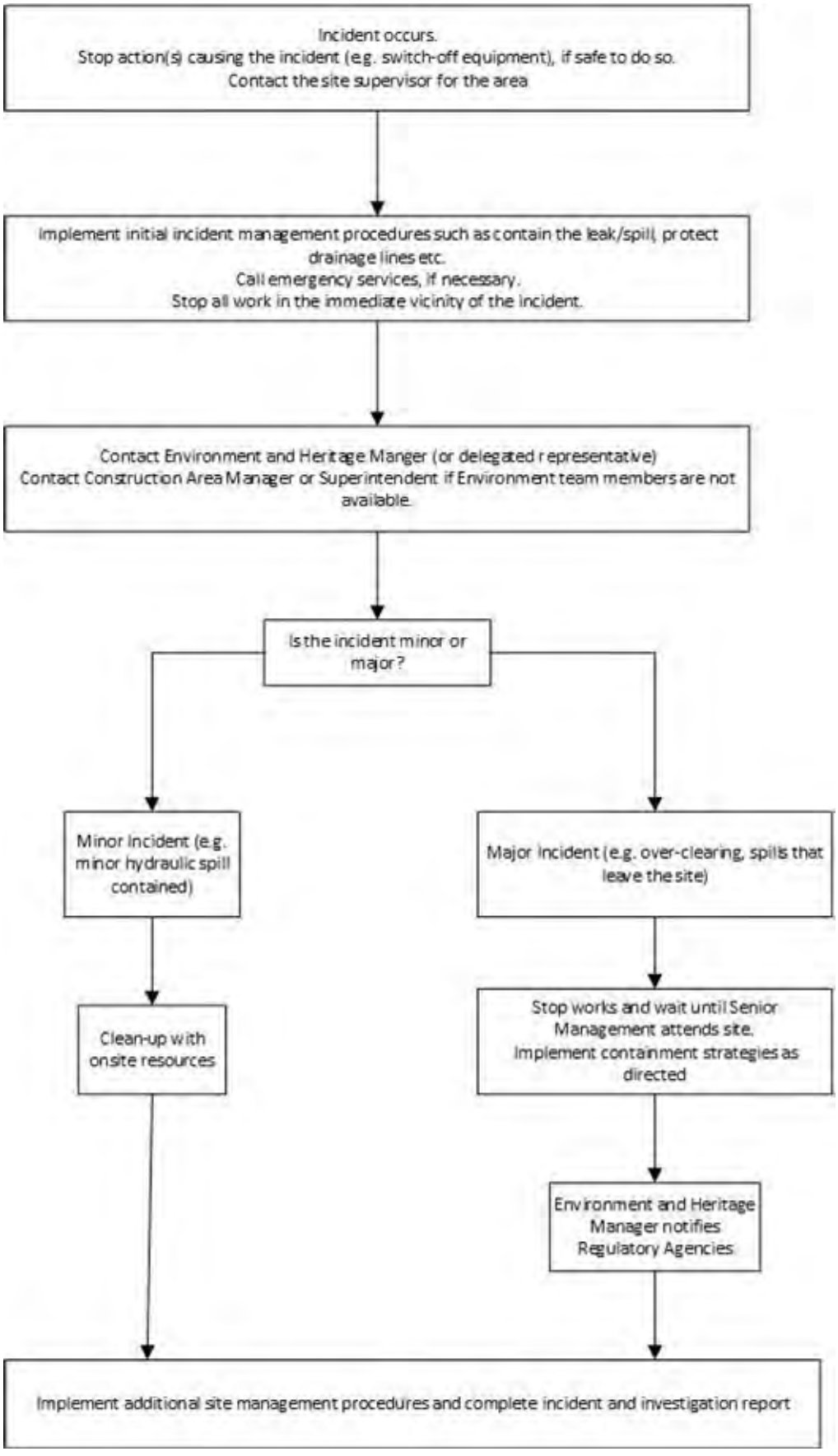

Figure 9-1 Flow Chart for Environmental Incident Response

9.2 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 Project Ceres Director of the incident, and actions taken to mitigate impact to the environment. Reporting to Project Ceres 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 Project Ceres 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 Project Ceres 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.

Section 7 includes management actions, where failure to comply with that action constitutes an incident. Where this occurs, these incidents are to be reported in writing to the CEO and DCCEEW as soon as practicable and no later than seven business days after becoming aware of the incident, in accordance with Condition 5-6 of MS 1180.

9.3 Non-Conformance Management

In the event that the environmental outcomes specified in Conditions 5-1 of MS 1180 are exceeded, or monitoring or investigations at any time indicate an exceedance of threshold criteria specified in this plan, the following actions will be taken in accordance with Condition 5-6 MS 1180:

1. Exceedance to be reported in writing to the CEO of the EPA and the Department of Agriculture, Water and the Environment (DAWE) (now Department of Climate Change, the Environment, Energy and Water, DCCEEW) within 7 days of the exceedance being identified;
2. Implement the management and/or contingency actions specified in Section within 7 days of the exceedances being reported in accordance with Item 1, and continue implementation of those actions until the CEO of the EPA has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and implementation of the management and/or contingency actions are no longer required;
3. Investigate to determine the cause of the threshold criteria being exceeded;
4. Investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded;
5. Provide a further report to the CEO of EPA and the DCCEEW within 21 days of the exceedance being reported as required by Item 1 which report shall include:
    a. details of management and/or contingency actions implemented;
    b. the effectiveness of the management and/or contingency actions implemented against the threshold criteria;
    c. the findings of the investigations required by Item 3 and Item 4;
    d. measures to prevent the threshold criteria being exceeded in the future;
    e. measures to prevent, control or abate the environmental harm which may have occurred; and
    f. justification of the threshold criteria remaining, or being adjusted based on better understanding, demonstrating that outcomes will continue to be met.

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 shall be maintained on site by Perdaman and shall record all corrective actions identified and implemented, including review of corrective actions and close out details. The close out details shall 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.

9.4 Emergency Management

Project Ceres's PCF-PD-PN-ERMP Emergency Response Management Plan shall be implemented, addressing health, safety and environmental 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.

10 Environmental Reporting and Compliance Requirements

10.1 Environmental Reporting

In addition to incident reporting and non-conformance reporting, Perdaman is responsible for the preparation of overall Project related environmental reports including compiling data from monitoring programs.

Perdaman will compile monitoring data and relevant environmental information on a monthly basis.

Perdaman will report to the CEO and DCCEEW, on the implementation of this FaMP as part of compliance reporting and must be in strict accordance with Project Ceres's approval conditions.

Reporting to DBCA will occur for the following aspects:

- Injured or deceased threatened, extinct or specially protected fauna under the Biodiversity Conservation Act 2016. Reported in accordance with BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358, Condition 2 (no conditioned timeframe).
    - Contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of such fauna must be included in the fauna taking return as required under the licence.
- Create, compile and maintain records and information as required by the licence of all fauna relocation activities as they occur. Reported in accordance with BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358, Condition 5, prior to the expiry of the licence.
    - A DBCA approved "Return of Fauna Relocated" must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au).

Consistent with standard document control procedures, Perdaman will maintain copies of all reports submittedto DCCEEW, the CEO and DBCA.

A series of registers relevant to fauna management practices will be maintained throughout thelife of Project Ceres. These are listed below:

- Fauna Interaction Register – this includes: all fauna sightings records, including conservation significant fauna, feral and pest animals, records of injuries and mortality, location, species identification, fate of animal, etc. The register also creates notifications to relevant personnel to ensure reporting is consistent with regulatory approvals, and to the Perdaman Environment and Heritage Manager.
- Training records
- Environmental incident register - record and monitor all environmental incidents within Project Ceres.

The reporting and relevant compliance to be conducted for this FaMP is identified in Table 10-1.

Table 10-1 Reporting Requirements

Aspect	Compliance Requirement	Responsibility	Authority	Timing	Actions to be taken
Exceedance of environmental outcomes in condition 5-1	MS 1180 Condition 5-6	Environment and Heritage Manager	CEO DCCEEW	Report the exceedance within seven days of the exceedance being identified	Comply with conditions 5-6 (1) to (5) and 15-5 of MS 1180
Monitoring or investigations at any time indicate an exceedance of threshold criteria specified in the Confirmed Fauna Management Plan	MS 1180 Condition 5-6	Environment and Heritage Manager	CEO DCCEEW	Report the exceedance within seven days of the exceedance being identified	Comply with conditions 5-6 (1) to (5) and 15-5 of MS 1180
Failure to implement one or more management and/or contingency actions, if the relevant threshold criteria have been exceeded	MS 1180 Condition 5-7	Environment and Heritage Manager	CEO DCCEEW	Report the exceedance within seven days of the exceedance being identified	Comply with conditions 5-6 (1) to (5) and 15-5 of MS 1180
Exceedance of a threshold criteria (regardless of whether the relevant management and/or contingency actions have been or are being implemented)	MS 1180 Condition 5-7	Environment and Heritage Manager	CEO DCCEEW	Report the exceedance within seven days of the exceedance being identified	Comply with conditions 5-6 (1) to (5) and 15-5 of MS 1180
Failure to comply with the requirements of the Confirmed Fauna Management Plan	MS 1180 Condition 5-7	Environment and Heritage Manager	CEO	Report the exceedance within seven days of the exceedance being identified	Comply with conditions 5-6 (1) to (5) and 15-5 of MS 1180
Review and revise the Confirmed Fauna Management Plan	MS 1180 Condition 5-8	Environment and Heritage Manager	MAC CEO DCCEEW	Submit upon finalisation	Consult with MAC Comply with condition 5-8 (1) of MS 1180
Review and revise the Confirmed Fauna Management Plan as and when directed by the CEO	MS 1180 Condition 5-8	Environment and Heritage Manager	MAC CEO DCCEEW	Submit upon finalisation	Consult with MAC Comply with condition 5-8 (2) of MS 1180
Submit an Environmental Performance Report to the	MS 1180 Condition 12-1	Environment and Heritage Manager	MAC Minister for	Every 5 years. The first report to be	Comply with conditions 12-3, 12-4 and 12-5 of MS 1180

Aspect	Compliance Requirement	Responsibility	Authority	Timing	Actions to be taken
Minister and the Murujuga Aboriginal Corporation			Environment (WA)	submitted within three months of the expiry of the five year period commencing from the first date of Ground Disturbing Activities, or such other time as may be approved by the CEO	
Assess compliance with conditions in accordance with the Confirmed Compliance Assessment Plan (PCF-PD-EN-CAP) and prepare Compliance Assessment Report	MS 1180 Condition 15-3	Environment and Heritage Manager	CEO EPA	The first Compliance Assessment Report due fifteen months from the date of issue of MS 1180 addressing the twelve month period from the date of issue of MS 1180 and then annually from the date of submission of the first Compliance Assessment Report, or at another time agreed in writing by the CEO.	Comply with condition 15-7 (1) to (5) of MS 1180
Injured or deceased threatened, extinct or specially protected fauna under the *Biodiversity Conservation Act 2016*	BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358 Condition 2	Contractor	DBCA	As soon as practicable (no conditioned timeframe).	Contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of such fauna must be included in the fauna taking return as required under the licence.
Create, compile and maintain records and information as required by the licence of all fauna relocation activities as they occur.	BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358 Condition 5	Contractor	DBCA	Prior to the expiry of the licence.	A DBCA approved “Return of Fauna Relocated” must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au)

10.2 Ministerial Statement 1180 Compliance Assessment Report

Perdaman is to submit to the CEO of the EPA a Compliance Assessment Report (CAR) annually in accordance with Condition 15 of MS 1180. The CAR is to be prepared in accordance with the Confirmed Compliance Assessment Plan (PCF-PD-EN-CAP).

The first CAR is to be submitted fifteen months from the date of issue of MS 1180. The Statement was issued on 24 January 2022. Therefore, the first CAR was due 24 June 2023. CAR's are required annually from the date of submission of the first CAR, therefore, by 24 June, each year.

The CAR demonstrates Perdaman's compliance with MS 1180 through reporting the monitoring results in comparison to the established trigger and threshold criteria. This will help to identify non-compliances and describe the corrective and preventative actions to be taken to maintain compliance.

In accordance with Condition 15-7 of MS 1180, each CAR shall:

1. be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
2. include a statement as to whether the proponent has complied with the Conditions;
3. identify all potential non-compliances and describe corrective and preventative actions taken;
4. be made publicly available in accordance with the approved Compliance Assessment Plan; and
5. indicate any proposed changes to the Compliance Assessment Plan required by Condition 15-2.

Where the outcome of objective is not met and the trigger / threshold criteria are exceeded during the reporting period, the CAR shall include a description of revised management actions / contingency actions to be implemented to achieve the outcome and objectives during the next reporting period. All changes to management actions will require review and approval by the CEO.

10.3 Ministerial Statement 1180 Environmental Performance Report

Perdaman is to submit Environmental Performance Report (EPR) to the Western Australian Minister for Environment and MAC every five years in accordance with Condition 12 of MS 1180.

The first report is to be submitted within three months of the expiry of the five-year period commencing from the first date of Ground Disturbing Activities or another time approved by the CEO. Ground Disturbing Activities commenced on 11 July 2023 by Main Roads WA for the development of Hearson's Cove Road. Therefore, the first report is due no later than 11 October 2028.

Relative to fauna, the Environmental Performance Report shall report on the following:

- State of fauna habitat (Rocky Outcrops, Hummock Grasslands, Samphire Shrublands and Drainage Lines)
- Feral animal sightings
- Fauna deaths and injuries / incidents
- The presence or death of threatened species and conservation significant species
- State of groundwater
- State of surface Water

The report shall include a comparison of those values mentioned above at the end of the five-year period against the state of each value at the beginning of the five-year period. Also, a comparison of the environmental values identified above at the end of the five-year period; against the state of the environmental values identified in first Environmental Performance Report submitted in accordance with Condition 12-2. In addition, the report will include the proposed Adaptive Management and continuous improvement strategies.

10.4 BC Regulation 28 Fauna Taking (Relocation) Licence FR28000358

As stipulated in Table 10-1, reporting to DBCA is required under the following circumstances:

- Licence FR28000358 condition 2: Any inadvertently captured species of fauna which is listed as threatened, extinct or specially protected (*Biodiversity Conservation Act 2016*), and is injured or deceased, the licence holder shall contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of such fauna must be included in the fauna taking return as required under this licence.
- Licence FR28000358 condition 5: The licence holder must create, compile and maintain records and information as required in a DBCA approved "Return of Fauna Relocated" of all fauna

relocation activities as they occur.

- Licence FR28000358 condition 6: A DBCA approved “Return of Fauna Relocated” must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the expiry of this licence.

The “Return of Fauna Relocated” data must include the following information:

- Location
- Site
- Datum
- Latitude
- Longitude
- Zone
- Easting
- Northing
- Accuracy
- Date
- Name ID
- Species name
- Common name
- Species group
- Count
- Identifier
- Certainty
- Method
- Fate
- Samples
- Marking
- Transmitter
- Voucher ref

This data is captured through the Fauna Interaction Register.

11 Stakeholder Consultation

The Confirmed Fauna Management Plan was prepared in consultation with Murujuga Aboriginal Corporation (MAC) in accordance with Condition 5-3 of MS 1180. Reviews and revision of the FaMP will be done in consultation with MAC, with submissions to be sent to the CEO, DCCEEW and DBCA.

Perdaman shall provide for the relevant traditional owners to be invited to observe any Ground Disturbing Activities and during construction activities and take reasonable steps to facilitate the observation of those activities by those persons.

Additionally, Perdaman have carried out stakeholder consultation with other key stakeholders. The most recent consultations with the Murujuga Aboriginal Corporation are included as Attachment C and Attachment D of this plan.

Table 11-1 Stakeholder Consultation Register

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Proponent Response
31 Jan 2022	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	Presentation / Meeting / Endorsement of CHMP	Presentation of the salvage and relocation proposal for the CHMP (Cultural Heritage Management Plan).	Endorsement of the amended CHMP and of the salvage and relocation methodology.
24 Jan 2022	Murujuga Aboriginal Corporation (MAC)	Site visit/ Presentation	MAC Board • Presentation of key aspects of this amended Surface Water Management Plan for discussion. • Opportunities • Potential challenges and solutions.	None Required.
2019 & 2020 (Various times during this period)	Hon. Alannah Mac Tiernan	Presentation / Meeting	Project update including: • Community stakeholder consultation & feedback • Environmental Impact Assessment • Common-user infrastructure • Social benefits • Employment opportunities • Training opportunities	• Details discussed including potential social and economic benefits • Commercial arrangements with PPA and Water Corporation
January 2020	MAC	In principle Endorsement of Heritage Charter	Overarching Perdaman Project Destiny Overarching Position for Heritage Interaction and management, including Rock Art and Murujuga.	In principle (subject to final Part IV approval of Project) endorsement of Proponent commitment to its overarching position which will underpin Aboriginal Heritage Management Plans, protocols and actions for life of the Project
November & December 2019	Hon. Mark McGowen, Premier	Presentation / Meeting	Project update including • Community stakeholder consultation & feedback • Social benefits • Employment opportunities • Training opportunities	• Details discussed including potential social and economic benefits • Commercial arrangements with PPA and Water Corporation

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Proponent Response
			• Environmental Impact Assessment • Common-user Infrastructure	
November 2019	Hon. Ben Morton, Assistant Minister to the Prime Minister and Cabinet	Presentation / Meeting	Project update including • Community stakeholder consultation & feedback • Social benefits • Employment opportunities • Training opportunities • Environmental Impact Assessment • Common-user Infrastructure	• Details discussed including potential social and economic benefits • Commercial arrangements with State GTEs and common-user infrastructure requirements
27 November 2019	MAC	Agreement Signing	Signing of Commercial Agreement, transformative opportunities	Agreement on mutual support for future aspirations of both parties
14 October 2019	Kevin Michel MLA, Karratha	Briefing	• Update on the Environmental Impact Assessment • Update on liaison with other community stakeholders	Details discussed
14 October 2019	City of Karratha, PDC	Meeting	• Update on the Environmental Impact Assessment • Discussions about the housing strategy, City of Karratha is supportive of a strategy that will provide long-term benefits to the community	Details discussed • Accommodations for the Project will be integrated to the local community rather than building isolated camps
14 October 2019	Circle of Elders	Presentation / Meeting	• Access to the meeting site in the south-west corner to Site F • Location of the proposed infrastructure on site • Transformative opportunities	• The fence that will be installed aims at preventing site workers to access the cultural site and will not block access for the Traditional Owners (TO) • Refer to Figures in Appendix A of the ERD Commercial Agreement to be signed with MAC
14 October 2019	MAC	Workshop	• Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent
September 2019	Hon. Ben Wyatt, Treasure	Presentation / Meeting	• Update on Project including the Environmental Impact Assessment	Details discussed including potential social and economic benefits
20 September 2019	MAC & Advisors	Meeting	• Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent
4 September 2019	MAC & Advisors	Meeting	• Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Proponent Response
June-August 2019	Pilbara Ports Authority (PPS)	Online form, letter	• Panamax size vessels • Capacity of the shed at the Port	• The Proponent will be using high tides to access the berth Storage capacity at the port changed to 65,000 tonnes
05 July 2019	MAC	Presentation / Meeting	• Assessment timeline clarification • Plant design	• The Proponent provided clarification regarding the environmental approval processes • The Proponent provided an update on the plant design MAC advised that they support the draft ESD and confirmed the Project aligns with their core objectives (ref. email to the EPA of the 8thJuly 2019)
June 2019	Karratha, Roebourne, Dampier and Wickham Community	Information booths, online form	• Project timeline • Employment opportunities	Refer to Section 2.3.7 of the ERD.
16 May 2019	Pilbara Development Corporation(PDC)	Meeting	• PDC indicated a preference for flexible working hours for employees so they can pursue activities/sports • Visual amenity	• The Proponent is committing to give the opportunity to all employees to request flexibility to pursue nominated activities/hobbies/sports. Refer to Section 4.9.5 (ERD)
16 May 2019	NYFL	Presentation / workshop	• Approach to monitoring and detriment to rock art • NYFL Chairman requested information about continuous access for Aboriginal people to NHL area thought to be associated with “Fish Thalu” site within the boundary of site F • Any changes to the access to Ngajarlias a result of Hearson Cove Road realignment • Access to the meeting site in the south-west corner of site F • Visual aspects and opportunities	• The Proponent worked with Woodside to obtain a comprehensive regional airshed model (Section 4.8.5 and Appendix D). An Air Quality Management Plan and Heritage Management Plan have been developed (Appendix K) • The Proponent will make access arrangements whereby those with connection to the NHL site would be met at the gate and escorted to the sacred site. The sacred “Fish Thalu” site is outside the operational site boundary (refer to plan layout, Figure 3, Appendix A) • Hearson Cove Road will be realigned to its official gazetted alignment.

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Proponent Response
				Access to Ngajarli will be maintained • The construction-phase boundary has been modified to ensure this cultural site is outside of the fenced area and its use is not impaired Discussed opportunities to use the wall surfaces of Project buildings and facilities as a medium for Aboriginal artworks and as a visual medium to communicate heritage stories
April 2019	Woodside	Meeting	Air Quality modelling	Data share agreement
February 2019	Senator Michaelia Cash, Federal Minister for Employment, Skills, Small and Family		Update on Project including • Potential social benefits • Potential employment & training opportunities • Potential economic opportunities	Details discussed
25 February 2019	Water Corporation	Letter	Discharge in the MUBRL and seawater intake	Appendix J of the ERD
12 February 2019	Murujuga Aboriginal Corporation (MAC) City of Karratha	Site visit / Presentation	MAC: • Construction phase, Site preparation, Plant erection • Potential Heritage issues • Plant emissions / impacts on Burrup Rock Art • General processing plant understanding • Employment, training and business opportunities • MAC could benefit from • Work undertaken to evaluate a Project location at Maitland City of Karratha: • The City of Karratha would prefer that the Dampier public wharf be used, and the shed located north of proposed options A & B.	Section 2.3.3 of the ERD Section 2.2.4 of the ERD Third option 'C' added to the Port infrastructure location options. Refer to Section 2.2.6 of the ERD

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 toolbox 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 or Contractors 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 Fauna Management Plan Review

Ongoing monitoring of this FaMP and its commitments will ensure environmental risks associated with terrestrial fauna 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 Perdaman's 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.

This FaMP will be reviewed and updated upon meeting the following conditions:

- At least annually throughout the life of the Project.
- As a result of significant incidents that have directly impacted fauna.
- When performance improvements are identified for the protection of fauna.
- When changes to operational processes pose a risk to fauna.
- Outcomes of monitoring programs are received
- Implementation and effectiveness of management measures and monitoring programs.
- Threshold/trigger criteria and threshold/trigger level actions.
- Changes to relevant legislation, policy, guidelines, management plans and industry practices.
- Changes to the conservation status of fauna species.
- The identification of a conservation significant fauna species not previously confirmed within the Project area.
- Specialist advice.
- Stakeholder consultation.
- Review will also include a gap analysis of current early response actions, trigger response actions and threshold contingency actions to identify non-compliances and where necessary any additional actions that may be required to minimise risk of further exceedance.

Any revisions or amendments of this FaMP must be in consultation with MAC and must be submitted to the CEO and DCCEEW as per Condition 5-8 of MS 1180.

13 Changes to the FaMP

This plan has been amended from the previous version PCF-PD-EN-FaMP_PCF4 to ensure that all commitments and conditions required in accordance with regulatory approvals are captured and addressed.

All changes to this Fauna Management Plan post-assessment must be provided separate to compliance reports and submitted to registrar@dwer.wa.gov.au, the DCCEEW and DBCA.

Table 13-1 Changes to FaMP

Complexity of changes	Minor revisions ☐		Moderate revisions	☐	Major revisions	☒	
Number of Key Environmental Factors	One ☐		2-3	☒	> 3	☐	
Date revision submitted to EPA, DCCEEW and DBCA: 01/02/2022							
Proponent's operational requirement timeframe for approval of revision Reason for Timeframe: **Approval of revision not required**.	< One Mth ☐		< Six ☐Months		> Six ☐Months	None ☒	
Item no.	EMP Section no.	EMP page no.	Summary of change	Reason for change			
1.	ALL		Update to include references to current legislative requirements and reporting	Current legislative requirements and reporting			
2.	ALL		Removal of references to conservation significant species	Conservation significant species are provided in the Threatened Species Management Plan			
3.	3	9	Roles and responsibilities	Added			
4.	6	30	Risks to fauna	Added			
5.	Table 7-1	35	Reporting	Updated to reflect correct legislative reporting requirements			
6.	7.3	64	Pre-clearance survey	Added			
7.	7.4.4	66	Environmental inspections	Added			
8.	7.4.5	67	Environmental audits	Added			
9.	8	68	Training and awareness	Added			

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15 Definitions

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.

Environmental Representative

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

Environment and Heritage Manager

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

Ground Disturbance Permit

A Ground Disturbance Permit (GDP) is a permit issued to a Subcontractor, by the Contractor, enabling Works within defined battery limits to manage any impacts on native vegetation, heritage or other environmentally sensitive values. It includes the key approval commitments and obligations obtained by or issued to the Contractor or Owner by regulators, tenure holders and other third parties.

May

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

Must

Indicates a requirement or action that must be followed to comply with legal framework for the Project and environmental approval conditions.

Perdaman

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

Project Personnel

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

Project Work Sites

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

No-Go Zones

No-Go Zones are defined areas within the Project's footprint which are not 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.

Saipem Clough Joint Venture (SCJV)

SCJV is the contractor nominated to carry out the design, planning and construction of the Perdaman Project, as the Engineering, Procurement Contractor (EPC).

Shall

Indicates that a statement is mandatory.

Should

Indicates a recommendation.

Weed

A weed is a plant that is regarded as not endemic and considered undesirable in a particular location or region.

Will

Indicates a requirement or action that Perdaman or the Contractor will be implementing or complying with during the Project activities to ensure compliance with legal framework for the Project and environmental approval conditions.

Works

Works includes all work which SCJV and or its Subcontractors are required to perform to comply withits obligations under the Contract during construction.

16 Abbreviations

Abbreviation	Description
APM	Animal Plant Mineral Pty Ltd
BSIA	Burrup Strategic Industrial Agreement
CAR	Compliance Assessment Report
CEO	CEO of the Environmental Protection Authority
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, the Environment, Energy and Water
DoEE	Department of the Environment and Energy
EMS	Environmental Management System
EPA	Environmental Protection Authority
EPC	Engineering, Procurement and Construction
EPBC	Environmental Protection and Biodiversity Conservation Act 1999
ERD	Environmental Review Document
EWSC	Burrup East West Services Corridor
FaMP	Fauna Management Plan
FEED	Front End Engineering and Design
FID	Final Investment Decision
FMP	Flora Management Plan
GDA	Ground Disturbing Activities
GDP	Ground Disturbance Permit
IBRA	Interim Biogeographical Regionalisation for Australia
MAC	Murujuga Aboriginal Corporation
Mtpa	Million tonnes per annum
MNES	Matters of national environmental Significance
PDE	Project Development Envelope
PEC	Priority Ecological Community
PEMP	Project Environmental Management Plan
PPA	Pilbara Ports Authority
TEC	Threatened Ecological Community

17 Project Delivery Applicability

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

Appendix 1 – Ministerial Statement 1180 Conditions Compliance Table

Condition No.	Condition	Section of this Plan
5-1	The proponent shall implement the proposal to meet the following environmental outcomes: (1) clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed 0.16 ha; (2) clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed 49.17 ha; (3) clearing in the fauna habitat type identified as Samphire Shrublands / Supratidal flats shall not exceed 11.97 ha; (4) clearing in the fauna habitat type identified as Drainage Lines shall not exceed 2.7 ha; and (5) impacts to short-range endemic fauna species are avoided, unless it is demonstrated and the CEO confirms in writing that the species occurs in a self-sustaining population outside the development envelope.	Section 1, 4.1.3 and 7.1
5-2	The proponent shall implement the proposal to achieve the following environmental objective: (1) minimise direct and indirect impacts to the northern quoll, Pilbara olive python and the ghost bat within the development envelope.	Section 1 and 7.2
5-3	At least six months prior to Ground Disturbing Activities within the Development Envelope delineated in Figure 2 of Schedule 1, or such lesser time approved in writing by the CEO, the proponent shall, in consultation with the Murujuga Aboriginal Corporation and DCCEEW, revise and submit to the CEO the Fauna Management Plan (PCF-PD-EN-FaMP, Version PCF 1, 12/01/2021) and the Fauna Management Plan (PCF-PD-EN-TSMP, PCF 1, 12/01/2021), one or both of which shall: (1) demonstrate how the environmental outcomes in condition 5-1 and environmental objective in condition 5-2 will be achieved; (2) include details of the outcomes of a detailed short-range endemic fauna survey undertaken within the development envelope and surrounding region at least six months prior to Ground Disturbing Activities; (3) include provisions to avoid where practicable and otherwise minimise impacts to significant terrestrial fauna species, including short-range endemic fauna and migratory birds, including, but not limited to, impacts from: (a) clearing of habitat; (b) lighting; (c) noise and vibration; (d) dust; (e) vehicle and machinery movement strike; (f) entrapment in trenches or ponds; (g) the attraction of feral animals; and	Section 4.4, 4.1.3, 7.1, 7.2 and 7.3

Condition No.	Condition	Section of this Plan
	(h) fire; (4) provide for relevant traditional owners to be invited to observe any Ground Disturbing Activities and during construction, and take reasonable steps to facilitate the observation of those activities by those persons; (5) specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent direct or indirect impacts to significant terrestrial fauna species, including short-range endemic fauna; (6) specify threshold criteria to demonstrate compliance with conditions **5-1** and **5-2;** (7) specify monitoring methodology to determine if trigger criteria and threshold criteria have been met; (8) specify management and/or contingency actions to be implemented if the trigger criteria required by condition **5-3(5)** and/or the threshold criteria required by condition **5-3(6)** have not been met; and (9) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that conditions **5-1** and **5-2** have been met over the reporting period in the Compliance Assessment Report required by condition 15-7.	
5-4	The proponent must not commence Ground Disturbing Activities until the CEO has confirmed in writing that the Fauna Management Plan and the Fauna Management Plan satisfy the requirements of condition **5- 3.**	Section 1.2
5-5	The proponent shall implement the most recent versions of the Confirmed Fauna Management Plan and Confirmed Fauna Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the environmental outcomes in condition **5-1** and objectives detailed in condition **5-2** have been met.	Section 4.4
5-6	In the event that the environmental outcomes in condition **5-1** are exceeded, or monitoring or investigations at any time indicate an exceedance of threshold criteria specified in the Confirmed Fauna Management Plan or Confirmed Fauna Management Plan, the proponent shall: (1) report the exceedance in writing to the CEO and the DCCEEW within seven days of the exceedance being identified; (2) implement the management and/or contingency actions required by condition **5-3(8)** within seven days of the exceedances being reported as required by condition **5-6(1)** and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and implementation of the management and/or contingency actions are no longer required; (3) investigate to determine the cause of the threshold criteria being exceeded; (4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded;	Section 9.3

Condition No.	Condition	Section of this Plan
	(5) provide a further report to the CEO and the DCCEEW within twenty-one (21) days of the exceedance being reported as required by condition **5- 6(1)** which report shall include: (a) details of management and/or contingency actions implemented; (b) the effectiveness of the management and/or contingency actions implemented against the threshold criteria; (c) the findings of the investigations required by conditions **5-6(3)** and **5-6(4)**; (d) measures to prevent the threshold criteria being exceeded in the future; (e) measures to prevent, control or abate the environmental harm which may have occurred; and (f) justification of the threshold criteria remaining, or being adjusted based on better understanding, demonstrating that outcomes will continue to be met.	
5-7	Without limiting condition **5-5** (implementation of the plans) and notwithstanding compliance with condition **5-6** (response to exceedance), the proponent must not cause or allow: (1) a failure to implement one or more management and/or contingency actions, if the relevant threshold criteria have been exceeded; (2) the exceedance of a threshold criteria (regardless of whether the relevant management and/or contingency actions have been or are being implemented); and/or (3) a failure to comply with the requirements of the Confirmed Fauna Management Plan or the Confirmed Fauna Management Plan.	Section 9.3
5-8	The proponent, in consultation with the Murujuga Aboriginal Corporation: (1) may review and revise the Confirmed Fauna Management Plan and/or Confirmed Threatened Species Management Plan and submit it to the CEO and the DCCEEW; and (2) shall review and revise the Confirmed Fauna Management Plan and/or Confirmed Threatened Species Management Plan and submit it to the CEO and the DCCEEW as and when directed by the CEO.	Section 11

Appendix 2A - Environmental Risk Assessment Process & Risk Matrix

Risk Assessment Process	Description	Methodology	Application						Reference Procedures	
			Corporate	Business Division	New Opportunity	Project Planning	Project Execution	Project Close-out		
Business Risk Assessment - HSSE Impacts	Identify, assess and control potential HSSE impacts of conducting Contractor business	Bow-tie	■	■	■	■			Risk Management Procedure	CORP-RA-PR-G-0001
Major Accident Event Hazard Assessment	Identify, assess and control Major Accident Events Hazards	MAE Bow-ties	■		■	■	■	■	MAE Hazard Management Procedure	CORP-HSE-PR-G-0068
Technical HSSE Assessments										
Design risks	Identify, assess and document inherent design risks	HAZID, HAZOP, FMEA			■	■		■	Safety in Design Procedure	CORP-ENG-PR-G-0016
Design reviews - construction, operation, maintenance	Identify, assess and mitigation of HSSE hazards introduced by the design when facility being constructed, operated or maintained	HAZID, HAZOP			■	■			Safety in Design Procedure	CORP-ENG-PR-G-0016
Human Factors analysis	Identify, assess and control potential ergonomic, health impacts of operation as part of design	Human Factors Analysis Study			■	■			Safety in Design Procedure	CORP-ENG-PR-G-0016
Fire & Explosion analysis	Identify, assess and control potential sources of fire & explosion, and consequence mitigation through design	Fire and Explosion Study			■	■			Safety in Design Procedure	CORP-ENG-PR-G-0016

Risk Assessment Process	Description	Methodology	Application						Reference Procedures	
			Corporate	Business Division	New Opportunity	Project Planning	Project Execution	Project Close-out		
Threat Specific HSSE Hazard Assessment (where applicable to Project)										
Health Risk Assessment	Identify, assess and mitigate health exposures - travel and site based	HRA							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Environmental / Social Impact Assessment	Identify, assess and mitigate environment and community impacts	EIA, HAZID, Social Impact Study							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Natural Disasters Assessment (Emergency Events)	Identify, assess and mitigate potential natural disaster events which may affect the site (e.g. cyclone, wild fire, tsunami)	HAZID							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Task Based HSSE Hazard Assessment										
Project HSSE Assessment	Identify, assess and control potential HSSE impacts specific to the Project & Site	HAZID							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Construction Package HSSE Assessment	Identify, assess and control potential HSSE impacts specific to the Construction package	HAZID							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Subcontractor HSSE Assessment	Assess the HSSE capability of subcontractors to inform management strategy Identify, assess and control potential HSSE impacts of contract scope	PRE-QUAL / HAZID							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072

Risk Assessment Process	Description	Methodology	Application						Reference Procedures	
			Corporate	Business Division	New Opportunity	Project Planning	Project Execution	Project Close-out		
Work Team Task Assessment	Work teams identify, assess and control HSSE hazards of planned work	JHA							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072
Personal Task Assessment	Individuals identify, assess and control HSSE hazards of planned task	TAKE 5							HSSE Risk Management Procedure	CORP-HSE-PR-G-0072

HSSE Risk Matrix

Descriptor		Actual / Potential Consequence				
		Insignificant (5)	Minor (4)	Moderate (3)	Major (2)	Catastrophic (1)
Probability	Has Occurred /Almost Certain	9	16	18	23	25
	Likely	4	11	17	20	24
	Possible	3	10	13	19	22
	Unlikely	2	6	12	14	21
	Rare	1	5	7	8	15

Key			HSSE Risk Response Guide
Risk Level	Rating Range		
Low	1	8	Confirm no further control measures are required to demonstrate the risk ALARP. Responsible Supervisor to ensure all identified control measures are in place prior to the work progressing.
Moderate	9	15	Action is required to identify control measures to reduce the risk to ALARP. Work can only progress at this risk level with approval of Project Management.
High	16	22	Immediate action is required to identify control measures to reduce the risk to ALARP. Risk must be added to Project Risk Register for monitoring. Work can only progress at this risk level with approval of the Project Manager or Clough Senior Management.
Very High	23	25	This denotes unacceptable event or level of risk. Immediate action is required to identify control measures to reduce the risk to ALARP. Risk must be added to Project Risk Register for monitoring.

*The HSSE Risk Matrix and Guidelines DO NOT replace the requirements for risk assessment and treatment carried out in accordance with the Risk Management and Assurance Operating Standard (CORP-RA-OS-G-0003) and should only be used when performing HSSE Risk Assessment at a Project Level.

**The HSSE Risk Matrix shall be used to determine the level and timing of incident notification, classification and investigation. Events rated 19 or above (highlighted by shading and bold border) are considered High Potential Incidents and shall be reported accordingly.

HSE Risk Matrix

HSSE Consequence / Severity Table

Consequence	Health & Safety	Environmental Impact	Security	Business Risk	Financial impact	Murray & Roberts Injury Consequences
Catastrophic	Multiple fatalities, Multiple serious disabling injuries.	Release of pollutants capable of causing irreversible environmental harm requiring national / international resources for remediation.	One or more fatalities Terrorists attacks. Inability to conduct any business.	Company prosecuted. Loss of future work. Project shutdown. Violation of Company policy. Widespread dissatisfaction resulting in legal action.	>$30 Million	**Critical (Level 5)** Fatal injury. Incident has the potential for more than one fatal injury.
Major	Single fatality, serious injury resulting in permanent disability. Multiple injured parties.	Release of pollutants to sensitive areas; Immediate off-site contamination requiring state / regional external resource for remediation. Long term impact (6-12 months)	Deliberate attacks on staff and family resulting in severe injuries. Kidnapping. Severe delays to business operations. Rape.	Adverse national media coverage. Significant reduction in customer satisfaction. Threat to project success with potential for legal action.	$10M - $30M	
Moderate	Lost Time Injury Restricted Duties Injuries Injury reportable to Regulatory body	Environmental harm reportable to Government authority. Breach of licence conditions / lease. Onsite contamination with the potential to cause offsite contamination. Medium term impact (1-6 months)	Threat and intimidation of staff. Assault resulting in minor/no injury. Theft/vandalism/ sabotage of equipment that cannot easily be replaced. Short delays or interruptions to operations.	Local media coverage. Failure causing customer dissatisfaction with moderate delay, rework or extra work requiring additional resource. Client forced to impose penalties.	$2M - $10M	**Major (Level 4)** Incident has the potential for fatal injury **Serious (Level 3)** Lost time injuries. Incident has the potential for permanent disablement.
Minor	Medical Treatment	Minor onsite pollution not within confines of protected area. No long term impact. Clean up within 1 month.	Crime with minimal impact. Theft / Vandalism of nuisance value only. No lasting impact on business operations	Telephone or written complaints. Failure causing slight customer concern and inconvenience, resolved with current levels of resource.	$50K – $2M	**Minor (Level 2)** Medical treatment injuries
Insignificant	First Aid Treatment No treatment required	Localised / Contained impact / Immediate complete fix	Insignificant crime Theft of insignificance. No impact on business operations.	Minimal or no impact to project delivery.	Less than $50K	**Low (Level 1)** First aid treatment injuries

Probability

Probability	Description
Almost Certain	This event is expected to occur or is known to have occurred frequently at Clough in similar situations.
Likely	This event may occur or is known to have occurred at Clough in similar circumstances.
Possible	This event might occur or is known to have occurred at Clough in additional circumstances.
Unlikely	This event could occur or is known to have occurred in the industry but not at Clough.
Rare	This event may only occur in exceptional circumstances or is not known to have occurred in the industry.

Appendix 2B – Terrestrial Fauna Risk Assessment

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
Reduction and / or fragmentation of fauna habitat Clearing of vegetation can lead to direct loss or fragmentation of fauna habitat. Clearing activities may also cause direct impacts to fauna.	**Avoid** The original processing facility layout was forecast to impact 21.3 ha of the tidal flats and Samphire Shrubland/Saltplains habitat. Following design optimisation, proposed clearing of this habitat type has been significantly reduced; Limit clearing to that which is absolutely necessary; Avoid clearing of rocky/boulder habitat that may contain micro-habitat suitable for refuge for some small terrestrial mammal species, including the Pilbara Olive Python; Impact on the creekline in the south-west of Site F, which is likely to be used by the Ghost Bat for foraging, will be avoided: location of the construction fence line has been modified accordingly. High quality vegetation located on the northern margins of Murujuga National Park (southern perimeter of Site F) has been avoided by selecting the northern Hearson Cove Road re-alignment option. **Minimise** The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure; Do not disturb rock piles between the months of early November to late April where practicable as this is a time of inactivity for the Pilbara Olive Python and a period where individuals are slow to move and unable to avoid impact from land clearing (clearing of vegetation to be performed outside of the Pilbara Olive Python breeding season if possible); Maintain denning habitat by avoiding disturbance to rock piles on the upper slopes of the valleys; Engage a qualified fauna specialist (for Conservation Significant Fauna Species as per the TSMP), prior to clearing, to conduct a trapping and relocation program for conservation significant fauna in accordance with DBCA's Standard Operating Procedures (SOPs) and permit/licence conditions as required under the BC Act. Clearing to be undertaken progressively in one direction to allow fauna to move on.			

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
	Fauna spotters are required on site during vegetation clearing activities to supervise dispersal and relocation of any fauna. Fauna identified within the demarcated clearing areas unable to move away from the clearing areas without intervention are be moved to a location deemed appropriate for the safety and survival of the fauna individual/s. Bury concrete or steel structures of a suitable size to a suitable depth where practicable in the rock batters used to elevate and stabilize the plant to create potential day time or maternity roosts; Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer; Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site; Land clearing to commence no more than six months prior to commencement of construction; Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation; Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation; Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site; and Plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas. **Rehabilitate** Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss; and Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna. Construction of the processing facility on the slopes of Site C and F will require significant cut and fill to bring levels up. The scheduling for materials dumped to fill could be manipulated to ensure large boulders are grouped as conglomerates around the periphery of the retaining batters. These large boulders should then, by virtue of their position in the batter slopes, offer potential cave and crevice habitat for the Pilbara Olive Python, contributing to the availability of secure refuge in the local area.			

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
Vehicle strike Impacts with moving vehicles can cause injury or death of native fauna.	**Avoid** No domestic animals will be allowed on site. Minimise Predator control (wild dogs: *Canis lupus familiaris*, feral cats: *Felis catus*, red foxes: *Vulpes vulpes*) has been identified as an absolute priority to minimise the impact of the Project; Initiate a feral fauna trapping and euthanisation program to reduce the number of feral fauna around the site; Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility; Develop and implement an introduced predator control program; Liaise with PPA and YACMAC Rangers and participate in existing and/or planned catchment wide pest animal management programs (i.e. Feral Cat control); Develop a Cane Toad Monitoring Program; and Develop a Cane Toad Control Program for potential future implementation. **Minimise** Vehicle speeds will be managed on site (including entry and exit points) by enforcing speed limits in construction areas to reduce the potential for vehicle strikes. Where practicable, prior to commencing vegetation clearing activities, machinery will idle for at least half an hour. Road signage will be installed within the construction and operational areas to raise driver awareness to reduce the potential for vehicle strikes (particularly for slow moving species such as the Olive Python). In the event vertebrate fauna is injured during clearing or construction, the animal shall be taken to an authorised veterinarian or trained wildlife carer, or if not possible, humanely euthanized in accordance with DBCA SOPs. All employees will be required to record and report any native fauna strikes. Roadkill will be removed at least 10 m into surrounding vegetation, when safe to do so, by designated personnel to avoid further strikes of fauna feeding on carcasses. Site induction to emphasise that all native fauna has right-of-way, where possible and safe to do so. Personnel will be inducted regarding the key risk times for vehicle strike to fauna (e.g. dusk and dawn). Where possible, all non-essential movement will be scheduled to take place during the day. Site inductions to introduce personnel to local conservation significant fauna, and signage displayed in crib rooms and notice boards, to ensure all personnel can identify all larger conservation significant species.			

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
Lighting Artificial light can alter foraging patterns, increase predation risk, disrupt biological clocks, and disrupt of dispersal movements.	**Minimise** Lighting will be designed in accordance with AS 4282-1997: Control of Obtrusive Effects of Outdoor Lighting Guidelines; Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe construction and/or operation, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over; and Where possible, lighting will be the minimum wattage, whilst not compromising safety or OH&S requirements.			
Noise and vibration Noise and vibration acts as a general stressor, masks acoustic signals, and can disturb ecosystem balance.	**Minimise** Noise emissions will comply with Environmental Protection (Noise) Regulations 1997; Maintain equipment such that all noise emitting equipment is fully serviceable and working to the correct specifications; and Where possible, all non-essential movement will be scheduled to take place during the day.			
Fauna entrapment and poisoning Fauna may be trapped in artificial water bodies and excavations leading to injury and/ or death.	**Minimise** Barb wire fences will not be used on site during or following construction. If the site must be fenced for security, barbed/razor wire should be placed at the base of the fence on the ground and the fence itself must be cyclone mesh; Fauna egress will be installed on all excavations, even if temporary; All excavations will be checked for trapped fauna within three hours of sunrise if left open overnight. All fauna should be removed by qualified personnel; All excavations that must be left open for more than 12 hours must have gentle ramped egress that all fauna are capable of using; and Where practicable avoid the use of larvicides and adulticides for chemical control of mosquitoes in on-site storage ponds. Should larvicide or adulticide be applied, Perdaman shall develop a management plan to ensure the protection of native fauna.			

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
Increase in introduced fauna Food waste and increased water availability within the Project Area could potentially increase introduced fauna numbers. Cane Toad populations may in future migrate into theBurrup Peninsula.	**Avoid** No pets, traps or firearms are allowed within the site. **Minimise** Predator control (wild dogs (*Canis lupus familiaris)*, feral cats (*Felis catus)*, red foxes (*Vulpes Vulpes)*) has been identified as an absolute priority to minimise theimpact of the Project. Initiate a feral fauna trapping and euthanisation program to reduce the number of feral fauna around the site. Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. Develop and implement an introduced predator control program. Liaise with PPA and YACMAC Rangers and participate in existing and/or planned catchment wide pest animal management programs (i.e. Feral Cat control). Develop a Cane Toad Monitoring Program Develop a Cane Toad Control Program for potential future implementation.			
Changes to water quality Wastewater discharge to the MUBRL has the potential to impact on marine environmental quality.	**Avoid** The objective is to ensure that the seawater blow down discharge to MUBRL, in combination with other future industrial discharges to the MUBRL, will not compromise the ability of the Water Corporation to meet the requirements of Ministerial Statement 594 and the ANZECC and ARMCANZ (2000) species protection level water quality guidelines within the 0.01 km2 mixing zone as recommended in the EPA Report 1044. Seawater discharge to MUBRLis compliant with the Water Corporation set guidelines. Implement controls as per the **Surface Water Management Plan.**			

Potential Impact	Mitigation Measures	Likelihood	Consequence	Residual Risk
OBJECTIVE: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*				
Water Quality Degradation of water quality from elevated levels of suspended solids or contaminants in surface water runoff (including urea fines). Indirect impact on the mangrove communities of King Bay as a result of water quality changes. Impacts on marine environmental quality from runoff. Impacts to vegetation of the intertidal flats from pollution and sedimentation flushed via tidal movements and runoff.	**Avoid** No erosion or deposition of sediment within the surface water courses beyond natural fluctuations. Stormwater quality is in compliance with the Project approval conditions. The design scope for the fully enclosed conveying and ship loading system eliminates of the risk of loss of urea product as fugitive dust emissions or spills with the consequential loss of valuable product and potential environment impacts of degradation of water quality in the terrestrial and marine environments. **Minimise** Implement drainage, erosion, sedimentation and pollution management as per the **Confirmed Surface Water Management Plan.** Implement pollution controls as per the **Hydrocarbons and Hazardous Substances Management Protocol.** Implement pollution controls as per the **Solid and Liquid Waste Management Protocol.** **Rehabilitate** Throughout construction, rehabilitation of disturbed areas will be progressively undertaken, or as soon as practicable, following completion of specific works.			

Attachment A – Pre and Post - Wet Season Biological Survey

Refer to Attachment B of Threatened Species Management Plan

Attachment B – Marine Fauna Desktop Assessment

Refer to Attachment A of Threatened Species Management Plan

Attachment C – Letter to EPA for MAC Consultation on Project Destiny

31st January 2022

Robert Hughes
Environment Protection Authority
Prime House
8 Davidson Terrace, Joondalup
Locked Bag 10, Joondalup DC, WA, 6919

Regulator References:
Department of Water and Environmental Regulation, Part IV Assessment No. ***2184, MS 1705***
Department of Agriculture, Water and the Environment, EPBC Assessment No. ***2018/8383***

Dear Robert,

Re: Perdaman Urea Project – MAC Consultation

I am writing to you on behalf of the Murujuga Aboriginal Corporation (MAC) and its board members regarding the Perdaman Urea Project (the Project).

On the 24th January 2022, Perdaman and its EPC Contractors comprising Saipem and Clough, visited the MAC offices to present a series of management plans to myself and the MAC Board. The presentation commenced by revisiting the previous consultations undertook by Perdaman over the past four years and was presented by the Perdaman Chairman, Mr Vikas Rambal.

The following Environmental Management Plans were presented in three sessions during this consultation:

1. Flora Management Plan;
2. Surface Water Management Plan;
3. Greenhouse Gas Management Plan;
4. Fauna and Threatened Species Management Plan;
5. Light Management Plan; and,
6. Cultural Heritage Management Plan

The MAC Board were also offered a discussion opportunity for each Plan and minutes were recorded by the EPC Contractors representative. The minutes were distributed after the meeting to myself and the MAC board and is considered a true and accurate record of the meeting.

Attachment D – MAC Consultation 24th Jan 2022

Attachment E – Significant Impacts Against Guidelines

Assessment of the Projects Significant Impacts against Guidelines.

Guidance	Objective	Identified Consistency
Matters of National Environmental Significance - Significant Impact Guidelines 1.1	An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: • substantially modify, destroy or isolate an area of important habitat for a migratory species	**Addressed in:** ERD, Section 6.8.1 "The proximity of the sites to beaches and mangroves suggests that migratory sea birds and shorebirds may also be seasonally present within the Project Development Envelope, or in the adjacent areas. The Burrup Road, a busy road providing access to the many processing facilities and Port, is situated immediately to the west of the supra-tidal flats. As a result, this area is already subject to noise disturbance from traffic, and the species observed during the Flora and Fauna Surveys, are present despite this disturbance. While further disturbance to this area should be minimised, it is unlikely to present a significant increase to that already created by the Burrup Road." **Addressed in**: ERD, Section 4.6.6 – Table 4-14: (Mitigation of Potential Impacts to Terrestrial Fauna).
	• result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Potential Impact: "Food waste and increased water availability within the Project Area could potentially increase introduced fauna numbers." **Addressed in:** ERD, Section 6.8.3 Potential impacts to marine migratory species: **"**The Project will result in increase of 1 or 2 shipping vessel movements per week for the export of urea. However, the Port of Dampier and Port Hedland are two of the world's largest bulk export ports with 10,521 vessel movements were recorded in the Port of Dampier for the 2018-19 period (Pilbara Ports Authority, 2019). This small increase in shipping numbers would be overshadowed by the typical variability in shipping numbers associated with existing and future proposed industries. It is therefore considered that the incremental risk to marine fauna associated with shipping movements is unlikely to be significant."

	• seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.	**Addressed in**: Section 6.8.4 "Artificial light has the potential to directly impact migratory species, including birds and turtles, and can result in detrimental changes in behaviour. The additional artificial light from the Proposal could increase the light glow from the Burrup industrial estate. Oil spills can heavily impact on turtles because of their need to surface to breathe or to leave the water to breed. Subsequently, coastal dwelling birds feeding on fish are also at high risk from hydrocarbon spills. However, strict management policies, plans and procedures by PPA to manage contamination risks associated with all current and future Port related business and operational activities within the port are precinct currently in place. As noted in Table 4-5, an Operational Environmental Management Plant (OEMP) is required to be prepared and submitted to PPA for review prior to any operational activities taking place on PPA's lands. It is a standard requirement of PPA's Commercial Agreements with tenants. The proponent is committed to conduct all its activities within the port precinct both during the construction and operational phases wholly in compliance with the applicable approved PPA management policies, plans and procedures. Therefore, it is expected that these risks can be managed effectively during construction and operational activities. Product discharge to the marine environment during ship loading is unlikely to occur as the ship loader will be equipped with a telescopic chute and shroud. Only personnel properly trained and qualified will be able to operate the ship loader and PPA procedural requirements will be adhered to. As noted above, the proponent is committed to conduct all its activities within the port precinct during both the construction and operational phases wholly in compliance with the applicable approved PPA management policies, plans and procedures. Therefore, it is expected that these risks can be managed effectively during construction and operational activities. Turtles are at most risk from impacts during nesting, hatchling emergence and at-sea dispersal. Low level turtle nesting is expected at proximity of the Proposal Development Envelope, and given the proposed mitigation measures being implemented to reduce light emissions, potential impacts are unlikely to result in population-level effects. Mitigation Measures: Avoid The original processing facility layout was forecast to impact 21.3 ha of the tidal flats and Samphire Shrubland/Saltplains habitat. Following design optimization, proposed clearing of this habitat type has been significantly reduced. Limit clearing to the minimum possible area, not exceeding 73.05 ha. Minimise

		The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction/maintenance/shut- down activities. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure. Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing to commence no more than six months prior to commencement of construction. Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation. Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. During the final design phase, plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas. "Predator control (wild dogs *Canis lupus familiaris*, feral cats *Felis catus*, red foxes *Vulpes vulpes*) has been identified as an absolute priority to minimise the impact of the Project. Initiate a feral fauna trapping and euthanisation program to reduce the number of feral fauna around the site. Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. Develop and implement an introduced predator control program. Develop a Cane Toad Control program for potential future implementation. Lighting will be designed in accordance with AS 4282-1997: Control of Obtrusive Effects of Outdoor Lighting Guidelines. Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe construction and/or operation, with a low vertical angle,

		and light shields will be placed on large equipment to minimise light spill over. Lighting will be minimum wattage, whilst not compromising safety or OH&S requirements. PPA Procedures, emergency plans and OEMP will be followed at all time during port-side operations. Rehabilitate Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss. Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna.

Guidance	Objective	Identified Consistency
Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DOEE, 2017)	Prioritise key species, ecological communities, ecosystems and locations across Australia for strategic feral pig management. Encourage the integration of feral pig management into land management activities at regional, state and territory and national levels Encourage further scientific research into feral pig impacts on nationally threatened species and ecological communities, and feral pig ecology and control. Record and monitor feral pig control programs, so their effectiveness can be evaluated Build capacity for feral pig management and raise feral pig awareness amongst landholders and land managers, and Improve public awareness about feral pigs and the environmental damage and problems they cause, and the need for the feral pig control.	The WA Department of Primary Industries and Regional Development's Western Australian Feral Pig Strategy 2020-2025 identifies feral pigs as absent or unknown in the City of Karratha region (including the Burrup Peninsula) Mitigation Measures: Minimise Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. Develop and implement an introduced predator control program.

Guidance	Objective	Identified Consistency
Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DOEE, 2018).	Contribute to long-term prevention of the incidence of marine debris. Understand the scale of impacts from marine plastic and microplastics on key species, ecological communities and locations. Remove existing marine debris. Monitor the quantities, origins, types and hazardous chemical contaminants of marine debris, and assess the effectiveness of management arrangements for reducing marine debris. .	**Partially addressed:** ERD, Section 8 – Table 8-1 All reasonable and practical measures will be undertaken during the construction and operation phases of the Project to minimise the generation of waste." **Partially addressed:** PCF-PD-EN-PEMP Environmental Management Plan, Section 8.12. "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 *Waste Management Protocol* (WaMP) 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" Mitigation Measures: Minimise To minimise and manage the creation of solid and liquid wastes, a waste management plan shall be prepared for the Project. Solid waste storage areas will be provided on site. All waste shall be segregated to maximise reuse and recycling.
	Increase public understanding of the causes and impacts of harmful marine debris, including microplastic and hazardous chemical contaminants, to bring about behaviour change.	Bins and skips (with lids) will be labelled and maintained so as to hold the intended waste stream securely. Ensure that facilities used for the receiving of waste from the site are appropriately licensed to accept the classified waste type. Solid wastes shall be removed off site by an appropriately licensed contractor. 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
Threat abatement plan for	1. Prevent foxes occupying new areas in Australia and eradicate foxes from high-	**Partially addressed**: ERD, Section 4.6.6 – Table 4-14: (Mitigation of Potential Impacts to Terrestrial Fauna) (p.91). Potential Impact: "Food waste and increased water availability within the Project Area could

Guidance	Objective	Identified Consistency
predation by the European red fox DEWHA, 2008)	conservation-value 'islands'	potentially increase introduced fauna numbers."
	2. Promote the maintenance and recovery of native species and ecological communities that are affected by fox predation	Mitigation Measures: "Predator control (wild dogs *Canis lupus familiaris*, feral cats *Felis catus*, red foxes *Vulpes vulpes*) has been identified as an absolute priority to minimise the impact of the Project. Initiate a feral fauna trapping and euthanisation program to reduce the number of feral fauna around the site. Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. Develop and implement an introduced predator control program."
Marine Bioregional Plan for the North-west Marine Region (DSEWPac, 2012)	Supporting strategic, consistent and informed decision-making under Commonwealth environment legislation in relation to Commonwealth marine areas.	**Addressed in:** ERD, Section 6.9 The Marine bioregional plan for the North-west Marine Region (DSEWPaC, 2012) identifies the conservation values of the Commonwealth waters from the Western Australia – Northern Territory border to Kalbarri, south of Shark Bay. None of the thirteen key ecological features identified in the North-west Marine Region is located within or at proximity of the Proposal Development Envelope.
	Supporting efficient administration of the EPBC Act to promote the conservation and ecologically sustainable use of the marine environment and its resources. Providing a framework for strategic intervention and investment by government to meet its policy objectives and statutory responsibilities.	The National Conservation Values Atlas (DoEE, 2015) maps the waters directly adjacent to Dampier Port as a Biologically Important Area (BIA) for some marine turtle species protected under the EPBC Act. The following turtle species have BIAs (internesting) identified at proximity of the Dampier Port: Flatback Turtle – *Natator depressus;* Green Turtle - *Chelonia mydas;* Hawksbill Turtle – *Eretmochelys imbricate;* Loggerhead Turtle – *Caretta caretta.* No protected places, heritage places and historic shipwrecks occur within or at proximity of the Proposal Development Envelope.

Guidance	Objective	Identified Consistency
Conservation Advice *Calidris canutus* Red knot (TSSC, 2016a).	1. Conservation and management actions (habitat) Protect important habitat in Australia. Maintain and improve protection of roosting habitats. Incorporate requirements for red knot into coastal planning and management. Manage disturbance at important sites which are subject to anthropogenic disturbance when red knot are present – e.g discourage or prohibit vehicle access, horse riding and dogs on beaches, implement temporary site closures.	**Addressed:** ERD, Section 4.6.5 (P.87). "Given the low numbers (one individual) of the associated Red-necked Stint recorded during the APM surveys, it is highly unlikely that the Project is going to significantly impact populations of Red Knot. The loss of wading/tidal flat habitat as a result of construction of the Urea processing facility is inconsequential given the expanses of other more suitable habitat nearby. Moreover, the loss of available habitat for this species has been dramatically reduced due to redesign of the Project layout (i.e. causeway) to reduce clearing of tidal flat areas. The outcomes of the pre-wet season biological survey report (APM, 2018), identifying habitat fragmentation as the greatest potential impact of the feeding sites in Australia. This was the catalyst for the redesign and optimisation of the Project layout." ERD, Section 4.6.6 – Table 4-14 (Mitigation of Potential Impacts to Terrestrial Fauna) (p.91). Potential Impact: "Reduction and/or fragmentation of fauna habitat (Clearing of vegetation can lead to direct loss or fragmentation of fauna habitat)." Mitigation Measures: Avoid The original processing facility layout was forecast to impact 21.3 ha of the tidal flats and Samphire Shrubland/Saltplains habitat. Following design optimization, proposed clearing of this habitat type has been significantly reduced. Limit clearing to the minimum possible area, not exceeding 73.05 ha. Minimise The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure. Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing to commence no more than six months prior to commencement of construction. Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation. Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation.

Guidance	Objective	Identified Consistency
		Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. During the final design phase, plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas. Rehabilitate Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss. Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna."
Conservation Advice *Macroderma gigas* ghost bat (TSSC, 2016b).	1. Protect roost sites from human disturbance and collapse.	**Addressed:** Biological Survey Report, Section 5.2.6.2 (p.94-95) mining. "No suitable roosting caves were located within the Study Area during APM surveys, although Ghost Bats were detected on two occasions on the south side of the Study Area in close proximity to rocky outcrops. The creekline in the southwest of the Study Area contained large trees and is in close proximity to the rocky outcrops of Murujuga National Park, where roosting habitat may be present. Given the provision of tall trees as vantage points and the proximity to potential roosting habitat, this creekline is considered important Ghost Bat habitat." **Addressed**: ERD, Section 4.6 (p.89) and Section 6.3.4 (p.151). "There are likely no roosts within the Project area for the Ghost Bat, and the reduction of clearing impacts to tidal flat and samphire habitat within the Project Area as a result of design optimisation, does not represent a significant impact to foraging habitat for this species."
	2. Replace the top strands of barbed wire in fences near roost sites with single strand wire.	**Addressed:** ERD, Section 4.6 (p.89). "Ghost bats typically fly low to the ground, around fence height, and are prone to collisions with wire fences.. Planning prior to construction will require the consideration of wire fencing for security vs the potential for impact on local individuals." **Addressed:** ERD, Section 6.3.5 (p.152). "No barbed wire will be used on any fences during the construction or operation phases of the Project."
Approved Conservation Advice	1. Habitat loss, Disturbance and Modification.	**Addressed:** ERD, Section 4.6.6 – Table 4-14 (Mitigation of Potential Impacts to Terrestrial Fauna) (p.91). Potential Impact: "Reduction and/or fragmentation of fauna habitat (Clearing of vegetation can lead

Guidance	Objective	Identified Consistency
for *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies) (DEWHA, 2008a).	Ensure road widening, maintenance activities and gas infrastructure development (or development activities) in areas where the Olive Python occurs do not adversely impact on known populations. Manage any changes to hydrology which may result in changes to the water table levels, increased run-off, sedimentation and pollution.	to direct loss or fragmentation of fauna habitat)" and "vehicle strike." Mitigation Measures: Avoid Limit clearing to the minimum possible area, not exceeding 73.05 ha. Avoid clearing of rocky/boulder habitat that may contain micro-habitat suitable for refuge for some terrestrial mammal species, including the Pilbara Olive Python. Minimise The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction/maintenance/ shutdown activities. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure. Do not disturb rock piles between the months of early November to late April where practicable as this is a time of inactivity for the Pilbara Olive Python and a period where individuals are slow to move and unable to avoid impact from land clearing. Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing to commence no more than six months prior to commencement of construction. Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation. Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation. Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. During the final design phase, plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas.

Guidance	Objective	Identified Consistency
		Road signage to be installed within construction and operational areas to raise driver awareness to reduce the potential for vehicle strikes. Rehabilitate Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss. Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna. Construction of the processing facility on the slopes of Site C and F will require significant cut and fill to bring levels up. The scheduling for materials dumped to fill could be manipulated to ensure large boulders are grouped as conglomerates around the periphery of the retaining batters. These large boulders should then, by virtue of their position in the batter slopes, offer potential cave and crevice habitat for the Pilbara Olive Python, contributing to the availability of secure refuge in the local area."
	2. Animal predation or competition Implement Threat Abatement Plan for the control and eradication of foxes and cats in the local region.	**Addressed:** See response for "Threat abatement plan for predation by the European red fox (DEWHA, 2008a)" and "Threat abatement plan for predation by feral cats (DoE, 2015)."
	3. Conservation Information Use road signage to raise awareness of the Pilbara Olive Python with road users on or near roads.	**Addressed:** ERD, Section 4.6.6 – Table 4-14 (P.91). Potential Impact: "vehicle strike (Impacts with moving vehicles can cause injury or death of native fauna." Mitigation Measures: "Vehicle speeds will be managed on site (including entry and exit points) by enforcing speed limits in construction areas to reduce the potential for vehicle strikes. All employees will be required to record and report any native fauna strikes. Roadkill will be removed at least 10 m into surrounding vegetation, when safe to do so, by designated personnel to avoid further strikes of fauna feeding on carcasses. Site induction to emphasise that all native fauna has right-of-way, where possible and safe to do so. Personnel will be inducted regarding the key risk times for vehicle strike to fauna (e.g. dusk and

Guidance	Objective	Identified Consistency
		dawn). Where possible, all non-essential movement will be scheduled to take place during the day. Site inductions to introduce personnel to local conservation significant fauna, and signage displayed in crib rooms and notice boards, to ensure all personnel can identify all larger conservation significant species."
Threat abatement plan for predation by feral cats (DoE, 2015).	Effectively control feral cats in different landscapes.	**Addressed:** ERD, Section 4.6.6 – Table 4-14 (P.91). Potential Impact: "Food waste and increased water availability within the Project Area could potentially increase introduced fauna numbers." Mitigation Measures: "Predator control (wild dogs Canis lupus familiaris, feral cats Felis catus, red foxes Vulpes vulpes) has been identified as an absolute priority to minimise the impact of the Project. Initiate a feral fauna trapping and euthanisation program to reduce the number of feral fauna around the site. Introduce and implement hygiene procedures which result in the reduction of food waste around the processing facility to ensure that feral predators are not attracted to the facility. Develop and implement an introduced predator control program."
Common wealth Listing Advice on Northern Quoll (*Dasyurus hallucatus*) (TSSC, 2005).	1. Inappropriate fire regimes.	**Addressed:** The Proponent will avoid ignighting bushfires (thereby avoiding altering the current fire regimes to the best of their ability) **ERD**, Section 4.5.6, Table 4-11 (Mitigation of Potential Impacts to Flora and Vegetation) (p.76). Potential Impact: Loss of Vegetation and/or Flora from Fire. Mitigation Measures: "Manage fire to reduce frequency and intensity around the Project area and the local area. Staff will be trained in the use of fire extinguishers. Spot fire control measures will be devised. All vehicles will be fitted with fire extinguishers. A Hot Work Permit system will be devised and implemented. Cigarette disposal units will be designated in approved smoking areas on site. Employees will not be permitted to smoke in vehicles within the Project Area. Vehicles will be required to remain on established tracks and roads only and will be instructed in

Guidance	Objective	Identified Consistency
		avoiding leaving vehicles idling over vegetation, regrowth or dry grass, in the summer months."
	2. Predation following fire	**Addressed:** See response for "Threat abatement plan for predation by the European red fox (DEWHA, 2008a)" and "Threat abatement plan for predation by feral cats (DoE, 2015)". The Proponent will control populations of feral Cats and Foxes, which will, in turn, limit predation of Northern Quolls following fire.
	3. Lethal toxic ingestion of Cane Toad toxin.	While the population is continuing to spread, to date, the Cane Toad has yet to be recorded on the Burrup Peninsula. Therefore, potential ingestion of this species has not been addressed in the **ERD.**
National Recovery Plan for the Northern Quoll *Dasyurus hallucatus* (Hill and Ward, 2010).	1. Halt northern quoll declines in areas not yet colonised by cane toads.	The Proponent is aware that the Proposal will lead to fragmentation of Quoll habitat. See **ERD**, Section 4.6 (pp.88-89): "The cumulative construction of the fertilizer, nitrate and urea plants do present a significant barrier for this species, however, careful consideration of the layout of the proposed urea Project can play a role in greatly reducing the extent of the impact… consideration of the potential to fragment populations of terrestrial fauna has resulted in the redesign of the Project layout, significantly reducing broad extents of habitat loss and the creation of barriers preventing exchange of individuals between sub-populations. **Addressed:** ERD, Section 4.6.6 – Table 4-14 (Mitigation of Potential Impacts to Terrestrial Fauna) (p.91). Potential Impact: "Reduction and/or fragmentation of fauna habitat (Clearing of vegetation can lead to direct loss or fragmentation of fauna habitat)." (Relevant) Mitigation Measures: Avoid The original processing facility layout was forecast to impact 21.3 ha of the tidal flats and Samphire Shrubland/Saltplains habitat. Following design optimization, proposed clearing of this habitat type has been significantly reduced. Limit clearing to the minimum possible area, not exceeding 73.05 ha. Avoid clearing of rocky/boulder habitat that may contain micro-habitat suitable for refuge for some small terrestrial mammal species, including the Pilbara Olive Python.

Guidance	Objective	Identified Consistency
		Minimise The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure. Maintain denning habitat by avoiding disturbance to rock piles on the upper slopes of the valleys. Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing to commence no more than six months prior to commencement of construction. Clearing will be planned to maximise the 'area to perimeter' ratio of remnant vegetation. Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation. Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. During the final design phase, plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas. Rehabilitate Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss. Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna. Construction of the processing facility on the slopes of Site C and F will require significant cut and fill to bring levels up. The scheduling for materials dumped to fill could be manipulated to ensure large boulders are grouped as conglomerates around the periphery of the retaining batters. These large boulders should then, by virtue of their position in the batter slopes, offer potential cave and crevice habitat for the Pilbara Olive Python, contributing to the availability of secure refuge in the local area." Other factors that may lead to declines in Quoll populations as a result of the Proposal include predation by feral predators (Addressed: see below – Objective 2), inappropriate fire regimes

Guidance	Objective	Identified Consistency
		(Addressed: see above – "Commonwealth Listing Advice on Northern Quoll", Objective 2), and vehicle strike mortalities (Addressed: see above – "Approved Conservation Advice for Liasis olivaceus barroni", Objective 3).
	2. Reduce the impact of feral predators on northern quolls.	**Addressed:** See response for "Threat abatement plan for predation by feral cats (DoE, 2015)". The Proponent will implement control programs for feral predators, including feral Cats and Foxes.
Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by Cane Toads (DSEWPC, 2011)	Reduce the impacts of cane toads on populations of priority species and ecological communities.	While the population is continuing to spread, to date, the Cane Toad has yet to be recorded on the Burrup Peninsula. Therefore, potential impacts of this species have not been addressed in the **ERD.**
Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPC, 2012).	Implement the cost-effective on ground management strategies in the Project area,	The five species for which this guidance exists (gamba grass (*Andropogon gayanus*), para grass (*Urochloa mutica*), olive hymenachne (*Hymenachne amplexicaulis*), perennial mission grass (*Cenchrus polystachios* syn. *Pennisetum polystachion*) and annual mission grass (*Cenchrus pedicellatus* syn. *Pennisetum pedicellatum*)) were not recorded in high-priority areas (Biological Survey Report, Section 4.2.8, p.70). However, weeds/introduced flora in general have been addressed. **Addressed:** ERD, Section 4.5.4 (p.72). "Introduction and/or spread of weeds: The introduction and/or spread of these species have the potential to occur when moving vegetative material and topsoil (containing seed) from one site to another. There is also the potential that movement of vehicles in the Project area could increase weeds abundance, which could indirectly impact flora and vegetation. Without suitable management, these species can be aggressive (particularly buffel grass) and have the potential to further degrade the quality of vegetation within the site and surrounding area."

Guidance	Objective	Identified Consistency
		ERD, Section 4.5.5 (p.74) "The current number of weed species at the site is comparable to other sites around the industrial estate and nearby conservation areas. The Burrup Peninsula is a small and relatively uniform landscape with a high degree of connectivity between sites (i.e. roads and access tracks) which has enabled the spread of weeds within the region. Management of weeds is largely inhibited by the level of industrial activity and the high number of stakeholders utilising the area." Table 4-11 (Mitigation of Potential Impacts to Flora and Vegetation), p.76. Potential Impact: "Degradation of Vegetation as a Result of Ingress of Weeds (Clearing and/ or movement of vehicles containing weed seeds throughout Project Area could result in increased weed abundance)." Mitigation Measures: *"*Avoid Any imported fill material/soil will be obtained from weed free sources to prevent further spread of weeds. Prior the importation of any fill material to the Project site, a written verification from the supplier will be obtain certifying that the material is weed free and meets the criteria of clean fill as defined in the DWER Landfill Waste Classification and Waste Definition 1996 (as amended 2018). Minimise To prevent the spread and/or distribution of weeds within the Project Area and to surrounding areas a Weed Management Plan will be prepared prior to the commencement of construction. This plan will outline weed hygiene and management procedures to be undertaken during construction and operations, particularly in referring to controlling the spread of Cenchrus ciliaris (Buffel Grass). Active management of edge effects will be employed which may involve weeding to ensure no creep of disturbance responsive weed species into remaining vegetation. Appropriate eradication of problematic species will be employed within construction and operation areas, so that weed control measures do not adversely affect adjacent native vegetation. Clean entry procedures will be enforced for all vehicles, equipment and personnel entering the Project past public carparks. Vehicles will be required to go through a site entry check and wash down. All employees and contractors will be inducted and trained in wash down procedures. All vehicles and equipment are restricted to designated roads and other paved areas to prevent excessive disturbance and dispersal of weed species.

Guidance	Objective	Identified Consistency
		Ongoing weed monitoring will occur within the project site and along the site boundary for new infestations during and following construction activities. Weed risk areas will be identified on weed maps and through the Ground Disturbance Permit (GDP) process and shall be treated as avoidance sites wherever possible."
Conservation Advice Curlew sandpiper Calidris ferruginea (DoE, 2015)	Achieve a stable or increasing population. Maintain and enhance important habitat. Disturbance at key roosting and feeding sites reduced. Raise awareness of curlew sandpiper within the local community.	**Addressed:** ERD, Section 6.7.4.1 "This species has been recorded in the Dampier region (DBCA, 2018) and historically on the Burrup area (Worley Astron, 2006). This species may use the Project area during the wet season. The records suggest that the species prefers undisturbed islands and islets and therefore, likelihood of the species occurrence in the Project area is moderate. Significant impact to the species or the habitat is not anticipated." **Addressed**: PCF-PD-PN-TSMP Threatened Species management Plan, Table 7.2 Mitigation measures of potential impacts to threatened species. Mitigation Measures: Avoid The original processing facility layout was forecast to impact 21.3 ha of the tidal flats and Samphire Shrubland / Saltplains habitat. Following design optimization, proposed clearing of this habitat type has been significantly reduced. Limit clearing to the minimum possible area, not exceeding 73.05 ha. Minimise The entire project layout has been redesigned to minimise habitat fragmentation. The tidal flat area is no longer being reclaimed and raised to a level to support construction. Instead, the processing plant will be located on Site C and Site F will contain administrative buildings and a designated laydown area for construction. The two sites will be joined across the tidal flats by a small causeway enabling access between the two sites. The causeway will contain large culverts to maintain hydrological and tidal flows and also allow fauna to freely move through the structure. Develop and implement a GDP system prior to the commencement of construction. Prior to any clearing, a GDP is required to be approved by the site Environmental Officer. Preferential clearing will occur for well represented habitat types over other habitat types that do not cover significant portions of the site. Land clearing to commence no more than six months prior to commencement of construction.

Guidance	Objective	Identified Consistency
		Clearing will be planned to maximise the ‘area to perimeter’ ratio of remnant vegetation. Clearing of vegetation will be kept to a minimum necessary for safe and efficient construction and operation. Land clearing will be undertaken progressively and incrementally during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site. During the final design phase plan clearing to retain vegetation where possible, such as around carparks and infrastructure, and landscaped areas. Rehabilitate Following construction, ensure that any disturbed habitats (laydown areas) are returned to their pre-disturbance state to reduce the overall impact of habitat loss. Attempt to reinstate valuable microhabitat elements to the landscape to encourage use of the periphery of the site by this conservation-dependent fauna.”

Attachment F – DWER Review

Attachment 1: Document Review and Comments Sheet

Document Title:	Fauna Management Plan Perdaman Urea Project Burrup Peninsula, Western Australia PCF-PD-EN-FaMP 07 February 2022
Revision Number:	Rev PCF 2
Statement/Condition:	Statement 1180: Condition 5 – Terrestrial Fauna Management
Review Date:	21 February 2022

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
1.	Table of Contents	The numbering of sub sections in the following Sections in the plan do not follow chronological order: • 1.2 • 1.4 • 2.3 • 2.4 See Item No. 4 below for more detail. This needs to be corrected.	Addressed
2.	Table of Contents - Figures	Figure 0-1-2 Structure of the project environmental management plan and supporting sub-plans is listed as being on page 5 of the plan. The plan does not include a Figure 0-1-2.	Addressed – (should be Figure 0-1).
3.	Section 1.2	The first paragraph of Section 1.2 reads:	Addition of impacts to social surroundings factor.

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
		'Perdaman has identified six key environmental factors relevant to terrestrial fauna species including; Flora & Vegetation, Terrestrial Fauna, Marine Fauna, Inland Waters, Coastal Processes, Social Surroundings and Marine Environmental Quality. ***Error! Reference source not found.*** *below outlines the environmental f actors and corresponding EPA objectives.* Table 1-1 lists the key environmental factors as: • Flora & Vegetation • Terrestrial Fauna • Coastal Processes • Marine Environmental Quality • Marine Fauna • Inland Waters. The key environmental factors detailed in Section 1-2 should align to those detailed and Table 1-1 and Table 1-2.	
4.	Section 1.2	The numbering of sub sections in Section 1-2 does not follow chronological order, i.e. Section 1.2 - Key Environmental Factors Section 1.2.1 - Potential Impacts The numbering of sub sections in Section 1.2 is as follows: Section 1.2 - Key Environmental Factors Section 1.1.4 - Potential Impacts This is also the case with the numbering of sub sections in Sections 1-4, 2-3 and 2-4 of the plan. This needs to be corrected.	Addressed

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
5.	Table 1-3	Table 1-3 Environmental Factors & Impacts to Terrestrial Fauna This table requires updating with information on short-range endemic species when that information becomes available.	Awaiting SRE survey
6.	Section 2.1	Section 2.1 states: *'There is currently a lack of scientific understanding of the short range endemic fauna species potentially impacted by the Project activities (refer to Section* ***Error! Reference source not found.****). Currently due to this lack of scientific data and survey results, it has been difficult to set appropriate triggers and thresholds specific to the outcome required by MS 1180 which requires that impacts to short-range endemic fauna species are avoided, unless it is demonstrated, and the CEO confirms in writing that the species occurs in a self-sustaining population outside the development envelope. Following the SRE fauna survey results, Perdaman will specify triggers and thresholds that will measure the environmental performance of the Project in avoiding impacts to SRE fauna'.* At the time of DWER's review of the Fauna Management Plan (FaMP) the SRE fauna survey results had not been provided. Consequently, a determination of whether SRE species are occurring in self-sustaining populations outside the proposal development envelope cannot be made. The FaMP cannot be approved, unless: • the CEO determines that SRE species occur in self-sustaining populations outside the proposal development envelope in accordance with Condition 5-1(5); or	Awaiting SRE Survey results

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
		• the proponent develops acceptable trigger and threshold criteria for SRE's and specifies these criteria in the FaMP.	
7.	Table 2-1	Table **Error! No text of specified style in document.**-1 Fauna Outcome-Based Conditions (Triggers, Thresholds, Contingency Actions). Trigger criterion 6 and threshold criterion 6 for SRE's are not specified in the FaMP. The FaMP is required to specify acceptable trigger and threshold criteria, contingency actions, monitoring and reporting.	Awaiting SRE survey results.
8.	Table 2-2	Table **Error! No text of specified style in document.**-2 Threatened Species Objective-Based Management Actions & Targets. <u>FaMP Management Target 21 - Habitat Connectivity</u> Table 2-2 does not include any information on how the management action and management target for habitat connectivity will be monitored or reported. Table 2-2 needs to specify the monitoring and reporting that will demonstrate that the causeway (between sites C and F) on the tidal flats that will contain large culverts is maintaining hydrological and tidal flows and also allowing fauna to freely move through the structures.	Addressed Table 2-2 – Management Action 21.
9.	Table 2-2	Table **Error! No text of specified style in document.**-3 Threatened Species Objective-Based Management Actions & Targets. <u>FaMP Management Target 23 - SRE species Management</u>	Perdaman will update the Table 2-2 and associated Management Actions pertaining to the SRE

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
		Table 2-2 will need to be updated based on the results of SRE fauna surveys that had not been completed at the time of DWER's review of the FaMP. Condition 5-1(5) environmental outcome is for '*impacts to short-range endemic fauna species are avoided*' during implementation of the proposal. Table 2-2 states the frequency and timing of monitoring of the management actions and management targets for SRE's is during construction. Monitoring needs to be undertaken at all stages of the proposal implementation (Construction, operation, decommissioning) not just during construction and Table 2-2 needs to be amended to specify this for management target 23 and other applicable management targets) relevant during the ongoing operation of the proposal.	fauna species likely to be impacted, when the results from the SRE survey have been received. Bennelongia are expected to complete this SRE Survey and Report mid-March 2022. Monitoring -
10.	Table 2-2	Table **Error! No text of specified style in document.**-4 Threatened Species Objective-Based Management Actions & Targets. Table 2-2 includes two references to FaMP management target 24. This needs to be corrected.	Addressed.
11.	Table 3-1	Table 3-1 Corrective Actions 'Ghost Bat trapped in fencing' does not have a title or position listed in the responsibility column. This need to be addressed.	Addressed
12.	Table 3-1	Table 3-1 Corrective Actions	Addressed

Item No.	FaMP Section No. / Issue	DWER Comments	Proponent Response
		Trigger '*Introduction and/ or increase in abundance of pest species or significant weed species in Project area'*. Section 7 includes a definition for Weed of: • A weed is a plant that is regarded as not endemic and considered undesirable in a particular location or region. It is unclear from Table 3-1 and Section 7 what a "significant weed species" is. It is recommended that the FaMP simply refers to 'weeds' rather than 'significant weeds' and the following definition for weeds in included in section 7 of the FaMP: 'Any plant declared under section 22(2) of the *Biosecurity and Agriculture Management Act 2007*, any plant listed on a National Weeds List and any weeds listed on DBCA's Pilbara Impact and Invasiveness Ratings list as amended or replaced from time to time'.	
13.	Appendix 3	The FaMP contains two risk assessments in the appendices: • Appendix 3A - Environmental Risk Assessment Process & Risk Matrix • Appendix 3B - Terrestrial Fauna Risk Assessment Various sections of the FaMP state '*summarised in Appendix 3*' or *'(see risk assessment Appendix*)'. There is only one sentence in the FaMP on page 45 the refers to Appendix 3 and details whether the reader should refer to Appendix A or B. For clarity any paragraph or table in the FaMP that refers to information in Appendix 3 should state whether it is Appendix 3A, 3B or both.	Addressed

Attachment G – Bennelongia SRE Report

Bennelongia Environmental Consultants

Pilbara Perdaman Urea Project

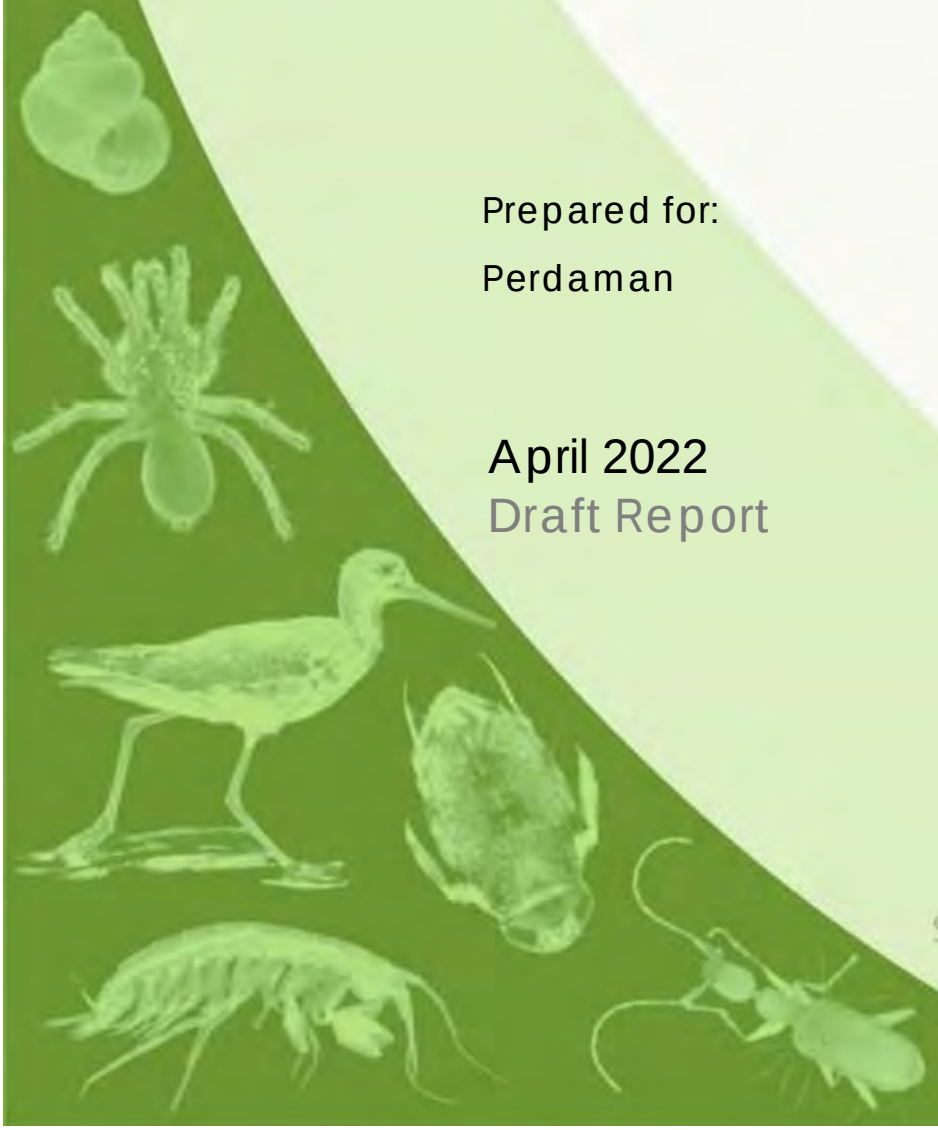
Short-Range Endemic Invertebrate Desktop and Survey Report

Prepared for:

Perdaman

April 2022

Draft Report



Short-Range Endemics | Subterranean Fauna

Waterbirds | Wetlands

Pilbara Perdaman Urea Project Short-Range Endemic Invertebrate Desktop and Survey Report

Bennelongia Pty Ltd
5 Bishop Street
Jolimont WA 6014

F: (08) 9285 8811

ABN: 55 124 110 167

Report Number: 496

Report Version	Prepared by	Reviewed by	Submitted to Client	
			Method	Date
Draft			Email	19 April 2022
Final				

EXECUTIVE SUMMARY

Perdaman Chemicals and Fertilisers Pty Ltd (Perdaman) plans to establish a urea plant on the Burrup Peninsula approximately 20 km north-west of Karratha, Western Australia. The Pilbara Perdaman Urea Project (the Project) will require the construction of the urea production facility, together with associated infrastructure such as administration, maintenance, storage and ship loading facilities. This report describes the occurrence of, and potential impacts on, short-range endemic (SRE) invertebrate species at the Project.

In the context of environmental impact assessment in Western Australia, SRE species are broadly defined as ground-dwelling invertebrates with overall ranges of less than 10,000 km^2. They are usually characterised by patchy distributions within their range, slow growth, low fecundity, and poor dispersal capabilities. Assessment typically focuses on taxonomic groups (the SRE Groups) that are known to contain high proportions of species that are regarded as SREs. The groups include land snails (Gastropoda), millipedes (Diplopoda), centipedes (Chilopoda), pseudoscorpions (Pseudoscorpiones), scorpions (Scorpiones), spiders [Araneae, mainly Mygalomorphae (trapdoor spiders)], slaters (Isopoda) and harvestmen (Opiliones).

This report consists of both a desktop review of likely occurrence and impact of the Project on SRE species and the results of a field survey designed to collect SRE species at the Project. Previous records of terrestrial invertebrate species were collated for a search area of 100 x 100 km around the Project (decimal degrees search area, top left: -20.3°S:116.3°E; bottom right: -21.2°S:117.2°E) using data from Western Australian Museum (WAM) and Bennelongia databases, published research papers and available environmental reports.

Subsequent field survey of SRE invertebrate fauna was undertaken in February and March 2022 in accordance with the Environment Protection Authority's *Technical Guidance: Sampling of Short Range Endemic Invertebrate Fauna*. A total of 424 specimens belonging to at least 28 species of SRE groups were collected. Groups represented include trapdoor spiders (one species), pseudoscorpions (12 species), scorpions (one species), centipedes (two species), millipedes (three species), isopods (six species) and snails (three species).

Twenty-one species are considered to be potential SREs, one an unlikely SRE, and six species are widespread. At least 19 of the 21 potential SRE species are only known from the Project area. They comprise 11 species of pseudoscorpion, six species of isopod, one centipede species and one millipede species. While a species of land snail belonging to the Burrup Peninsula rock pile Priority Ecological Community are present, the probable species is widespread.

Based on the size of the Project area, what is known of the biology of the SRE Groups and the continuous connections of habitat inside the development envelope with similar habitat outside, it is likely that all species have distributions that extend beyond the Project. Therefore, it is unlikely that the Project development will have significant detrimental effect the conservation status of any species.

CONTENTS

Executive Summary iii
1. Introduction 2
1.1. Project Setting 2
1.2. Listing of Threatened Terrestrial Invertebrates 2
1.3. SRE Framework 4
1.4. Local Habitat 4
2. Desktop Assessment 5
2.1. Methods 5
2.2. Results 6
2.2.1. Listed Species and Communities 6
2.2.2. SRE Invertebrate Groups in the Area 6
3. Field Survey 10
3.1. Timing 10
3.2. Survey Effort 10
3.3. Survey Methods 10
3.4. Morphological Species Identifications 16
4. Results 16
5. Discussion and Conclusions 20
5.1. SRE Species 20
5.2. Listed Species and Communities 24
5.3. Summary 24
6. References 24
Appendix 1- Species of SRE invertebrate groups recorded in the Project and its surrounds 27
Appendix 2 – Photographs of SRE collection sites in the Project Area 34

LIST OF FIGURES

Figure 1. Location of the Project on the Burrup Peninsula 3
Figure 2. Surface geology surrounding the Project 7
Figure 3. Habitat types within the Project area 8
Figure 4. SRE groups in the search area 9
Figure 5. Perdaman development envelope and SRE survey sites 11
Figure 6. Potential SRE scorpions and myriapods at the Project 21
Figure 7. Potential SRE pseudoscorpions at the Project 22
Figure 8. Potential SRE isopods and snails at the Project 23

LIST OF TABLES

Table 1. Characterisation of sites (locations shown in Figure 6) where SRE groups were surveyed. 12
Table 2: Species of SRE groups collected during the field survey in the Perdaman Urea Project. 14
Table 3. Species records from target SRE groups within the search area 27

1. INTRODUCTION

1.1. Project Setting

Perdaman Chemicals and Fertilisers Pty Ltd (Perdaman) plans to establish a urea plant on the Burrup Peninsula approximately 20 km north-west of Karratha, Western Australia (Figure 1). The Pilbara Perdaman Urea Project (the Project) will require the construction of the urea production facility along with associated infrastructure, such as administration, maintenance, storage and ship loading facilities.

The Project is situated within the Burrup Strategic Industrial Area (BSIA), adjacent to the Murujuga National Park (Figure 1). The BSIA is the location of multiple pre-existing, established industrial facilities. The Project Development Envelope extends approximately 3.4 km east-west, encompassing around 105 hectares. The Development Envelope can be separated into five key areas consisting of Sites C and F, the causeway, the conveyor and the Port area (Perdaman 2021b).

Site C is bounded to the north by steep rocky outcrops and by saline coastal flat to the south and is essentially undeveloped bar a few access tracks. Perdaman plans to develop Site C to accommodate the main processing plant and urea storage shed. Site F is located on the opposite side of the saline coastal flat to the south of Site C. Hearson Cove Road intersects Site F and the site contains a large proportion of rehabilitated areas. Perdaman will use this site as their laydown area for equipment and the eastern section will house Project infrastructure, including administration, warehouse, maintenance and storage facilities. Linking Sites C and F is the causeway. The causeway will extend across the saline coastal flat and will be built above this flat so as not to impede tidal movement and natural drainage (Perdaman 2021b).

The conveyor will be 3.5 km long and used to transport urea from Site C to the Port Area. The beginning of the conveyor will be constructed on undisturbed habitat before connecting to, and extending along, the existing bitumen sealed Burrup East West Services Corridor (EWSC). The Port Area includes storage and loading facilities on largely previously disturbed land.

1.2. Listing of Threatened Terrestrial Invertebrates

Native flora and fauna in Western Australia are protected at both State and Commonwealth levels. At the state level, the *Biodiversity Conservation Act 2016* (BC Act) provides a legal framework for protection of all species, particularly for species listed by the Minister for the Environment as threatened. At a national level, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) also protects species listed as threatened, although the threatened fauna list of the EPBC Act currently does not cover inland subterranean fauna. In addition to the formal list of threatened species in Western Australia under the BC Act, the Department of Biodiversity, Conservation and Attractions (DBCA) maintains a list of priority fauna species that are of conservation importance but, for various reasons, do not meet the criteria for listing as threatened. Both the EPBC and BC Acts provide frameworks for the protection of threatened ecological communities (TECs). Within Western Australia, DBCA also informally recognises communities of potential conservation concern, but for which there is little information, as priority ecological communities (PECs). The list of TECs recognised under the BC Act is larger than the EPBC Act list and has much greater focus on subterranean communities.

Figure 1. Location of the Project on the Burrup Peninsula

1.3. SRE Framework

SRE species are defined as having overall ranges of less than 10,000 km^2 (Harvey 2002). They tend to exhibit patchy distributions within their range, slow growth, low fecundity, and poor dispersal capabilities. Guidelines for the consideration and assessment of SRE invertebrates in Western Australia are provided in *Environmental Factor Guideline: Terrestrial fauna* (EPA 2016a) and *Technical Guidance: Sampling of short range endemic invertebrate fauna* (EPA 2016b). Assessment typically focuses on several taxonomic groups (the SRE Groups) that are known to contain at least some, but more commonly moderate to high proportions of, SRE species. The groups include land snails (Gastropoda), millipedes (Diplopoda), centipedes (Chilopoda), pseudoscorpions (Pseudoscorpiones), scorpions (Scorpiones), spiders [Araneae, mainly Mygalomorphae (trapdoor spiders)], slaters (Isopoda) and harvestmen (Opiliones). Some other groups, such as velvet worms (Onychophora) and earthworms (Oligochaeta), are SRE Groups but are restricted to mesic landscapes.

Recognising SRE species is the first step is a filtering process when assessing threats to ground-dwelling invertebrates. Small ranges make SRE species potentially vulnerable to development. The first step is focussing assessment on SRE Groups and second step is to determine whether species in the Project are SREs. Determining whether a species belonging to an SRE Group is an SRE (i.e. range <10,000 km^2) is often difficult. Just as groups containing species that are mostly widespread may contain species with very restricted ranges (e.g., Framenau *et al.* 2008; López-López *et al.* 2016; Rix *et al.* 2015), some species belonging to SRE Groups are in fact widespread. However, the distribution of an SRE Group species is likely to reflect the extent of its preferred or obligate habitat(s), so that species that are only found in restricted or patchy habitats usually have smaller ranges than those collected from extensive or common habitats. There is a caveat to inferring range from habitat, in that sometimes short-range endemism may be related to life history or behaviour, rather than historical biogeography, and species may be SREs through occupying only part of a widespread habitat (Harvey 2002; Harvey *et al.* 2011; Rix *et al.* 2015).

Here we screened species using the SRE classification used by the Western Australian Museum (WAM), where a species can be classified into one of the following categories:

1. **Confirmed SREs** have a known distribution range smaller than 10,000 km^2. The taxonomy is well known, and the group well represented in collections and/or via comprehensive sampling.
2. **Potential SREs** belong to a group with gaps in our knowledge, either because the group is not well represented in collections, taxonomic knowledge is incomplete, or the distribution is poorly understood due to insufficient sampling.
3. **Widespread (unlikely SRE)** species have a known distribution range larger than 10,000 km^2. The taxonomy is well known, and the group well represented in collections via comprehensive sampling.

Specifically, the factors considered when evaluating the SRE status of each species in this report were the known range of the species, habitat(s) at the collection location(s) and the spatial extent and connectivity of these habitats, as well as the distribution patterns of phylogenetically related surrogate species (which are ideally members of the same genus). Even restricted species may be locally widespread around a project area, however, so whether a potential SRE species may be threatened by a proposed development depends on the proportion of its population outside the project impact area. This is often done by comparing the extent of the species' preferred habitat within and outside the proposed impact footprint.

1.4. Local Habitat

Habitat prospectivity for SRE invertebrates in the Project area was assessed using regolith mapping and habitat information from Perdaman (Perdaman 2021a, b) (Figure 2 and 3). Since isolated or patchy habitats are generally considered to be more prospective for SRE species, emphasis was placed on identifying relict, isolated, sheltered, or moist habitats.

Regolith mapping revealed, in broad terms, that the area in and around the Development Envelope mostly consists of:

- Widespread exposed rock, saprolite and saprock;
- Areas of slope deposits with colluvium and sheetwash; and
- Tidal flats and tidal channels.

From regolith mapping, it appears that all geological units continue well beyond the Development Envelope (Figure 2). Regarding potential habitat for SRE groups, the isolated exposed rock is the most prospective due to the likelihood of rocky outcrops (which frequently yield SRE species).

Habitat mapping completed by Perdaman (2021a, b) covered only the Development Envelope but the connectivity of habitats within this area to areas of similar habitat outside the Development Envelope could be readily inferred by regolith mapping and inspection of Google Earth maps. The habitats mapped were widespread hummock grassland on mid slopes, marine alluvial flats (samphire shrubland/supratidal flats), drainage lines fringed with well-established eucalypts and isolated rocky outcrops (Figure 3).

The leaf litter of scattered shrubs of *Acacia pyrifolia* and *Acacia inaequilatera* found within hummock grassland on coastal and subcoastal plains, as well as large and tall eucalypt trees within and beside drainage lines, likely provide habitat for SREs in the Development Envelope. The supratidal flats within contain mangal systems that are prone to inundation during the dry and pre-wet season and lacks canopy cover. This area may provide habitat for specialised halotolerant SRE groups. The rocky outcrops in the Development Envelope are defined as small and isolated (Figure 3). These formations exhibit pockets and outcrops that create sheltered habitat for some SRE groups.

Throughout the Burrup Peninsula, weathering has formed deep narrow valleys amongst the exposed bedrock. There are a number of drainage lines present within the Development Envelope with a significant drainage channel in the southwest corner; and the drainage lines host large well-established fringing *Eucalyptus* communities (Perdaman 2021a, b). The coastal and subcoastal plains, characterised as hummock grassland, contain scattered shrubs of *Acacia*. Both *Eucalyptus* and *Acacia* are prospective habitat for SRE groups. This is due to the potential for microhabitats to form within these environments i.e., the accumulation of leaf litter, spaces under bark and large logs. The presence of such organic matter is important for many SRE groups as it provides nutrition and shelter.

2. DESKTOP ASSESSMENT

The specific aims of this assessment are to:

1. Review available vegetation and geological information to assess the prospectivity of habitats within and in the vicinity of the Project for SRE invertebrate fauna;
2. Compile and evaluate records of SRE Group species within and in the vicinity of the Project (including listed species and ecological communities), with available information on their ranges; and
3. Assess the likelihood of the Project having conservation-significant impacts on SRE Group species or listed invertebrate species.

2.1. Methods

Records of species from SRE groups, and records of listed invertebrate species, were compiled by searching the Western Australian Museum (WAM) database, Bennelongia Environmental Consultants database, published research papers and available environmental reports. A comprehensive review of the databases mentioned above was conducted on a 100 x 100 km square area around the Project (coordinates of limits: 20.314°S [N], 116.264°E [W]; 21.223°S [S], 117.226°E [E]). The distribution of records of SRE Group species recorded in the search area are shown in Figure 4.

While the review of previous records provides an indication of the likelihood of SRE and listed species occurring the Project area, the empirical data collected during field surveys are usually a much better guide to what is, or may, be present.

2.2. Results

Appendix 1 provides a tabulated list of species previously recorded in the search area. The records provide an indication of the level of species richness that can be expected within the Development Envelope. It is important to note that due to incomplete or inconsistent taxonomy for some records, it is not possible to determine the exact number of species recorded in the search area. Some recorded species may contain multiple taxa and, conversely, some specimens assigned to different taxa may actually represent the same species.

2.2.1. Listed Species and Communities

The terrestrial invertebrates of the Burrup Peninsula rock pile communities are listed as a Priority 1 PEC and include short-range endemic land snails.

Three Priority species have known distributions that suggest they could possibly occur at project, namely two dragonflies (*Antipodogomphus hodgkini* and *Nosoticta pilbara*), and a single land snail (*Dupucharopa millestriata*). The type location of both dragonflies is Millstream Spring but *Antipodogomphus hodgkini* has also been recorded north of Mardie and along the De Grey River, resulting in a linear range of 363 km (Pinder *et al.* 2010). *Nosoticta pilbara* is known from near Onslow through to Millstream Chichester National Park (linear range of 232 km; ALA 2021; Pinder *et al.* 2010). There are currently no records of these species inside the desktop search area and both are essentially freshwater species (with some dispersal by adults). The land snail is only known from Depuch Island, east-northeast of Roebourne (outside the search area; Solem 1984) and is unlikely to occur at the Project.

2.2.2. SRE Group Species in the Search Area

Based on the desktop search, at least 132 species belonging to SRE Groups have been recorded in the search area, including 22 species of mygalomorph spiders, three species of araneomorph spiders, 19 species of pseudoscorpion, 24 species of scorpion, 11 species of centipede, nine species of millipede, 24 species of isopods and 20 species of land snail (Appendix 1; Figure 4). None of the species had sufficient taxonomic certainty and representation in collections to be categorised as confirmed SREs. However, based on collecting locations and available information regarding habitat specialisation, biology and ecology of the species or their close relatives, 69 of the species are considered potential SREs. In addition, 21 species were data deficient and assigned as potential SREs by default (these species are marked with an asterisk in Table 3).

Records belonging to 52 different species were identified to higher taxonomic levels only because the specimens collected were of a life stage (juveniles) or sex (usually females) that does not allow species level identification. Some of these records might belong to other species already recorded (and so are not viewed as extra species in the species list, such as *Tyrannochthonius* sp. for example). Other records represent an additional species because no other species from that order/family/genus has been recorded in the search area, e.g., *Laevophiloscia* sp. (Appendix 1).

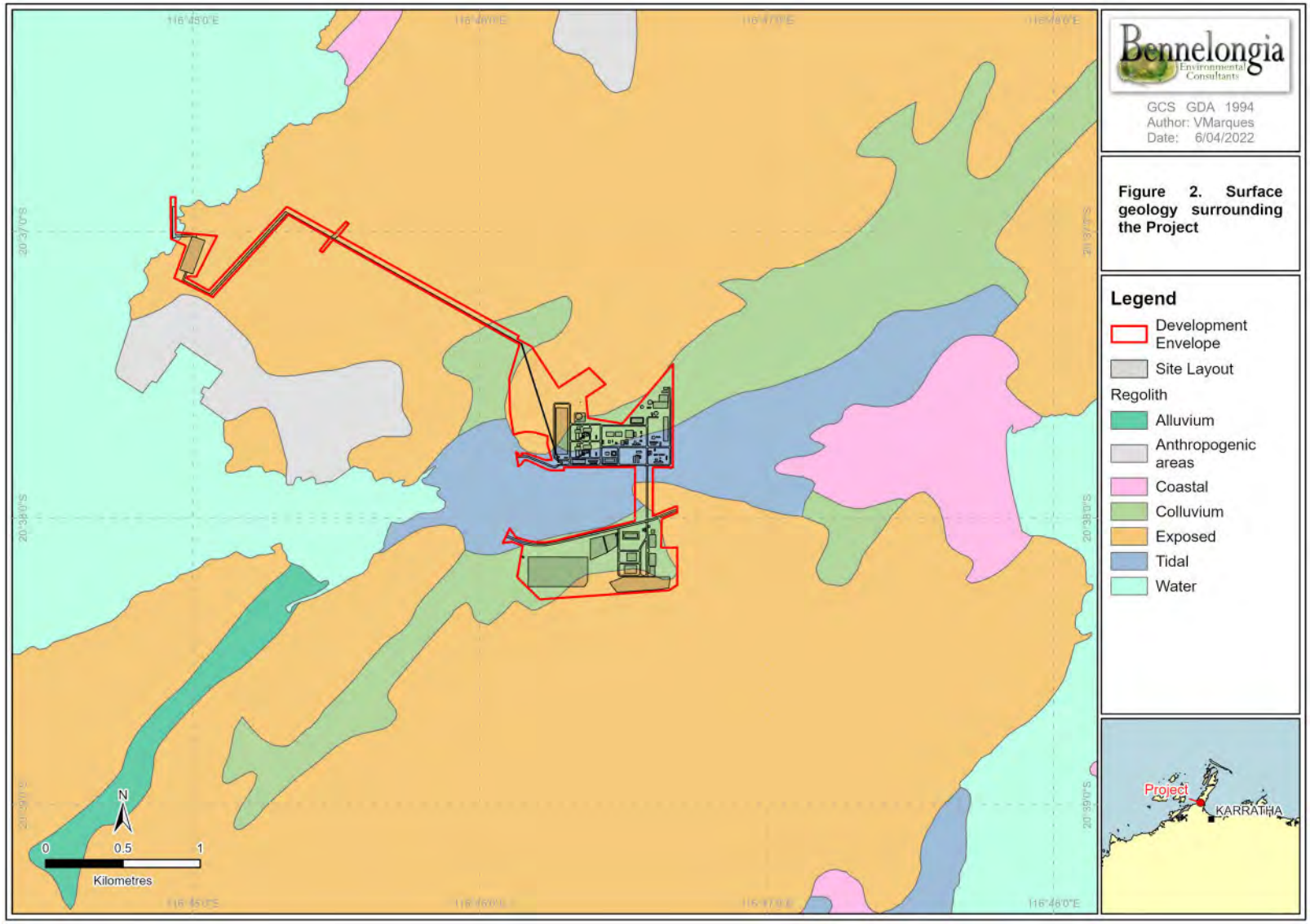


Figure 2. Surface geology surrounding the Project

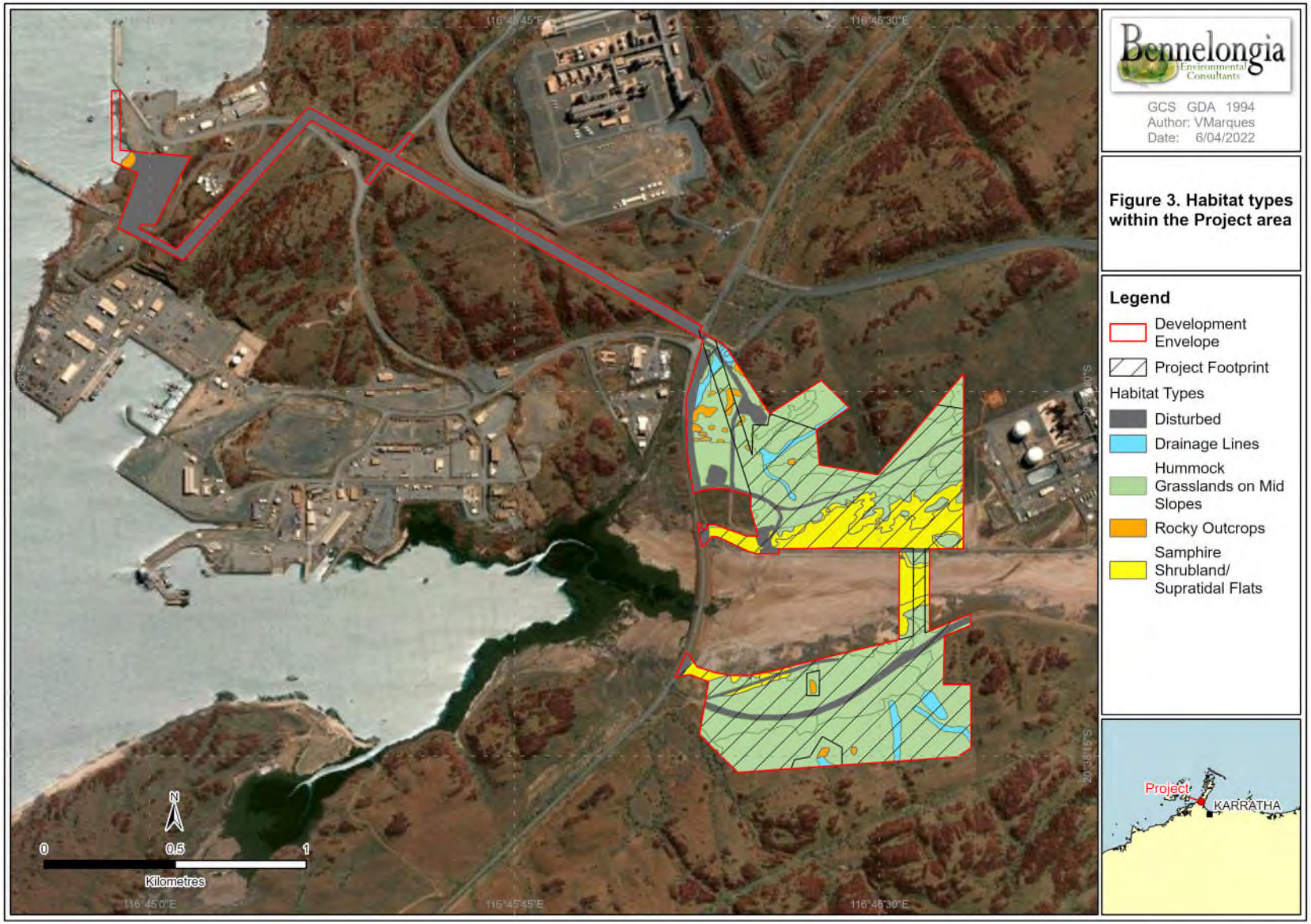


Figure 3. Habitat types within the Project area

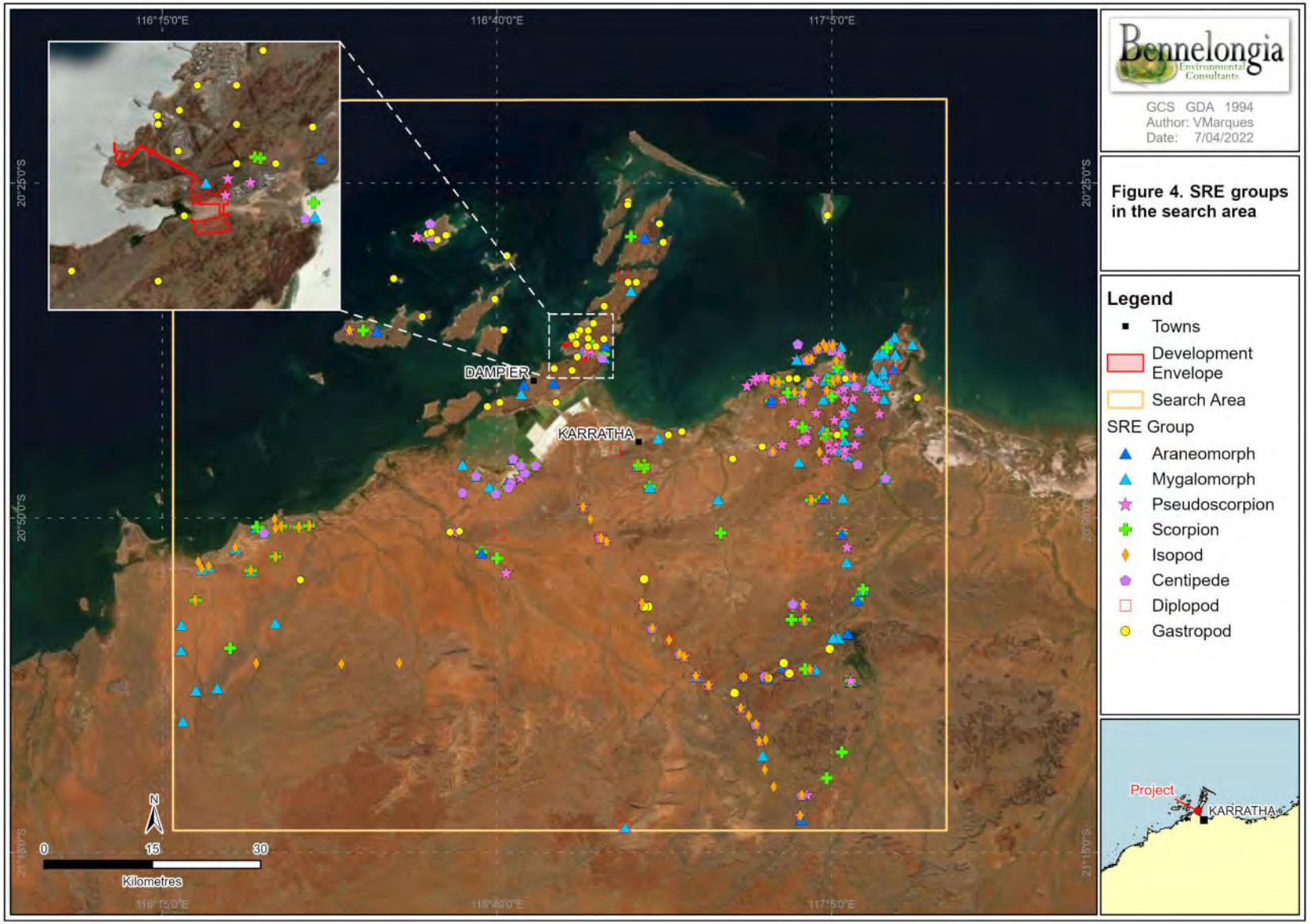


Figure 4. SRE groups in the search area

3. FIELD SURVEY

A field survey for SRE Group invertebrate fauna was undertaken in accordance with *Technical Guidance: Sampling of short range endemic invertebrate fauna* (EPA 2016b). The survey was designed to target species belonging to the SRE Groups other than earthworms and velvet worms. The specific aims of the survey were to:

1. Document SRE Group species occurring in the Project area;
2. Ground truth existing information about SRE habitats of the Project area and its surrounds, including quantifying some characteristics of microhabitats likely to be used by species; and
3. Assess the SRE status of species in the Project area to assess the likelihood of these species being confined to the Development Envelope.

3.1. Timing

The optimal time to sample SREs is immediately after rainfall because most SRE groups are most active immediately following rainfall. This means the optimal survey period for SREs in the Pilbara is during the cyclone season (November to April; EPA 2016b). The nearest weather stations to the Project are Dampier Salt (station 005061) and Karratha Aero (station 004083), which received 1.4 and 1.6 mm of rain respectively from July 2021 to January 2022 (BOM 2022). This is a typical level of rainfall on the Pilbara coast, where most rain is received from late summer through to early winter. Therefore, the fiels survey was conducted from 14–17 February 2022, one week after 17.5 mm was recorded in the area over four days (Dampier Salt station; BOM 2022). Only 0.6 mm of rain was recorded between trap setting in February and trap collection four weeks later on 16 March 2022.

3.2. Survey Effort

Twenty-two sites were sampled across the Project Area, with 14 of these in the Development Envelope (Figure 5) using a range of active search methods that varied at each site according to habitat, knowledge of biology and certain taxa and visual observations of burrows or other signs of target species. The sampling sites were distributed across each of the habitat present based on vegetation mapping provided by Perdaman and aerial imagery, with minor adjustments to the pre-selected locations when in the field to focus on sampling isolated vegetation patches likely to harbour SRE species. Site details are presented in Table 1 and photos of sites are shown in Appendix 2.

3.3. Survey Methods

The survey methods used by Bennelongia were chosen in consultation with Perdaman and the Wildlife Protection Branch of DBCA. Four methodologies were applied during the survey. These were habitat characterisation, active foraging, litter samples and wet pitfall trapping. At 14 sites all four methods were employed, whereas only habitat characterisation was done at eight sites (Table 1). While walking to, from and between sites, any SRE group species observed were collected as opportunistic samples as a means of maximising specimen collection and increasing knowledge on species habitat requirements and distribution around the Project.

Habitat characterisation consisted of recording the dominant vegetation type; land formation and slope of terrain; the depth of leaf litter and estimating proportion of the site area covered by three depth categories (< 1mm, between 1mm and 5mm and > 5mm); and the estimating extent of fire and stock impact on the site (both in categories of 1 to 4).

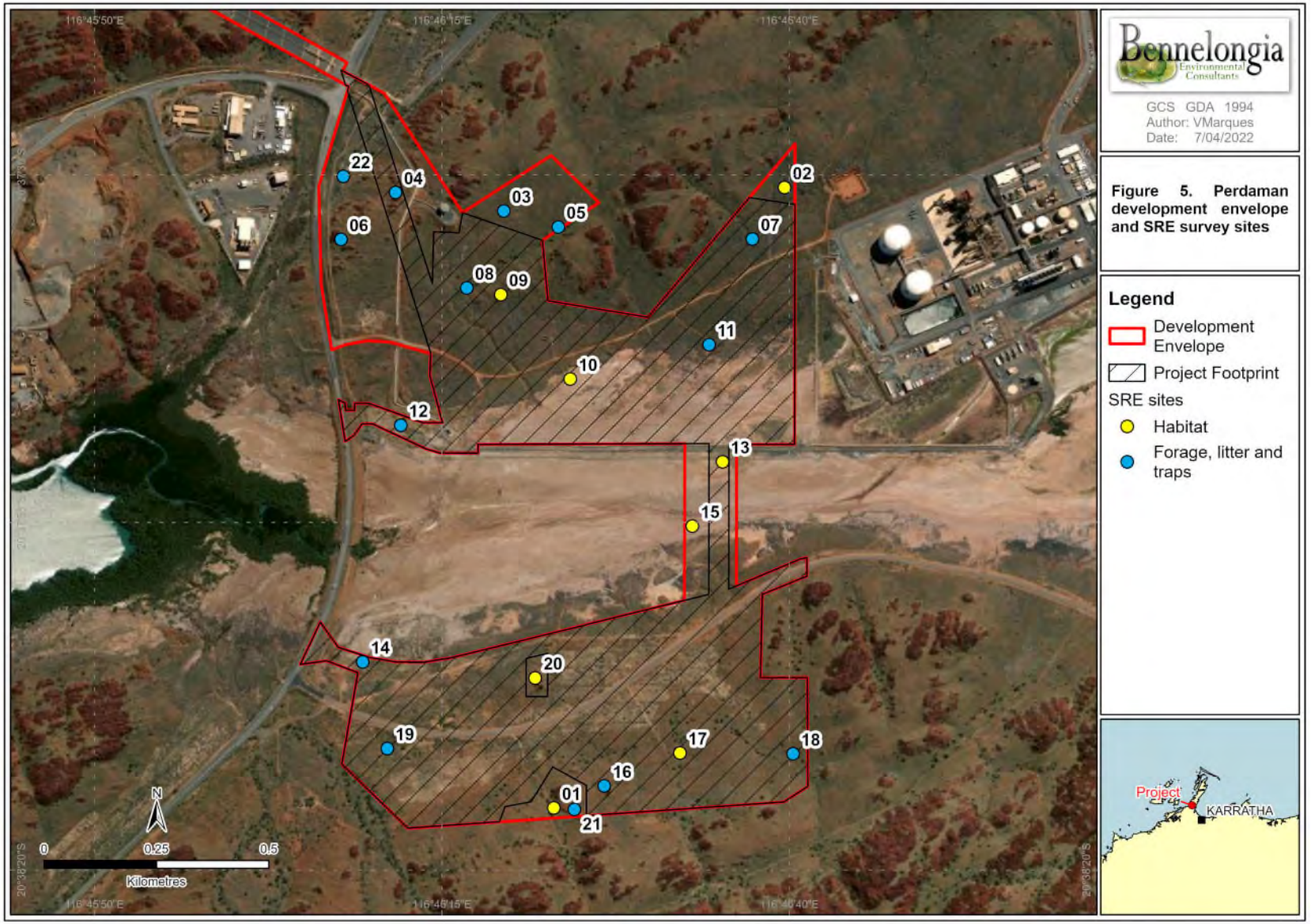


Figure 5. Perdaman development envelope and SRE survey sites

Table 1. Characterisation of sites (locations shown in Figure 6) where SRE groups were surveyed.

Site	Pitfall traps	Bark Peel	Tree Dig	Rock turn	Log Turn	Burrow Dig		Litter Sieve (number)	Leaf Blow	Litter samples	UV Spotlighting	Scorpion cup traps	Shade	< 1 cm litter (%)	< 1 -5 cm litter (%)	> 5 cm litter (%)	Soil Type	Landform	Mapped Habitat Type	Slope	Moisture	Fire Impact score (0 = no fire, 3 = recent intense fire)	Stock Impact score (0 = no stock damage, 3 = intensive stock damage)
Site 01	*Habitat characterisation*												Low 5-20%	5	0	0	Clay Loam Sandy	Medium Drainage Line	Drainage Line	Moderate	Dry	0	0
Site 02	*Habitat characterisation*												Low 5-20%	2	0	0	Clay Loam Sandy	Sandy/ Stony Plain	Hummock Grasslands on Mid Slopes	Low	Dry	0	0
Site 03	✓		✓	✓				2	✓	2	✓		Negligible <5%	5	2	0	Clay Loam Sandy	Stony Plain	Hummock Grasslands on Mid Slopes	Low	Dry	0	0
Site 04	✓			✓				3	✓	2			Negligible <5%	0	5	0	Clay Loam Sandy	Boulders/ Rockpiles	Rocky Outcrops	Moderate	Dry	0	0
Site 05	✓	✓	✓	✓	✓			2	✓	2			Low 5-20%	10	2	0	Clay Loam Sandy	Minor Drainage Line	Drainage Line	Low	Dry	0	0
Site 06	✓	✓	✓	✓				3	✓	2	✓		Negligible <5%	2	10	0	Clay Loam	Boulders/ Rockpiles	Rocky Outcrops	Moderate	Dry	0	0
Site 07	✓	✓	✓	✓	✓			2	✓	2	✓		Low 5-20%	15	0	0	Clay Loam Sandy	Stony Plain	Hummock Grasslands on Mid Slopes	Low	Dry	0	0
Site 08	✓	✓	✓	✓	✓			3	✓	2			Medium 40-60%	30	5	0	Clay Loam Sandy	Major Drainage Line	Drainage Line	Moderate	Dry	0	0
Site 09	*Habitat characterisation*												Negligible <5%	1	0	0	Clay Loam Sandy	Boulders/ Rockpiles	Rocky Outcrops	Flat	Dry	0	0
Site 10	*Habitat characterisation*												Negligible <5%	0.5	0	0	Sand	Saline Flats and Marsh	Samphire Shrubland/ Supratidal Flats	Flat	Damp Topsoil	0	0
Site 11	✓			✓	✓	1		3	✓	2			Negligible <5%	0.5	0	0	Clayey Sand	Saline Flats and Marsh	Samphire Shrubland/ Supratidal Flats	Flat	Dry	0	0
Site 12	✓		✓	✓				2	✓	2			Negligible <5%	2	1	0	Clayey Sand	Saline Flats and Marsh	Samphire Shrubland/ Supratidal Flats	Flat	Dry	0	0

Site	Pitfall traps	Bark Peel	Tree Dig	Rock turn	Log Turn	Burrow Dig		Litter Sieve (number)	Leaf Blow	Litter samples	UV Spotlighting	Scorpion cup traps	Shade	< 1 cm litter (%)	< 1 -5 cm litter (%)	> 5 cm litter (%)	Soil Type	Landform	Mapped Habitat Type	Slope	Moisture	Fire Impact score (0 = no fire, 3 = recent intense fire)	Stock Impact score (0 = no stock damage, 3 = intensive stock damage)
Site 13	*Habitat characterisation*												Negligible <5%	5	0	0	Sand	Sand Plain	Hummock Grasslands on Mid Slopes	Flat	Dry	0	0
Site 14	✓			✓		1				0			Negligible <5%	0	0	0	Clay Loam Sandy	Tidal Flats	Samphire Shrubland/ Supratidal Flats	Flat	Dry	0	0
Site 15	*Habitat characterisation*												Negligible <5%	0	0	0	Clayey Sand	Tidal Flats	Samphire Shrubland/ Supratidal Flats	Flat	Dry	0	0
Site 16	✓		✓	✓				2	✓	2			Low to Med 20-40%	2	2	0	Clay Loam Sandy	Boulders/ Rockpiles	Rocky Outcrops	Low	Dry	0	0
Site 17	*Habitat characterisation*												Low 5-20%	5	2	0	Clay Loam Sandy	Medium Drainage Line	Drainage Line	Low	Dry	0	0
Site 18	✓	✓	✓	✓		2		2	✓	2	✓		Low 5-20%	10	0	0	Clay Loam Sandy	Medium Drainage Line	Drainage Line	Low	Dry	0	0
Site 19	✓	✓	✓	✓	✓	1		3	✓	2	✓		Low 5-20%	20	0	0	Clay Loam Sandy	Stony Plain	Hummock Grasslands on Mid Slopes	Flat	Dry	0	1
Site 20	*Habitat characterisation*												Negligible <5%	2	0	0	Clay Loam Sandy	Boulders/ Rockpiles	Rocky Outcrops	Flat	Dry	0	0
Site 21	✓		✓	✓				2	✓	2			Negligible <5%	0	1	0	Clay Loam Sandy	Sandy/ Stony Plain	Hummock Grasslands on Mid Slopes	Moderate	Dry	0	0
Site 22	✓	✓	✓	✓				3	✓	2	✓		Low 5-20%	20	5	0	Clay Loam Sandy	Medium Drainage Line	Drainage Line	Low	Dry	0	0

Table 2: Species of SRE groups collected during the field survey in the Perdaman Urea Project.
N.B. Grey denotes higher order identifications that might belong to other listed species (not viewed as unique species); blue represents species complexes.

Higher Classification	Lowest Identification	Specimens	Sites	Known only from the Project?	Distribution and SRE status
Arthropoda					
ARACHNIDA					
Araneae					
Mygalomorphae					
Anamidae	*Aname mellosa*	4	14, 18, 19	No	Widespread
Pseudoscorpiones					
Chernetidae	Chernetidae `BPS431`	11	5, 6	Yes	**Potential SRE**; multiple habitat types
	Chernetidae `BPS432`	5	19	Yes	**Potential SRE;** singleton
Chthoniidae	*Tyrannochthonius aridus*	1	22	No	**Potential SRE**; found elsewhere in the Pilbara
Hyidae	*Indohya* `BPS433`	2	6	Yes	**Potential SRE**; singleton
Olpiidae	*Beierolpium* 8/2 `BPS427`	6	3, 16, 21	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS428`	33	3, 7, 8, 18	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS429`	27	3, 4, 6, 12, 16, 18	Yes	**Potential SRE**; multiple habitat types
	Beierolpium 8/4 `BPS430`	5	5, 11	Yes	**Potential SRE**; multiple habitat types
	Beierolpium sp.	4	3, 12, 18	Uncertain	Likely represents the species above
	Indolpium `BPS423`	6	4, 11	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS424`	2	4, 14	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS425`	12	3, 5, 7, 14, 19, 21	Yes	**Potential SRE**; multiple habitat types
	Indolpium `BPS426`	4	11, 16	Yes	**Potential SRE**; multiple habitat types
	Indolpium sp.	4	8, 18, 21	Uncertain	Likely represents the species above
	Olpiidae sp.	12	3, 4, 8, 14, 21, 22	Uncertain	Likely represents the species above
Scorpiones					
Urodacidae	*Urodacus armatus s.l.*	2	14	No	**Potential SRE**; found elsewhere in the Pilbara
MALACOSTRACA					
Isopoda					

Higher Classification	Lowest Identification	Specimens	Sites	Known only from the Project?	Distribution and SRE status
Armadillidae	*Buddelundia* `BIS468`	7	18, 19	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS469`	6	3, 8, 18	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS470`	5	4, 5, 21	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS471`	5	3, 7, 16	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS472`	4	7, 8	Yes	**Potential SRE**; multiple habitat types
	Buddelundia `BIS473`	1	3	Yes	**Potential SRE**; singleton
	Buddelundia sp.	2	12	Uncertain	Likely represents the species above
	Armadillidae sp.	1	11	Uncertain	Likely represents the species above
CHILOPODA					
Geophilida					
Geophilidae	Geophilidae sp.	1	19	Uncertain	Data deficient **Potential SRE**; singleton
Scolopendrida					
Scolopendridae	*Scolopendra morsitans*	32	3, 4, 5, 6, 7, 8, 12, 18, 19, 21	No	Widespread
DIPLOPODA					
Polydesmida					
Paradoxosomatidae	Paradoxosomatidae sp.	1	16	Uncertain	Data deficient **Potential SRE**; singleton
Polyxenida					
Polyxenidae	*Unixenus* sp.	3	7, 18	Uncertain	Data deficient unlikely SRE
Synxenidae	*Phryssonotus novaehollandiae*	44	3, 4, 5, 7, 8, 22	No	Widespread
MOLLUSCA					
GASTROPODA					
Stylommatophora					
Camaenidae	*Rhagada convicta*	161	1, 3, 4, 5, 6, 8, 12, 14, 19, 22	No	Widespread
Pupillidae	*Pupoides contrarius*	9	11, 19	No	Widespread
	Pupoides lepidulus	2	12, 16	No	Widespread

Active foraging consisted of visual searching for evidence of SRE Group species and included searching under boulders and bark, counting spider burrows and digging up representative burrows to confirm species identifications, setting of cup traps to catch scorpions, digging through litter and around roots and sieving litter (Table 1). Foraging was conducted in all relevant microhabitats present at a survey site, such as under logs, rocks, tree bark or in the shade of south facing slopes. Active foraging was always performed for at least 1 hr by two people, equating a total of 2 hr of sampling effort per site. All animals collected were preserved directly in 100% ethanol and kept refrigerated at 4 °C.

Litter Samples were taken at each of the sites where active foraging was undertaken (and where litter is available for collection) to capture small species, such as pseudoscorpions, small snails, scorpions, centipedes and millipedes. Two calico bags, each filled with approximately 1 L of leaf litter (preferably from two different plant species) and underlying soil, were collected on site, and transported to the laboratory in Perth. Litter samples were then processed in Tulgren Funnels which separates the animals into preservation fluid for subsequent sorting and identification.

Wet pitfall trapping was undertaken by digging a hole in the ground into which a 500 ml container with 70 mm aperture was inserted until the mouth of the container was level with the ground surface. A 25 X 25 mm mesh was placed over the aperture to limit the collection of by-catch. The opening of traps was covered by a slightly raised roof to deter larger animals from being collected as by-catch and to protect the trap from damage due to rain and other natural events (Richter and Freegard 2009). Three pitfall traps were placed at each site and left in situ for four weeks. Once collected, traps were returned to Perth for sorting and identification of animals.

3.4. Species Identifications

All animals collected by foraging, and the species belonging to SRE groups in the Tullgren funnels and wet pitfall traps, were identified morphologically to species level unless the material was unsuitable for identification. This was done using dissecting and compound microscopes and the available taxonomic literature, unpublished keys, and reference collections. The identifications were made by Jane McRae (isopods, pseudoscorpions, millipedes), Kevin Espinoza (spiders, scorpions), Huon Clark (snails), Melanie Fulcher (centipedes), Heather McLetchie (millipedes) and Melita Pennifold (millipedes) at the Bennelongia laboratory.

4. RESULTS

The field survey collected 424 specimens of at least 28 different species from SRE Groups. These included spiders (one species), pseudoscorpions (at least 12 species), scorpions (one species), centipedes (two species), millipedes (three species), isopods (at least six species) and snails (three species). Table 2 provides a list of species from SRE Groups collected during the single season survey and an assessment of their SRE status. Detailed comments about the results of taxonomy and SRE status are provided below for some species. Not all species are discussed, and the reader should refer to Table 2 for a comprehensive listing of species and status.

Araneomorph spiders

Two species of 'wall crab spiders' (or 'flatties') from the genus *Karaops* have been recorded in the search area (Table 3). This genus currently contains 37 described species throughout Australia and potentially many more undescribed (Crews and Harvey 2011; Crews 2013). Both *Karaops ngarluma* and *Karaops jaburrara* are considered potential SREs because they have been recorded only from north-west of Lake Poongkaliyarra to south-west of Roebourne and 15 km west of Wickham, respectively (Crews 2013). In addition, higher order identifications belonging to the genus *Karaops* have been recorded 2.6 km N of the Project. Thus, although species of *Karaops* were not collected in the field survey, members of this genus potentially occur at the Project.

Mygalomorph (trapdoor) spiders

The majority of mygalomorph spiders construct burrows (Main 1985), often close to their maternal burrow due to their poor dispersal ability (Buzatto *et al.* 2021). Burrow morphology can be highly variable between species (Mason *et al.* 2012), consisting of open holes (Castalanelli *et al.* 2020) covered by trapdoors (Main 1985). Those that build trapdoors often incorporate specific vegetation into the lids (Rix *et al.* 2018), highlighting the importance of habitat and species associations for these species.

The desktop review identified 15 species of trapdoors spiders in the search area that were considered potential SREs (Appendix 1), representing the families Anamidae (six species), Barychelidae (one species), Halonoproctidae (five species) and Idiopidae (two species). Although some of these species could potentially occur within the Development Envelope due to their proximity to the Project and local habitat connectivity, the field survey collected only one species of trapdoor spider, *Aname mellosa*.

Open-holed trapdoor spiders (family Anamidae)

Aname mellosa has been recognised as a species complex for sometime. Recently Castalanelli (2020) has described 11 new species of the genus from arid WA and Rix et al. (2021) investigated the genus genetically, identifying 17 different species belonging to the '*mellosa* group'. The records of *Aname mellosa* from the search area and field survey belong to *Aname mellosa* sensu stricto, which is a relatively widespread species in the Pilbara.

Pseudoscorpions

Epigean pseudoscorpion species are generally considered to have widespread distributions and it has been suggested that few species are SREs (Harvey 2002). Notably, however, some species are restricted to specialist habitats including granite outcrops and have limited distributions (Harvey 2010, 2012; Harvey 2018; Harvey *et al.* 2015). Phoresy (dispersal by means of attachment to a host organism) has been documented for many families of pseudoscorpion (Jhasser Martínez *et al.* 2018; Lira and Tizo-Pedroso 2017; Muchmore 1972), perhaps giving rise to relatively wide ranges. However, pseudoscorpion taxonomy is poorly resolved, largely due to high diversity, and accurate range determination can be difficult.

The desktop detected at least 19 species of pseudoscorpions of nine different families within the search area; seven of these species were considered potential SRE. The field survey identified at least 12 species of pseudoscorpion in the Project, representing the families Chernetidae, Chthoniidae, Hyidae and Olpiidae.

Family Chernetidae

Within Chernetidae, two different species were collected (Chernetidae `BPS431` and Chernetidae `BPS432`). Whereas Chernetidae `BPS431` was collected from sites 05 and 06 in the current survey, Chernetidae `BPS432` is currently known from a singleton at site 19. Both species are only known from the Project area and are considered potential SREs.

Family Chthoniidae

The species *Tyrannochthonius aridus* has been considered widespread in the Pilbara, however recent data suggest these records represent a species complex. Sequences publicly available in GenBank exhibit divergence greater than expected from one species. *Tyrannochthonius aridus* has been recorded at one location within the search area at Millstream-Chichester N.P. (as well as much more widely in the Pilbara) and at site 22 during the field survey; the species is considered a potential SRE (assuming the species at the project does not have the full range currently recognised for *Tyrannochthonius aridus*).

Family Hyidae

Only one species belonging to the family Hyidae was recorded in the Project area, *Indohya* `BPS433. The species is a singleton currently known from site 06 and, therefore, is considered a potential SRE.

Family Olpiidae

The family Olpiidae is large and diverse, containing 22 genera and 193 described species. There are many more species that await description, some of which are known to be SREs (Štáhlavský *et al.* 2006). Multiple records of Olpiidae sp. occur throughout the desktop search area and, as most species are represented by higher order identifications, they are considered potential SRE. At least eight species of Olpiidae: *Beierolpium* 8/2 `BPS427`, *Beierolpium* 8/4 `BPS428`, *Beierolpium* 8/4 `BPS429`, *Beierolpium* 8/4 `BPS430`, *Indolpium* `BPS423`, *Indolpium* `BPS424`, *Indolpium* `BPS425` and *Indolpium* `BPS426` were collected from different habitat types within the Project area and are potential SREs.

Scorpions

The framework for formal scorpion identification in Australia needs revisions, so determining the distribution of morphospecies of the family Urodacidae requires comparison with a range of specimens from the region.

Family Urodacidae

The genus *Urodacus* is endemic to Australia where there are currently 20 described species although additional, undescribed species are known from the Western Australian Museum collection. Some of the described species are widespread, but even in these species the populations are restricted and only occupy small and patchy areas of the available habitat. At the same time, other *Urodacus* species are confirmed SREs, so that undescribed *Urodacus* are usually considered potential SREs. Seven species of *Urodacus* have been recorded in the desktop search area, and one species was collected during the field survey.

There are multiple records within the search area of *Urodacus* `hamersley black`. This species currently has a minimum known linear distribution of 47 km and is a Potential SRE that potentially occurs at the Project. Similarly, *Urodacus* `pilbara 5`, *Urodacus* `SCO010, pearcei` and *Urodacus* `erramurra` are also considered potential SREs, with the latter two being represented by records from a single location at Erramurra near Cape Preston. *Urodacus* `sp. pilbara 8` and *Urodacus* `sp. 9` are well-known species distributed throughout the Pilbara'.

Urodacus `armatus`, has been recorded state-wide and is probably an amalgamation of many species, although originally considered to be a highly variable species with a wide range (Volschenk *et al.* 2010). In the search area, *Urodacus* `armatus`, has been previously recorded 2.5 km west and 17 km north of the Project and is considered a potential SRE (assuming *Urodacus* `armatus` is a species complex). *Urodacus* `armatus` was collected from site 14 during the field survey.

Chilopods (centipedes)

Centipedes are generally ground-dwelling, burrowing predators that utilise undergrowth and leaf litter habitats. Of the centipede species recorded from the desktop and field survey, five species were considered Potential SREs.

Order Geophilida

The species Mecistocephalidae sp., Oryidae sp. and Schendylidae sp. from the search area and Geophilidae sp. collected from site 19 are higher order identifications and limited information is available. As the families are known to contain SRE species, these species are currently treated as data deficient potential SREs.

Order Scolopendrida

The genus *Cryptops* is regarded as taxonomically difficult and there are currently 148 species recognised within this group, which is known to contain SRE species and widespread species (Lewis 2009). *Cryptops* sp. B48 has been recorded at one location 52 km south-east of the Project and is a potential SRE.

Diplopods (millipedes)

Six species of millipede belonging to the family Paradoxosomatidae were recorded within the search area. *Orthomorpha coarctata* is a widely introduced species of millipede and is thought to be native to south-east Asia (ALA 2021). The genera *Boreohesperus* is endemic to Western Australia (Car and Harvey 2013). *Boreohesperus undulatus* has been collected from two localities- Karratha Station and Marda Pool and is a potential SRE. It has a linear distribution of approximately 50 km, with the closest record occurring 27 km from the Project. It is likely that this species occurs at the Project.

The remaining three species belong to the diverse genus *Antichiropus*. This genus comprises leaf litter dwellers and has been extensively studied recently, with many species now considered confirmed SREs (Car and Harvey 2014; Car *et al.* 2019; Car *et al.* 2013). *Antichiropus spathion* however appears to have a larger distribution than most Pilbara millipede species, ranging from the Coongan River area, near Marble Bar to Wickham- approximately 500 km (Car *et al.* 2019) and is treated as widespread. Similarly, *Antichiropus* `DIP032, bluespec` and *Antichiropus salutus* have been recorded at multiple locations up to 345 km and 119 km apart, respectively, and are considered widespread (Car *et al.* 2019). Only one species belonging to the family Paradoxosomatidae was collected in the 2022 survey. The specimen from site 16 was juvenile and in poor condition and, therefore, could not be identified to species level. As some millipedes in this family are confirmed SREs, Paradoxosomatidae sp. was considered to be a potential SRE, although there is doubt about this classification.

Two species within the order Polyxenida (pin-cushion millipedes) were also collected during the field survey. *Phryssonotus novaehollandiae* (family Synxenidae) is a widespread described species, and the records of *Unixenus* sp. (family Polyxenidae), despite being identified to genus level only, are unlikely SREs (Short and Huynh 2013).

Isopods (slaters)

In Australia, the order Isopoda contains a largely undescribed and diverse group of terrestrial epigean crustaceans (suborder Oniscidae) that, due to poor dispersal capabilities and specific habitat preferences, are often SREs (Judd 2004; Judd and Horwitz 2003; Judd and Tati 2011). Two families of isopod have been recorded in the area (Armadillidae and Philosciidae), with Armadillidae being the most dominant in the desktop search and the only family collected in the field survey.

The dominant armadillid genus in the desktop search area was *Buddelundia*,with at least 17 species of varying SRE status (12 species are considered to be SREs). The field survey recorded at least six different species of isopods from the genus *Buddelundia* (*Buddelundia `BIS468`, B. `BIS469`, B. `BIS470`, B `BIS471`, B. `BIS472` and B. `BIS473`*). All species are undescribed, only known from the Project area and are treated as potential SREs.

Gastropoda (land snails)

Terrestrial snails are collected frequently during fauna surveys and the community in the Dampier Archipelago and Burrup Peninsula is particularly diverse. The desktop search recorded 20 species of land snail from two families within the search area (Table 2). The family Camaenidae is dominant, with two genera present *Rhagada* and *Quistrachia*. The field survey recorded one species of *Rhagada* within the Project area.

There are currently 31 described species of *Rhagada* in WA, seven of which are endemic to the Dampier Archipelago (Johnson *et al.* 2004; Johnson *et al.* 2012; Johnson *et al.* 2016). The four *Rhagada* species found on the Burrup Peninsula have complementary geographic distributions, showing sympatry only at the edges of their distributions. Three of these species occur in the vicinity of the Project. *Rhagada convicta* has been recorded to the south, *R. ngurrana* to the east and north, and one undescribed species (morphotype Morph HP) to the north of the Project area (Johnson *et al.* 2016). Thus, as the locations of sites sampled in the field survey lie between the distributions of the species mentioned above, the specimens recorded in the field survey are likely to belong to one of these species. Although shell

morphology suggest that it may be the relatively widespread *R. convicta*, studies have shown that some shells of different *Rhagada* species are indistinguishable and primary taxonomic evidence should come from DNA sequences (Johnson *et al.* 2016). As all specimens were collected as shells of dead individuals, genetic sequencing is not possible the identification of animals collected during the survey as *Rhagada convicta* is tentative.

5. DISCUSSION AND CONCLUSIONS

Twenty-two sites were sampled for species in SRE Groups during the field survey. The sample sites, selection of which was based on imagery and habitat mapping provided by Perdaman, were located throughout the Project Development Envelope. When vegetation information and ground-truthing was added to regolith mapping, four fauna habitat types were identified within the envelope:

- Hummock grassland on mid slopes with scattered shrubs of *Acacia*,
- Marine alluvial flats (samphire shrubland/supratidal flats),
- Drainage lines fringed with well-established eucalypts, and
- Isolated rocky outcrops.

5.1. SRE Species

The field survey collected a total of 424 specimens belonging to at least 28 species. We classify 21 species as potential SRE species, many of which are default assignments due to lack of data. One species is classified as an unlikely potential SRE (although also with inadequate data) and six species are classified as widespread (Table 2).

The scorpion *Urodacus armatus* s.l. and the pseudoscorpion *Tyrannochthonius aridus*, although considered potential SREs, have been recorded elsewhere outside the Project (Figure 6 and 7). Thus, these species are unlikely to be impacted by proposed development.

At least 19 of the 21 species with some potential to be SREs are only known from the Project area, comprising 11 species of pseudoscorpion, six species of isopod, one species of centipede and one species of millipede. Among the pseudoscorpions, four species are currently known only from the Project footprint (Figure 7). However, *Indolpium* `BPS423`, *Indolpium* `BPS424` and *Indolpium* `BPS426` were each collected from more than one habitat type within the footprint, which suggests unspecific habitat preferences and, as a consequence, geographic distributions that may extend beyond the Project footprint. Chernetidae `BPS432` was recorded as a singleton from site 19, collected from bark peeling of *Eucalyptus* within hummock grassland. Given that this is the most extensive habitat type in the Project and surroundings, and that site 19 is located only 87 m from the western boundary of the footprint, Chernetidae `BPS432` is also likely to occur outside the Project footprint.

Two species of isopod are also only known from the Project footprint (Figure 8). However, similarly to the species of *Indolpium* discussed above, *Buddelundia* `BIS468` and *Buddelundia* `BIS472` were collected from multiple habitat types, which increases the likelihood of these species occurring outside the Project footprint.

The centipede Geophilidae sp. and the millipede Paradoxosomatidae sp. were recorded as singletons within the Project footprint (Figure 6) but could not be identified further because were juvenile specimens. Thus, the species were considered data deficient Potential SREs. Geophilidae sp. was collected from wet trapping on site 19 within hummock grassland, the most extensive habitat type on the Burrup Peninsula. Paradoxosomatidae sp. was collected from a leaf litter sample on site 16 within rocky outcrop habitat. The rocky outcrops within the Project area are small and isolated but larger outcrops are found to the south, which may have substantial prospectivity for millipedes and other SRE

Figure 6. Potential SRE scorpions and myriapods at the Project

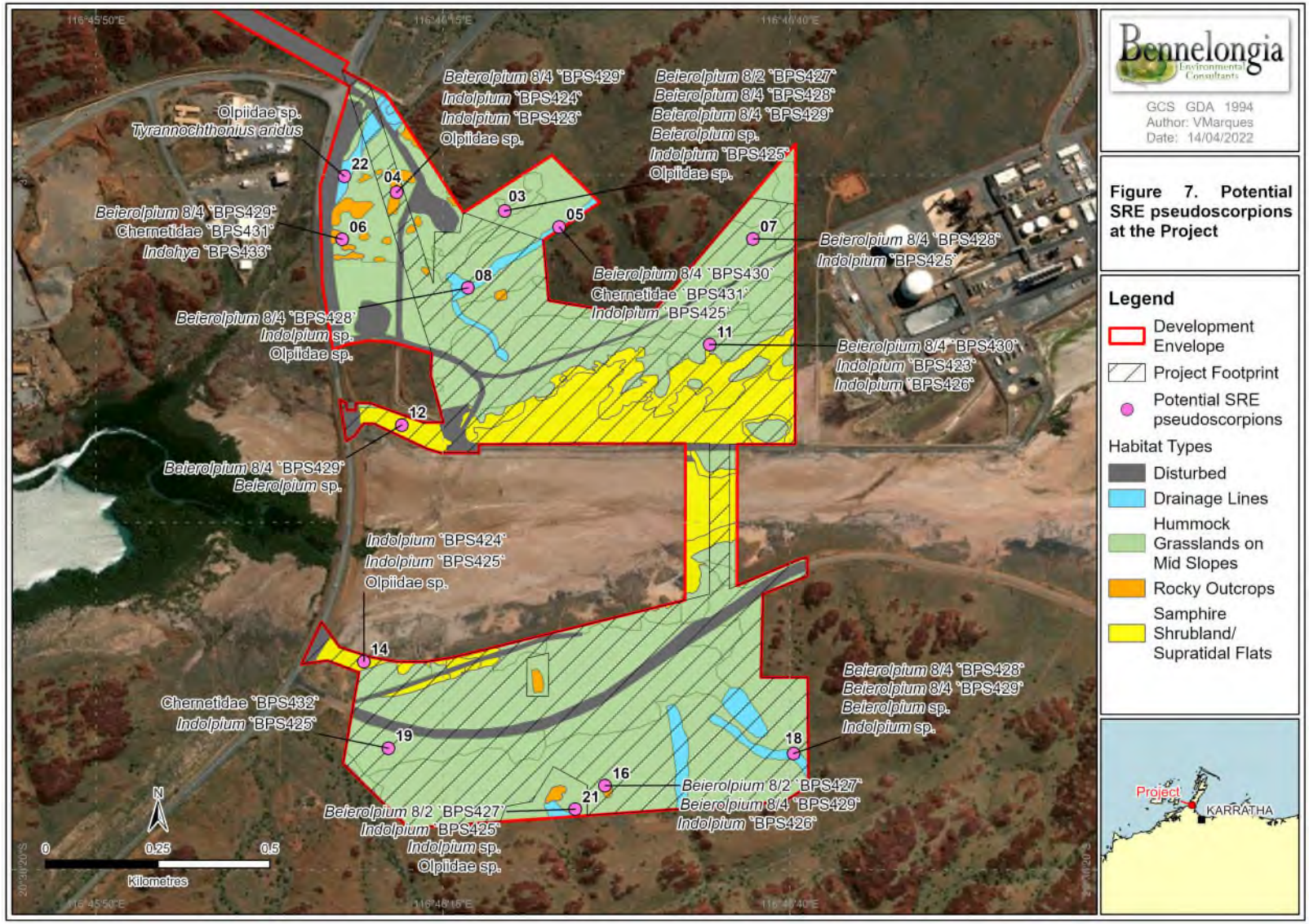


Figure 7. Potential SRE pseudoscorpions at the Project

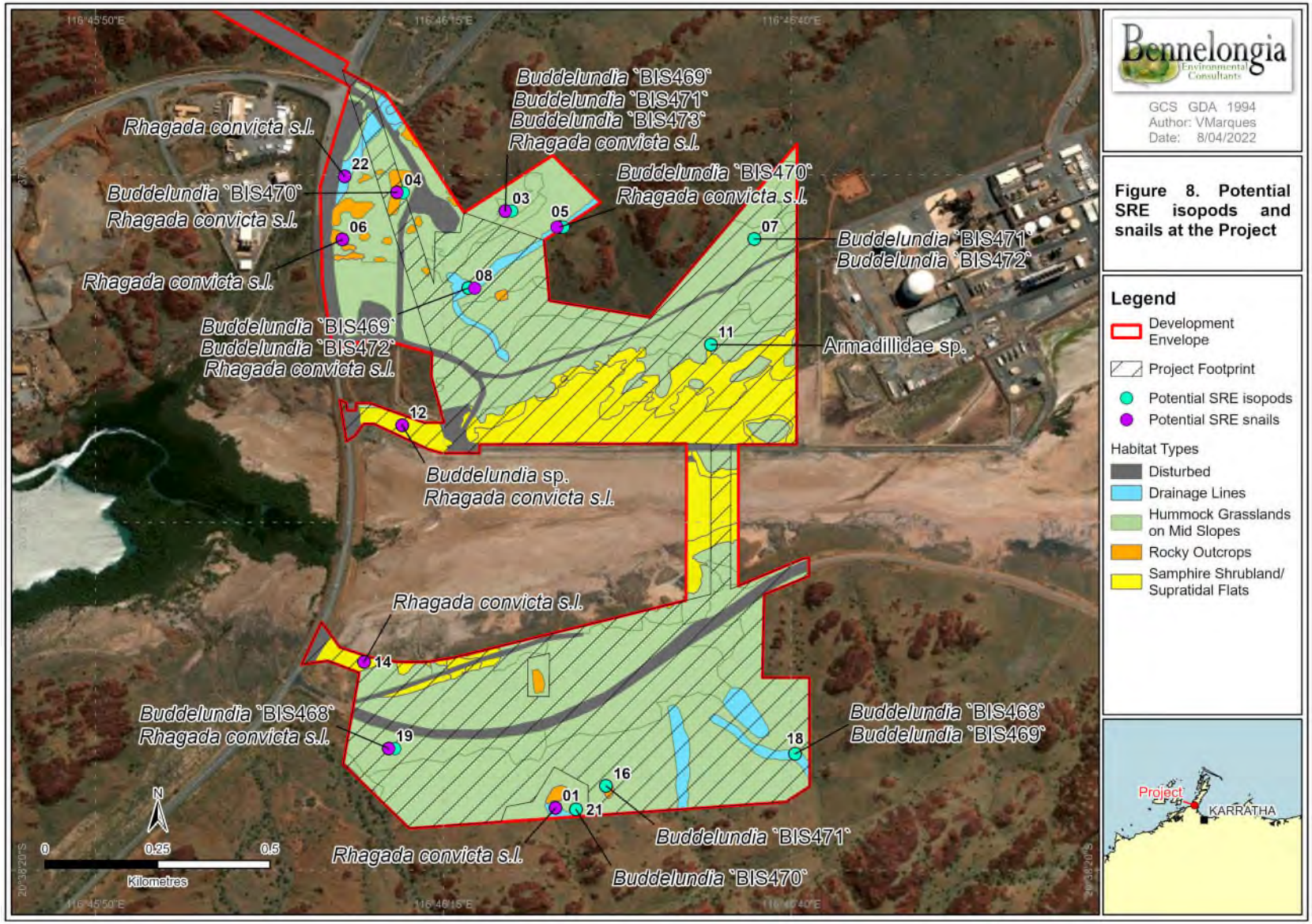


Figure 8. Potential SRE isopods and snails at the Project

Groups. Consequently, it is considered likely that both Geophilidae sp. and Paradoxosomatidae sp. occur outside the Project area and are unlikely to be impacted by the development.

5.2. Listed Species and Communities

The field survey did not record any of listed species. However, land snails belonging to the Priority 1 PEC Burrup Peninsula rock pile communities were collected during the field survey. As previously discussed, most species of *Rhagada* that occur on the Burrup Peninsula and Dampier Archipelago are endemic to the area, showing complementary geographic distributions. The collection of 161 land snails during the field survey was made at multiples sites and habitat types (Figure 8). Although genetic sequencing is required to confirm species identification, all specimens of *Rhagada* appeared to be *Rhagada convicta*. This species is known to occur south of the Project area.

5.3. Summary

The habitat in the Project area was assessed as being prospective for SREs. There are areas of isolated and sheltered habitat consisting of rocky outcrops, drainage lines and hummock grasslands. Within these habitats, there are opportunities for prospective microhabitats with organic matter present, which is important for nutrition and shelter of many SRE Group species.

The desktop found that 132 species from SRE Groups have been recorded in the search area around the Project. This includes araneomorph spiders, trapdoor spiders, pseudoscorpions, scorpions, centipedes, millipedes, isopods, and land snails. Many of these represented undescribed species for which it is difficult to determine SRE status and, as a result, they are considered (data deficient) Potential SREs. Some species recorded in the desktop were expected to occur within the Project area due to the close locations of previous records. However, only a few of these were collected during the field survey. This suggests that additional species that were not captured by the desktop review or field survey are likely to occur in the Project and surroundings.

The field survey itself collected 424 specimens of at least 28 species belonging to SRE Groups, including spiders (one species), pseudoscorpions (at least 12 species), scorpions (one species), centipedes (two species), millipedes (three species), isopods (at least six species) and snails (three species). Known biology of the groups and distributions of all species suggest that 21 of these species are Potential SREs.

Nineteen species are currently known from the Project Development Envelope and eight species are known only from the Project footprint (Table 2). Based on the size of the Project area (any location is within 250 m of the boundary of the Development Envelope) and the continuous connections of habitat inside and outside, combined with what is known of the biology of the groups, it is likely that all species have ranges extending beyond the Project and proposed areas of disturbance. The conservation status of species recorded in the Project footprint and Development Envelope is unlikely to be altered by Project development.

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Appendix 1- Species of SRE invertebrate groups recorded in the Project and its surrounds

Table 3. Species records from target SRE groups within the search area

N.B. Grey denotes higher order identifications that might belong to other listed species (not viewed as unique species); blue represents species complexes. *Species considered likely potential SRE due to data deficiency.

Higher Classification	Lowest Identification	SRE Status	Comments
ARTHROPODA			
ARACHNIDA			
Araneae			
Araneomorphae			
Lycosidae	*Tetralycosa* sp.	Potential SRE	
	Lycosinae sp.		
Selenopidae	*Karaops ngarluma*	Potential SRE	
	Karaops jaburrara	Potential SRE	
	Karaops sp.		
Mygalomorphae			
Actinopodidae	*Missulena rutraspina*	Widespread	
	Missulena sp.		
Anamidae	*Aname mellosa*	Widespread	
	Aname sinuata	Widespread	
	Aname `MYG365`	Potential SRE	Records from Wickham/Port Sampson area minimum linear distribution of 6 km
	Aname `MYG578`	Potential SRE	Recorded at four locations, minimum linear distribution of 5 km
	Aname `MYG579`	Potential SRE	Recorded at three locations in search area minimum linear distribution of 9.3 km (approx. 67 km from the Project)
	Aname `MYG271`	Unlikely SRE	Recorded SW of Karratha within search area and at Pannawonica minimum linear distribution of 135 km
	Aname mainae	Potential SRE	
	Aname sp.		
	Kwonkan `MYG007`	Potential SRE	Recorded at one location in search area 48 km from the Project
	Kwonkan `po2`	Potential SRE	Recorded at one location in search area 72 km from the Project
	Kwonkan `MYG195`	Unlikely SRE	Also recorded 350 km inland near BHPs Yandi operations

Higher Classification	Lowest Identification	SRE Status	Comments
	Kwonkan sp.		
	`MYGAAB` sp.	Potential SRE*	
	Anamidae sp.		
Barychelidae	*Synothele* `MYG335`	Potential SRE	Recorded at one location in search area 56 km from the Project
	Synothele sp.		
	Barychelidae sp.		
Halonoproctidae	*Conothele* `MYG560`	Potential SRE	Recorded at one location in search area 40 km from the Project
	Conothele `MYG562`	Potential SRE	Recorded at one location in search area 40 km from the Project
	Conothele `MYG574`	Potential SRE	Recorded at one location in search area 56 km from the Project
	Conothele `MYG559`	Potential SRE	Recorded at one location in search area 36 km from the Project
	Conothele `MYG726`	Potential SRE	Recorded at one location in search area 52 km from the Project
	Conothele sp.		
Idiopidae	*Bungulla bertmaini*	Widespread	
	Eucyrtops `MYG081, lake_poongkaliyarra`	Potential SRE	Recorded at one location in search area 44 km from the Project
	Eucyrtops sp.		
	Idiosoma `occidentalis sp. group`	Potential SRE	One record of this species in the search area 9.5 km S of the Project
	Idiosoma `MYG084`	Unlikely SRE	Records from Dixon Island, Lake Poongkaliyarra and 57 km SSE of Port Hedland minimum linear distribution of 160 km.
	Idiosoma sp.		
	Idiopidae sp.		
Pseudoscorpiones			
Hyidae	*Indohya* `PSE178`	Potential SRE	Recorded at one location in search area 48 km from the Project
Atemnidae	*Oratemnus* sp.	Potential SRE*	
Cheiridiidae	*PSEAAB* sp.	Potential SRE*	
Chernetidae	*PSEAAF* sp.	Potential SRE*	
	Haplochernes sp.	Potential SRE*	
Garypidae	*Synsphyronus* `sp. B`	Potential SRE	Recorded at three locations in search area minimum linear distribution of 48 km (37 km from the Project)
	Synsphyronus `Mortland River`	Potential SRE	Recorded at one location in search area 30 km from the Project

Higher Classification	Lowest Identification	SRE Status	Comments
	Synsphyronus sp.		
	Garypidae sp.		
Garypinidae	*Amblyolpium* `sp. A`	Potential SRE	Recorded at one location in search area 36 km from the Project
	Amblyolpium sp.		
	Solinus sp.	Potential SRE*	
Olpiidae	*Beierolpium* 6/2 sp.	Potential SRE*	
	Beierolpium 8/2 sp.	Potential SRE*	
	Beierolpium 8/3 sp.	Potential SRE*	
	Beierolpium 8/4 sp.	Potential SRE*	
	Beierolpium sp.		
	Euryolpium sp. B10	Potential SRE	Three recorded within search area minimum linear distance of 6 km (50 km from the Project)
	Indolpium sp.	Potential SRE*	
	Austrohorus sp.	Potential SRE*	
	Olpiidae sp.		
Sternophoridae	*Afrosternophorus* `sp. A`	Potential SRE	Recorded at one location in search area 44 km from the Project
	Afrosternophorus sp.		
Chthoniidae	*Tyrannochthonius aridus*	Potential SRE	
	Tyrannochthonius sp.		
	Panctenata sp.	Potential SRE*	
	Pseudoscorpiones sp.		
Scorpiones			
Buthidae	*Isometroides* `SCO051, barrow`	Potential SRE	Recorded at one location in search area 50 km from the Project
	Isometroides sp.		
	Lychas annulatus	Potential SRE	
	Lychas `adonis`	Widespread	
	Lychas `anketell`	Potential SRE	Two locations within search area minimum linear distribution of 3.8 km (25 km from the Project)
	Lychas `bituberculatus`	Potential SRE	
	Lychas `gracilimanus`	Widespread	

Higher Classification	Lowest Identification	SRE Status	Comments
	Lychas `hairy tail`	Potential SRE	
	Lychas `harveyi`	Widespread	
	Lychas `multipunctatus complex`	Potential SRE	
	Lychas `prendinii`	Widespread	
	Lychas `SCO039, glauerti`	Potential SRE	Records from four locations within search area, minimum linear distribution of 16.5 km
	Lychas `sp. 1`	Widespread	
	Lychas `sp. 2`	Widespread	
	Lychas `sp. 4`	Widespread	
	Lychas `sp. 3`	Widespread	
	Lychas `sp. 5`	Widespread	
	Lychas `sp. 6`	Widespread	
	Lychas sp.		
	Buthidae sp.		
Urodacidae	*Urodacus* `armatus`	Potential SRE	
	Urodacus `erramurra`	Potential SRE	Recorded at one location within search area 45 km from the Project
	Urodacus `hamersley black`	Potential SRE	Recorded at four locations within search area minimum known linear distribution of 47 km
	Urodacus `Pilbara 5`	Potential SRE	Recorded at three locations within search area minimum known linear distribution of 68 km
	Urodacus `Pilbara 8`	Widespread	
	Urodacus `sp. 9`	Widespread	
	Urodacus `SCO010, pearcei`	Potential SRE	Recorded at one location within search area 45 km from the Project
	Urodacus sp.		
	Scorpiones sp.		
CHILOPODA			
Geophilida			
Geophilidae	*Tuoba sydneyensis*	Widespread	
Mecistocephalidae	Mecistocephalidae sp.	Potential SRE*	
Oryidae	Oryidae sp.	Potential SRE*	
Schendylidae	Schendylidae sp.	Potential SRE*	

Higher Classification	Lowest Identification	SRE Status	Comments
Scolopendrida			
Cryptopidae	*Cryptops* 'sp. B48'	Potential SRE	Recorded at one location in search area 52 km from the Project
	Cryptops sp.		
Scolopendridae	*Arthrorhabdus paucispinus*	Widespread	
	Cormocephalus turneri	Widespread	
	Ethmostigmus `muiri?`	Widespread	
	Ethmostigmus curtipes	Widespread	
	Scolopendra morsitans	Widespread	
	Scolopendra laeta	Widespread	
DIPLOPODA			
Polydesmida			
Paradoxosomatidae	*Orthomorpha coarctata*	Widespread	
	Boreohesperus undulatus	Potential SRE	Two records, Karratha Station and Marda Pool, minimum linear distribution of 50 km, with the closest record 27 km from the Project
	Antichiropus spathion	Widespread	Ranging from the Coongan River area, near Marble Bar to Wickham- approximately 500 km
	Antichiropus salutus	Unlikely SRE	Recorded at multiple locations up to 119 km apart
	Antichiropus `DIP032`, bluespec`	Unlikely SRE	Recorded at multiple locations up to 345 km apart
	Antichiropus sp.		
	DIPAAA `DIP020`	Potential SRE	Recorded at one location in search area 17 km from the Project
Polyxenida			
Polyxenidae	Polyxenidae sp.	Unlikely SRE	
Synxenidae	Synxenidae sp.	Unlikely SRE	
Spirobolida			
Trigoniulidae	*Austrostrophus stictopygus*	Widespread	
MALACOSTRACA			
Isopoda			
Ligiamorpha			
Armadillidae	*Acanthodillo* `sp. indet. A (erramurra)`	Potential SRE*	

Higher Classification	Lowest Identification	SRE Status	Comments
	Acanthodillo `sp. indet. B (erramurra)`	Potential SRE*	
	Acanthodillo sp.		
	Barrowdillo `sp. 2`	Potential SRE	Recorded at one location in search area 52 km from the Project
	Barrowdillo `sp. 3`	Potential SRE	Recorded at one location in search area 52 km from the Project
	Buddelundia `sp. 10`	Widespread	
	Buddelundia `sp. 13`	Widespread	
	Buddelundia `sp. 14hr`	Potential SRE	Recorded at two locations in search area minimum linear distribution of 7.4 km
	Buddelundia `sp. 14`	Widespread	
	Buddelundia `sp. 15`	Potential SRE	Recorded at one location in search area 52 km from the Project
	Buddelundia `sp. 17`	Widespread	
	Buddelundia `sp. 20`	Potential SRE	Recorded at five locations in search area minimum linear distribution of 10 km
	Buddelundia `sp. 32`	Potential SRE	Recorded at eight locations in search area minimum linear distribution of 15 km
	Buddelundia `sp. 33`	Widespread	
	Buddelundia `sp. 34`	Potential SRE	Recorded at five locations in search area minimum linear distribution of 65km
	Buddelundia `sp. 35`	Potential SRE	Recorded at three locations in search area minimum linear distribution of 22 km
	Buddelundia `sp. 36`	Potential SRE	Recorded at two locations in search area minimum linear distribution of 11.4 km
	Buddelundia `sp. 37`	Potential SRE	Recorded at one location in search area 55 km from the Project
	Buddelundia `sp. 44`	Potential SRE	Recorded at four locations in search area minimum linear distribution of 14.2 km
	Buddelundia `sp. 61`	Potential SRE	Recorded at two locations in search area minimum linear distribution of 7.4 km
	Buddelundia sp. B75	Potential SRE	One record at Maitland River within search area 50 km South of the Project
	Buddelundia sp. B78	Potential SRE	One record at Maitland River within search area 50 km South of the Project
	Buddelundia sp.		
	Armadillidae sp.		
Philosciidae	*Spherillo* sp.	Potential SRE*	
	Laevophiloscia sp.	Potential SRE*	
	Philosciidae sp.	Potential SRE*	
MOLLUSCA			
GASTROPODA			
Stylommatophora			

Higher Classification	Lowest Identification	SRE Status	Comments
Camaenidae	*Rhagada angulata*	Potential SRE	Two records on Dolphin and Gidley Island minimum linear distribution of 7 km
	Rhagada dampierana	Potential SRE	Recorded on Rosemary Island 24 km NW of the Project
	Rhagada convicta	Widespread	
	Rhagada elachystoma	Potential SRE	Recorded on Goodwyn Island approximately 24 km NW of the Project
	Rhagada intermedia	Potential SRE	Recorded on Delambre Island 37 km NE of the Project
	Rhagada minima	Potential SRE	Recorded on Rosemary Island 24 km NW of the Project
	Rhagada perprima	Potential SRE	Recorded on West and East Lewis Island, Rosemary Island and Malus Island minimum linear distribution of 16 km
	Rhagada `sp. 1`	Potential SRE	Recorded on Enderby Island 20 km NW of the Project
	Rhagada `sp. 2`	Potential SRE	Recorded on the Burrup Peninsula 1 km from the Project
	Rhagada `sp. 3`	Potential SRE	Recorded on the Burrup Peninsula 3 km from the Project
	Rhagada `sp. 5`	Potential SRE	Recorded at Devil Creek 50 km from the Project
	Rhagada `sp. 12`	Potential SRE	Recorded on the Burrup Peninsula 1.4 km from the Project
	Rhagada `sp. HC`	Potential SRE	Recorded on the Burrup Peninsula 2 km from the Project
	Rhagada `sp. HP`	Potential SRE	Recorded on the Burrup Peninsula 2.5 km from the Project
	Quistrachia herberti	Widespread	
	Quistrachia legendrei	Potential SRE	Recorded at 13 locations in search area minimum linear distribution of 34 km
	Quistrachia turneri	Widespread	
	Quistrachia `sp. X`	Potential SRE	Recorded at five locations in search area minimum linear distribution of 54 km
	Quistrachia `sp. X `Anketell Point`	Potential SRE	One record at Maitland River within search area 50 km South of the Project
Pupillidae	*Pupoides lepidulus*	Widespread	

Appendix 2 – Photographs of SRE collection sites in the Project Area

Site 01


Site 02


Site 03


Site 04

Site 05

Site 06

Site 07


Site 08


Site 09


Site 10


Site 11


Site 12


Site 13


Site 14


Site 15


Site 16

Site 17

Site 18

Site 19

Site 20

Site 21

Site 22

Attachment H – SRE Peer Reviews

Att H – SER Mgt Plan Review

Att H – SER Mgt Plan Review FINAL Response

Invertebrate Solutions

6th May 2022

[redacted]
Director Invertebrate Solutions Pty Ltd
PO Box 14
Victoria Park, WA 6979

Our Reference: 2022ISJ10-F01-20220506
Your Reference:

Perdaman Project Destiny – Burrup Strategic Industral Area – Short Range Endemic fauna as part of the Fauna Management Plan Peer Review Independent Review Advice

Attention [redacted]
Clough Projects Australia Pty Ltd
Level 9, Alluvion Building,
58 Mounts Bay Road,
Perth, WA, 6000

Dear Simon,

Invertebrate Solutions Pty Ltd is pleased to provide Clough on behalf of Saipam Clough Joint Venture (SCJV) with peer review advice related to the Short Range Endemic (SRE) invertebrate management as part of the Fauna Management Plan (FaMP) report for the Perdaman Urea Project, located within the Burrup Strategic Industrial Area, Burrup Peninsula, Western Australia (the site).

1. Project Appreciation

Western Australian Environmental Protection Authority (EPA) assessment report 1705 sets out what the EPA considered to be the key environmental factors relating to the Perdaman Urea Project site and associated recommended conditions to which implementation should be subject. In respect of SRE species, the Ministerial Statement 1180 (24 January 2022) considered that the likely residual impacts of the proposal were:

Condition 5-1 The proponent shall implement the proposal to meet the following environmental outcomes:

1) clearing in the fauna habitat type identified as Rocky Outcrops shall not exceed 0.16 ha;
2) clearing in the fauna habitat type identified as Hummock Grasslands on Mid-slopes shall not exceed 49.17 ha;
3) clearing in the fauna habitat type identified as Samphire Shrublands / Supratidal flats shall not exceed 11.97 ha;
4) clearing in the fauna habitat type identified as Drainage Lines shall not exceed 2.7 ha; and

5) impacts to short-range endemic fauna species are avoided, unless it is demonstrated and the **CEO** confirms in writing that the species occurs in a self-sustaining population outside the development envelope.

Condition 5-3 At least six months prior to **Ground Disturbing Activities** within the development envelope the proponent shall, in consultation with the Murujuga Aboriginal Corporation and **DAWE**, revise and submit to the **CEO** the Fauna Management Plan (PCF-PD-EN-FaMP, Version PCF 1, 12/01/2021) and the Threatened Species Management Plan (PCF-PD-EN-TSMP, PCF 1, 12/01/2021), one or both of which shall:

1) demonstrate how the environmental outcomes in condition 5-1 and environmental objective in condition 5-2 will be achieved;
2) include details of the outcomes of a detailed short-range endemic fauna survey undertaken within the development envelope and surrounding region at least six months prior to Ground Disturbing Activities;
3) include provisions to avoid where practicable and otherwise minimise impacts to significant terrestrial fauna species, including short-range endemic fauna and migratory birds, including, but not limited to, impacts from:
    (a) clearing of habitat;
    (b) lighting;
    (c) noise and vibration;
    (d) dust;
    (e) vehicle and machinery movement strike;
    (f) entrapment in trenches or ponds;
    (g) the attraction of feral animals; and
    (h) fire;
5) specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent direct or indirect impacts to significant terrestrial fauna species, including short-range endemic fauna;
6) specify threshold criteria to demonstrate compliance with conditions 5-1 and 5-2;
7) specify monitoring methodology to determine if trigger criteria and threshold criteria have been met;
8) specify management and/or contingency actions to be implemented if the trigger criteria required by condition 5-3(5) and/or the threshold criteria required by condition 5-3(6) have not been met; and
9) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that conditions 5-1 and 5-2 have been met over the reporting period in the Compliance Assessment Report required by condition 15-6.

2. Review Objectives

The objective of the review was to assess the quality and completeness of the FaMP, as it relates to SRE invertebrates with reference to the requirements of MS 1180 Condition 5-1 and 5-3 and compliance with relevant aspects of the guidelines stipulated in the ministerial condition.

3. Scope of Work and Methods

The scope of work included review of the following draft report:

- Perdaman Urea Project – Project Destiny – Fauna Management Plan, SCJV/Bennelongia, dated 22 February 2022, PCF 3.

The review was completed by Dr Timothy Moulds with reference to the following guidelines and specific requirements of MS Condition 5-1 :

- How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plan – Instructions – Environmental Protection Authority (October 2021)
- Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA 2016)

4. Summary Findings

Invertebrate Solutions have completed a review of the draft FaMP with respect to the specific requirements outlined in Ministerial Statement 1180, Condition 5-1 and 5-3.

The approach of the FaMP in attempting to mitigate impacts to the most abundant SRE groups recorded (pseudoscorpions and isopods) is sound when considering the less abundant SRE species share microhabitat elements. The conservation of SRE habitat is critical to the mitigation of impacts to SRE species, and as such, the management of SRE species through the focus on limiting clearing of vegetation to the limits outlined in Ministerial Statement 1180 is adequate, if it is demonstrated that all identified SRE species exist in self-sustaining populations outside of the Project Development Envelope (PDE).

The FaMP is considered to adequately address the requirements of Ministerial Statement 1180, Condition 5-1 and 5-3, with regard to the regulatory guidelines, subject to the satisfactory addressing of the detailed findings in Section 5.

5. Detailed Findings

The following detailed findings are summarised in the table below.

Comment	Section	Reviewer Comments
1.	**Section 1.2.1, paragraph 3**	Refer to comment 5 relating to self-sustaining SRE populations
2.	**Section 1.4.1**	This section is disjointed and needs the SRE and vertebrate fauna studies to be introduced together at the start. The SRE portion of this section does not include the same information as was included for the vertebrate study such as SRE habitats identified or methods used for the SRE study. The Section needs to be reworded so it is consistent throughout.
3.	**Section 1.4.1, paragraph 5**	Consider rewording the final sentence "The below Sections discuss the findings" as the paragraph immediately following relates to SRE fauna and not the findings of the vertebrate fauna study.
4.	**Section 1.4.1.5, paragraph 5**	The targeted Camaenid land snail survey that was undertaken is not referenced within the text so it is unclear who undertook this survey.
5.	**Section 1.4.1.5, paragraph 7 and 8 / Table 1-13**	The SRE survey undertaken by Bennelongia (2022) identified 19 of the 21 potential SRE species as only known from within the Project area. Whilst 16 of these species were recorded from multiple different microhabitats, three species (two pseudoscorpions and one isopod) were recorded from single microhabitats (Chernetidae 'BPS432', *Indohya* 'BPS433' and *Buddelundia* 'BIS473') and Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19. The FaMP needs to explicitly demonstrate that these three species exist in self-sustaining populations outside of the PDE in order to meet Ministerial Condition 5-1 (5).
6.	**Section 1.4.1.5, paragraph 9, sentence 2**	This sentence is incorrect as it states that all species in Table 1-13 occur outside of the PDE, however, Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19.
7.	**Table 2-2**	Training needs to explicitly include and refer to SRE taxa and their habitats, and also elsewhere within Table 2-2 where possible.

6. Closure

If you have any questions or comments regarding this review please do not hesitate to contact the undersigned [redacted]

Sincerely

Director and Principal Ecologist
Invertebrate Solutions Pty Ltd
6th May 2022
0429792834

www.invertebratesolutions.com

Invertebrate Solutions

12th May 2022

Director Invertebrate Solutions Pty Ltd
PO Box 14
Victoria Park, WA 6979

Our Reference: 2022ISJ10-R01-20220512
Your Reference:

Perdaman Project Destiny – Burrup Strategic Industral Area – Short Range Endemic fauna as part of the Fauna Management Plan Peer Review Independent Review Advice

Attention

Clough Projects Australia Pty Ltd
Level 9, Alluvion Building,
58 Mounts Bay Road,
Perth, WA, 6000

Dear Simon,

Invertebrate Solutions Pty Ltd has reviewed the Proponent Response and the updated Fauna Management Plan , Perdaman Urea Project, Version PCF 4, 12 May 2022 to the peer review by Invertebrate Solutions (10th May 2022) and is satisfied that all reviewer comments have been adequately addressed that the responses meet the requirements as outlined in the Ministerial Conditions (1180) and no further alterations or commitments are required.

1. Proponent Response

The proponent made the following detailed response to reviewer comments:

Invertebrate Solutions Pty Ltd has reviewed the Fauna Management Plan, Perdaman Urea Project, Version PCF 3, 22 Feb 2022 (the Plan) to assess the quality and completeness of the FaMP, as it relates to SRE invertebrates with reference to the requirements of MS 1180 Condition 5-1 and 5-3 and compliance with relevant aspects of the guidelines stipulated in the ministerial condition (1180).

Invertebrate Solutions Pty Ltd considers that the Plan requires amendments before it can be approved for implementation. The following comments have been addressed with amendments made to the Plan accordingly.

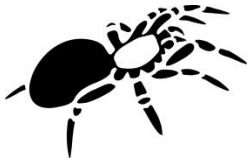
Comment	Section	Reviewer Comments	Proponent Response	Reviewer Acceptance
1	Section 1.2.1, paragraph 3	Refer to comment 5 relating to self-sustaining SRE populations	Addressed – concludes that impacts to Indohya and Buddelundia are avoided by design (no works scheduled near sample site). Suggests further sampling efforts for Chernetidae .	Comment adequately addressed
2	Section 1.4.1	This section is disjointed and needs the SRE and vertebrate fauna studies to be introduced together at the start. The SRE portion of this section does not include the same information as was included for the vertebrate study such as SRE habitats identified or methods used for the SRE study. The Section needs to be reworded so it is consistent throughout.	Addressed SRE and APM surveys introduced together. SRE portion now including identified habitats and survey methods.	Comment adequately addressed
3	Section 1.4.1, paragraph 5	Consider rewording the final sentence "The below Sections discuss the findings" as the paragraph immediately following relates to SRE fauna and not the findings of the vertebrate fauna study.	Addressed Reworded to: "Sections 1.4.1.1 through 1.4.1.4 below discuss the findings."	Comment adequately addressed
4	Section 1.4.1.5, paragraph 5	The targeted Camaenid land snail survey that was undertaken is not referenced within the text so it is unclear who undertook this survey.	Addressed Survey undertaken by APM, 2019	Comment adequately addressed

Comment	Section	Reviewer Comments	Proponent Response	Reviewer Acceptance
5	Section 1.4.1.5, paragraph 7 and 8 / Table 1-13	The SRE survey undertaken by Bennelongia (2022) identified 19 of the 21 potential SRE species as only known from within the Project area. Whilst 16 of these species were recorded from multiple different microhabitats, three species (two pseudoscorpions and one isopod) were recorded from single microhabitats (Chernetidae 'BPS432', *Indohya* 'BPS433' and *Buddelundia* 'BIS473') and Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19. The FaMP needs to explicitly demonstrate that these three species exist in self-sustaining populations outside of the PDE in order to meet Ministerial Condition 5-1 (5).	Addressed concludes that impacts to Indohya and Buddelundia are avoided by design (no works scheduled near sample site). Suggests further sampling efforts for Chernetidae.	Comment adequately addressed
6	Section 1.4.1.5, paragraph 9, sentence 2	This sentence is incorrect as it states that all species in Table 1-13 occur outside of the PDE, however, Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19.	Addressed Sentence changed to state that species in table 1-13 were found during SRE survey by Bennelongia	Comment adequately addressed
7	Table 2-2	Training needs to explicitly include and refer to SRE taxa and their habitats, and also elsewhere within Table 2-2 where possible.	Addressed in Management target 2 and 22	Comment adequately addressed

2. Closure

If you have any questions or comments regarding this review please do not hesitate to contact the undersigned at

Sincerely



Director and Principal Ecologist

Invertebrate Solutions Pty Ltd

12th May 2022

0429792834

www.invertebratesolutions.com

Attachment I – PROPONENT RESPONSE

Perdaman Project Destiny – Burrup Strategic Industrial Area – Short Range Endemic fauna as part of the Fauna Management Plan Peer Review Independent Review Advice

Invertebrate Solutions Pty Ltd has reviewed the Fauna Management Plan, Perdaman Urea Project, Version PCF 3, 22 Feb 2022 (the Plan) to assess the quality and completeness of the FaMP, as it relates to SRE invertebrates with reference to the requirements of MS 1180 Condition 5-1 and 5-3 and compliance with relevant aspects of the guidelines stipulated in the ministerial condition (1180).

Invertebrate Solutions Pty Ltd considers that the Plan requires amendments before it can be approved for implementation. The following comments have been addressed with amendments made to the Plan accordingly.

Comment	Section	Reviewer Comments	Proponent Response
1	Section 1.2.1, paragraph 3	Refer to comment 5 relating to self-sustaining SRE populations	Addressed – concludes that impacts to Indohya and Buddelundia are avoided by design (no works scheduled near sample site). Suggests further sampling efforts for Chernetidae.
2	Section 1.4.1	This section is disjointed and needs the SRE and vertebrate fauna studies to be introduced together at the start. The SRE portion of this section does not include the same information as was included for the vertebrate study such as SRE habitats identified or methods used for the SRE study. The Section needs to be reworded so it is consistent throughout.	Addressed SRE and APM surveys introduced together. SRE portion now including identified habitats and survey methods.
3	Section 1.4.1, paragraph 5	Consider rewording the final sentence "The below Sections discuss the findings" as the paragraph immediately following relates to SRE fauna and not the findings of the vertebrate fauna study.	Addressed Reworded to: "Sections **Error! Reference source not found.** through **Error! Reference source not found.** below discuss the findings."
4	Section 1.4.1.5, paragraph 5	The targeted Camaenid land snail survey that was undertaken is not referenced within the text so it is unclear who undertook this survey.	Addressed Survey undertaken by APM, 2019
5	Section 1.4.1.5, paragraph 7 and 8 / Table 1-13	The SRE survey undertaken by Bennelongia (2022) identified 19 of the 21 potential SRE species as only known from within the Project area. Whilst 16 of these species were recorded from multiple different microhabitats, three species (two pseudoscorpions and one isopod) were recorded from single microhabitats	Addressed concludes that impacts to Indohya and Buddelundia are avoided by design (no works scheduled near sample site). Suggests

		(Chernetidae 'BPS432', *Indohya* 'BPS433' and *Buddelundia* 'BIS473') and Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19. The FaMP needs to explicitly demonstrate that these three species exist in self-sustaining populations outside of the PDE in order to meet Ministerial Condition 5-1 (5).	further sampling efforts for Chernetidae.
6	Section 1.4.1.5, paragraph 9, sentence 2	This sentence is incorrect as it states that all species in Table 1-13 occur outside of the PDE, however, Chernetidae 'BPS432' is only known from within the PDE at Bennelongia site 19.	Addressed Sentence changed to state that species in table 1-13 were found during SRE survey by Bennelongia
7	Table 2-2	Training needs to explicitly include and refer to SRE taxa and their habitats, and also elsewhere within Table 2-2 where possible.	Addressed in Management target 2 and 22