

TNG LIMITED

**ENVIRONMENTAL
MANAGEMENT PLAN**

**DARWIN PROCESSING
FACILITY**

DARWIN, NORTHERN TERRITORY

Version 2.0

January 2021



TNG022 – TNG Limited Darwin Processing Facility

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DEFINITIONS

Term	Meaning
Concentrate	Magnetite concentrate.
The Project	The proposed construction and operation of the Darwin Processing Facility
The Project area, can also be referred to as the Site	Lot 1817, Hundred of Ayers, Middle Arm Industrial Precinct, Wickham, NT. The Project area is approximately 507 hectares (ha) of which 40 ha is mangrove forest and intertidal zone, and 467 ha is terrestrial land
Proponent	TNG Limited

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AAPA	Aboriginal Areas Protection Authority
AHD	Australian Height Datum
BOM	Bureau of Meteorology
DAWE	Department of Agriculture, Water and the Environment
DPIR	Department of Primary Industry and Resources
EA Act	Environmental Assessment Act 1982
EAAP	Environmental Assessment Administrative Procedures 1984
EIS	Environmental Impact Statement, comprises: • Draft EIS (subject to public exhibition), • Supplement (addressing written comments of the Draft EIS) • Further info requested by NT EPA
EMP	Environment Management Plan
EMS	Environmental Management System
EP Act	Environment Protection Act 2019
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERC	Emergency Response Coordinator
ERP	Emergency Response Plan
ERR	Environmental Risk Register
GDP	Ground Disturbance Permit
GGMP	Greenhouse Gas Management Plan
GHG	greenhouse gas
HSEMS	Health Safety and Environment Management System
KPI	Key Performance Indicator
LNG	Liquid Natural Gas
MSDS	Material Safety Data Sheet

Abbreviation	Meaning
NOI	Notice of Intent
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
NTG	Northern Territory Government
POL	Petroleum, Oil and Lubricant
RMP	Rehabilitation Management Plan
SoCS	Sites of Conservation Significance
TiO ₂	Titanium dioxide
TNG	TNG Limited
ToR	Terms of Reference
TPWC Act	Territory Parks and Wildlife Conservation Act 2000 (NT)
V ₂ O ₅	Vanadium pentoxide

UNITS OF MEASURE

Abbreviation	Meaning
%	Percentage
ha	Hectare
km	Kilometre
kPa	Kilopascals
m	Metre
tpa	Tonnes per annum
tph	Tonnes per hour

1 INTRODUCTION

1.1 PURPOSE

This Environmental Management Plan (**EMP**) has been prepared to provide an environmental management framework for construction and operation of the Darwin Processing Facility (**Project**). It prescribes the implementation of TNG Limited's (**TNG**) Environmental Management System (**EMS**) at the Project. Development and implementation of this EMP is a requirement of the formal Project Terms of Reference (**TOR**) for the environmental impact assessments undertaken under the Environment Protection Act 2019 (**EP Act**), (formerly the *Environmental Assessment Act 1982* (**EA Act**)), the Environment Protection Regulations 2020 and *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**).

This EMP describes general application and administration of TNG's EMS (sometimes referred to, simply, as "plan, do, check, act") broadly over the Project's environmental aspects. The actions, methodologies, strategies and procedures herein are applicable to all Project environmental aspects. Mitigation of potential Project environmental impacts on specific environmental factors is addressed in a series of environmental factor-specific management plans (which were also recommendations of the formal Project environmental impact assessments undertaken under the EP Act and EPBC Act). The environmental factor-specific management plans are listed in chapter 1.5.

In addition to describing the structure and functioning of the Project EMS, this EMP also assigns environmental management responsibilities to site personnel roles (chapter 9.4).

An Emergency Response Plan (**ERP**) for the Project is in place should the environmental control measures prescribed within this EMP and the environmental factor-specific management plans fail.

1.2 VERSION HISTORY

This Plan was initially developed in parallel to the Draft Environmental Impact Statement (**Draft EIS**), submitted to the Northern Territory Environmental Protection Authority (**NT EPA**) in November 2019 and was made available for comment for a period of 12 weeks from 30 November 2019 to 21 February 2020. Submissions on the Draft EIS were received by the NT EPA and forwarded to TNG.

In accordance with clause 12 of the Environmental Assessment Administrative Procedures 1984 (**EAAP**), the NT EPA directed TNG to provide a Supplement to the Draft EIS. The Supplement addresses comments raised through submissions on the Draft EIS and details Project amendments undertaken since the Draft EIS was completed.

To support the proposed changes to the Project, this EMP has been revised in parallel with the EIS Supplement.

1.3 OBJECTIVES

This EMP has been produced to manage potential environmental risks associated with the Project. It is intended to be utilised in conjunction with the environmental factor-specific management plans listed in Chapter 1.5. The main objectives of the EMP are to:

- Summarise the Project description, statutory and non-statutory requirements, site conditions and Project risks;

- Outline an EMS including structure, roles and responsibilities, environmental training and education; and
- Summarise previous period performance including internal reporting, external reporting, internal auditing, continuous improvement strategies, complaints register and a summary of sub-environmental management plan performances (at completion of the first Project environmental reporting period).

1.4 STRUCTURE

This EMP includes the following general content applicable to management of all Project environmental aspects:

- TNG's Environmental Policy
- Regulatory context and requirements;
- Environmental management structure;
- Roles and Responsibilities;
- Environmental training and induction;
- Monitoring and Reporting procedures;
- Mechanisms for addressing complaints and grievances; and
- Non-conformances and corrective actions.

1.5 ENVIRONMENTAL FACTOR-SPECIFIC MANAGEMENT PLANS

Among the NT EPA recommendations arising from the formal assessment of potential Project environmental impacts was the development and preparation of several EMPs and monitoring programs.

For the revised Project proposed in the EIS Supplement and following stakeholder engagement and community consultation, changes have been made to some of the factor-specific plans. One plan has been removed and three new plans have been developed. The changes are listed in **Table 1-1**.

Table 1-1. Changes to factor-specific plans

Environmental Factor Specific Management Plan	Revision for the EMP Version 2.
Plans developed in the Draft EIS	
Biting Insects Management Plan (Appendix J of the Draft EIS);	No Changes to this plan
Acid Sulfate Soil Management Plan (Appendix C of the Draft EIS);	This plan has been updated for the EIS Supplement (Appendix L)
Fire Management Plan (Appendix E of the Draft EIS);	This plan has been updated for the EIS Supplement (Appendix N)
Biodiversity Management Plan (Appendix F of the Draft EIS);	This plan has been updated for the EIS Supplement and is Appendix A of this EMP
Marine Environmental Quality Monitoring and Management Plan (Appendix G of the Draft EIS);	Due to Project changes detailed in the EIS Supplement this plan is no longer required.
Economic and Social Impact Management Plan (Appendix H	No Changes to this plan

of the Draft EIS)	
Traffic Management Plan (Appendix I of the Draft EIS).	No Changes to this plan
New plans developed	
Rehabilitation Management Plan	EIS Supplement Appendix B
Stormwater Management Plan	EIS Supplement Appendix C
Stakeholder and Community Engagement Plan	EIS Supplement Appendix O

The above EMPs and monitoring programs have been prepared under separate covers, and all Project activities must be undertaken in accordance with them. Electronic copies of these documents are available on the TNG intranet.

1.6 PROCEDURES

Operational controls for activities not addressed by the specific management plans outlined in **Table 1-1** are delivered through the Environmental Procedures detailed in **Section 10**.

For the EMP version 2 the Topsoil and Rehabilitation Procedures have been removed and instead managed through the Rehabilitation Management Plan.

The Flora and Vegetation Management and the Fauna Procedures have been incorporated into the Biodiversity Management Plan.

2 PROJECT DETAILS

2.1 OVERVIEW

The Proponent proposes to construct and operate the Darwin Processing Facility at Lot 1817, Hundred of Ayers, Middle Arm Industrial Precinct, (658 Channel Island Road) Wickham. The Project is approximately 16 kilometres (**km**) south east of Darwin, Northern Territory (**NT**). The purpose of the Project is processing magnetite concentrate (**concentrate**) from the TNG owned Mount Peake Mine to produce higher value products for export from East Arm Wharf to international customers. The scope of the Project is limited to activities within the Processing Facility allotment, encompassing construction, operation, decommissioning and closure of the Processing Facility.

The Project will comprise:

- Clearing of a partially vegetated allotment formerly utilised for extractive industries;
- Construction and operation of a magnetite concentrate Processing Facility;
- Development of support infrastructure, including workshops and stores, office/administration buildings, laydown areas, water storage and treatment facilities, car parking, electrical sub-station and utilities infrastructure, access roads and Water Recycling Plant;
- Construction and operation of a rail siding, unloading and loadout facilities on the Adelaide-Darwin railway; and
- Loading of trains at the rail siding, with products to be railed to East Arm Wharf.

The Project, with associated access roads, supporting infrastructure and services comprises a development envelope of approximately 270.5 hectares (**ha**), of which 180 ha has been previously disturbed. The Project requires access to the following existing services:

- Road access from the existing Channel Island Road;
- Natural gas supplied from the Amadeus gas pipeline;
- Power to be supplied by natural gas fired power plant, to be built, owned and operated by a third party;
- Communications;
- Water from the Palmerston zone pipeline; and
- Access to the Adelaide-Darwin railway.

New infrastructure requirements on Lot 1817 Middle Arm include:

- Rail siding – 3.8 km long, adjoining the Adelaide-Darwin railway;
- Processing Facility;
- Concentrate and coke stockpiles and conveyor tunnels;
- Raw water and rainwater ponds;
- Sewage Treatment Plant
- Process water, contaminated stormwater and Sewage Treatment Plant Water Recycling Plant with associated storage and treatment tanks and pipelines;
- Filter cake stockpile area / hardstand;
- Workshop and stores;
- Offices, administration area, including kitchen / mess-hall, emergency services;
- Electricity sub-station;

- Potable water and fire water tanks;
- Gatehouse;
- Acid regeneration plant;
- Tank farm and reagent storage;
- Laydown areas; and
- Car parking.

Third parties will provide services external to the Processing Facility's allotment boundary including:

- Concentrate transport by rail to the Processing Facility;
- Transport of consumables by rail to the Processing Facility;
- Transport of consumable by road to the Processing Facility;
- Transport of products by rail from the Processing Facility to East Arm Wharf;
- Transport of solid wastes by rail to an approved disposal site;
- Port activities including the unloading, storage, handling and export of products; and
- Port importing activities for consumables such as coke.

Third party services will assume responsibility for environmental management measures associated with these activities.

The construction period is anticipated to be 24 months continuing over both wet and dry seasons. The design life of the Processing Facility is 40 years. Processing of concentrate would occur at a rate of 700,000 tonnes per annum (**tpa**). The life of the Processing Facility mirrors the production of concentrate from the Mount Peake Mine, the primary source of concentrate for the Project. Additional concentrate may in future be sourced from the Mount Peake area (subject to the results of further exploration drilling and economic evaluation) or from third parties.

Ultimate decommissioning of the site would be evaluated throughout the operation of the Processing Facility and discussed with regulators as part of ongoing licence requirements.

The location of the Project appears as Figure 2-1.

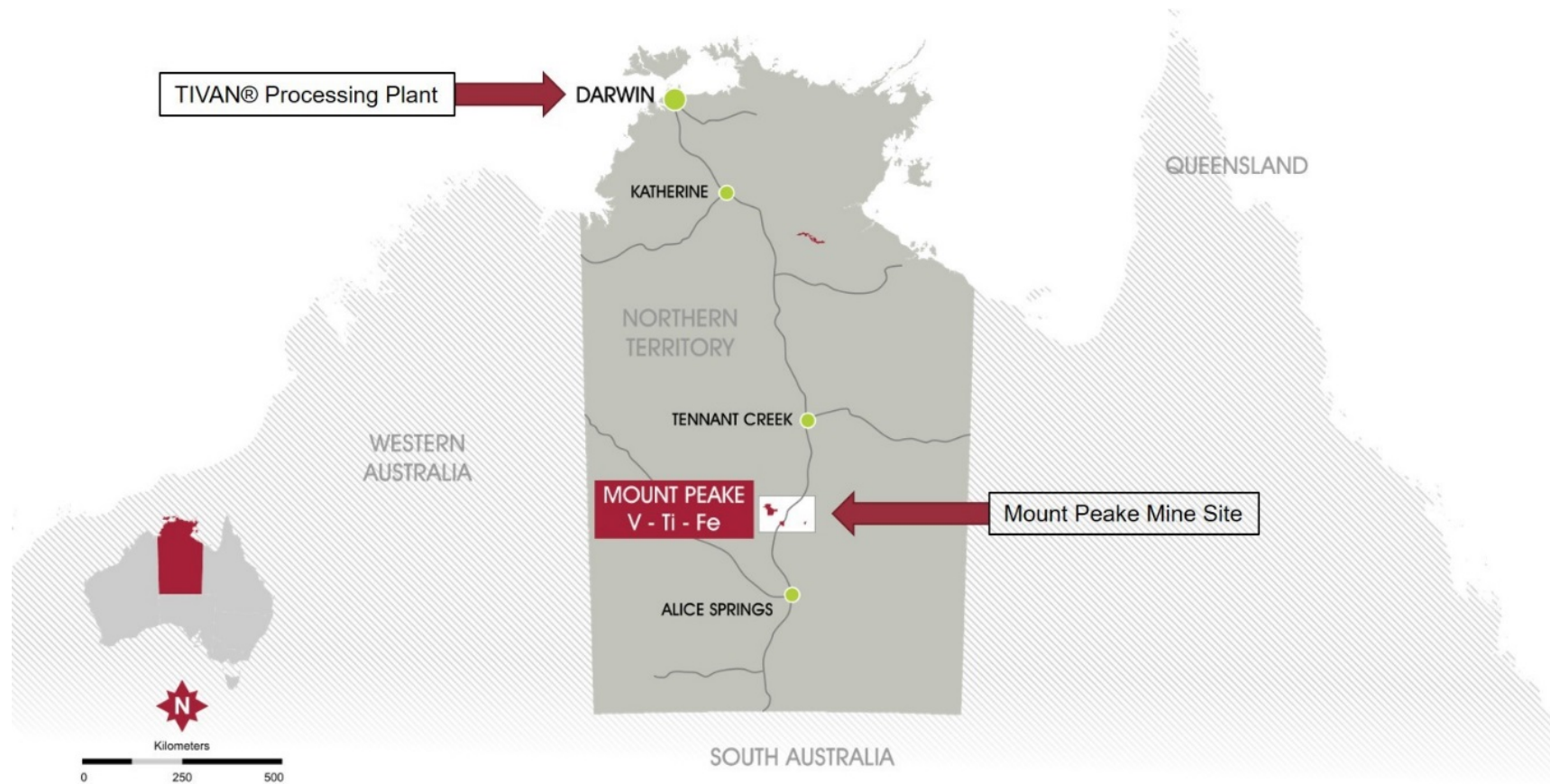


Figure 2-1: Location of the Darwin Processing Facility

2.2 OPERATOR DETAILS

TNG operates the Project. TNG's details are summarised in Table 2-1.

Table 2-1: Operator Details

Company	TNG Limited
Contact	Paul Burton Managing Director
Postal address	PO Box 1126, Subiaco, WA 6904
Phone	+61 8 9327 0900
Fax	+61 8 9327 0901
Email	corporate@tngltd.com.au
ABN	12 000 817 023
ASX code	TNG
Web	www.tngltd.com.au

3 REGIONAL SETTING

3.1 PROJECT SITE

The Project is located on Darwin Harbour, adjacent to the Elizabeth River. Contained within the Middle Arm Industrial Precinct, Lot 1817 has an area of approximately 507 ha, of which 40 ha is mangrove forest and intertidal zone, and 467 ha is terrestrial land. It is accessed from Channel Island Road, south of Elizabeth River Bridge.

Darwin Harbour is a major waterway and an important recreational fishery. Significant subtidal and intertidal habitats within Darwin Harbour include estuaries, mangroves, stony or hard coral reefs, sponge and soft coral beds, macroalgae-dominated communities, rocky outcrops, and bare sandy/ silty substrates. There are no significant groundwater or surface water resources associated with the Project area.

Middle Arm Industrial Precinct also includes the Darwin Liquid Natural Gas (**LNG**) Plant and the INPEX Ichthys Onshore LNG Processing Facility. Existing residential areas nearest to the Project are the suburbs of Bellamack, approximately 2.7 km north-northeast, and Virginia, approximately 4.8 km east. The Elizabeth River Boat Ramp is approximately 900 m to the northeast of the Project.

Locations of sacred, cultural, historical, recreational or social interest within the local vicinity of the Project are summarised in Table 3-1. A depiction of the locations of interest appears as **Figure 3-1**.

Table 3-1: Proximity of the Project to Locations of Interest

Location of Interest	Direction from the Project	Distance from the Project (km)	Aspect/s of Interest
Palmerston/ Elizabeth River boat ramp	Northeast	0.9	Boat access to Elizabeth River and Darwin Harbour at all tides Fishing jetty
Charles Darwin National Park	Northwest	10.5	National Reserve System
Elizabeth River - unidentified wreck (Identification no. 3435)	Northwest	0.2	Ship wreck
Royal Australian Air Force Catalina A24-1	Northwest	3.8	Wrecked aircraft (1945)
Darwin Harbour Wetlands	N/A	Adjacent	Register of the National Estate
Channel Island Leprosarium and Reefs/ Channel Island Conservation Reserve	West	9.3	NT Heritage Register National Reserve System
Middle Arm Petroglyphs	West-Southwest	3	Locally and regionally significant Aboriginal art
Yirra (Catalina Island)	Northwest	7.5	Registered Sacred Site (5073-0066)

The AAPA Authority Certificate (No 201900386; covering letter 31 July 2019) obtained for the Project indicates there are no Registered or Recorded Sacred Sites within the site.

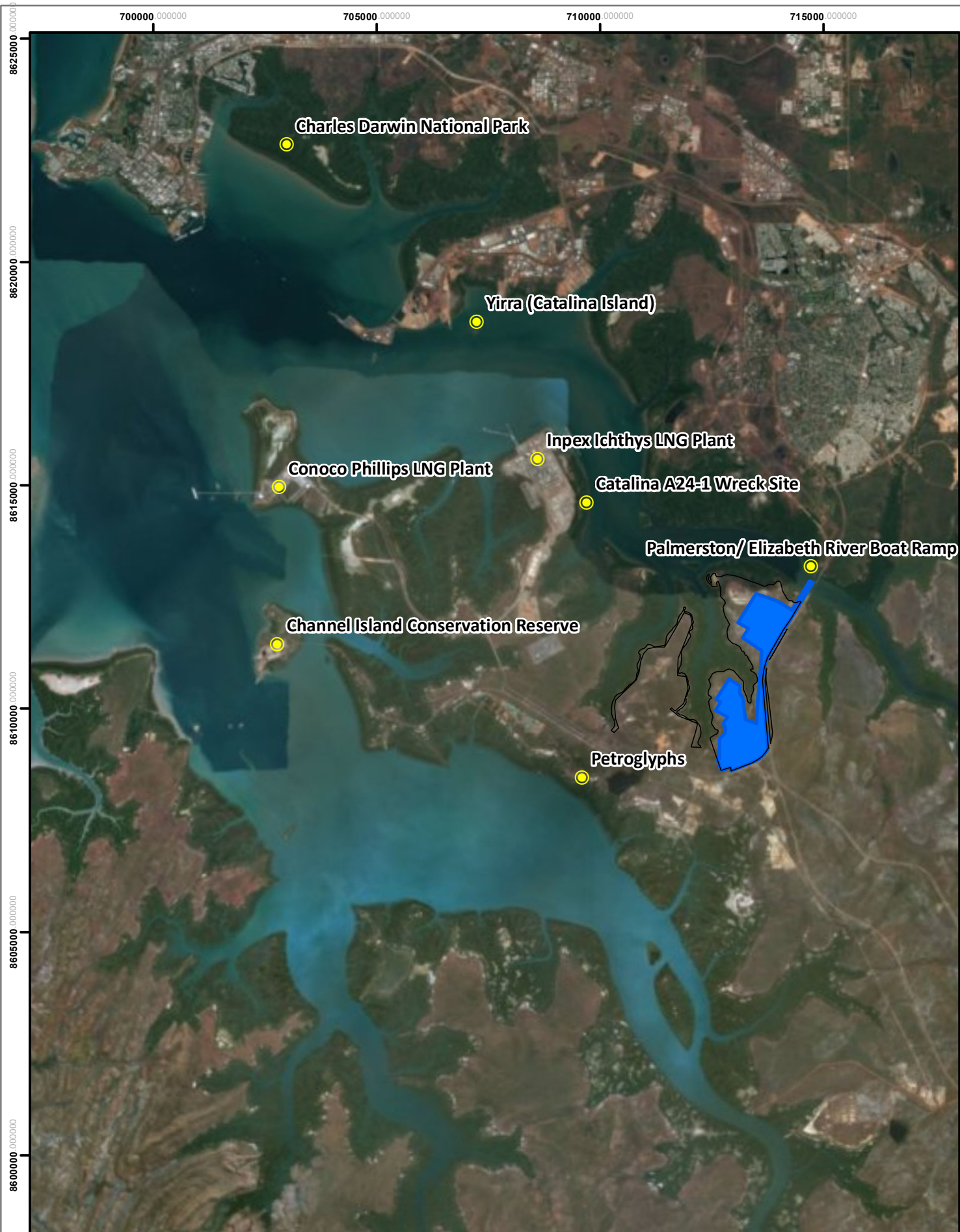
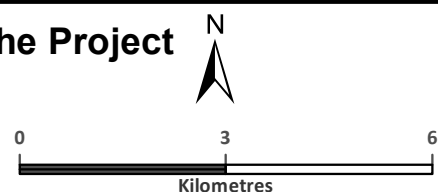


Figure 3-1: Locations of interest in the vicinity of the Project

Legend

-  *Areas of Interest*
-  *Lot 1817, Hundred of Ayers*
-  *Darwin Processing Facility Envelope*



1:110,000 GDA 94 MGA Zone 52
Date: 22/11/2019

3.2 PROJECT AREA TENURE AND ZONING

The Project site is vacant Crown Land situated within the Darwin Building Control Area. The Register of Native Title Claims, Register of Indigenous Land Use Agreements, Native Title Register and unregistered applications indicate that the site was assessed under Native Title application DC96/4 Darwin Larrakia and a determination made that 'Native Title does not exist'.

Lot 1817 is separated into two main areas, a northern peninsula and a southern peninsula. Most of the Lot is land based, adjacent and to the west of Channel Island Road. TNG have been advised that a small area to the west following the coastal perimeter of Lot 1902, and a small area of saltpan within the north eastern tip of the northern peninsula are likely to be removed from Lot 1817 prior to TNG's purchase of the land.

A utilities easement approximately bisects the Project site at a north east orientation.

According to the Northern Territory Planning Scheme (Department of Infrastructure, Planning and Logistics, 2018), four town planning zones apply to the Project:

- Future Development: most of the Project site;
- Conservation: mangrove forest and intertidal areas;
- Utilities: utilities easement; and
- Main Road: the eastern segment between the Lot 1817 railway corridor and the Channel Island Road Main Road corridor.

Lot 1817 and the planning scheme layers associated with the Project site appear on Figure 3-2.

3.2.1 Land uses

Land uses in the vicinity of the Project include quarrying for gravels, electricity substations and transmission, estuary and coastal waters, gas treatment, storage and transmission, railways, roads and residual native cover. The land use at Lot 1817 and the surrounding area is depicted on Figure 3-3. The quarrying activity has been extensive over the proposed Project Site, and existing disturbance at the Site is shown in more detail on **Figure 3-4**.

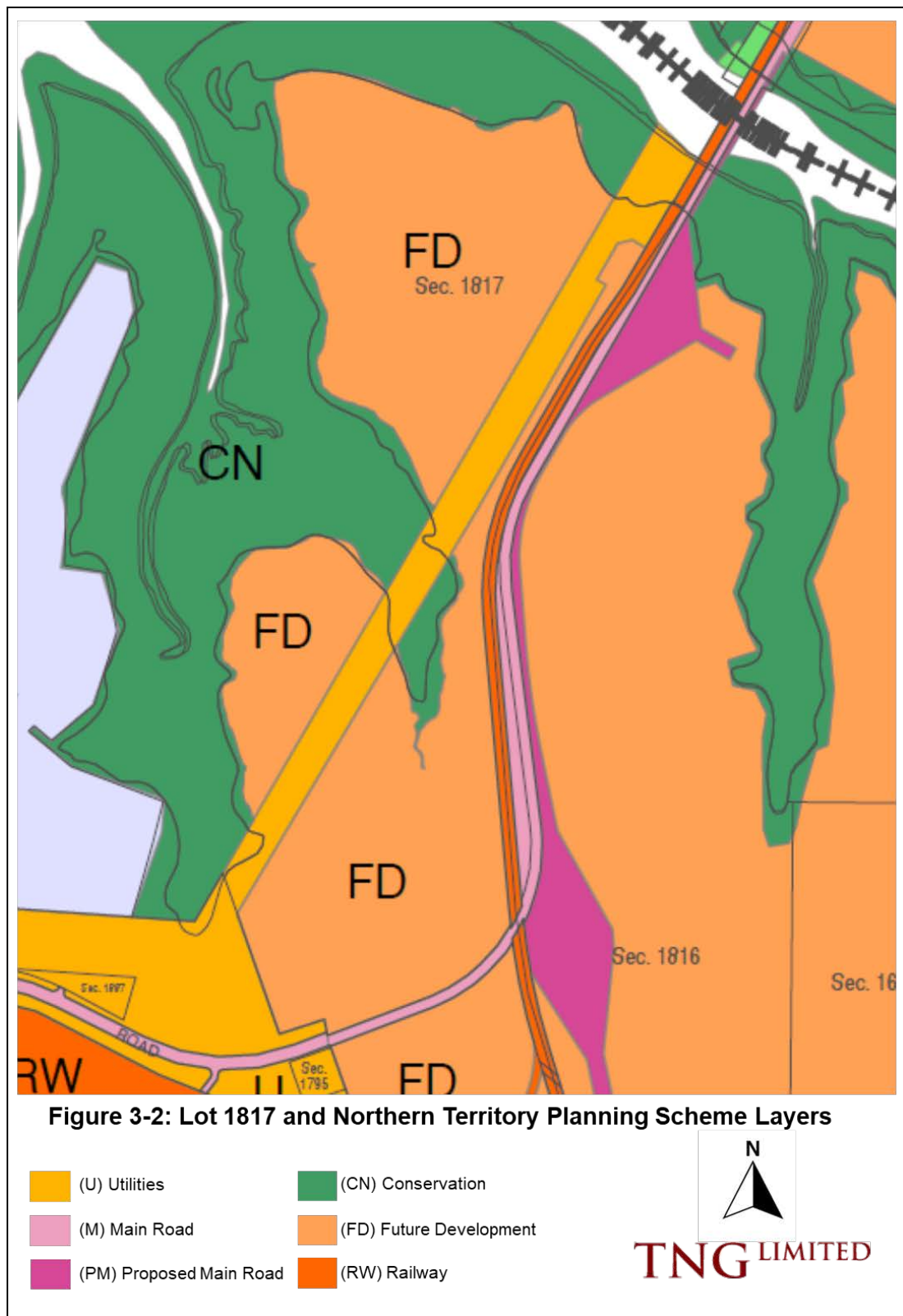


Figure 3-2: Lot 1817 and Northern Territory Planning Scheme layers

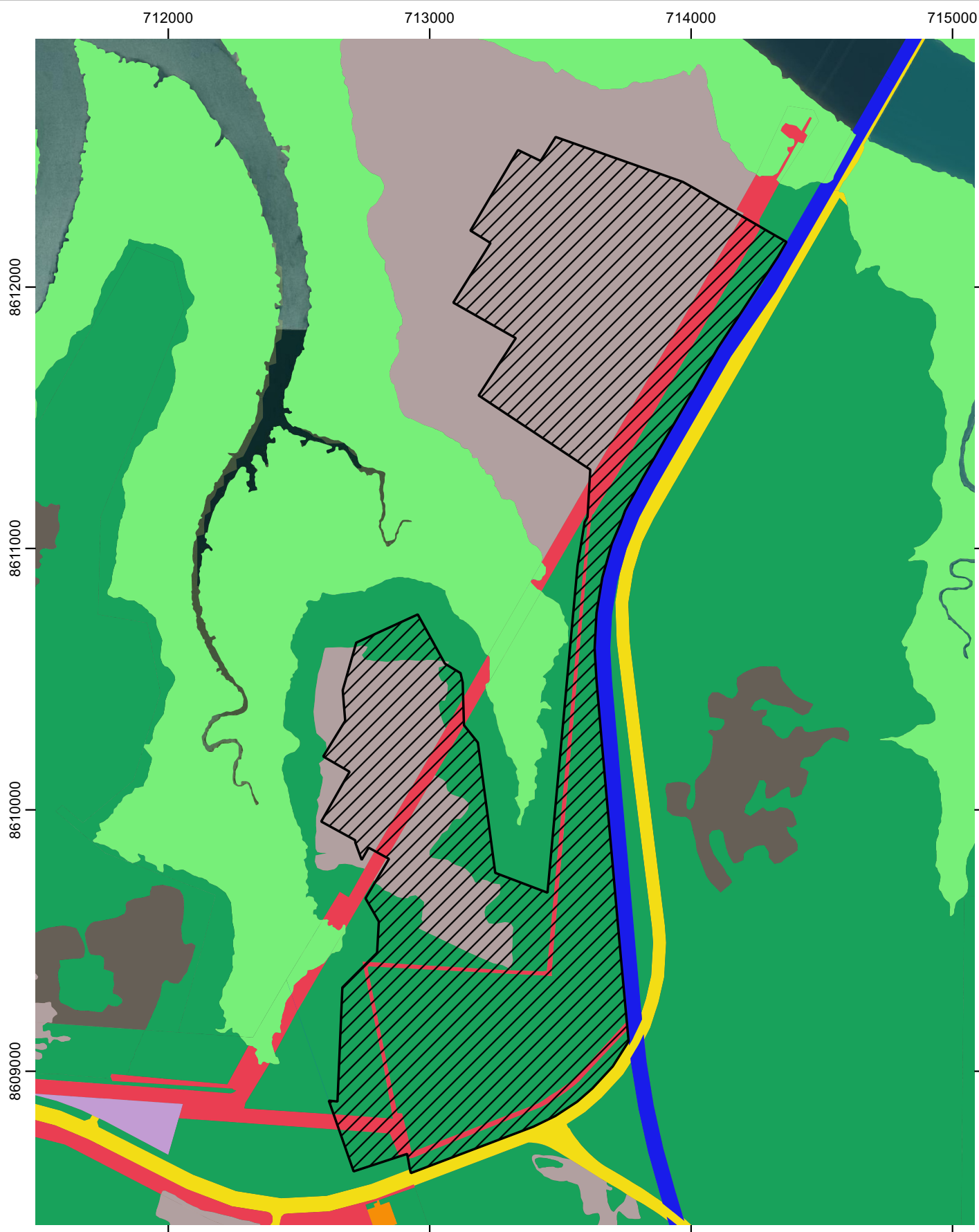


Figure 3-3: Lot 1817 and land use in the vicinity of the Project

Legend

- | | |
|---|---|
| ■ Electricity substations and transmission | ■ Residual native cover |
| ■ Estuary/coastal waters - conservation | ■ River |
| ■ Extractive industry not in use | ■ Roads |
| ■ Fuel powered electricity generation | Development Envelope |
| ■ Gas treatment storage and transmission | |
| ■ Quarries | |
| ■ Railways | |



Scale when printed in A4 is 1: 20,000
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 CRS: GDA 1994 MGA Zone 52

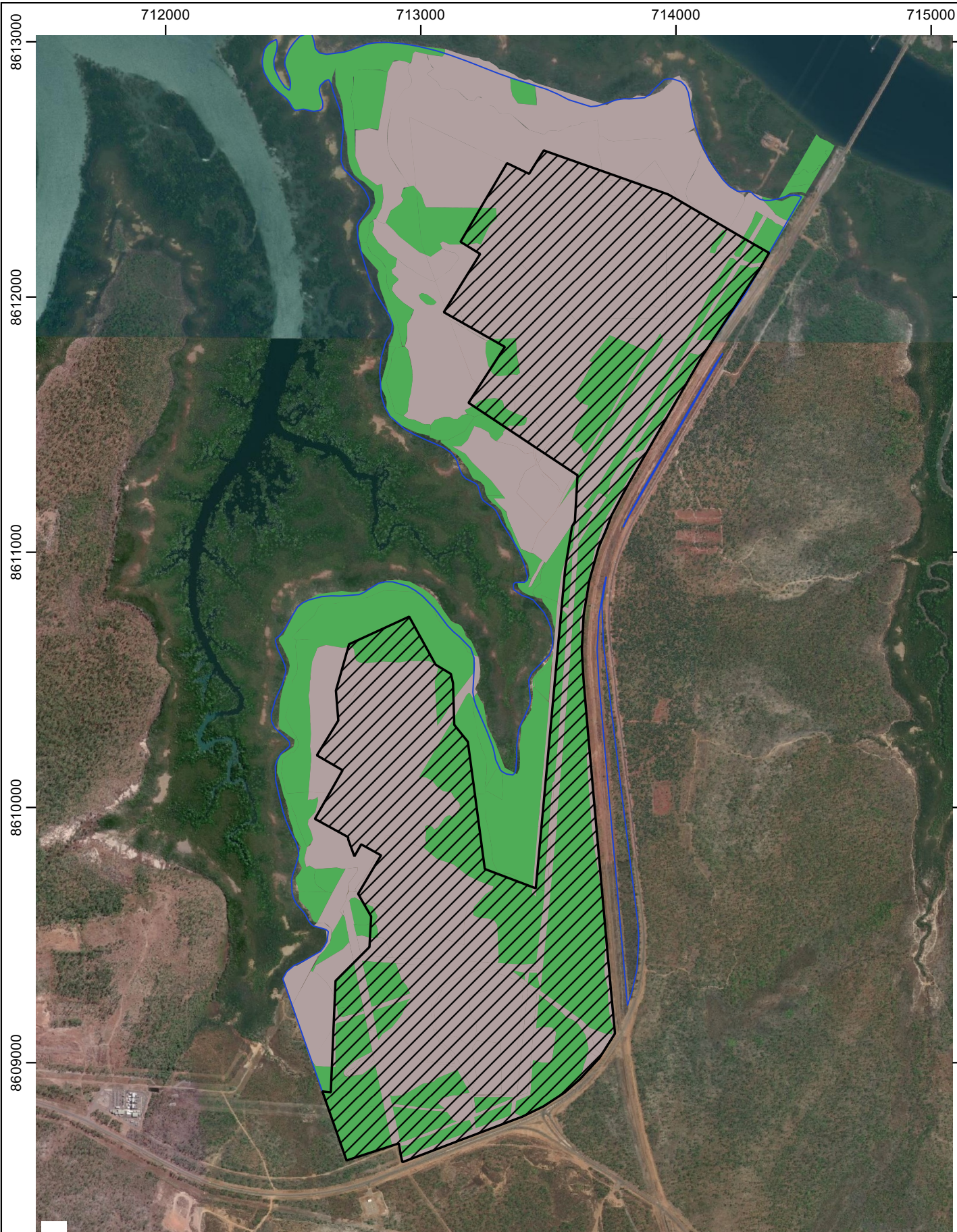


Figure 3-4: Existing disturbance at the Project

Legend

- Not previously disturbed
- Previously disturbed
- Development Envelope
- Lot 1817 boundary



Scale when printed in A4 is 1: 20,000
 Date drawn: 26/01/2021
 CRS: GDA 1994 MGA Zone 52

3.3 REASONABLY FORESEEABLE FUTURE ACTIVITIES

The *Darwin Regional Land Use Plan 2015* (Department of Lands, Planning and the Environment, 2015) identifies land on Middle Arm as an area with potential for strategic industrial development, including additional deep water port development.

The Middle Arm Industrial Precinct is designed to accommodate large strategic industrial lots for downstream gas processing and gas related industry; with access to an extensive corridor network to carry utilities, gas, feedstock and products. Future developments (by others) may include commercial and support industry zones, planned extractive industry depot and material processing and a rail spur line, with a site to maintain and store rolling stock.

Coogee Chemicals Pty Ltd are proposing to develop a methanol plant in the Middle Arm Industrial Precinct. While little information is publicly available, Coogee are examining the feasibility of a 350,000 tpa methanol plant. A final investment decision is expected in early 2021 with potential for start-up in 2024. The approval, construction and operation of the methanol plant will create a draw on potential workforce personnel, water and gas resources. Traffic movements are likely to significantly increase during construction and operations of the methanol plant should it proceed.

3.4 BIOPHYSICAL SETTING

3.4.1 Climate

The climate for the site is described by the Köppen classification system as Tropical Savanna (Figure 3-5). This is typified by monthly mean temperatures above 18 degrees Celsius for every month of the year and the driest month having less than 60 mm of rain.

Of the four types of tropical savanna climates, the site is typified by a pronounced wet and dry season of relatively equal duration, with summer dominant rainfall.

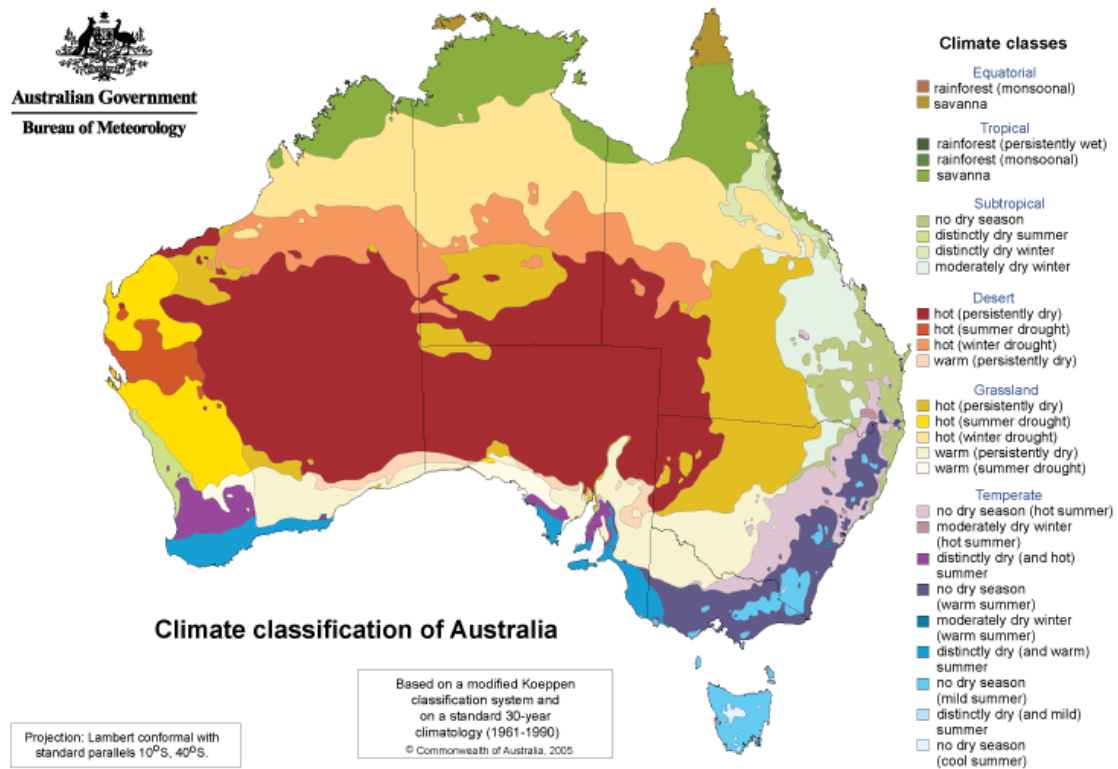


Figure 3-5: Köppen Climate Classification (Source: Bureau of Meteorology (BoM))

Temperature

Darwin Airport (Site No. 014015) has a recorded mean maximum temperature of 32.1 degrees Celsius and a mean minimum temperature of 23.2 degrees Celsius. Mean monthly maximum temperatures only vary by approximately three degrees Celsius between the summer and winter extremes, however mean monthly minimum temperature extremes vary by up to six degrees Celsius. Figure 3-6 presents the monthly maximum and minimum mean temperatures.

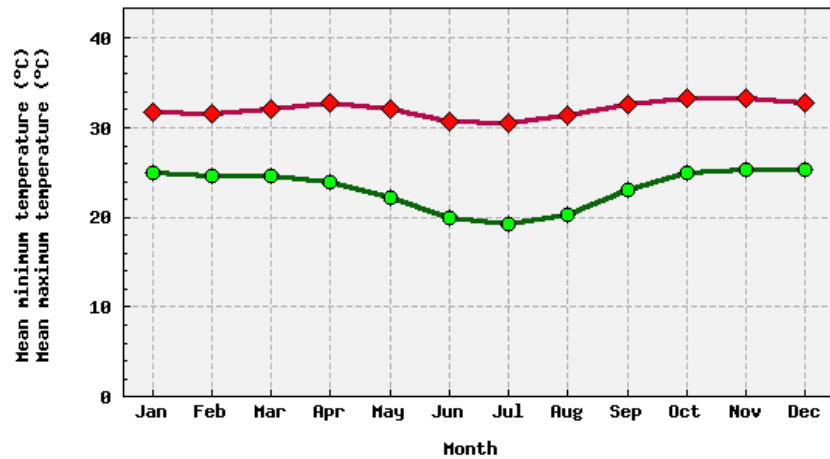


Figure 3-6: Mean Monthly Maximum and Minimum Temperatures – Darwin Airport (Source: BoM)

Rainfall

Darwin Airport (Site No. 014015) has a recorded mean annual rainfall of 1725 mm. Approximately 93% of this annual total falls in the months between November and April. The distinct wet and dry seasons are typically of equal duration (six months each).

Mean monthly rainfall and 30 year mean rainfall statistics for the period between 1981 to 2010 are presented in Figure 3-7.

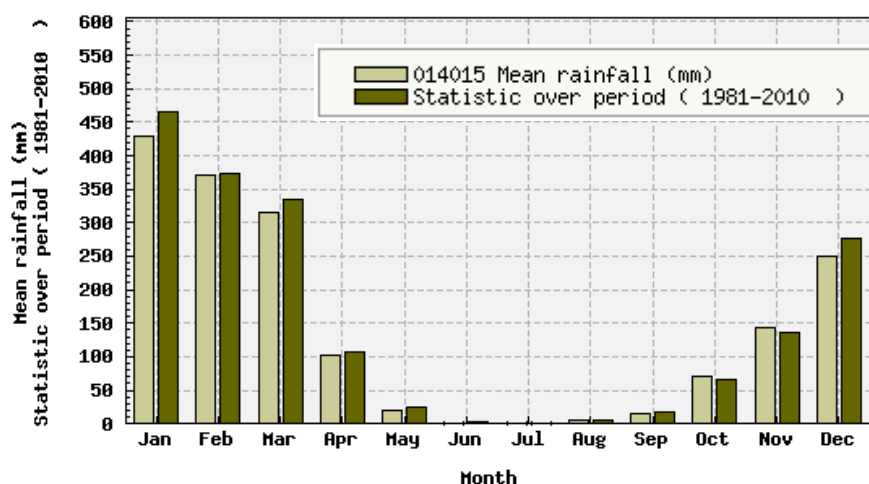


Figure 3-7: Mean Monthly Rainfall and 30 Year Mean (1981-2010) – Darwin Airport (Source: BoM)

Humidity

Darwin Airport (Site No. 014015) has a recorded mean 9am relative humidity of 71 % and a mean 3pm relative humidity of 54 %. During the wet season months of January to March, the humidity levels are higher with a mean 9 am and 3 pm relative humidity of approximately 82 % and 70 % respectively. The mean 9 am and 3 pm relative humidity monthly statistics are presented in Figure 3-8.

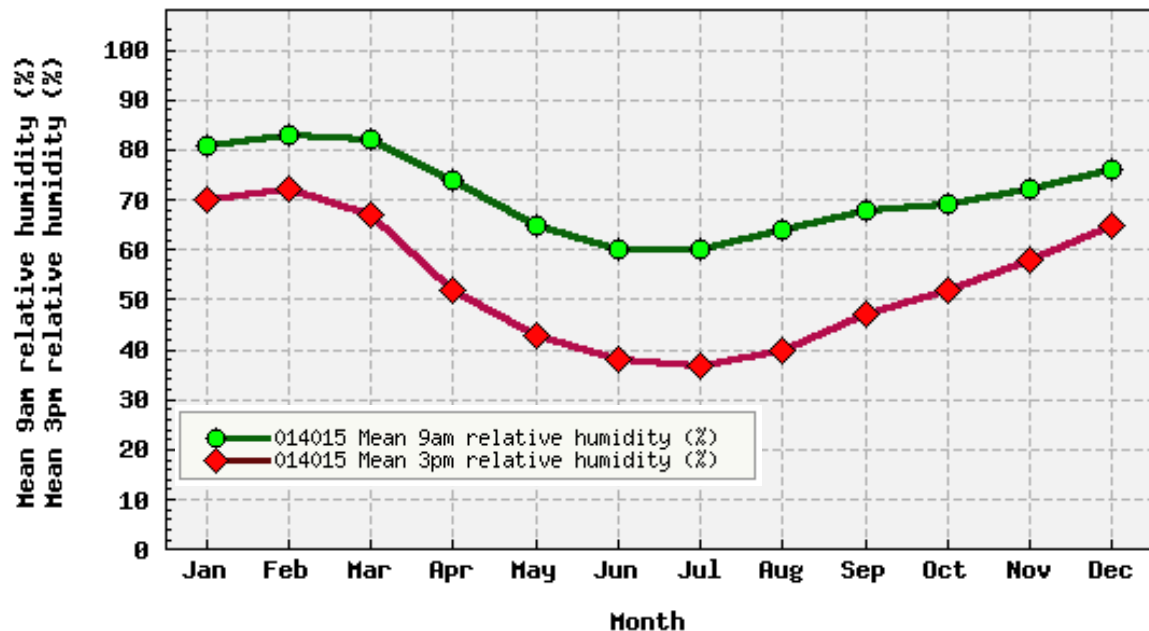


Figure 3-8: Mean Monthly 9am and 3pm Relative Humidity (%) – Darwin Airport (Source: BoM)

Evaporation

The BoM gridded mean annual pan evaporation dataset indicates the mean annual pan evaporation for the site is 2345 mm. Mean daily evaporation rates are presented in Figure 3-9.

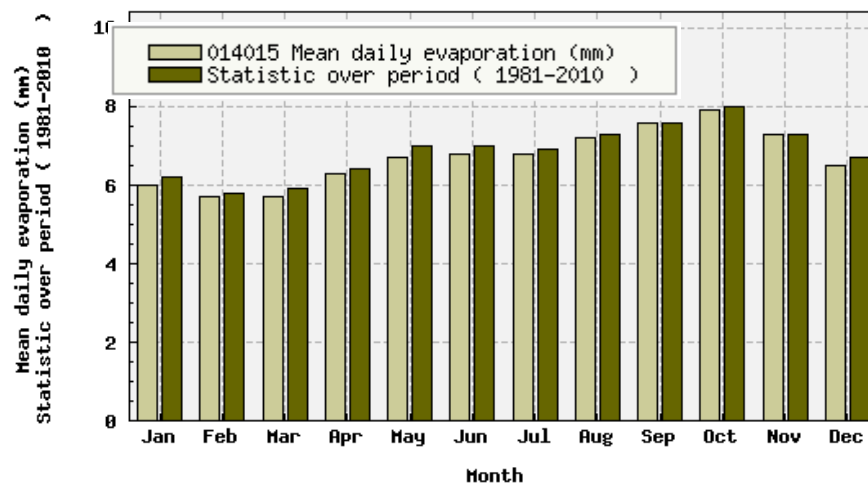


Figure 3-9: Mean Daily Evaporation and 30 Year Mean (1981-2010) – Darwin Airport (Source: BoM)

Wind

Wind roses derived from three-dimensional meteorological modelling for the site indicates that the dominant wind direction is from northwest – westerly during the summer months, whilst in autumn and winter the winds are primarily from a southeast direction. Wind roses are presented in **Figure 3-10** below.

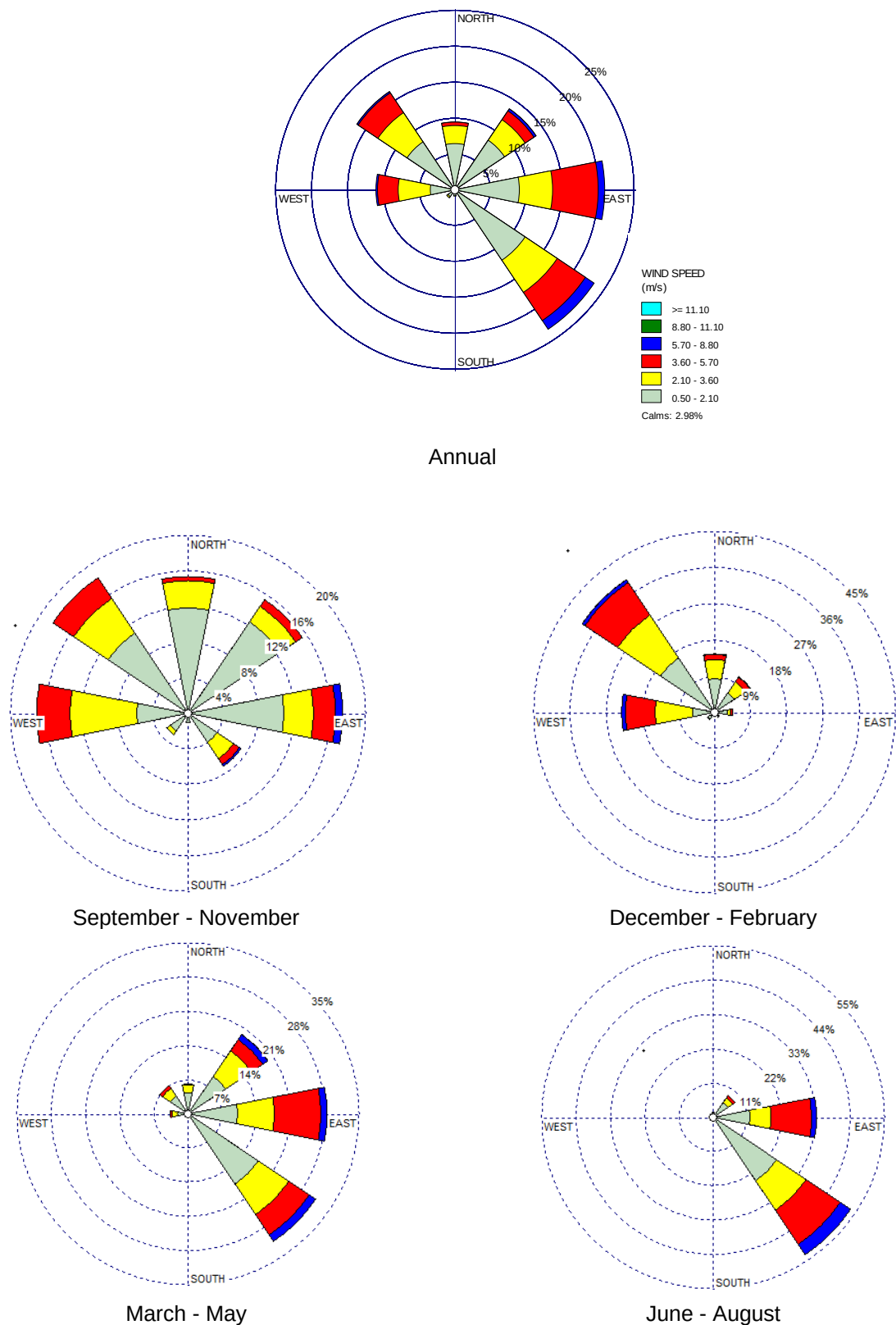


Figure 3-10: Wind Roses for the Project Arena Based on TAPM-CALMET Modelling for the Year 2017

Tropical Cyclones

The tropical cyclone season for the northern region is defined as being from November to April, with cyclones forming from lows within the monsoon trough.

The BoM indicates that there are on average 7.7 days per season when a cyclone exists in the Northern Region. Typically, the Arafura and Timor Seas average one cyclone per year.

3.4.2 Bioregion

The Project site is within the Darwin Coastal Bioregion, as classified by the Interim Biogeographic Regionalisation for Australia Version 7 (Thackway & Creswell 1995 - updated by DAWE).

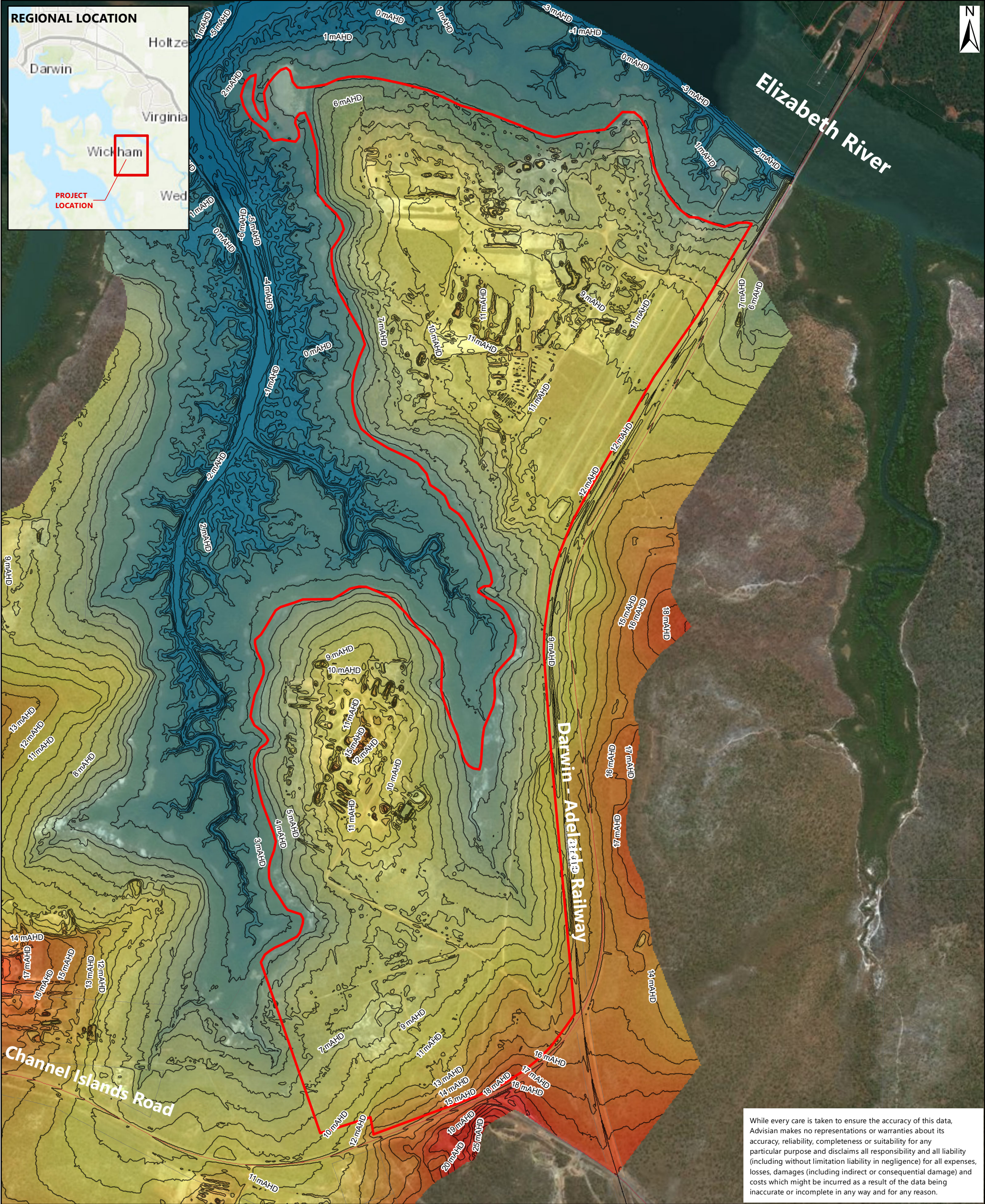
Land within the Darwin Coastal Bioregion is predominantly flat with minimal elevation above sea level. It is intersected by several major rivers. Vegetation is comprised of eucalypt forest and woodlands with tussock and hummock grass understorey.

Land use is mixed within the bioregion, with urban development concentrated around Darwin; Aboriginal land, pastoral leases and conservation reserves occupy other areas of the bioregion. The major population centres are Palmerston and Darwin (Department of the Environment 2008).

3.4.3 Topography

The site is comprised of two raised peninsulas, with the western and northern cadastral boundaries of the site located at an elevation of approximately 3 to 4 m Australian Height Datum (**mAHD**). The southern and eastern boundaries (parallel to Channel Island Road) represent the higher regions of the site and elevations along this perimeter vary from approximately six mAHD (western perimeter between peninsulas) to 18 mAHD (southern perimeter).

The proposed main project hub, within the southern peninsula, has an average elevation of approximately eight mAHD. The site topography is presented in Figure 3-11



TNG Darwin Processing Facility

Figure 3-11: Site Topography

Legend

Site Boundary

Contour (1 m Interval)

Digital Elevation Model

High : 20

Low : 0

0 0.125 0.25 0.5 0.75 1

Kilometers

Scale at A3 - 1:15,000

Coordinate System: GDA 1994 MGA Zone 52

Projection: Transverse Mercator

Datum: GDA 1994

False Easting: 500,000.0000

TNG LIMITED

Advisian

Worley Group

3.4.4 Land Units

The Land Systems of the Darwin Region report (Wood *et al.* 1985), is a broadscale land resource inventory of the Darwin Region, and an evaluation of the capability of the land to support a number of land uses. It serves as a basis for regional planning decisions and aims to promote sustainable land use. Wood *et al.* (1985), classified the survey area into Land Systems, defined as areas of land which have distinctive and recurring pattern of landforms, soils and vegetation. A Land System is comprised of a sequence of Land Units, the latter being relatively homogeneous. Two Land Systems occur at the Site:

- **Keefers Hut:** Lateritic plains and rises associated with deeply weathered profiles (laterite), including sand sheets and other depositional products, sandy and earth soils. The dominant landform is dissected, gently undulating to undulating rises on deeply weathered rocks. Soils are generally described as Orthic and Leptic Tenosols and Leptic Rudosols, which appear as shallow, gravelly yellow earths. Acid sulfate soils do not generally occur. A broad description of vegetation is mid-high open woodland of *Eucalyptus tetrodonta*, *E. miniata*, *Corymbia foelscheana*, *E. tectifera*, and *C. ferruginea* over *Heteropogon spp.*, *Chrysopogon fallax* and *Sehima nervosum*.
- **Littoral 1:** tidal mudflats and coastal floodplains with channels and estuaries. Poorly drained clays and muds are subject to tidal inundation. The dominant landforms are level tidal flats with channels and estuaries, and minor dunes. Soils are comprised of supratidal and intertidal Hydrosols (saline muds and grey cracking clays). Acid sulfate soils commonly occur on tidal flats, coastal floodplains and some coastal sandplains. Vegetation generally consists of samphire, sedgeland, or mangrove low closed forest.

Land Systems are divided into Land Units (Department of Environment and Natural Resources 2000). The Land Units present at the Site (pre-disturbance) are listed in Table 3-2.

Table 3-2: Land Units of the Site (Department of Environment and Natural Resources, 2000)

Unit	Landform	Soils	Vegetation
1c	Rises and short steep slopes	Leptic Rudosols	Woodland of <i>Eucalyptus miniata</i> and <i>Corymbia bleeseri</i> over <i>Sorghum</i> spp.
2a1	Rises	Leptic Rudosols	Open Woodland of <i>E. miniata</i> , <i>E. tetrodonta</i> , or <i>C. foelscheana</i> , <i>C. confertifolia</i> and <i>E. tectifera</i> over mixed grasses
2b2	Sideslopes	Brown Kandosols	Low Open to Open Woodland of mixed species over sparse grasses
4d	Plains	Leptic Rudosols	Grassland of mixed species with emergent trees and shrubs
9b	Marine	Intertidal Hydrosols	Low Closed Forest of Mangrove spp.; intertidal inundation
9a	Marine	Supratidal Hydrosols	-

4 PROPOSAL DESCRIPTION

4.1 OVERVIEW

The objective of the Project is to construct and operate a facility to process magnetite concentrate, railed from TNG's Mount Peake mine site to produce the following products:

- Titanium dioxide (TiO_2) pigment;
- Vanadium pentoxide (V_2O_5); and
- Ferric oxide (Fe_2O_3).

The Project is expected to produce 100,000 tpa of TiO_2 , 6,000 tpa of V_2O_5 and 500,000 tpa of Fe_2O_3 to export to international customers.

4.2 LAYOUT OF THE PROCESSING FACILITY

The revised Development Envelope is 270.5 ha, incorporating 75.2 ha of existing disturbed land, 88 ha of degraded vegetation and 107.3 ha of good to excellent quality vegetation.

The Processing Facility is retained predominantly on the southern peninsula of Lot 1817. Project support infrastructure will adjoin the Processing Facility on the southern peninsula, with additional support infrastructure established on the northern peninsula of Lot 1817. The wastewater discharge pipeline corridor has been removed from the layout and additional stormwater management infrastructure has been included.

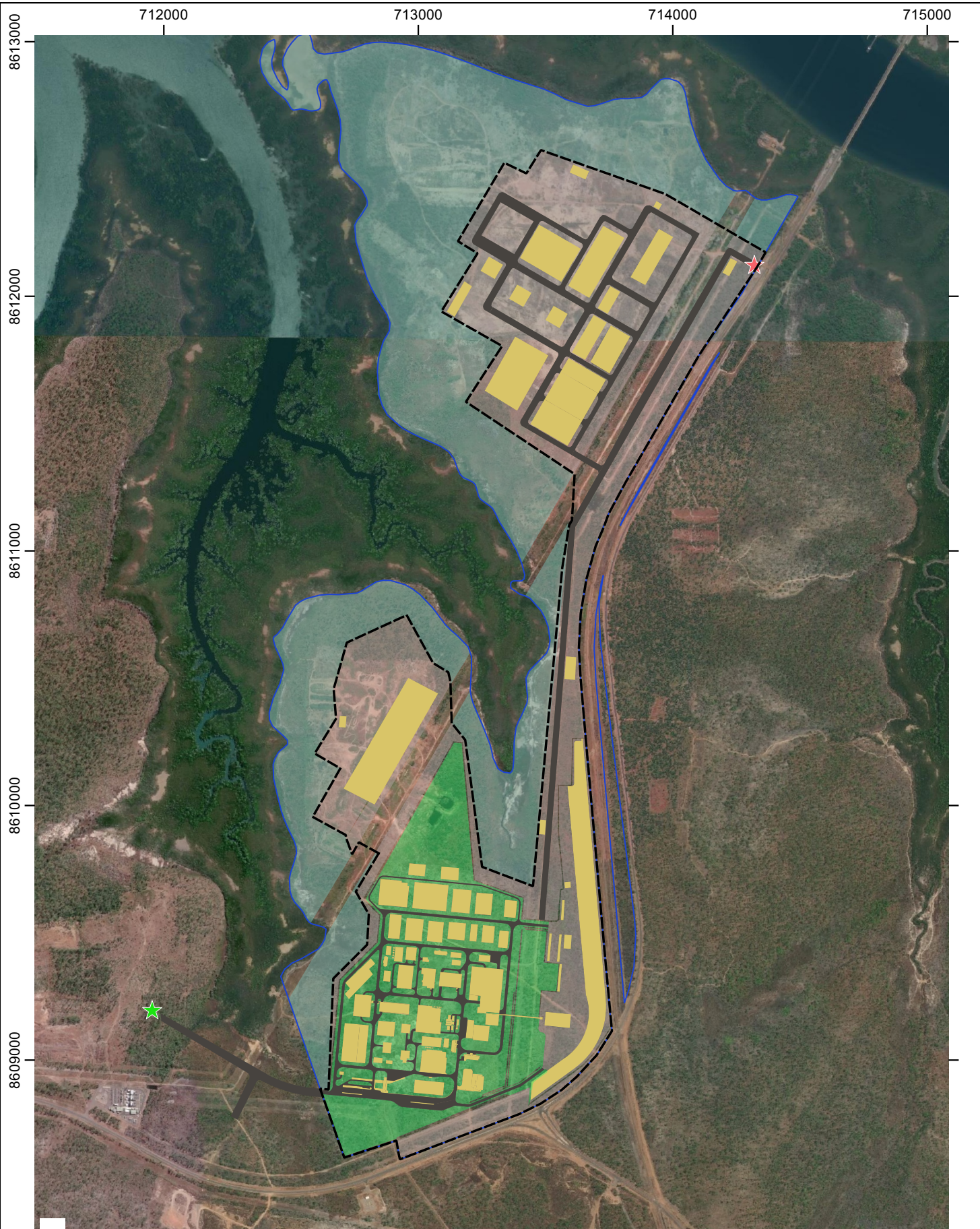


Figure 4-1. Darwin Processing Facility Site Layout

Legend

- | | |
|---|--|
| Infrastructure | ★ Main Site Access |
| Grass | ★ Emergency Site Access |
| Native vegetation cover | Development Envelope |
| Roads and Carparks | Lot 1817 boundary |



Scale when printed in A4 is 1: 20,000
 Date drawn: 26/01/2021
 CRS: GDA 1994 MGA Zone 52

4.3 CONSTRUCTION PHASE

The construction period for the Darwin Processing Facility is anticipated to be 24 months, continuing over both wet and dry seasons. The construction phase will involve:

- Site preparation;
- Vegetation clearing,
- Rehabilitation of existing degraded land outside the Development Envelope
- Bulk earthworks,
- Civil and architectural construction,
- Structural, mechanical and platework erection;
- Piping installation; and
- Electrical instrument installation.

4.4 OPERATIONAL PHASE

Upon completion of the construction phase, usage of the site will consist of operational and maintenance related traffic. The following provides an overview of the key features of the proposed processing operations, with flow charts supplied as Figure 4-2 and Figure 4-3. Table 4-1 provides a summary of the key operational requirements of the Project.

Table 4-1. Key components of the operational phase of the Project

Component	Description in the Draft EIS	Change in the EIS Supplement
Operational Requirements		
Development Envelope	264 hectares (ha)	270.5 ha
Throughput	700,000 tonnes per annum (tpa)	No change
Operating hours	The Processing Facility will operate 24 hours per day, seven days per week.	No change
Products	Titanium Dioxide Pigment (TiO₂)	
	TNG's average production: 100,000 tpa (1.5% of world demand)	No change
	Vanadium Pentoxide (V₂O₅)	
	TNG's average production: 6,000 tpa (3.5% of world demand)	No change
	Ferric Oxide (Fe₂O₃)	
	TNG's average production: 500,000 tpa (0.5% of world demand)	No change
Reagents	• Several acids, bases and oxidants; and • Several solid reagents including metals, hydroxides, limestone, diatomaceous earth, sulfur, organic	<u>Processing:</u> Oleum Plant and associated reagents removed from process.

	polymers (floculants) and inorganic salts	<u>Water Recycling Plant:</u> Addition of Sulphuric acid, Nitric acid, Hydrochloric acid, Sodium hydroxide, Ferric chloride, Sodium hypochlorite, Antiscalant, Sodium metabisulphite, Citric acid, Flocculant (polymer), Defoamer.														
Electricity Consumption (TJ/annum)	1316	1597														
Natural Gas Usage (PJ/per annum)	4.82	5.2														
Water sourced from the Darwin Water + Supply (GL/per annum)	11	3.85														
Wastewater management	Discharged into Darwin Harbour via a pipeline.	No discharge into marine environment, liquid wastes will be treated and recycled in the Wastewater Recycling Plant.														
Train movements	On average: - three train loads of concentrate per week will be delivered to the Processing Facility from Mount Peake; and - seven train movements between the Processing Facility and East Arm Wharf will occur weekly	No change														
Traffic movements (Maximum traffic on external roads; vehicles/day)	985	636														
Operations Phase Waste Streams	- Wastewater from Processing Facility to be disposed through marine discharge at a rate of 9.5 GL/annum. - Filter cake from wastewater precipitate produced in the pigment plant, the TIVAN® Process and collected stormwater., - Neutralised digest residue tailings. - Dry magnetic separation non-magnetics. will be produced at a rate of 570 tpa.	<table><thead><tr><th><u>Waste Product</u></th><th><u>Volume tpa</u></th></tr></thead><tbody><tr><td>Coke ash</td><td>2,500</td></tr><tr><td>Sulphate digest leach residue</td><td>55,000</td></tr><tr><td>Metal hydroxide precipitation #1</td><td>15,000</td></tr><tr><td>Metal hydroxide precipitation #2</td><td>30,000</td></tr><tr><td>WRP Clarifier solids</td><td>4,000</td></tr><tr><td>Sewage</td><td>150 m³/day</td></tr></tbody></table>	<u>Waste Product</u>	<u>Volume tpa</u>	Coke ash	2,500	Sulphate digest leach residue	55,000	Metal hydroxide precipitation #1	15,000	Metal hydroxide precipitation #2	30,000	WRP Clarifier solids	4,000	Sewage	150 m³/day
<u>Waste Product</u>	<u>Volume tpa</u>															
Coke ash	2,500															
Sulphate digest leach residue	55,000															
Metal hydroxide precipitation #1	15,000															
Metal hydroxide precipitation #2	30,000															
WRP Clarifier solids	4,000															
Sewage	150 m³/day															
By-products from waste streams	None identified	<u>By-Product</u> Gypsum products Digest residue WRP salt residue components (with further processing)														
Workforce	Peak workforce during construction is expected to be approximately 700 to 1000 personnel The operations of the Processing Facility is estimated to require a workforce of approximately 600 personnel.	Construction workforce estimated to be approximately 1200 to 1500 personnel. Operations workforce estimated to be approximately 850 personnel, with 300 personnel on site at any one time.														

Greenhouse gases	Direct emissions – 828,310 t CO ₂ eq	Direct emissions – 944,020 t CO ₂ eq
	Indirect emissions – 204, 711 t CO ₂ eq	Indirect emissions – 248,383 t CO ₂ eq
	Total emissions – 1,033,021 t CO ₂ eq	Total emissions – 1,192,401 CO ₂ eq

4.4.1 TIVAN Process

The TIVAN® leach circuit - TNG's proprietary TIVAN® Process is a hydro-extraction process designed to produce very high-purity vanadium pentoxide, titanium dioxide and iron oxide. The simplified Darwin Processing Facility process flowsheet is displayed in Figure 4-2.

4.4.2 Titanium Pigment Plant

The simplified titanium pigment plant flowsheet is displayed in Figure 4-3. Processing broadly involves digestion of titanium from the TIVAN® leach residue, hydrolysis of titanium from solution, calcination of hydrolysed titanium, milling and surface treatment of raw TiO₂, followed by steam milling to produce the titanium pigment product.

4.4.3 Other Processing Requirements

Table 4-2 summarises the other processing requirements for the production of the end products.

Table 4-2.. Other inputs required in the production process.

Processing Requirement	Description
Oxygen Plant	An oxygen plant will supply oxygen for the hydrometallurgical process and for the pigment plant by air liquefaction. The primary product will be gaseous oxygen. A small percentage of the gaseous or liquid nitrogen will be used in the process plant. The remaining nitrogen will be vented to the atmosphere.
Steam	Steam is required for the titanium pigment plant, for heating in the hydrometallurgical process and for the vanadium purification circuit. The steam for the plant will be generated from waste heat recovery of the off gas. Where required, natural gas will be used to make-up steam requirements for the plant. Water for steam production will be a combination of recycled condensed steam and demineralised makeup water.
Cooling	Air cooling towers will provide cooling for the Processing Facility. 7,850 tph of cooling air will provide a heat sink for 1,270 tph of circulating cooling water required for process units throughout the plant.

TIVAN® PLANT FLOWSHEET

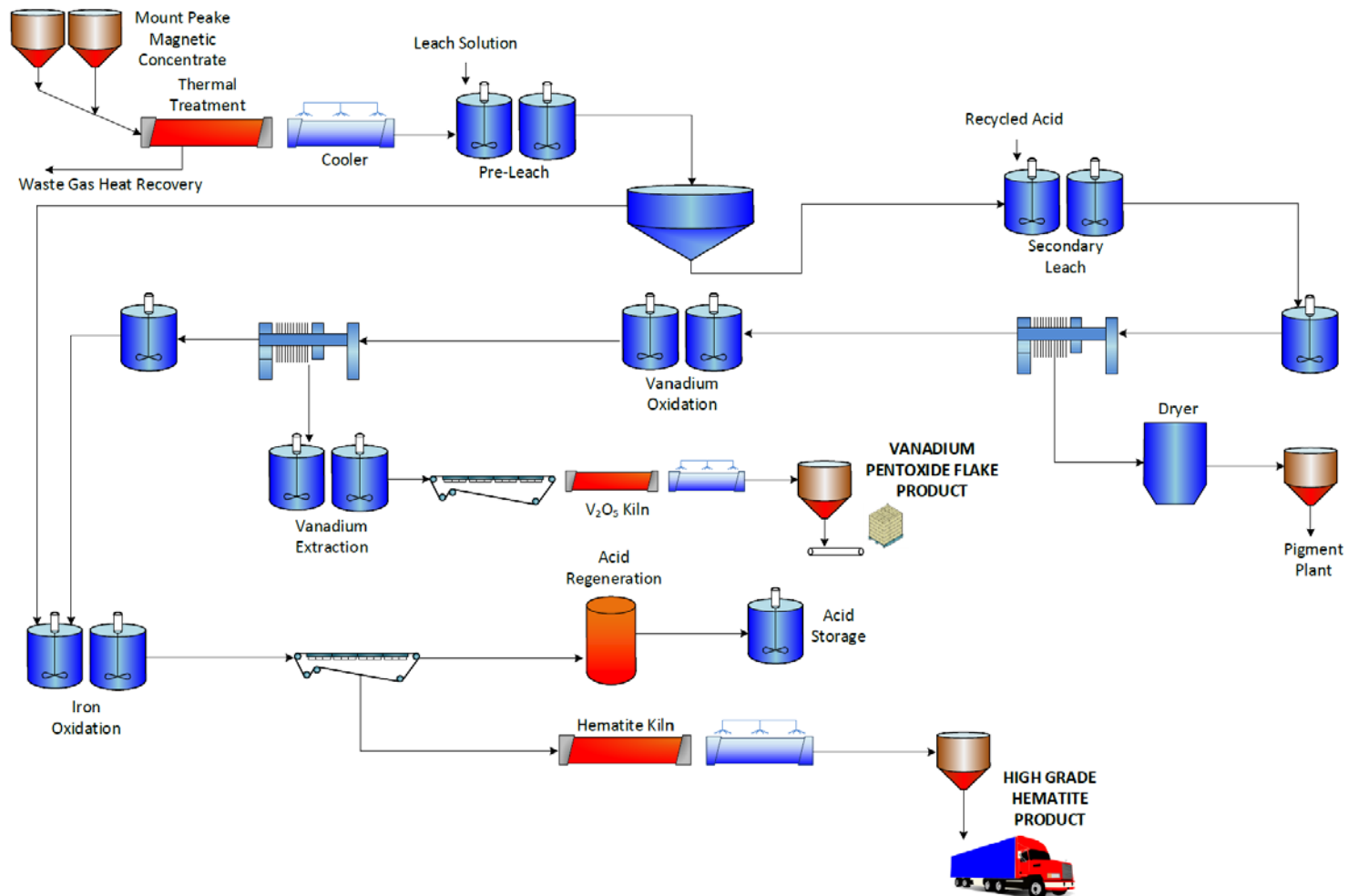


Figure 4-2. Darwin Processing Facility Process Flow Diagram.

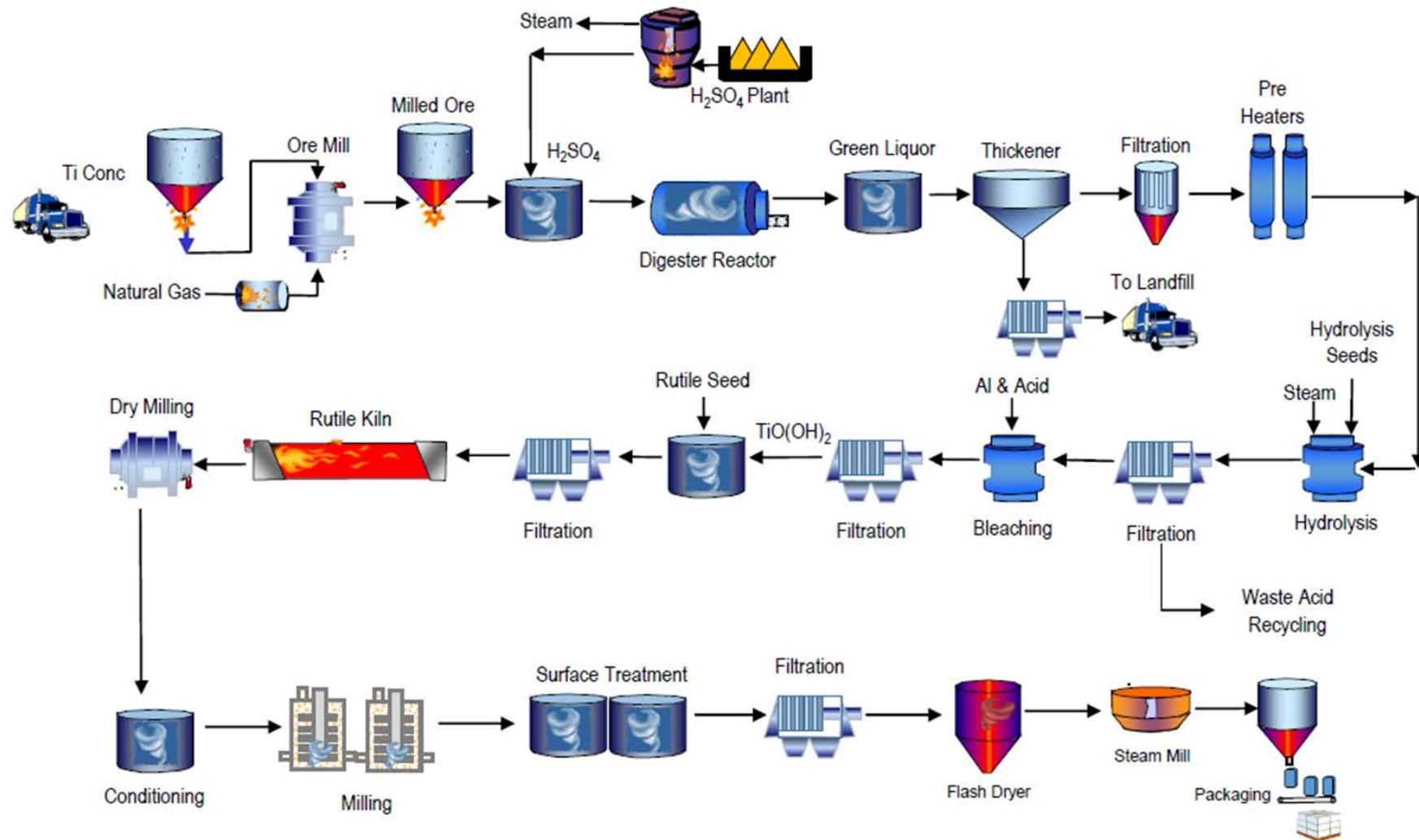


Figure 4-3. Titanium Pigment Processing Facility Process Flow Diagram.

4.5 DECOMMISSIONING AND REHABILITATION

TNG intend to leave the Project site in a condition that facilitates relinquishment without any future safety, financial or environmental liability for TNG, land managers, Government or the community. Given the longevity of the Project, it is proposed that TNG provide a full Closure Plan for the site five years prior to decommissioning and rehabilitation. The closure plan will be developed in consultation with all stakeholders to ensure an agreed final land use, closure objectives and relinquishment criteria are acceptable and can be met.

4.5.1 Closure objective and completion criteria

Closure objectives and completion criteria have been developed for the Project; these appear as Table 4-3. During the development of a closure plan for the Project the objectives and completion criteria, and the measurable standards to meet completion criteria, will be refined.

4.5.2 Future land use

An option for future land use of the site following decommissioning and rehabilitation is industrial use, given the site is located within an area earmarked for medium to long term industrial use. Alternatively, depending on future local development patterns and surrounding land uses, it may be considered more desirable to rehabilitate and repurpose the site for other land uses, such as conservation, recreation and/ or residential use.

4.5.3 Decommissioning activities

Regardless of the future land use, which will be determined in consultation with key stakeholders prior to completion of the Project, the following will be undertaken upon closure of the facility:

- All infrastructure will be removed (including processing infrastructure, rail siding, support buildings, service infrastructure etc);
- Underground services will be cut off below surface and buried;
- All concrete footings will be removed, with concrete either disposed off-site or buried in a designated area within the site;
- Carpark areas, access roads and other hardstand areas will be removed and underlying compacted soils ripped;
- A Contaminated Site Assessment will be undertaken in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure, 2013*. If contamination is identified, remedial works will be undertaken to ensure soils are within acceptable criteria prior to relinquishment of the site;
- The topography of the site will be levelled to allow for future land uses.

Table 4-3: Closure objectives and completion criteria for the Project

Aspect	Objective	Completion Criteria	Measurable Standards to Meet Completion Criteria
Safety and public health	Site closure activities undertaken safely.	All site excavations backfilled.	Site inspected by independent auditor and a completion report produced.
	Public access to closed areas deterred.	Restricted access to open pits. Signage where appropriate. Roads no longer required will be rehabilitated.	
Infrastructure	Assets will be disposed or retained in accordance with requirements of stakeholders and regulatory agencies.	Infrastructure decommissioned and removed unless retention is agreed by stakeholders and regulatory agencies. Any buried infrastructure to be defined and markers maintained if required. A transfer agreement is in place for all residual assets.	No infrastructure remaining at closure unless transfer agreement in place; to be confirmed by post closure inspection.
Soils	Contaminated soils do not remain <i>in situ</i> at levels above those acceptable for the agreed post-closure land use.	Any remaining contaminated sites are identified and contaminated sites classification does not impact on suitability of the Project area for proposed post-Project land use. Contaminated soils are remediated, as warranted.	Any sites that pose or threaten to pose serious or material environmental harm, as defined in the <i>Waste Management and Pollution Control Act 1998</i> , are to be assessed in accordance with requirements for environmental audits in the Act and in accordance with the <i>National Environment Protection (Assessment of Site Contamination) Measure</i> . Contaminated soils to be remediated with regard to the <i>Northern Territory Contaminated Land Guidelines</i> where applicable.
Groundwater	Alteration to groundwater from the Project not affecting existing or future uses, users or offsite receivers.	Ground water quality from site monitoring bores is within target parameters established during baseline monitoring.	Post Project groundwater quality from mine site monitoring bores not exceeding contaminant thresholds established during baseline monitoring; or remaining within 10% of baseline levels.

Aspect	Objective	Completion Criteria	Measurable Standards to Meet Completion Criteria
Surface Water	Controlled surface water flows on rehabilitated landforms.	At a catchment and local scale, natural surface water drainage flow functionality is reinstated.	Audit of surface drainage infrastructure upon closure including assessment of connectivity of surface water flow against those established in baseline reports using survey and 'as-built' data.
	Surface water flows from rehabilitated land surfaces integrate with flows from adjacent undisturbed land surfaces ensuring continuity of surface hydrology across the disturbance.	Surface water diversion infrastructure, where retained by agreement with stakeholders, to be functional, effective to its design capacity, remain stable and resist erosion.	
Revegetation	Establish self-sustaining, resilient and stable vegetation comprised of local provenance taxa with minimal weed impacts	Final areas to include representative local provenance endemic flora that contributes to erosion stability, rainfall infiltration/run-off and nutrient cycling.	Rehabilitation to be considered successful when achieving 60% of comparable analogue site for three consecutive monitoring periods.
		Canopy volume, density and species diversity at rehabilitation areas achieving 60% of appropriate analogues.	Area of weed infestation recorded annually post closure does not exceed pre Project infestations, for three consecutive (annual) monitoring periods post closure.
		No new weed infestations.	
Waste	All non-mineral waste is appropriately disposed or removed from site.	All available topsoil is respread over rehabilitation areas.	Completion report upon closure.
		All non-mineral waste disposed in accordance with regulations. Recycling opportunities maximised for appropriate materials.	

4.5.4 Rehabilitation activities

Rehabilitation activities will be conducted parallel to the Construction phase in areas identified in the Rehabilitation Management Plan (RMP). These areas will be rehabilitated with the materials available during vegetation clearing for the Project. The RMP provides details for the identification of suitable areas for

material harvest and the handling and application procedure. In summary the rehabilitation during the construction phase will:

- Collect vegetation (as woodchips and hollow logs) and topsoil from clearing areas identified in the Rehabilitation Management Plan
- Collect subsoil where it is unsuitable for fill
- Apply subsoil in 64 ha of currently disturbed land outside the Development Envelope within Lot 1817
- Apply topsoil and woodchips, rip the soil surface
- Transplant *Cycas armstrongii*
- Apply large hollow logs

Areas to be rehabilitated during the construction phase are shown in Figure 4-4.

Further Rehabilitation will be carried out at the conclusion of processing activities. Rehabilitation activities will differ depending on the final land use.

Assuming the site is to be used for industrial uses – the measures outlined above under decommissioning will be completed to leave the site in a state that is ready for the next land user to commence activities.

If the site is to be utilised for recreation or conservation, the following measures will be undertaken:

- Re-placing topsoil over the Project areas;
- Reinstating natural drainage lines in accordance with the site topography;
- Ripping areas to assist with infiltration and surface roughness;
- A combination of seeding the area and planting tubestock of local provenance indigenous native taxa across the site.

If the site is to be used for residential purposes there may be a requirement to provide fill over and above that available at the site. Investigation of requirements for rehabilitation for residential use will be explored further in the Project closure plan.

4.5.5 Unexpected closure

In the very unlikely event of unplanned closure, the following will be undertaken:

- all concentrate, reagents, hazardous materials, waste products and other consumables will be removed from the site;
- Infrastructure will be made safe and all buildings and the premise boundary will be secured to restrict unauthorised access;

Liaison will be undertaken with key stakeholders, particularly applicable Government agencies, to determine the fate of remaining infrastructure.

Where applicable, third parties would be approached to recommission the operation or closure activities would be enacted and the site decommissioned and rehabilitated.

TNG will provide notice to the NT Government at least five years before the end of production to allow discussions on site decommissioning to occur.

4.5.6 Future Land Tenure

It is expected that negotiations with NTG will be ongoing over the life of the Project with regard to future land tenure. Any developments will be noted in future iterations of the Project closure plan.

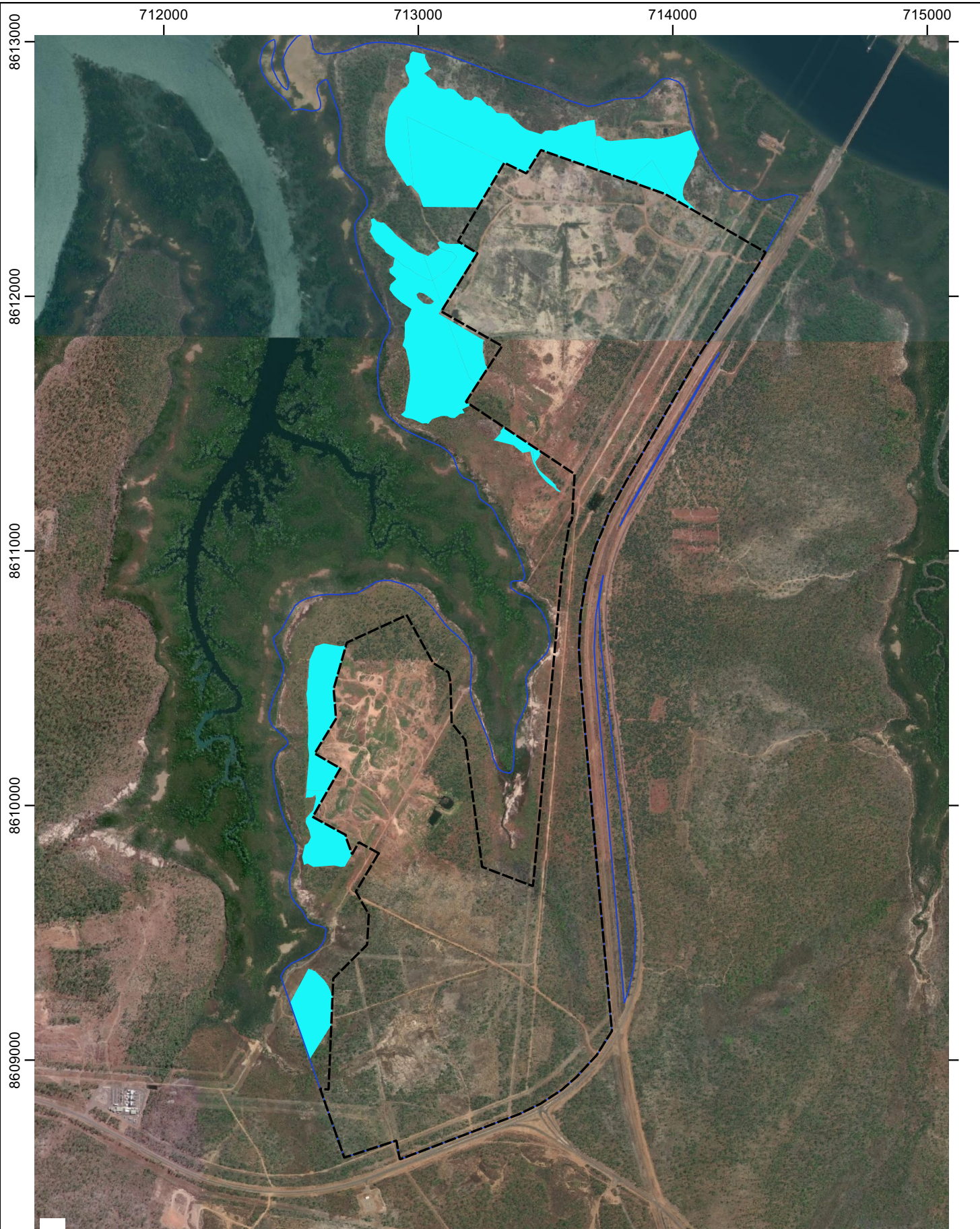


Figure 4-4. Rehabilitation areas during the Construction Phase

Legend

- Rehabilitation areas
- Development Envelope
- Lot 1817 boundary



Scale when printed in A4 is 1: 20,000
 Date drawn: 26/01/2021
 CRS: GDA 1994 MGA Zone 52

5 FLORA AND VEGETATION

From the April 2018 Survey, 198 taxa from 121 Genus and 61 Families were collected within the study area. The full report for the flora and vegetation surveys conducted at Lot 1817 is included in Appendix B.

5.1 VEGETATION COMMUNITIES

Table 5-1 details the 11 vegetation associations and NVIS level V descriptions identified from previous survey work of the area. No Threatened Ecological Communities as defined under the Federal EPBC Act occur in the Study area.

Table 5-1: Vegetation Association of the Study Area

Code	Vegetation Association	Condition	NVIS V Description	Comparable Regional Unit	Area to be cleared
VA1	Eucalyptus woodland	Very Good	U+ [^] <i>Eucalyptus tetrodonta</i> , <i>E. miniata</i> , <i>Corymbia bleeseri</i> / [^] tree/7/i; M [^] <i>Livistona humilis</i> , <i>Cycas armstrongii</i> , <i>Acacia latescens</i> / [^] cycad, shrub/3/r; G [^] <i>Heteropogon contortus</i> , <i>Sorghum intrans</i> , <i>Microstachys chamaelea</i> / [^] tussock grass, forb/2/c.	<i>Eucalyptus</i> mid woodland/ <i>Livistona</i> unknown palm/ <i>Sorghum</i> mid tussock grassland; and Land Unit 1c Eucalyptus Open Woodland as described by Fogarty <i>et al.</i> (1984)	72.1 ha
VA2	Regenerating Eucalyptus woodland	Good	U+ [^] <i>Eucalyptus tetrodonta</i> , <i>E. miniata</i> , <i>Erythrophleum chlorostachys</i> / [^] tree/7/i; M [^] <i>Planchonia careya</i> , <i>Terminalia ferdinandiana</i> , <i>Livistona humilis</i> / [^] tree, palm/6/i; G [^] <i>Heteropogon contortus</i> , <i>Sorghum intrans</i> , <i>Mnesithea formosa</i> / [^] tussock grass/2/c	<i>Eucalyptus</i> mid woodland/ <i>Livistona</i> unknown palm/ <i>Sorghum</i> mid tussock grassland; and Land Unit 1c Eucalyptus Open Woodland as described by Fogarty <i>et al.</i> (1984)	20.4 ha
VA3	Melaleuca woodland/open forest	Excellent to Good	U+ [^] <i>Melaleuca viridiflora</i> , <i>M. leucadendra</i> , <i>M. nervosa</i> / [^] tree/7/c; M [^] <i>M. viridiflora</i> , <i>M. leucadendra</i> <i>Livistona humilis</i> / [^] shrub/4/r; G [^] <i>Fimbristylis acuminata</i> , <i>Ectrosia leporina</i> , <i>Sorghum plumosum</i> / [^] sedge, tussock grass/1/c.	Melaleuca viridiflora (Broad Leaved Paperbark), Eucalyptus low open-woodland with <i>Chrysopogon fallax</i> (Golden Beard Grass) grassland understorey, and Land Unit 8b as described in Fogarty <i>et al</i> (1984)	2.5 ha (Excellent) 3.4 ha (Good)
VA4	Grevillea open shrubland	Degraded	U+ [^] <i>Grevillea pteridifolia</i> , <i>Pandanus spiralis</i> , <i>Planchonella arnhemica</i> / [^] tree/7/i; M [^] <i>Livistona humilis</i> , <i>Grevillea dimidiata</i> , <i>Calytrix extipulata</i> / [^] palm, shrub/3/bl; G [^] <i>Themeda triandra</i> , <i>Ectrosia leporina</i> , <i>Heteropogon contortus</i> , / [^] tussock grass/2/c	(Fogarty <i>et al.</i> 1984) Land Unit 6b Tall shrubland to low open woodland of <i>Grevillea pteridifolia</i>	30.4 ha
VA5	Closed Grassland	Degraded	M [^] <i>Ampelissus acetose</i> , <i>Ludwigia hyssopifolia</i> / [^] shrub/2/bl; G [^] <i>*Cenchrus polystachyos</i> , <i>Mnesithea Formosa</i> , <i>Sorghum intrans</i> / [^] tussock grass/2/d	This vegetation type is derived from disturbance and management techniques and has no natural analogue.	0.7 ha

Code	Vegetation Association		Condition	NVIS V Description	Comparable Regional Unit	Area to be cleared
VA6	Disturbed rehabilitated Acacia shrubland		Degraded	U+^ <i>Acacia pellita</i> , <i>A. difficilis</i> , <i>A. dimidiata</i> /^shrub/3/c; G^ <i>Heterachne abortiva</i> , <i>Mnesithea formosa</i> , <i>Ectrosia leporina</i> , <i>Heteropogon contortus</i> , /^tussock grass/1/r	This vegetation type is derived from disturbance and management techniques and has no natural analogue.	37.1 ha
VA7	Disturbed not rehabilitated		Completely Degraded	U+^ <i>Calytrix extipulata</i> , <i>Acacia latescens</i> , <i>Pandanus spiralis</i> /^shrub, palm/3/r; G^ * <i>Andropogon gayanus</i> , <i>Ectrosia leporina</i> , <i>Heteropogon triticeus</i> /^tussock grass/3/c	This vegetation type is derived from disturbance and management techniques and has no natural analogue.	75.2 ha
VA8	Mangrove forest	closed	Excellent	Sub-association 1: Mixed species low closed forest/open forest (hinterland) Sub-association 2: <i>Ceriops tagal</i> low closed forest (mid tidal flat) Sub-association 4: <i>Tecticornia</i> open samphire shrubland	(Brocklehurst and Edmeades 1996). 1: Mixed species low closed-forests (hinterland) (unit 6) 2: <i>Ceriops tagal</i> low closed forest (mid tidal flat) (unit 4) 4: Samphire/Saltpan (unit 11)	0 ha
VA9	Monsoon forest	closed	Good	U+^ <i>Corymbia ?polycarpa</i> , XX, <i>Ficus ?scobina</i> /^tree/6,7/i; M^ <i>Bridelia tomentosa</i> , <i>Acacia neurocarpa</i> , <i>Erythrophleum chlorostachys</i> /^shrub/4/i; G^ XX, <i>Passiflora foetida</i> /^tussock grass, vine/3/i.	Closed Forest Unit 1a Seasonal Coastal Habitats (Wilson <i>et al.</i> 1990), and (Russell-Smith 1991), Floristic Group 3: Dry Coastal/subcoastal Monsoon Forest Group 10: Semi-deciduous rain forests associated with the levees of seasonally flooded, north-western lowland river systems	0 ha
VA10	Tussock Grassland		Excellent	U^ <i>Xanthostemon paradoxus</i> , <i>Erythrophleum chlorostachys</i> , <i>Pandanus spiralis</i> /^tree, palm/6/i; M^ <i>Livistona humilis</i> , <i>Acacia plectocarpa</i> subsp. <i>plectocarpa</i> /^cycad, shrub/4/r; G+^ <i>Heteropogon contortus</i> /^tussock grass/3/c.	Fogarty <i>et al.</i> (1984), Land Unit 4d Grassland with areas of emergent shrubs.	8.9 ha
VA11	Slashed Infrastructure	for	Degraded	Not assessed	This vegetation type is derived from disturbance and management techniques and has no natural analogue.	19.8 ha

*National Vegetation Information System

5.2 VEGETATION CONDITION

Vegetation condition aligned with the Vegetation Associations as areas within an association had been exposed to the same disturbances in general Table 5-2. An exception is the Melaleuca woodland/open forest on the northern boundary that has evidence of historic soil disturbance.

Table 5-2. General vegetation condition of the vegetation associations.

Veg Code	Vegetation Association	Condition	Disturbances
VA1	Eucalyptus woodland	Very Good	Some relatively slight signs of damage caused by human activities. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, and/or occasional vehicle tracks. Exploratory digging by current or former lease holders with large machinery that has not been rehabilitated, leaving pits up to two m deep at intervals as close as 50 m apart in places. This vegetation type is in the drier parts of the site and accessible from the major roads and as such has accumulated a larger portion of the illegally dumped rubbish than other undisturbed vegetation types.
VA2	Regenerating Eucalyptus woodland	Good	Disturbances include land clearing, fragmentation and frequent fire. Some obvious impact on the vegetation structure being the reduced cover and height of Eucalypt overstory.
VA3	Melaleuca woodland/open forest	Excellent	No evidence of disturbance.
VA3	Melaleuca woodland/open forest – previously disturbed	Good	Obvious evidence of historical land clearing due to the presence of large soil bunds. However, vegetation is mature, diverse, and does not differ substantially from undisturbed areas in structure and diversity.
VA4	Grevillea open shrubland	Degraded	Soil disturbances are prevalent including evidence of extensive soil ripping for rehabilitation, the presence of large soil bunds associated with infrastructure such as roads, powerlines and gas pipelines which intersect this vegetation. The sandy topsoil layer is not present with clay rich subsoils at the surface. Invasive species Scope for some regeneration but not to a state approaching good condition without intensive management.
VA5	Closed Grassland	Degraded	Severely impacted by land clearing. Contains a number of invasive species. Scope for some regeneration but not to a state approaching good condition without intensive management.
VA6	Disturbed rehabilitated Acacia shrubland	Degraded	Severely impacted by land clearing. Contains a number of invasive species. Scope for some regeneration but not to a state approaching good condition without intensive management.

Veg Code	Vegetation Association	Condition	Disturbances
VA7	Disturbed not rehabilitated	Completely Degraded	Severely impacted by land clearing. Contains a number of invasive species. Scope for some regeneration but not to a state approaching good condition without intensive management.
VA8	Mangrove closed forest	Excellent	No evidence of disturbance
VA9	Monsoon closed forest	Good	Inland of this very small pocket of this vegetation there is extensive landscape change. Large soil bunds occur which may be altering the flow of surface water towards this vegetation. Disturbances include the presence of the aggressive weed <i>*Passiflora foetida</i>
VA10	Tussock grassland	Excellent	No evidence of disturbance
VA11	Slashed for infrastructure	Degraded	Severely impacted by land clearing. Contains a number of invasive species. Scope for some regeneration but not to a state approaching good condition without intensive management.

5.3 CONSERVATION SIGNIFICANT FLORA

Population sizes of conservation significant flora are listed in Table 5-3.

Cycas armstrongii is a Vulnerable (TPWC Act) cycad common throughout the Study Area in all of the Eucalyptus woodland areas with an average density of 300 plants per ha. The species appears to be sensitive to disturbance as it was also found in Regenerating Eucalyptus woodland but at a much lower average density of 50 plants per ha.

Tricoryne elatior is a Near Threatened (TPWC Act) perennial lily, which was identified in low densities from Regenerating Eucalypt woodland (site W1), Eucalypt woodland (site F2) and from a targeted search (April 2018 collection number OC 17, also Eucalypt woodland).

Buchnera sp. ciliate bracts is considered Data Deficient and was located in the Grevillea open shrublands site G2 at low density.

Polymeria pusilla is considered Data Deficient and was located at Melaleuca woodland site ME1 as an aquatic herb at 1% cover, and as a prostrate herb in waterlogged areas of the Rehabilitated Acacia shrubland site R2 at <1% cover.

Table 5-3. Population sizes of Conservation significant flora detected in the study area.

Taxa	Vegetation Association	Location (GDA 94 MGA Zone 52)		Number of plants	Total number of plants in the Project Area
<i>Cycas armstrongii</i>	Eucalypt Woodland	NA		300 ha ⁻¹	33, 545
	Regenerating Eucalypt Woodland	NA		50 ha ⁻¹	
<i>Tricoryne elatior</i>	Regenerating Eucalypt woodland	(Full list of locations in Appendix B)			132
	Eucalypt woodland				
<i>Buchnera</i> sp. ciliate bracts	Grevillea open shrublands	0712960.2	8609142	2	2
<i>Polymeria pusilla</i>	Melaleuca woodland	0712998.8	8612969	100	105
	Rehabilitated Acacia shrubland	0713483.4	8612531	5	

5.4 SENSITIVE ENVIRONMENTS

5.4.1 Sites of Conservation Significance

Sites of Conservation Significance (**SoCS**) are identified as important sites for biodiversity that need protecting. In the NT there have been 67 sites identified as SoCS. The Darwin Harbour is a SoCS and as such the entire Project falls within the Darwin Harbour SoCS.

5.4.2 Nationally Important Wetlands

The Port of Darwin is a Nationally Important Wetland and is listed on the Directory of Important Wetlands in Australia. The fringing mangroves and waterways adjacent to Lot 1817 Hundred of Ayres are within the boundaries of the Port of Darwin Nationally Important Wetland.

The Darwin Harbour hosts a number of Nationally Significant Aggregations of waterbirds. Darwin Harbour meets the criteria for a nationally significant aggregation based upon diversity of migratory shorebirds, and within the Harbour at also at the specific locations of The East Arm Wharf and the Middle Arm Peninsula. These locations are also significant for a number of species for which the criteria for abundance are met on a regular occurrence. The species that have met the criteria for a nationally significant aggregation based upon abundance are listed in Table 5-4.

Table 5-4. Nationally significant aggregations of waterbirds in the Darwin Harbour

Species	Conservation Code*		Location
	EPBC Act	TPWC Act	
Sharp-tailed sandpiper	Mi		East Arm Wharf
Greater Sand Plover	VU, Mi	VU	East Arm Wharf

Species	Conservation Code*		Location
	EPBC Act	TPWC Act	
Lesser Sand Plover	EN, Mi	VU	East Arm Wharf
Far Eastern Curlew	CR, Mi	VU	East Arm Wharf Darwin Harbour Proper Middle Arm
Whimbrel	Mi		East Arm Wharf Middle Arm
Grey-tailed Tattler	Mi		East Arm Wharf Middle Arm
Common Greenshank	Mi		East Arm Wharf
Terek Sandpiper	Mi		East Arm Wharf Middle Arm

* Mi = Migratory, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.

5.5 INTRODUCED FLORA

Two Weeds of National Significance (WoNS) or NT Prohibited or Restricted weeds were found in the Study area. **Andropogon gayanus* (Gamba Grass) is also a Class A/B weed in the NT and is the dominant species in the Disturbed non-rehabilitated areas, with densities of 60 to 70% cover (Rossiter-Rachor *et al.* 2009; 2003). It also occurs at high densities along tracks in other vegetation types and in lower densities in all previously disturbed vegetation. Legislation requires that this weed be eradicated. Eradication measures will need to visit all areas of the site as the plant is sparsely distributed across all the previously disturbed areas of the site.

**Cenchrus ciliaris* (Buffel grass) was noted in the Rehabilitated Acacia shrubland site R3 at 1% cover. Although it is a WoNS it is not a Class A or B weed under NT legislation and therefore there are no mandatory actions required to control it.

One Class B weed **Cenchrus polystachyos* was recorded at the Rehabilitated Acacia shrubland site R3 at 1% cover, at the Regenerating Eucalyptus woodland site W2 at <1% cover, at the Grevillea open shrubland site G2 at <1% cover, at the closed grassland site GR1 at 50% cover, and at two locations during the targeted searches - at OC6 80% cover occurred on a soil bund approximately 20 m x 10 m, and at Wet1 a 50 x 10m strip had 100% cover. Additionally, **Cenchrus polystachyos* was frequently observed in clumped distributions on roadsides. Class B weeds are required to have their populations and spread controlled under NT legislation.

TNG have committed to the eradication of weedy grasses at the site and it is expected all three species will be controlled when and where they are found to occur.

Other weed species encountered that do not require any specific management under NT legislation are **Cyperus compressus*, **Aeschynomene americana*, **Crotalaria goreensis*, **Stylosanthes hamata*, **Stylosanthes scabra*, **Passiflora foetida*, **Scoparia dulcis* and **Spermacoce articularis*.

6 TERRESTRIAL VERTEBRATE FAUNA

6.1 AVIFAUNA

The site has a diverse avifauna assemblage, due to the habitat heterogeneity afforded by the collection of marine and mangrove environments in close proximity to the site, and the natural bushland and disturbed areas within the site. Across three targeted bird surveys conducted at the sites (and in surrounding areas), 129 species have been recorded. Of particular note, the Eastern Curlew, listed as Critically Endangered (EPBC) has been recorded in two surveys. The Greater Sand Plover (*Charadrius leschenaultii*) and Bar-tailed Godwit (*Limosa lapponica*), both listed as Vulnerable (TPWC) have been recorded in one survey. In addition, migratory species such as the Eastern Reef Egret (*Egretta sacra*), Bush Stone-Curlew (*Burhinus grallarius*), Eastern Osprey (*Pandion cristatus*), Common Sandpiper (*Actitis hypoleucos*), and Common Greenshank (*Tringa nebularia*) have been recorded in multiple surveys. The combined list of avifauna recorded across four surveys are shown in Appendix B.

6.2 MAMMALS

Despite the highly modified nature of much of the site, a diverse range of amphibians, reptiles and mammals have been recorded at the site. Twenty-four mammal species have been recorded at the site, four of which are introduced species, and 10 are bats. Of the native species, there are includes nine micro bats, five native rodents, one macropod, and one possum, bandicoot, glider, echidna, and flying fox. The most abundant mammal was the Northern Brown Bandicoot, 113 of which were trapped (making up 60% of total mammal recordings).

Of note are the Black-footed Tree-rat (*Mesembriomys gouldii*), listed as Vulnerable (TPWC) and Endangered (EPBC), the Pale Field-rat (*Rattus tunneyi*), listed as Vulnerable (TPWC), and the Northern Brown Bandicoot (*Isodon macrourus*) and Northern Brushtail Possum (*Trichosurus vulpecula*), both listed as Near Threatened (TPWC).

6.3 REPTILES AND AMPHIBIANS

The reptile assemblage recorded at the site is especially diverse (22 species). The 2017 survey identified 19 species, while opportunistic records of the Green Tree Snake (*Dendrelaphis punctulata*), Water Python (*Lialis fuscus*) and the Children's Python (*Antaresia childreni*) in 2018 added to this total. The most abundant species were Slender Rainbow skink with 32 records, Port Essington Ctenotus with 28 records and Bynoe's Gecko with 16 records. Reptile species of conservation significance include the Mulga Snake (*Pseudechis australia*), listed as Near Threatened (TPWC) and the Green Tree Snake (*Dendrelaphis punctulatus*), listed as Data Deficient (TPWC).

In total, 15 species of amphibian have been recorded, 14 in the 2017 survey, and an additional record of the Green Tree Frog (*Litoria caerulea*) in 2018. The most specious families were the Hylids (nine species) and Limnodynastids (three species). Significant amphibian species include the Howard Springs Toadlet (*Uperoleia daviesae*), listed as Vulnerable (TPWC), and the Cane Toad (*Rhinella marina*), an invasive species. The Howard Springs Toadlet has not yet been confirmed from the Site, with initial records taken from physical characteristics. Vocalisations are required for determination. As suitable habitat is not present at the Site it is thought to be unlikely the species is occurring.

6.4 CONSERVATION SIGNIFICANT FAUNA

During field surveys 25 species of conservation significance have been recorded, including 18 birds, four mammals, two reptiles, and one amphibian. A complete list of the conservation species that may occur (based on database searches) appear in the Biological Report attached as Appendix B. Those recorded within Lot 1817 are listed in Table 6-1.

Table 6-1: Threatened fauna recorded within Lot 1817

Scientific Name	Common Name
Amphibians	
<i>Uperoleia daviesae</i>	Howard River Toadlet (unconfirmed)
Birds	
<i>Burhinus grallarius</i>	Bush Stone-curlew
<i>Charadrius leschenaultia</i>	Greater Sand Plover
<i>Numenius madagascariensis</i>	Eastern Curlew
<i>Numenius phaeopus</i>	Whimbrel
<i>Tringa brevipes</i>	Grey-tailed Tattler
Mammals	
<i>Isoodon macrourus</i>	Northern Brown Bandicoot
<i>Mesembriomys gouldii gouldii</i>	Black-footed Tree-rat
<i>Pseudechis australis</i>	Mulga Snake
<i>Pseudomys nanus</i>	Western Chestnut Mouse
<i>Rattus tunneyi</i>	Pale Field-rat
<i>Rhinonictis aurantia</i>	Orange Leaf nosed Bat
<i>Taphozous kapalgensis</i>	Arnhem Sheath-tailed Bat
<i>Trichosurus vulpecula arnhemensis</i>	Northern Brushtail Possum

7 STAKEHOLDER ENGAGEMENT AND CONSULTATION

Early consultation undertaken by TNG has been assisted through the engagement of local communication experts, Elton Consulting. This chapter provides an overview of the stakeholder consultation principles and approach undertaken to date and summarises the key findings. Opportunities for stakeholders to further engage with the project through the EIS and beyond are also discussed.

7.1 CONSULTATION APPROACH

7.1.1 Principles of Stakeholder Engagement

TNG has given consideration to five principles in developing a stakeholder engagement strategy; communication, transparency, collaboration, inclusiveness and integrity.

- **Communication** - Communication will be open, accessible, clearly defined, two-way and appropriate.
- **Transparency** - The process and outcomes of community and stakeholder engagement will, wherever possible, be made open and transparent, will be agreed upon and documented.
- **Collaboration** - A cooperative and collaborative approach will be adopted to seek mutually beneficial outcomes.
- **Inclusiveness** - Stakeholders will be identified early and involved throughout the engagement process.
- **Integrity** - Community and stakeholder engagement should establish and foster mutual trust and respect.

7.1.2 Objectives of engagement

Broadly, stakeholder engagement objectives for the Project are to:

- Identify key risks at an early stage, ensuring they are promptly addressed;
- Ensure that Community members, groups and surrounding land users are informed regarding progress of the Project and have an opportunity to comment;
- Establish a safe environment for staff and the public through early liaison regarding subjects such as traffic management on public roads;
- Establish key Project area attributes and mitigate impacts where practicable; and
- Establish long term relationships with key stakeholders.

The format and frequency of communications with stakeholders and decision-makers has varied depending on the nature of matters under discussion and the rate of progress of the Project aspects and technical studies.

7.1.3 Methods of consultation

Methods of consultation employed by TNG include:

- Project briefings and presentations;
- Stakeholder workshops;
- Meetings and discussions;
- Written Communications;
- Company announcements;
- Webpage updates;
- Fact sheets;
- Radio media;
- Telephone discussions; and
- Community displays and engagement events.

In addition to the above, Project information has been available through the NT EPA and EPBC Act referral processes, including release of the NOI and development of the TOR.

7.2 KEY STAKEHOLDERS

Stakeholders have been identified based on an assessment of the Project location, surrounding land users, significant elements of the proposed impact area that may be of interest to non-government organisations or community groups, and potential Project environmental impacts and risks.

Table 7-1 lists key stakeholders identified for the Project; this list is dynamic and will be updated throughout the Project life as necessary.

Table 7-1: Key Stakeholders for the Darwin Processing Facility

Stakeholder Group	Specific Stakeholder
Political (State)	Chief Minister
	Deputy Chief Minister
	Minister for Northern Australia and Trade
	Minister for Major Projects and Territory Economic Reconstruction
	Treasurer
	Minister for Environment and Water Security
	Minister for Infrastructure, Planning and Logistics
	Minister for Climate Change
	Minister for Renewables and Energy
	Member for Daly (site electorate)
	Member for Blain (nearest residential area electorate)
	Member for Goyder (nearest rural electorate)
Political (Local Council)	Member for Spillet (adjoining electorate)
	Mayor
	Local Councillor (South Ward)
NT Government	Department of Industry, Tourism and Trade

Stakeholder Group	Specific Stakeholder
Departments	Department of Environment, Parks and Water Security
	Department of Infrastructure, Planning and Logistics
	Power and Water Corporation
	Land Development Corporation
NTG Boards and Committees	NT Environment Protection Authority
	Development Consent Authority
	Litchfield Division Development Consent Authority
	NT Planning Commission
	Aboriginal Areas Protection Authority
Local Councils	Litchfield Council
	City of Palmerston
	City of Darwin
Industry Groups, Community Groups and Others	Landbridge Darwin Port
	Environment Centre NT
	Darwin Harbour Advisory Committee
	Planning Action Network
	Rural Residents' Rights Group
	Environmental Defenders Office
	Amateur Fishermen's Association of the Northern Territory
	Amadeus Gas Pipeline
	AustralAsia Railway Corporation
	Genesee Wyoming Australia
	Larrakia Nation Aboriginal Corporation
	Ichthys LNG Plant, Bladin Point
	Channel Island Power Station
	Darwin LNG, Wickham Point
	Bellamack Community and Residents
	Virginia Community and Residents
	Adjoining or nearby landowners
	General Community
	Extractive industry licence holders (x2)

Further detail is provided in the Socio-economic Impact Assessment for the Project (Appendix C).

7.3 FUTURE ENGAGEMENT OPPORTUNITIES

Stakeholder consultation will be continuous throughout the Project life. Objectives of ongoing consultation include:

- Keeping community members, groups and nearby land users up to date on Project progress and any changes;
- Addressing any complaints or grievances that are raised during Project construction and operations;
- Ensuring Government departments are kept up to date with any Project changes or issues that may arise, including updating approval documents if required;
- Ensuring closure planning is informed by key stakeholders and that all relevant stakeholders have agreed to the proposed end land uses;
- Identifying whether any infrastructure will be retained for end land users and ensuring appropriate approvals and transfer agreements are in place; and
- Ensuring all completion criteria have been met to the satisfaction of Government Regulators.

Potential methods of consultation employed by TNG throughout the operational life of the Project are identified in Table 7-2.

Table 7-2: Ongoing Stakeholder Consultation Methodology

Method	Target Stakeholder	Purpose
EIS Supplement Public Comment Period	All Stakeholders	- Detail Project description, impact assessment and proposed mitigating measures - Provide an opportunity for all stakeholder to comment on Project aspects prior to approval. - Provide TNG an insight into areas of concern and mitigate those wherever possible.
Media Releases	All Stakeholders	- Increase awareness of the Project. - Provide company contact details for feedback. - Provide Project updates to stakeholders.
Company Website	All Stakeholders	- Provide a mechanism for stakeholders to contact TNG with any comments or concerns regarding the Project. - Present Project updates for interested stakeholders throughout the life of the Project.
Lodgement of Approval Documents	Government Departments	Inform Government departments of Project activities, alterations, impacts and mitigating measures through a range of approval, license and permit applications.
Committee Participation	Government Departments Industry Representatives Community Members	- Inform key stakeholders about Project activities - Provide and receive input into aspects of the surrounding environmental, commercial and social contexts associated with the Project. - Provide an opportunity to develop mutually beneficial relationships with key stakeholders.
Complaints and Grievance Protocols	Community Members	- Develop a mechanism for community members to inform TNG regarding issues/impacts arising from Project activities. - Allow TNG an opportunity to understand implications of Project activities on stakeholders and implement mitigating measures to eliminate or reduce impacts.
Ad-hoc Liaison	Government Departments Members of Parliament Industry Representatives Community Groups	- Undertake ad-hoc liaison as required to inform stakeholders and discuss Project aspects throughout operations, as the need arises. - Build long-term relationships with key stakeholders.
Annual Reporting	Government Departments Community Members Shareholders	- Inform stakeholders regarding company performance against requirements. - Detail activities undertaken within the reporting year and provide information on proposed activities for the coming period.

Ongoing consultation throughout the life of the Project will be guided through the development of a Community and Stakeholder Engagement Plan. This plan will be dynamic and will be reviewed and updated regularly to ensure currency is maintained. Version 1 has been developed in parallel to the EIS Supplement.

8 APPROVAL AND LEGISLATIVE REQUIREMENTS

8.1 ENVIRONMENTAL APPROVALS

The Project has been assessed by the NT EPA, DAWE and Department of Primary Industry and Resources (DPIR) at the level of Environmental Impact Statement (EIS). TNG prepared a Draft EIS to address the ToR released by the NT EPA. The Draft EIS was made available for comment for a period of 12 weeks from 30 November 2019 to 21 February 2020. Submissions from the Public comment period were forwarded to TNG.

In accordance with clause 12 of the Environmental Assessment Administrative Procedures 1984 (EAAP), the NT EPA directed TNG to provide a Supplement to the Draft EIS. This Supplement addresses comments raised through submissions on the Draft EIS and details Project amendments undertaken since the Draft EIS was completed.

A summary of environmental approvals to date is provided in Table 8-1.

Table 8-1: Environmental Approvals

Date	Entity	Documentation	Details
October 2015	TNG	Notice of Intent	Introduction of the Project including: - Project Location and Description - Legislation - Site Descriptions, Potential Impacts and Mitigation.
January 2016	NT EPA	Statement of Reasons	NT EPA assessed the Notice of Intent and determined the Project required further assessment under the EA Act to the level of an Environmental Impact Statement.
May 2016	NT EPA	ToR for the Development of an EIS	EIS development guidelines and requirements for assessment.
30 November 2019 to 21 February 2020	NT EPA Public Comment	Draft EIS	Draft EIS to address the ToR was made available for public comment for 12 weeks
April 2020	NT EPA	Submissions on the Draft EIS	Consolidated Government and Public submissions on the project as proposed in the Draft EIS. NT EPA instructed TNG to prepare a Supplement to address the Submissions
January 2021	TNG	Supplement to the EIS	A Supplement to the EIS has been submitted to the NT EPA to address Submissions and describe Project changes subsequent to the Draft.

8.2 COMMONWEALTH AND NORTHERN TERRITORY REQUIREMENTS

All legislative requirements are explored in detail in the EIS through Section 4.3.1 – Commonwealth Legislation; and Section 4.3.2 – Northern Territory Legislation.

8.3 SACRED, ARCHAEOLOGICAL AND HERITAGE SITES

The traditional owners of the land on which the site sits, and the wider Darwin area are the Larrakia people. There are about 2000 Larrakia people and eight major Larrakia family groups in the NT today. The Larrakia people have appointed the Larrakia Nation Aboriginal Corporation the legal representative, responsible for

ensuring that their country and people are looked after and that they play an active role in the decisions that affect them.

In a letter dated 31 July 2019 the Aboriginal Areas Protection Authority advised that there are no records of Aboriginal sacred sites listed within the Project area. TNG subsequently received an Authority Certificate for the Project site, issued under section 22 of the Northern Territory Aboriginal Sacred Sites Act 1989. Despite the absence of known sacred sites, the letter indicates that the Project area is of cultural importance to the Larrakia people and reference was made by Aboriginal custodians to the possibility of burial sites being located within the Project area. Under the Northern Territory Criminal Code Act 1983 it is an offence to interfere with remains of a deceased person and under the Northern Territory Heritage Act 2011 it is an offence to interfere with the remains of a deceased Aboriginal person without authorisation under that Act.

9 ENVIRONMENTAL MANAGEMENT SYSTEM GUIDANCE NOTES

9.1 MANAGEMENT SYSTEM OVERVIEW

TNG manages impacts on the environment via an integrated management system (Health, Safety and Environmental Management System) being developed in accordance with international standards ISO 14001 and ISO 45001.

9.2 POLICIES

9.2.1 Environmental Policy

The TNG Environmental Policy provides a framework for all operations and activities undertaken by TNG. The policy applies to all personnel and contractors undertaking work for the company. Copies are displayed in prominent positions at the operation in the main office/foyer and on department notice boards as a minimum.

The TNG Environmental Policy is provided in Appendix D.

9.3 ENVIRONMENTAL MANAGEMENT STRUCTURE

Corporate environmental accountability, including overall management of the Darwin Processing Facility, is the responsibility of the TNG Managing Director and Board. Project specific environmental management is coordinated through the Site Manager and Health Safety Environment Manager, with support from Environmental Superintendent, Environmental Officer and specialist environmental consultants as required. The organisational structure for the Project appears as Figure 9-1.

The EMP outlines the mechanisms used to deliver commitments made within the EIS. The EMP has been designed to cover the construction and operation phase of the Project. It operates in conjunction with the environmental factor-specific management plans listed in Chapter 1.5 to provide transparent, effective and accountable means of managing Project environmental risk.

The EMP, environmental factor-specific management plans and procedures will be reviewed annually and revised as required throughout the Project. They are considered to be 'living' documents controlled electronically by TNG. The Environmental Superintendent is responsible for ensuring the EMP, environmental factor-specific management plans and monitoring programs reflect current legislation and / or requirements of the NT EPA and DPIR.

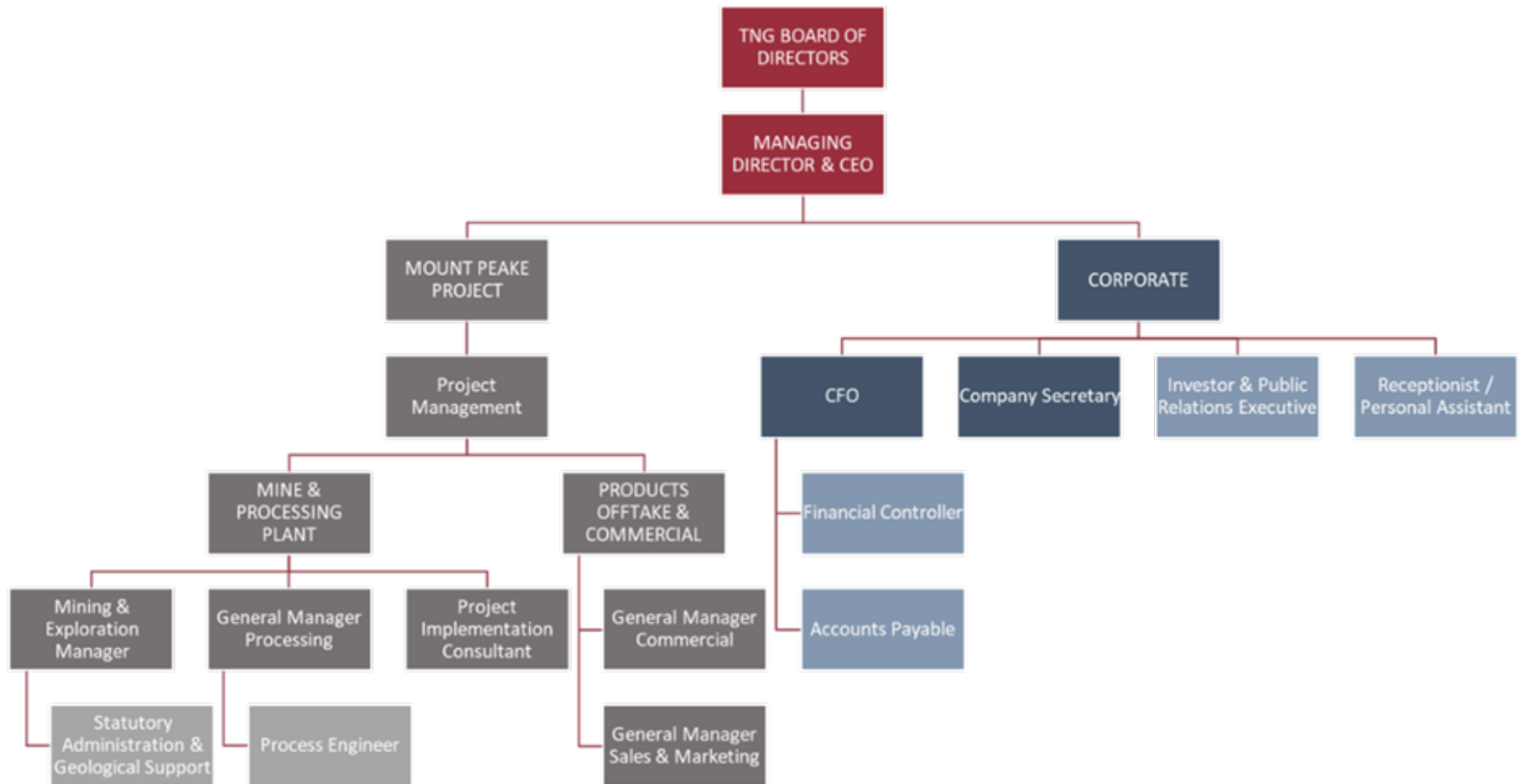


Figure 9-1: TNG Organisational Chart - Darwin Processing Facility

9.4 ROLES AND RESPONSIBILITIES

Key roles and responsibilities for environmental and emergency management are provided in Table 9-1.

Table 9-1: Environmental Management Roles and Responsibilities

Role	Responsibilities
Site Manager (Construction Manager / Site Manager)	• Ensure personnel and contractor conformance with the EMP, environmental factor-specific management plans, procedures and monitoring plans. • Assist the Health Safety Environment Manager with regulator and / or community consultation (i.e. complaints). • Act as the Emergency Response Coordinator (ERC) (see ERP). • Assign Emergency Team Responsibilities and provide appropriate training.
Health Safety Environment Manager	• Act as the Emergency Operations Officer. • Owner of the EMP, associated plans, procedures and monitoring programs. • Liaise with the NT EPA and DPIR regarding any substantial amendments to the EMP, environmental factor-specific management plans and procedures. • Liaise with regulators and other agencies as required in unison with the Site Manager.
Environmental Superintendent	• Implement all EMP, environmental factor-specific management plans, procedures and monitoring programs. • Confirm the Project environmental objectives and targets are being met. • Review and evaluate construction and operation contractors' EMPs to ensure consistency with TNG EMP. Ensure that the requirements of the EMP, environmental factor-specific management plans and monitoring programs have been addressed in all contractor environmental management documentation. • Approve minor amendments to the EMP, environmental factor-specific management plans and monitoring programs (minor amendments' being amendments that clarify or improve practices / procedures or add more stringent requirements / controls). No increase in or introduction of new environmental risks or impacts to be approved. • Undertake Environmental Superintendent role in emergency response procedures. • Undertake regular audits (or appoint an appropriately qualified representative) of environmental performance.
Site Personnel	• Comply with site induction and/or additional procedures relevant to works through EMP, environmental factor-specific management plans and monitoring programs.
Sub-Contractors	• Comply with the EMP and legislative requirements. • Obtain any additional permits from statutory authorities other than the applicable approvals. • Implement a project environmental management system in accordance with this EMP, environmental factor-specific management plans and monitoring programs. • Collect data and documentation to facilitate auditing by the Environmental Superintendent and/or appointed representative.

9.5 ENVIRONMENTAL TRAINING AND INDUCTION

The EMP, environmental factor-specific management plans contain management measures which will be captured during site inductions. A summary of the environmental component of the site induction is provided in Table 9-2.

Table 9-2: Site Induction – Environmental Component

Area	Details
Biodiversity Management Plan	- Summary of biodiversity at the Project including threatened flora and fauna (threatened species information cards are located in Appendix A and Appendix B of the Biodiversity Management Plan (Appendix A)). - Summary of introduced flora and fauna at the Site - Details of construction and operations activities that could impact on flora and fauna. - Procedure for fauna occurrences on site - Procedure for threatened or introduced flora occurrences on site - Procedure if fauna is injured or killed through Project activities including removal of roadkill at least 10 m from road. - Speed limits across the Project. - Areas to be cleared are to be flagged and approved through a Ground Disturbance Permit (GDP) System. - All onsite personnel are to utilise existing/approved roads and tracks only.
Fire Management Plan	- Awareness of potential bushfire risks across the Project. - Requirements for reporting bushfires or incidental fires in close proximity to the Processing Facility. - Hot works permitting system. - Management procedures/stop work requirements.
Acid Sulfate Soils Management Plan	- Procedure for assessing presence of Acid Sulfate Soils prior disturbance of soil. - Management procedures for excavating soil
Biting Insects Management Plan	- Impact on human health from biting midges and mosquitoes. - Mitigation and management strategies (personal protection equipment, chemical control and site inspections).
Economic and Social Impact Management Plan	- To identify key risks at an early stage to ensure they are promptly addressed. - Ensure stakeholders are continuously informed throughout the progress of the project.
Traffic Management Plan	- Manage traffic flow for personnel and general public - Procedures for entry and exit movements of vehicles to and from traffic streams.

Additionally, Environmental Management Procedures shall address areas not covered in the management plans outlined above. These procedures appear in Chapter 10.

9.6 REPORTING - INTERNAL

Project reporting will be undertaken internally and externally. Internal reporting has been designed to capture the overall effectiveness of the EMP. The data from internal reporting will be utilised to fulfil external reporting requirements including to the DPIR. The EMP internal reporting will be undertaken by the Environmental Superintendent.

9.6.1 Daily Inspections

The Environmental Superintendent will undertake a daily site inspection to assess Project risk including:

- Walkover of high risk locations including fuel farms, chemical storage shed, sewage treatment plant and stormwater ponds to identify any new risks / unmanaged risks

- Provision of environmental advice to personnel and/or contractors as required.

Responsibility: Environmental Superintendent

Documentation: Daily Inspection Checklist (to be developed).

Recipients: Environment Team

9.6.2 Monthly Environmental Performance Report

A Monthly Report will be developed by the Environmental Superintendent throughout the construction and operation phase. The report will include the following:

- Assessment of compliance with Project approvals including NT EPA EIS Recommendations, DPIR Authorisation Approval Conditions and Sub-management Plans
- Summary of sub-management plan monitoring data and objectives identifying non-conformances
- Environmental inspections and auditing results
- Non-conformance register status
- Complaints and incidents register status
- Environmental performance details including:
 - Fuel, water and electricity consumption
 - Number of deliveries to site
 - Hazardous substances and recyclable material transfers
 - Chemicals utilised.

Responsibility: Environmental Superintendent

Approval: Site Manager

Documentation: Monthly Environmental Performance Report

Recipients: Site Manager, TNG Board, Managing Director

9.6.3 Half-Year Report

Half-Year Report will capture monthly reporting details and provides a detailed summary of compliance with the EMP. The report is designed to capture trends, non-compliance and complaints. All non-compliances which cannot be reasonably explained will be scheduled for additional investigation and/or mitigation measures.

Responsibility: Environmental Superintendent

Approval: Site Manager

Documentation: Half-Year Report

Recipients: TNG Management Team, Site Manager, TNG Board, Managing Director

9.6.4 Annual Performance Review

The EMP, environmental factor-specific management plans and monitoring programs will be updated and modified annually. The modifications will be based on performance data from the previous 12 months and will summarise significant historical results.

Responsibility: Environmental Superintendent

Approval: Site Manager

Documentation: EMP Annual Performance Review

Recipients: TNG Management Team, Site Manager, TNG Board, Managing Director

9.7 REPORTING - EXTERNAL

9.7.1 Statutory Incident Reporting

External incident reporting will be provided in accordance with legislative requirements across the Project. A summary of incident reporting requirements is provided in Table 9-3. The Site Manager is responsible for all external incident reporting communications. Statutory incident reporting will be summarised within future EMPs.

Table 9-3: Regulator Reporting Requirements

Entity	Trigger	Timeframe and Contact Details	Incident Reporting Details
NT EPA	Incident which causes or is threatening or may threaten to cause pollution resulting in material environmental harm or serious harm.	< 24 hrs post incident ntepa@nt.gov.au pollution@nt.gov.au	The Section 14 Incident Report Form requires the following details: - Incident causing or threatening to cause pollution - Location occurred and area impacted - Date and time - How the pollution has occurred, is occurring or

Entity	Trigger	Timeframe and Contact Details	Incident Reporting Details
			may occur - Attempts made to prevent, reduce, control, rectify, investigation and/or clean up the pollution or resultant environmental harm caused or threatening to be caused by the incident - Operator details. The form is to be signed by the ERC for submission. The Incident Report Form is provided within the Emergency Response Plan.
DPIR	Environmental incidents are to be reported in accordance with section 29 <i>Mining Management Act</i>	As soon as practicable. Mineral.Info@nt.gov.au	The Section 28 Notification of Environmental Incident Form requires the following details: - Site and operator details - Location occurred and area impacted (GPS coordinates) - Date and time - Description of incident - Emergency and remedial actions taken - Nature of impact and severity - Current situation - Details of sampling undertaken - Notification status internally and externally. The form is to be signed by the ERC for submission. The Notification of Environmental Incident Form is provided within the Hazardous Substances Management Plan.
Heritage Branch	Exposure and/or interference with unidentified natural, cultural or indigenous heritage.	As soon as practicable. Tel: 08 8951 9247 heritage@nt.gov.au	No standard notification form is available. However, the following should be provided within the initial notification: - Type of natural, cultural or indigenous heritage - Location of the site (grid reference) - Type and method of interference (exposed and/or damaged) - Name and organisation of discoverer

Entity	Trigger	Timeframe and Contact Details	Incident Reporting Details
NT WorkSafe	Incident which results in either: • Death of a person; • Serious injury or illness; or • Dangerous incident.	Immediate verbal communication. Tel: 1800 019 115 Written notification < 48 hrs post incident. ntworksafe@nt.gov.au	• Photograph of site. The NT WorkSafe Incident Notification Form requires the following details: • Person submitting details • Incident details including date, time and human injury details • Work activity being undertake at the time of incident • Witness(es) details • Details of injured / deceased persons • Summary of injury or illness • Future remedial actions. The form is to be signed by the ERC for submission. The NT WorkSafe Incident Notification Form is provided within the Emergency Response Plan.
DAWE	Impact (injury or death) involving matters of national environmental significance.	As soon as practicable. 02 6274 1372 compliance@environment.gov.au	No standard notification is specified however the following information will be conveyed: • A Person submitting details • Incident details including location, date, time and MNES injury or fatality details • Work activity being undertake at the time of incident • Future remedial actions.
Central and/or Northern Land Council	Entrance and/or damage of sacred site or restricted works area.	As soon as practicable. Tel: 08 8951 6338 jstoll@clc.org.au	No standard notification form is available. However, the following should be provided within the initial notification: • Location of the site (grid reference) • Sacred Site Clearance Certificate pertaining to the site • Summary of damage • Name and organisation of discoverer • Type and method of interference (exposed and/or damaged)

Entity	Trigger	Timeframe and Contact Details	Incident Reporting Details
Aboriginal Areas Protection Authority	Entrance and/or damage of sacred site or restricted works area.	As soon as practicable. Tel: 08 8999 5511 enquiries.aapa@nt.gov.au	• Photograph of damage. No standard notification form is available. However, the following should be provided within the initial notification: • Location of the site (grid reference) • Sacred Site Clearance Certificate pertaining to the site • Summary of damage • Name and organisation of discoverer • Type and method of interference (exposed and/or damaged) • Photograph of damage.

9.8 INTERNAL AUDITING PLAN

Internal auditing will be undertaken by the Environmental Superintendent and/or suitably qualified representative. The audit will assess implementation of the EMP, environmental factor-specific management plans and monitoring program requirements. Prior to the audit a checklist will be developed that includes:

- Mitigation / commitment being assessed
- Compliance with each mitigation measure / commitment
- Corrective actions required and responsibility
- Risks associated with non-compliance
- Additional mitigation measures.

The Environmental Superintendent shall ensure that investigations are initiated into non-conformances to determine whether mitigation measures are possible and appropriate.

Frequency during construction will be quarterly and biannually during operations.

9.9 COMPLAINTS

The Project has the potential to impact upon the local community both negatively and positively. The mitigation measures developed through the environmental factor-specific management plans and monitoring programs are designed to mitigate and reduce environmental impacts. Should complaints be received from the general public in relation to the Project they will be lodged within the complaints register including:

- Date
- Name and location of complainant
- Contact details
- Complaint
- Aspect

- Flow-up Actions / Mitigation Measures
- Close-out Approval.

All complaints will be investigated to determine the source of the complaint, identify any underlying cause, establish additional investigation measure (if required), summarise corrective actions and undertake follow-up to ensure corrective actions are undertaken. The outcomes of investigations will be shared with the complainant and summarised in both Monthly, Half-Year Reporting and the Annual Performance Review.

9.10 EMERGENCY RESPONSE MANAGEMENT

Emergency responses will be undertaken in accordance with the ERP. This plan outlines standardised responses to the most likely emergency situations pertaining to the Project including:

- Fire – Building, Machinery, Bushfire or Explosion
- Human Health – Injured Person
- Human Health – Fatality
- Sacred Site / Restricted Work Area Interference
- Structural Failure
- Hazardous Substances Spill
- Vehicle Incident.

10 ENVIRONMENTAL PROCEDURES

The environmental procedures detailed in this EMP (Table 10-1) form the basis of the operational controls for processing activities not addressed by the specific management plans outlined in Section 1.5

The procedures detail the objectives, management actions, performance indicators, monitoring and reporting requirements for each relevant environmental aspect associated with activities at the Project.

Each procedure has an Owner and a Task Holder with whom the responsibility for the completion of these tasks lies. The Health Safety Environment Manager holds overall responsibility for the environmental aspects of the site and the Environmental Superintendent has responsibility for implementation of the EMP.

The Task Holder is delegated by the Owner to ensure that tasks and requirements are undertaken – in most cases the Task Holder is the Environmental Superintendent. Further delegation is possible but in all cases the responsibility remains with the Task Owner. Delegation is not abrogation. Where delegation has occurred, the delegate must be provided with the appropriate resources and level of authority to effectively carry out the task.

Table 10-1. Procedures

Code	Name	Code	Name
EP-01	Induction, Training & Policies	EP-11	Domestic and Industrial Waste Management
EP-02	Environmental Risk Register	EP-12	Sewage Management
EP-03	Incident Reporting	EP-13	Contaminated Sites
EP-04	Aboriginal and Cultural Heritage	EP-14	Contractor Management
EP-05	Ground Disturbance and Vegetation Clearing	EP-15	Reporting and Record Keeping
EP-06	Weed Management	EP-16	Change Management
EP-07	Water Management	EP-17	Noise Management
EP-08	Dust Emission Management		
EP-09	Greenhouse Gas Emissions		
EP-10	Hazardous Material Management		

EP - 01 INDUCTION, TRAINING & POLICIES**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

1. Ensure personnel complete an induction that includes an environmental component prior to the commencement of work. This will give employees the necessary skills and resources to perform their duties in accordance with TNG Environmental Policy.

Management

2. All employees, contractors and visitors must understand the environment policy and environmental requirements before commencing work;
3. Ensure all personnel and contractors working on site attend the site induction;
4. Ensure the site induction includes information on relevant legal requirements as well as the specific key environmental risks and environmental sensitivities relevant to the Project area.
5. Undertake appropriate refresher training at least every two years.
6. Employees and contractors will be informed as required of any new developments surrounding environmental issues.
7. Ensure all employees and contractors have access to relevant environmental information (e.g. legislation, regulations, standards, procedures, etc).

Performance Indicators

8. All personnel and contractors have completed the site induction prior to commencement of work on site.
9. The induction covers:
 - TNG environmental policy requirements;
 - Ground Disturbance Request process, including vegetation clearing, flora and fauna protection and weed control requirements;
 - Incident reporting procedures;
 - Flora and fauna information: identification of threatened flora and fauna species, avoidance areas, introduced flora and fauna, reporting and Site fauna register.
 - Dust control;
 - Tailings and water management;
 - Hydrocarbon and chemical management and spill control;
 - Topsoil management and rehabilitation;
 - General housekeeping and waste management.

Monitoring

- Conduct quarterly reviews to check the currency of required environmental training for site personnel and contractors.

Reporting

- Reporting of training delivered versus training scheduled in training matrix; and
- A brief description of the training provided in the Annual Report.

EP - 02 ENVIRONMENTAL RISK REGISTER	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - Identify all environmental risks and controls associated with the Processing facility and operating activities and record them in the Environmental Risk Register (ERR). - Develop strategies to mitigate, control, and manage identified environmental risks throughout life of the Darwin Processing Facility and at Facility closure.	
Management - The ERR for the Project site will be developed by each department in conjunction with the Environmental Superintendent; - The ERR will be maintained by the Environmental Superintendent and made available on the HSEMS; - The ERR will be reviewed annually and as required by findings from audits and inspections, or through changes to the relevant permits and approvals.	
Performance Indicators The ERR will be maintained and updated annually.	
Monitoring - ERR reviewed and updated annually or more frequently if required; - The ERR will be subject to internal audits.	
Reporting Reported as compliant or non-compliant in audit reports.	

EP - 03 INCIDENT REPORTING**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- All environmental, heritage and community incidents, near misses and hazards to be reported.
- Corrective action will be undertaken and completed to mitigate environmental impact from reported incidents.

Management

- Incident reporting procedures will be included in the site induction;
- Incident notification will occur verbally to the area superintendent or Manager and reported through the TNG reporting framework;
- All incidents, near misses and hazards, regardless of the severity, will be reported;
- Reported incidents will be reviewed by the Environmental Superintendent and documented on file;
- Actions resulting from investigations will be managed through the corrective action database;
- Public / community complaints shall be investigated and actioned through to resolution.

Performance Indicators

- All incidents, near misses and hazards reported as per site incident reporting procedures;
- The Environmental Superintendent will respond to complaints from the regulator and community via the Site Manager;
- All actions arising are closed out.

Monitoring

- Incident reporting procedures subject to internal audits;

Reporting

- Incident reporting will occur in accordance with site reporting procedures.
- Non reporting of incidents will be investigated.
- Incidents will be recorded on weekly department and management meetings and monthly reports to the TNG Head Office.
- All environmental incidents will be summarised in the Annual Report.

EP - 04 ABORIGINAL AND CULTURAL HERITAGE	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - Avoid unauthorised disturbance to Aboriginal heritage and sacred sites. - Ensure authorised disturbance complies with conditions of the relevant regulatory approval (e.g. EIS authorisation) and conditions within internal GDP requests. - Ensure authorised disturbance complies with conditions of <i>Heritage Act 2011</i> and <i>Northern Territory Aboriginal Sacred Sites Act 1989</i>.	
Permits/Approvals - Compliance with the Ground Disturbance Request Procedure; - Sacred Sites Clearance and compliance with Sacred Site Clearance Certificate conditions; - Works Approval Application lodged with the Heritage Branch to allow archaeological works within the project area including artefact recording and relocation, and archaeological excavations, in accordance with section 72 of the <i>Heritage Act 2011</i>.	
Management - Develop a Code of Conduct for workers and inductions that cover awareness and protection of heritage values. - Induction provides summary of sacred site and details Restricted Work Area access requirements and consequences for entering and / or interfering with these areas without authorisation. - Induction to provide example of installed fencing and signage at sacred sites and Restricted Work Area which are accessible / adjacent to Project infrastructure. - Areas to be cleared are to be flagged and approved through a GDP System. - Process Facility design to avoid known archaeological sites - All employees and contractors will promptly report any potential Aboriginal heritage sites to the Environmental Superintendent. - In the event that any skeletal remains are unearthed TNG will stop work and immediately report such disturbance to the Northern Territory police, and to the Director Heritage Branch, Department of Tourism and Culture (refer to the ERP – Draft EIS Appendix AA). - During the construction or operational phase of the Project, if a new site is found or suspected and potential impacts are unavoidable, Works Approval Application lodged with the Heritage Branch to allow archaeological works within the project area including artefact recording and relocation, and archaeological excavations, in accordance with section 72 of the <i>Heritage Act 2011</i>. Archaeological work will be undertaken to fully record the condition, extent and significance of the sites. - Clearly demarcate (including additional buffer zone) in field, areas of significance. - All heritage incidents should be reported immediately to the Environmental Superintendent.	
Performance Indicators - Site inductions provide information on Aboriginal sites in the Project site and local area, the requirement to avoid these sites and how to recognise Aboriginal sites in the field; - Aboriginal Heritage sites near operation and exploration areas flagged and/or fenced and/or signposted as per the Ground Disturbance Request Procedure; - No unauthorised disturbance to Aboriginal / European Heritage sites and Pastoral property.	

Monitoring

- The Environmental Superintendent will conduct inspections as required to ensure compliance with the *Heritage Act 2011* and the *Northern Territory Aboriginal Sacred Sites Act 1989*.

Reporting

- Any new suspected Heritage sites will be reported immediately;
- Unauthorised interference with any heritage sites will be reported as an incident as per TNG Environment Incident Reporting procedures.

EP - 05 GROUND DISTURBANCE AND VEGETATION CLEARING	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To prevent unapproved clearing of land; - To minimise adverse impacts from clearing; - To comply with conditions and commitments in EIS, and other approvals.	
Permits/Approvals - A GDP request is required prior to any ground disturbing activity. A GDP is to be sought from the Environmental Superintendent or delegate. - No ground disturbing work shall commence until all external approvals have been received and a GDP issued by the Environmental Superintendent. - All clearing boundaries and avoidance sites have been surveyed and flagged in the field. - All clearing is supervised by a responsible person.	
Emergency Ground Disturbance - Under emergency conditions where ground disturbance is necessary to prevent harm to human life or health or irreversible damage to a significant portion of the environment is a risk, ground disturbance may be conducted without a GDP. - Examples of this type of circumstance include an uncontrolled fire, major environmental incident or life threatening accident. Any emergency ground disturbance work must be reported to the Environmental Superintendent within 24 hours of the work being conducted. - Under lesser emergency conditions but where immediate ground disturbance is required then the Environmental Superintendent must be contacted for authorisation prior to conducting the work. - Under any emergency conditions there remains a requirement to avoid damage to known Aboriginal Heritage and other avoidance sites. - All emergency ground disturbance is undertaken under the ERP.	

Management • Fauna have been cleared from the site in accordance with the Biodiversity Management Plan and a fauna spotter/catcher is present • Implementation of appropriate site drainage to avoid or mitigate sedimentation impacts during the construction phase of the Project in line with the Stormwater Management Plan • Vehicles and machinery will only use designated tracks/roads. Off-road traversing is prohibited • Only the minimum area required for safe work is to be disturbed • The GDP application will include risk based assessment of all environmental risks and identify controls to reduce the impacts of ground disturbance • An estimate of the area to be disturbed and topsoil/subsoil volumes and destination should be included in the GDP request submission where possible • Lay down, parking and other storage areas will be located in approved GDP areas only. Where possible, existing cleared areas will be used for laydown areas. Vegetation clearing for these areas will be avoided where possible • When clearing land, vegetation will be removed and temporarily stockpiled with topsoil for use in rehabilitation areas in line with the Rehabilitation Management Plan; • In nominated areas Darwin Cycad will be salvaged in accordance with the Rehabilitation Management Plan prior to or during clearing • No burning of cleared vegetation is permitted at any time. • Clearing authorisation, EIS conditions will be met as well as any management commitments made in approval application documentation. Conditions and commitments will be recorded within the TNG Obligations Register and regularly audited for compliance • Ongoing maintenance of a spatial database containing up to date ground disturbance and clearing areas. • Topsoil infested with Gamba Grass is not to be used as clean fill or topsoil.
Performance Indicators • Clearing will comply with the requirements of TNG GDP request procedures, and with the conditions specified in the GDP. • All clearing condition and management commitments will be met. Non-conformances shall be reported in accordance with incident reporting procedures.
Monitoring • Follow up inspections will be completed as soon as possible post clearing. • Ground disturbance approvals and inspection documentation will be subject to internal and external audits.
Reporting • Unauthorised clearing and non-compliance with GDPs and external approvals shall be reported as per the TNG incident reporting process. Reports of unauthorised clearing will include GPS coordinates and photographs of the area cleared. • All incidents involving unauthorised clearing will be reported to the TNG Head Office. The relevant government agency will be notified.

EP - 06 WEED MANAGEMENT

Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To prevent the introduction and spread of weeds into and away from the Project site; - To comply with EIS commitments and approvals regarding weeds and plant pathogens; - To prevent the introduction and spread of declared invasive weed species; - To eradicate all gamba grass and other grassy weed species at the Project site; - To control/reduce existing infestations of other target weed species at the Project site.	
Management - Surveys will be conducted for weeds prior to the commencement of construction and periodically throughout the life of the Project. Weed data will be collected in accordance with the NT's "Weed Data Collection" guideline. Populations of weeds within the Project site will be demarcated on a site plan and entered into the GIS database; - Signpost areas of significant infestation and/or high risk of spread; - A list and means of identifying weeds on site will be made available to all personnel involved in or managing clearing activities through posters, identification sheets and awareness sessions; - Site Induction of all employees/contractors will include equipment hygiene requirements; - Minimum disturbance practices will be followed; - All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation, mud and soil prior to entry and exit from site; - Any equipment or vehicle considered to have been working in a weed risk area will be cleaned down before being remobilised to other parts of the Project site; - A weed seed prevention program will be designed and implemented in accordance with the "Preventing Weed Spread Is Everybody's Business" document produced by the Weed Management Branch of the NT including: - early control of weeds; - hygiene procedures; - exclusion zones for heavily infested areas; - measures to educate contractors and maintenance staff in gamba grass identification; and - measures to avoid passing through seeding gamba grass. - A weed control program using chemical, mechanical and/or physical means will be implemented where weed infestations occur. Spot spraying where appropriate will be done as required; - A gamba grass free buffer zone of 15 m in width on both sides of tracks and roads will be established and maintained (by chemical, mechanical or physical means) for all transport and service corridors prior to flowering and seeding each year; and - Gamba grass surveys, control measures and distribution information will be recorded and provided to the Weed Management Branch of the Northern Territory Government upon request.	
Performance Indicators - The site induction will include weed awareness information; - All earthmoving and ground engaging equipment will be clean prior to entry to site and exit from site; - Outbreaks of weeds within areas disturbed by earthmoving and ground engaging equipment will be controlled and monitored; - A GIS layer will be maintained presenting the location and treatment of known weed populations.	

Monitoring

- Weed monitoring to take place before Ground Disturbance activities. Species and area to be recorded;
- Known weed locations to be monitored quarterly or within four weeks of >25 mm rainfall;
- Weed control location to be monitored quarterly or > four weeks after treatment; and
- Land that does not have gamba grass will be identified and mapped. Monitoring and control activities will be undertaken annually to ensure these areas remain gamba grass free.

Reporting

- Weed monitoring and control works reported in the Annual Report including species, control method and areas treated.

EP - 07 WATER MANAGEMENT	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To increase efficiency of water - To minimise the consumption of water by the Project; - To ensure that on-site operations are carried out by such practicable means necessary to minimise the contact of incidental rainfall and stormwater runoff with wastes or other contaminants; - To ensure stormwater does not adversely impact upon the aesthetic or environmental values of receiving waters	
Management - Water management will include balancing the take of water from Raw Water Pond with any incident rainfall to minimise the potential for discharge to occur; - Clear labelling of potable and non-potable water stations; - Manage water use with the application of pressure trigger valves or twist nozzles to hoses; - Any spillage of wastes, contaminants or other materials shall be cleaned up as quickly as practicable using procedures that prevent contaminants or material being transferred to the stormwater drainage system; - The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken; - All runoff waters within areas where sources of COIs are stored, transported or used will be diverted into a managed water circuit separate from the general stormwater circuit, which incorporates appropriate bunding, sumps and isolation points where required. Water from these areas will be directed to the WRP for treatment; - All runoff waters within the Development Envelope (outside of areas where COIs are stored, transported or used) will be diverted into a managed water circuit for monitoring and treatment (if required) in the stormwater system or WRP - To avoid site flooding and inundation from storm surge primary infrastructure will be located in areas above the 1% AEP flood levels - Model 0.1% AEP inundation and flood levels and locate processing plant infrastructure above these levels - Implement diversion infrastructure around site infrastructure where identified through stormwater assessment - Rainfall will be intercepted on roof spaces and diverted to a rainwater pond for harvest - Chemical bulk storage tanks will be located in suitably bunded areas - A Stormwater Management Plan will continue to be updated to a more detailed level - The stormwater management system will be designed to effectively treat sediment, gross pollutants, nutrients and incidental hydrocarbons within stormwater runoff from non-process areas of the site. - Recycle greywater through the WRP prior to use for irrigation - All waters are managed within the water circuit and monitored for quality prior to irrigation - ASS Sites identified and managed according to the ASS MP	
Performance Indicators Sufficient stores of raw water to combat fire incidents;	

Monitoring

- Monitoring of water consumption rate from the Palmerston zone pipeline;

Reporting

- Rate of water consumption and use to be included in Annual Report.

EP - 08 DUST EMISSION MANAGEMENT**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Production Superintendent

Occupational Health and Safety Superintendent

Objectives

- To minimise dust emission generated by the operation.
- To ensure dust emissions do not adversely impact upon the amenity of surrounding land users.
- To minimise the impact of dust emissions on surrounding vegetation.

Management

- As part of workforce inductions, all personnel will be informed of the importance of minimising dust emissions;
- Water trucks will be used in areas which have the potential to generate dust, including areas that receive heavy traffic, unsealed roads and haul roads, or a dust suppressant chemical used;
- Vegetation clearing and exposed surfaces will be kept to a minimum wherever possible;
- Vehicle speeds on work sites and accommodation villages will be restricted;
- Maintain the concentrate at the dust extinction moisture level
- Use of dust control equipment in the processing facility including sprays or misting nozzles during stacking operations, water cannons/sprays on stockpiles, sprays on reclaim feeders and transfer points
- The performance of dust suppression equipment will be monitored by regular site inspections.

Performance Indicators

- Dust minimisation practices will be addressed in personnel inductions;
- Monitoring of dust levels around site.
- Reduction of dust generated from Project activities.

Monitoring

- Biannual photographic monitoring of vegetation health at site
- Monitoring in accordance with occupational exposure standards by Occupational Health and Safety Superintendent.

In addition, in the event of a dust related complaint, campaign monitoring will be undertaken in the vicinity of the complaint as follows:

- PM₁₀ to be monitored in accordance with the most recent version of either:
 - o Australian Standard AS 3580.9.6 – Methods for sampling and analysis of ambient air – Determination of suspended particulate matter - PM10 high volume sampler with size-selective inlet – Gravimetric method, or
 - o Australian Standard AS 3580.9.6 – Methods for sampling and analysis of ambient air – Determination of suspended particulate matter - PM10 low volume sampler – Gravimetric method;
- PM_{2.5} to be monitored in accordance with the most recent version of AS/NZS 3580.9.10 – Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{2.5} low volume sampler – Gravimetric method.

Reporting

- Significant dust emissions will be reported as an incident as per TNG Incident Reporting procedures.
- All incidents will be summarised in the Annual Report.
- Occupational exposures above standard to be reported in accordance with legislative requirements.

EP - 09 GREENHOUSE GAS EMISSIONS**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objective

- To minimise GHG emissions for processing and operating activities;
- To promote energy efficiency and ensure reporting requirements are met.

Management

- Recycling facilities will be made available on site to collect all recyclable materials, where possible, for transport to offsite recycling contractors;
- Minimise Land Clearing activities as far as possible and clear progressively to an extent that facilitates production while minimising vegetation loss;
- The benefits of energy-efficiency will be promoted on site. Energy saving devices will be used where possible and based on the energy star ranking standard;
- Rehabilitate disturbed areas as soon as possible; and
- Utilise lowest GHG emitting fuel / energy sources that are feasible.

Develop a detailed Greenhouse Gas Management Plan (**GGMP**) prior to the commencement of operations that will:

- Outline strategies to avoid, reduce, mitigate and offset the Projects direct (Scope1) emissions contributing towards the State's aspiration of net zero GHG emissions by 2050;
- Review the final facility design in relation to GHG intensity/efficiency;
- Commit to 5-yearly reviews of energy efficiency and renewable use over the life of the project with a view of reducing Scope 1 emission by an average of 1% a year over 20 years;
- Prepare an offset package;
- Utilise strategies that are unique to the Project's specific circumstances;
- Take into account opportunities for emissions reduction or offset at either the facility level or across national operations;
- Propose timeframes as well as regular interim and long-term targets that reflect an incremental reduction in Scope 1 emissions over the life of the proposal;
- Include requirements for periodic public reporting against targets; and
- Account for and align with Commonwealth targets.

Performance Indicators

- Recycling facilities implemented and operation demonstrating diversion of waste streams from landfill;
- Energy efficiency appliances installed where possible.
- Annual GHG emissions as reported to National Pollutant Inventory and National Greenhouse and Energy Reporting.
- GGMP in place prior to operations

Monitoring

- Monthly data collection of land cleared, fuel usage, electricity generation, rehabilitation, blasting and the quantity of material recycled.
- Annual compilation of monthly data.

Reporting

- Land cleared; fuel usage, electricity generation, rehabilitation and blasting will be reported in the Annual Report.
- Usage and production figures will be used to generate National Pollutant Inventory and National Greenhouse and Energy Reporting reports submitted on an annual basis as required.

EP - 10 HAZARDOUS MATERIAL MANAGEMENT**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- To ensure that the transport, handling and storage of hazardous materials are in accordance with the *Dangerous Goods Act 1998* and associated regulations and licence conditions;
- To collect, treat, transport and dispose of wastes in an environmentally acceptable manner in accordance with relevant legislation;
- To minimise the environmental impact of waste disposal.

Management

Where applicable, storage and transport will comply with any Dangerous Goods licences issued by the Northern Territory government.

When handling, transporting or storing Hazardous materials, the following will apply:

Bulk Hydrocarbon & Chemical Storage

- Wherever possible, double skinned self-bunded tanks will be used;
- All single skinned tanks will be located in areas with impervious floors and bunding with a capacity to contain 110% of the volume of the largest tank or 25% of the total volume stored in the compound (whichever is the largest);
- Each bund should be fitted with lockable outlet valve and pipe, which will only discharge to oil separating equipment;
- All 25L drums will be stored in an area with a concrete floor and bund with a spill holding capacity of 20% of the total hydrocarbon stored in the drums.
- Distances between the tanks and the bunding will be maintained as described in AS 1940 (2017);
- All new drums will be stored in polyethylene bulk container bunds, these containers must be observed for water collection after rainfall. Where possible bunds should be covered with tarpaulins to prevent water build up.
- The storage area will be graded to drain away from the storage tanks to a sump which can be emptied or pumped through an oil separator system, as required;
- All bulk storage tanks and fuel storage areas will be appropriately labelled, as required by the relevant legislation;
- If leaks are detected in storage facilities, the Site Supervisor will be immediately informed and arrangements made for the leak to be controlled and the vessel replaced or repaired;
- Oil-water separators to be routinely serviced and discharge water from wash-down pads contained and periodically sampled to monitor for oil-water separator efficacy;
- Discharge water from oil-water separator to be contained within capture sumps and prevented from overflowing into the environment;
- Bulk fuel facilities will be inspected as part of regular site environmental inspections and audits;
- Chemical storage will meet placarding and separation and segregation requirements of relevant standards;
- Material safety data sheets (SDS) will be available to all personnel;
- All bulk chemicals stores are to meet applicable standards for tank integrity including non-destructive testing in accordance with applicable standards;
- All process vessels and pipelines are to be labelled in accordance with applicable standards;
- TNG Change Management Process to include introduction of new hazardous materials onto the site to

ensure appropriate risk assessment and management strategies are implemented prior to use within the operation.

- The TNG Emergency Response Procedure outlines preventative and corrective actions in the event of a major spill involving hydrocarbons and process chemicals.

Minor Hydrocarbon & Chemical Storage

- All minor storage will be secondarily contained;
- All storage containers and areas will be appropriately labelled, as required by legislation;
- All chemicals will be stored in containment bunds, sea containers or chemical cabinets as appropriate for the volume and nature of the chemicals.

Poisons/Medical Substances

- All poisons and medical substances will be stored in accordance with SDS and applicable legislation;
- All required permits will be sought prior to use on site;
- Disposal will be in line with SDS and applicable legislation.

Pipelines

- Storage tanks and associated pipelines will be located above ground.

Spills

- Spill control equipment will be stored in critical locations to allow for a quick response to spills;
- Spillages will be contained and appropriately managed by the use of absorbent material and the excavation and removal of contaminated soil to an off-site licensed facility.
- Competency based Spill response training to be delivered to relevant personnel.

Waste Disposal

- A licensed controlled waste carrier will remove all bulk waste oils and oily products generated on site.
- Waste oil containers will be clearly labelled, stored in bunded areas or purpose built skips prior to collection and will be separated from new product drums;
- Hydrocarbons and oily waste such as fuels, grease, de-greasers, emulsified oil and oily wastewater will be managed by the following practices:
 - o Appropriate storage and handling procedures;
 - o Segregation of hydrocarbon contaminated water from stormwater and other water (i.e. via an oil/water separator);
 - o Segregation of oily wastes (i.e. rags, filters, etc.) from general wastes;
 - o Clean-up procedures for spills;
 - o Transport to off-site treatment facilities. Contaminated soils to be transported off-site by a licensed carrier.
- Controlled waste (including waste oil, other hydrocarbons and contaminated soil) will be handled and disposed by a suitably qualified contractor.

Contaminated Sites

- A list of areas identified as having the potential to be contaminated or being contaminated will be maintained on the internal server via GIS layer.

Management actions to prevent water pooling, sedimentation and contamination

- Avoid ponding or pooling of water in the area of works
- If ponding or pooling occurs, engineer the ground surface to allow natural surface flow
- Ensure stockpiles of bulk materials are located well clear of any waterway or drainage systems
- Avoid storing large volumes of bulk materials in the area of works
- Hazardous materials exposed during works, and then contained on site, will be managed to ensure no leaching into groundwater
- Ensure equipment and vehicles have been washed down and inspected for Petroleum, Oil and Lubricant

(POL) leaks etc., prior to being transported to work sites

- Construct bunds around fuel and chemical storage areas according to Australian Standards 1940 (unless quantity of the liquid stored is within that allowable as minor storage)
- Maximum quantity 100 L petrol and 250 L oils and lubricants permitted as minor storage within one m of a residence or any other building; and maximum quantity 2500 L permitted as minor storage on a construction site (See AS 1940 for detailed information relating to minor and major storages)

Management actions to prevent soil pollution

- Keep construction sites free from build-up of waste materials by directing regular clean ups
- Avoid storing large volumes of materials on site
- Concrete mixing and clean-up operations should be carried out in a designated area capable of containing excess water
- Ensure asbestos, when found on site for example by illegal tipping, is disposed of by specialist contractor (as specified by Law)
- Ensure equipment and vehicles have been washed down and inspected for POL leaks etc., prior to being transported to work sites
- Ensure herbicides used for weed control are registered and only applied by appropriately trained personnel
- Construct bunds around fuel and chemical storage areas according to Australian Standards 1940 (unless quantity of the liquid stored is within that allowable as minor storage)
- Maximum quantity 100 L petrol and 250 L oils and lubricants permitted as minor storage within one m of a residence or any other building; and maximum quantity 2500 L permitted as minor storage on a construction site (See AS 1940 for detailed information relating to minor and major storages)
- Hazardous materials exposed during works that impact on soils will be disposed of at approved landfill facilities or at disposal sites approved by the Operations Manager and Litchfield Town Council.
- Hazardous materials exposed during works that impact on soils, and then contained on site, will be managed to ensure no leaching into surrounding soil

Management actions to address contamination

- Ensure stockpiles of bulk materials are located well clear of any waterway or drainage systems.
- Construct bunds around fuel and chemical storage areas according to Australian Standards 1940: 2017 – The Storage and Handling of Flammable and Combustible Liquids (unless quantity of the liquid stored is within that allowable as minor storage), environmental protection licence or Major Hazard Facility licence requirements.
- Train personnel in implementation of safe work practices to minimise risks and impacts of spillage of fuels, chemicals and other contaminants.
- Train personnel in incident reporting and emergency management procedures and encourage the reporting of issues and near misses.
- Record and report all POL spills
- Ensure personnel have access to spill kits that contain an absorbent (e.g. kitty litter or commercially available product), clearly marked oily waste disposal drum and a shovel.
- In the event of a chemical or hazardous substance spill, containment measures should be enacted and SDS requirements complied with.
- In the event of a POL spill less than 20 L on soil, remove the soil and dispose of in oily waste disposal drum. If on a hard surface such as road or concrete, use absorbent and dispose in the drum.
- In the event of a POL spill of between 20 and 80 L, soak up as much as possible using absorbent, and turn/aerate the soil to allow natural processes (i.e. aeration and microbial systems) to breakdown the organic compounds (i.e. hydrocarbons). Remove contaminated soil if the spill occurs in the vicinity of drainage lines and waterways. If on a hard surface such as road or concrete, use absorbent and dispose in the oily waste disposal drum.
- In the event of a POL spill greater than 80L, all contaminated soil is to be removed, and disposed of in a clearly marked oily waste disposal drum.
- Undertake validation sampling of soil if the spill, or combined record of spills, is greater than 80 L to confirm all contaminated soil has been removed
- Note all contaminated soil and absorbent in the oily waste disposal drum should be disposed of by a

licenced waste contractor. If pooled water becomes contaminated, e.g. through a diesel spill, ensure it is contained and removed (and not discharged to sewerage system or natural water courses)
Performance Indicators - All chemicals and other hazardous materials will be retained within impervious holding facilities; - Storage of bulk fuels and chemicals in accordance with Dangerous Goods licence requirements. - Placarding, containment, separation and segregation of process chemical stores, process vessels and pipelines to be in accordance with relevant standards. - Material safety data sheets available in the workplace and a chemical register maintained on site. - Resources available on site to respond to hydrocarbon and chemical spills. Personnel trained in spill response and management in accordance with the TNG Emergency Response Procedure.
Monitoring - Daily inspection to ensure water is not pooling on site (see Daily Inspection Checklist) - Daily monitoring to ensure site is cleared of waste, all POL/chemicals have been stored and disposed of correctly, and all spills have been identified and dealt with (see Daily Inspection Checklist) - Regular inspection of any bunds to check integrity (see Weekly Inspection Checklist) - Regular inspection of bunds, where present, to check integrity and to detect leak and spills - Regular inspection of stormwater drains for any sediment capture (see Weekly Inspection Checklist) - Incidents are to be reported and records maintained/retained. - Keep waste tracking/disposal records for all HAZMAT in Daily Site Diary. - Report any waste management issues to the Site Supervisor - Periodic testing of oil-water separator discharge water for total petroleum hydrocarbons. - Personnel induction and training is up to date
Reporting - Reporting for the Annual Report will include the volume of controlled wastes moved off site; - All incidents will be reported in the Annual Report. - Any site that requires notification or reporting to the NT EPA under the <i>Waste Management and Pollution Control Act 1998</i>.

EP – 11 DOMESTIC AND INDUSTRIAL WASTE MANAGEMENT

Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To minimise the generation of waste; - To dispose of waste in an environmentally acceptable manner compliant with EIS requirements and commitments. - To dispose of waste to designated area, with consideration of the <i>Guidelines for Siting, Design and Management of Solid Waste Disposal Sites in the Norther Territory January 2013</i>. - All waste to be managed in accordance with the TNG Domestic and Industrial Waste Management Plan.	
Permits EIS authorisation.	
Management - Landfill waste will be managed with consideration for the requirements under the <i>Guidelines for Siting, Design and Management of Solid Waste Disposal Sites in the Norther Territory January 2013</i>. The landfill transfer area is to be routinely serviced and maintained to prevent windblown rubbish and minimise feral or pest animals and flies; - Recyclable materials, including cardboard, paper, glass, batteries, waste hydrocarbon drums and scrap metal, will be recycled wherever possible; - Housekeeping inspections of the work area will be undertaken weekly; - Littering on site is prohibited and work and office sites are to be kept clean and tidy; - Rubbish containers are to be carried in vehicles and provided at all work sites - All rubbish containers to be of a suitable design and location that prohibits access to fauna - Waste management will be addressed in the site induction;	
Performance Indicators - Compliance with the requirements of the EIS; - Weekly housekeeping inspections at all works areas.	
Monitoring - Weekly inspections of the landfill disposal site will be conducted; - Confirmation of the segregation of wastes will be included in regular site inspections.	
Reporting - Volumes of waste material and recycled material will be reported via the Annual Report. - Inappropriate waste disposal will be reportable as an incident and reported as per the TNG incident reporting processes.	

EP - 12 SEWAGE MANAGEMENT**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- To ensure sewage management practices comply with EIS commitments and requirements.

Management

- Sewage will be collected via sewer mains from which it will be pumped to the approved wastewater treatment plant;
- Regular maintenance checks will be conducted and recorded in accordance with EIS requirements.
- Sludge will be taken off site as required using a licensed controlled waste carrier.

Performance Indicators

- Compliance with the DER Prescribed Premises Licence conditions.

Monitoring

- Volume of wastewater treatment plant effluent discharged will be monitored.
- Annual effluent sampling will be conducted to test samples for Total Nitrogen, Total Phosphorus, BOD, thermo-tolerant faecal coliforms and total suspended solids.

Reporting

- Monthly volumes will be recorded and maintained. Totals are to be reported in the Annual Report.
- The results of annual effluent quality testing will be submitted in the Annual Report.
- All incidents are to be reported and actioned in accordance with TNG incident reporting procedures.

EP - 13 CONTAMINATED SITES
Responsibilities
Owner

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- To ensure contaminated sites do not pose a risk of harm to human health or environmental value.
- Compliance with the *Waste Management and Pollution Control Act 1998*.

Management

- All contaminated and potentially contaminated sites will be identified and recorded on the contaminated sites layer of the GIS system.
- The extent of contamination will be assessed for each site; this will be based on evaluation against the *National Environmental Protection Measure for the Assessment of Site Contamination*;
- The NT EPA shall be notified and sites will be registered in accordance with the provisions of the *Waste Management and Pollution Control Act 1998*.
- Where evaluation of the investigation levels indicates likelihood of adverse effects on human health or ecological values, a specific health and ecological risk assessment will be conducted.
- A remediation management plan to be developed for each identified contaminated site.

Performance Indicators

- All contaminated and potentially contaminated sites identified and registered;
- Character and extent of contamination defined, and risks and impacts identified and prioritised;
- Remediation actions will be completed as required by each remediation management plan.
- A GIS layer will be maintained presenting the location and status of all contaminated or potentially contaminated sites.

Monitoring

- Identified sites will be regularly inspected to ensure the management plan is implemented.

Reporting

- Contaminated sites information will be reported in the Annual Report.
- Contaminated sites reported to the NT EPA where required.

EP - 14 CONTRACTOR MANAGEMENT

Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To ensure that contractors deploying to the TNG Darwin Processing Facility Project are aware of site requirements for environmental management; - To ensure that site environmental requirements are captured within contracts and that prospective contractors have internal environmental standards and procedures within their own companies that meet the minimum standards required by TNG; - To ensure that contractors consistently meet site environmental requirements as a Key Performance Indicator (KPI).	
Management - All contractors and subcontractors employed on site are to complete the site Health, Safety and Environment induction and are made aware of environmental requirements; - Requirements for weed and seed hygiene of plant and equipment, firearms and pets are communicated to contractor personnel prior to arrival on site; - Environmental awareness topics are presented to contractors during toolbox meetings; - Contract objectives set clear conditions and KPIs with respect to environmental performance and compliance; - Contract documents stipulate that contractors are responsible for meeting site environmental requirements and ensuring that all approvals are obtained prior to commencement of ground engaging activities; - Contractor activities are continuously supervised by a TNG employee representative; - All incidents are reported and contractor incidents are fully investigated by TNG and corrective and preventative actions monitored.	
Performance Indicators - Contracts contain Specific, Measurable, Achievable, Relevant and Time phased (SMART) KPIs for environmental deliverables; - Contractors are recognised for good environmental performance and penalised for poor environmental outcomes; - All contractors are inducted and understand basic site requirements including waste and hydrocarbon management, incident reporting, flora and fauna protection, ground disturbance and housekeeping; - All incidents and completion of corrective actions are reported.	
Monitoring Performance against set KPI's are evaluated periodically through the contract and at the end of the contract.	
Reporting All incidents are to be reported in accordance with TNG incident reporting procedures.	

EP - 15 REPORTING AND RECORD KEEPING**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objective

- To maintain an up to date register on-site of all licences and permits required as part of the environmental management plans and procedures specified in this document; and
- To ensure statutory environmental reporting requirements are met.

Management

- The Site Licence Register shall be maintained on the TNG Server and list all licences and permits. This will include but is not limited to EIS and EPBC requirements, Dangerous Goods Licences and Poisons Permits;
- An obligations register will be maintained that will list and track compliance with all conditions and commitments relevant to all licenses and permits;
- Both the license register and obligations register are to be updated regularly and compliance against commitments checked quarterly;
- All reporting required under relevant obligations is to be completed and within set timeframes and in accordance with relevant reporting guidelines.

Performance Indicators

- Conduct regular reviews (at least quarterly) to check the ongoing maintenance and currency of required licences, permits and registers;
- Completion and submission of required reports to regulatory agencies within the prescribed timeframe and in accordance with reporting guidelines.

Monitoring

- Desktop review of new approvals documentation undertaken quarterly.

Reporting

- Records of all required licences will be maintained;
- Copies of all licenses and permits to be maintained electronically and in hard copy;
- Breach of legal obligations is considered a reportable incident and is reported via the TNG incident reporting procedures.

EP - 16 CHANGE MANAGEMENT**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- To ensure that changes are implemented and conducted in a manner that complies with relevant legislation and minimises any potential environmental impacts.

Management

- The required approvals for any changes to the operation are to be obtained prior to implementation;
- Legal requirements will be considered when planning or undertaking changes to the operation;
- Copies of relevant approval documentation will be placed in an Environmental Approvals Folder maintained by the Environmental Superintendent and made available to all site personnel;
- All new supervisors and managers will be briefed on their roles and responsibilities and relevant licenses and permits;
- Training/inductions will be updated to include relevant environmental requirements and responsibilities of personnel;
- Any changes to the operation are to undergo a systematic risk assessment based on AS4360. The hierarchy of controls is to be used to manage risks to levels As Low As Reasonably Achievable (ALARA) with preference given to higher levels of control.
- Any changes should be implemented and conducted in a manner such that they are consistent with this EP; however, if it will have a significant impact on an aspect of the environment, a project or aspect specific EP may be developed;
- Regular environmental audits/reviews of the Project will be undertaken to ensure that compliance with the conditions of the approval is achieved.

Performance Indicators

- No non-compliances resulting from changes to the operation;
- The requirements of this EP are followed or a new EP is produced.

Monitoring

- Regular environmental audits/reviews of the Project will be undertaken to ensure that compliance with the conditions of the approval is achieved.

Reporting

- Changes to approvals or approvals conditions noted in the Annual Report.

EP - 17 NOISE MANAGEMENT**Responsibilities****Owner**

HSE Manager

Task Holder

Environmental Superintendent

Objectives

- To ensure that noise levels comply with criteria for standard and non-standard operation hours during Construction and Operation phases of the Project.

Management

- Prohibiting noise generating construction activities in non-standard hours and recommending construction activities occur during standard hours (7am to 7pm) where possible.
- If out of hours construction is required, avoid operating particularly noisy machinery before 7am and after 7pm.
- Provide an induction to construction personnel (including sub-contractors) addressing responsibilities with regard to noise management.
- Ensure truck drivers are informed of designated vehicle routes, parking locations, delivery hours and minimising engine braking and idling.
- Provide education of supervisors, operators and sub-contractors on the need to minimise noise through toolbox meetings.
- Select appropriately sized equipment for the task, such as earthmoving/excavation equipment.
- Avoid noisy plant working simultaneously where possible.
- Ensure all equipment is equipped with appropriate noise controls (e.g. mufflers, silenced exhausts, acoustic enclosures, flashing lights as an alternative to reversing beepers) and equipment is shut down and not left idling when not in use.
- Ensure equipment is operated in the correct manner and adequately maintained - including replacement of engine covers, tightening of rattling components, repair of leakages in air lines and shutting down equipment not in use.
- Consider the use of temporary solid screens for noise mitigation of noisy stationary equipment.
- Consider the use alternatives to 'beeper' style reversing alarms, such as broadband style alarms (or quacker alarms).
- Establish a Complaints and Grievance Protocol to address noise complaints.
- Undertake noise modelling for any Project changes that could affect noise generation impacts on sensitive receptors.

Performance Indicators

- During Construction phase, noise generating activities to comply with criteria for standard operating hours.
- During Operation phase, noise generating activities to comply with the day, evening and night criteria.

Monitoring

- Undertake noise modelling for any Project changes that could affect noise generation impacts on sensitive receptors.

- Maintain a Complaints Register.

Reporting

- Complaints to be included in Annual Report.

11 PREVIOUS PERIOD PERFORMANCE

N / A.

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13 APPENDICES

Appendix A: Biodiversity Management Plan

TNG LIMITED

**BIODIVERSITY MANAGEMENT
PLAN**

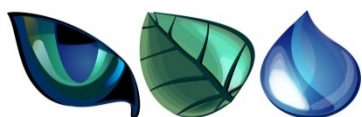
**TNG DARWIN PROCESSING
FACILITY**

DARWIN, NORTHERN TERRITORY

VERSION 1.1

JANUARY 2021

Prepared on behalf of TNG Limited by:



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Disclaimer

In the preparation of this document, Animal Plant Mineral Pty Ltd (APM) has relied on data, plans and other information provided by TNG Limited. Except as otherwise stated in the Report, APM has not verified the accuracy or completeness of the information. APM will not be liable in relation to incorrect conclusions or recommendations should any data or information, be incorrect, misrepresented or otherwise not fully disclosed to APM. Within the limitations imposed by the commission, the assessment of the site and preparation of the report have been undertaken in accordance with generally accepted practices using a degree of care ordinarily exercised by professional resource and environmental consultants. No other warranty, expressed or implied is made.

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

TNG Limited (TNG) proposes to construct and operate the Darwin Processing Facility at Lot 1817, Hundred of Ayers, Middle Arm Industrial Precinct, (658 Channel Island Road) Wickham. The Project is approximately 16 kilometres (**km**) south east of Darwin, Northern Territory (**NT**). The purpose of the Project is processing magnetite concentrate to produce higher value products for export from East Arm Wharf to international customers.

The Project will comprise:

- Clearing of a partially vegetated allotment formerly utilised for extractive industries;
- Construction of a magnetite concentrate Processing Facility;
- Construction of a rail siding, unloading and loadout facilities on the Adelaide to Darwin railway;
- Unloading of concentrate from trains at the rail siding;
- Refining of concentrate;
- Recycling of Process water in a Water Recycling Plant; and
- Loading of trains at the rail siding with Processing Facility products.

The design life of the Project is 40 years. The site is within the Litchfield Council Local Government Area and is adjacent to Elizabeth River, near the Elizabeth River Bridge.

The Development Envelope is 270.5 ha. The site has been extensively disturbed by previous uses. Within the development envelope 187 ha has been previously cleared or is in Degraded condition. Approximately 75.2 ha of the development envelope has been previously cleared and not rehabilitated, 19.8 ha hosts existing infrastructure and is maintained with minimal vegetation cover, 92 ha has native vegetation that is either spontaneous or planned rehabilitation of various ages or has significant disturbance. The remainder (83.5 ha) is high quality native vegetation.

Conservation significant flora and fauna occur in the Development Envelope and vegetation clearing practices need to minimise the risk to these species. Sensitive vegetation occurs on the fringes of Lot 1817 and vegetation clearing practices need to minimise the risk to these vegetation types. Whilst the Project is confined to the terrestrial habitats within Lot 1817, TNG recognises the potential for the Project to impact the marine environment in the Elizabeth River and Darwin Harbour and the need to establish management practices that minimise the risk.

Remnant vegetation surrounding the Project contains conservation significant flora and fauna, and sensitive vegetation. Construction and operation of the Processing Facility may impact these populations and specific management actions are required to reduce the impact as far as possible.

This Biodiversity Management Plan (**BMP**) is an Appendix to the project Environmental Management Plan (**EMP**) which, in turn, is a supporting document to the Environmental Impact Statement Supplement (**EIS Supplement**).

1.2 PROPONENT DETAILS

TNG operates the Project. TNG's details are summarised in Table 1-1.

Table 1-1: Proponent Details

Company	TNG Limited
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1.3 PURPOSE OF THE BMP

The Project involves activities, during construction and operation, that have the potential to impact on the biodiversity of the receiving environment. These have been identified through the EIS Supplement, the Significant Fauna Impact Assessment and Marine and Coastal Assessment (EIS Supplement Appendix J).

The purpose of this BMP is to outline all of the processes and procedures that are practicable and available to minimise the extent and severity of impact.

A net reduction in the extent and severity of impacts can be achieved through:

- Minimising impacts – making impacts smaller at the time of clearing and construction;
- Mitigating impacts – reducing the severity of the impacts during clearing and beyond to operation; and
- Managing impacts – actively moderating activities associated with construction and operation to ensure that impacts that cannot be eliminated at least remain controlled over the life of the project.

This BMP forms part of the EMP and is a working document. This current version is based on the outcomes of all of the previous biological survey work reported by APM (2019; Draft EIS Appendix J).

The tools that emerge out of this BMP (i.e. recommendations to minimise or mitigate impacts and identifying the management procedures to employ, to reduce impacts) have been generated following a generalised risk assessment of the impacts of the Project on flora (Draft EIS Appendix G) and a species specific risk assessment for all significant fauna (EIS Supplement Appendix J).

The BMP was originally developed parallel to the Draft EIS. Version 1.1 has been updated to include the findings of the Significant Fauna Impact Assessment and to accommodate the Project changes as detailed in the EIS Supplement.

This BMP has been prepared based upon the biological survey work commissioned by TNG and reported in the studies described in Section 2.1.

Interpretation of potential impacts, the risks to the receiving environment, and management of impacts have been made based on the Project description outlined in Section **Error! Reference source not found.**, where the total Project area under consideration is 1,000 ha (the Study area as defined in APM 2019) and the total proposed impact footprint is 270.5 ha.

When new information is obtained (e.g. new records of Threatened species or demonstrated inadequacy of mitigation measures), the BMP will be updated, and TNG will manage the potential impacts on biodiversity in

accordance with this BMP over the life of the Project. This BMP will provide a basis for auditing environmental performance as it relates to flora and fauna of conservation significance.

1.3.1 Impacts on Biodiversity

During the construction and operation of the Processing Facility, there are activities that may impact the integrity of flora and fauna populations and the habitats in which they persist, within and adjacent to the mining operation. It is these impacts that need to be avoided, minimised or managed to maintain biodiversity. The following list includes potential impacts that were identified in the NTEPA Terms of Reference, and others that were identified during the Project Environmental Impact Assessment.

These impacts are:

- The clearing of vegetation
- habitat fragmentation
- inappropriate or ineffective rehabilitation
- altered hydrology and impacts on surface water and groundwater systems
- contamination of surface and groundwater from chemicals, waste and acid sulfate soils
- erosion and sedimentation
- Introduced species
- human disturbance and vehicle strike
- lighting and uncontrolled fire
- noise
- dust
- fauna entrapment in infrastructure

Opportunities to minimise, mitigate or manage impacts centre around:

- Minimising the extent of native vegetation clearing where possible or minimising the impact of clearing by clearing flora, vegetation and fauna habitats that are of a lower regional value
- Considering the receiving environment in the context of habitat availability beyond the Project impact footprint and the consequences of habitat fragmentation
- Understanding the implications of inadequate or inappropriate rehabilitation, revegetation and poor weed management
- Understanding how altered fire regimes result in altered landscapes, through changes in vegetation species richness and diversity
- Considering the potential for contaminants to poison local populations of fauna and flora;
- Understanding surface and groundwater processes and how the Processing Facility may alter the availability of these resources to native flora and fauna
- Understanding the response of the altered landscape to weather, and consideration of the potential for increased erosion and sedimentation due to the instability of the newly created surfaces
- Considering waste, not only in the context of volumes, but in the context of methods and implications of disposal
- Awareness of the potential impacts of dust, noise and light on habitat quality
- Awareness of the potential harm to fauna if they interact with infrastructure for the Project.

1.4 LEGISLATION, GUIDELINES, RECOVERY PLANS AND THREAT ABATEMENT PLANS

The legislation and guidelines relating to the management of biodiversity at the Project site are:

- Legislation
 - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cth);
 - *Bushfires Management Act 2016* (NT);
 - *Environmental Offences and Penalties Act 1996* (NT);
 - *Mining Management Act 2011* (NT);
 - *National Environment Protection Council (Northern Territory) Act 1994* (NT);
 - *Territory Parks and Wildlife Conservation Act (TPWC Act) 2013* (NT); and
 - *Weeds Management Act 2001* (NT).
- Guidelines
 - Northern Territory Survey Methods for Flora and Fauna Survey Guidelines
 - Survey Guidelines for Australia's Threatened Mammals. EPBC Act Survey Guidelines
- Conservation Advice and Recovery Plans
 - CoA (2015) Conservation Advice *Mesembriomys gouldii gouldii* Black-footed tree-rat (Kimberley and mainland Northern Territory);
 - DoE (2015a) Conservation Advice *Calidris ferruginea* curlew sandpiper
 - DoE (2015b) Conservation Advice *Numenius madagascariensis* eastern curlew
 - TSSC (2016a) Conservation Advice *Calidris canutus* Red knot
 - CoA (2016) EPBC Act referral guideline for the endangered northern quoll
 - Hill and Ward (2010) National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*
 - DoE (2016) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral guideline for the endangered Northern Quoll (*Dasyurus hallucatus*);
 - TSSC (2016d) Conservation Advice *Charadrius mongolus* Lesser sand plover
 - TSSC (2016c) Conservation Advice *Charadrius leschenaultii* Greater sand plover
 - DEWHA (2009) Approved Conservation Advice for *Pristis clavata* (Dwarf Sawfish;
 - (DoE 2014) Approved Conservation Advice for *Pristis pristis* (largetooth sawfish;
 - (DEWHA 2008) Approved Conservation Advice for Green Sawfish
 - (DoE 2015) Sawfish and River Sharks Multispecies Recovery Plan
 - (DEE 2017) Recovery Plan for Marine Turtles in Australia
- Threat Abatement Plans
 - DoE (2015) Threat Abatement Plan for Predation by Feral Cats;
 - DEWHA (2008) Threat Abatement Plan for Predation by the European Red Fox;
 - DEE (2017) Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*);
 - (DEE 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans

2 BACKGROUND AND CONTEXT

2.1 BIOLOGICAL SURVEYS

Terrestrial flora and fauna surveys have been initiated by TNG for Lot 1817 and surrounds from 2016 to 2019. The methods and survey effort for flora are summarised in Table 2-1. Flora and vegetation field surveys and for fauna in **Table 2-2**. Fauna field surveys The full survey reports are consolidated in APM (2019; EIS Supplement Appendix J). The area within Lot 1817 plus the surrounding area that may be impacted by the Project was included in the surveys. This area is referred to as the Study Area.

Table 2-1. Flora and vegetation field surveys

Survey	Date	Description
Flora and vegetation survey	June 2017	Dry season survey - Full Characterisation Sites and 13 Check Sites, opportunistic collections and vegetation mapping
Flora and Vegetation Survey	April 2018	Wet season survey - 24 Full Characterisation Sites and 6 Check Sites, opportunistic collections and vegetation mapping
Targeted Survey	April 2018 and February 2019	Targeted Searches for conservation significant flora and systematic assessment of tree diameter at breast height

Table 2-2. Fauna field surveys

Survey type	GHD 2016 (Birds)	GHD 2017 (Fauna)	APM 2018 (Fauna incl. birds)	APM 2019 (Birds)	APM2019 (Mammals)
Total Survey Effort	5 field days.	6 sites, > 4 trap-nights per site.	4 field days.	4 field days.	5 trap lines, 5 nights per line.
Shorebird Surveys					
On foot	6 surveys inside and outside Study Area. 20 hours in total.				
Helicopter			7 surveys, 7 hours in total.		
Boat	6 surveys inside and outside Study Area. 26 hours in total.		2 surveys, 6 hours in total.	4 surveys, 14 hours in total.	
Terrestrial Surveys					
Habitat assessment		~2 hours per site.	Opportunistic assessment over 4 field days.		Opportunistic assessment over 5 field days.
Elliot traps		16 traps per site. 400 trap-nights in total.			30 traps per line. 750 trap-nights in total.
Cage traps		4 traps per site. 100 trap-nights in total.			6 traps per line. 150 trap-nights in total.
Pitfall traps		4 per site. 100 trap-nights in total.			
Funnel traps		8 traps per site. 200 trap-nights in total.			
Nocturnal searches		2x 20-minute searches per site. ~14 searches in total.	4x 40-minute spotlight searches on roads and tracks.		5x ~40-minute searches on roads and tracks.
Bird surveys		>3x 20-minute surveys per site. 18 surveys in total.	5x 20-minute 2 ha surveys. Opportunistic recordings throughout.	17x 20-minute 2 ha surveys. Opportunistic recordings throughout.	
Camera traps		10 locations. 256 trap-nights in total.	6 locations. 11 trap-nights in total.	3 locations. 9 trap-nights in total.	15 locations. 189 trap-nights in total.
Bat detectors		4 survey-nights in total.			29 survey-nights in total.
Significant Species (Significance: TPWC Act/EPBC Act)	Eastern Curlew (VU/CR) Greater Sand Plover (VU/VU) Bar-tailed Godwit (VU/Mi) Common Sandpiper (-/Mi) Common Greenshank (-/Mi) Whimbrel (-/Mi)	Black-footed Tree-rat (VU/EN) Pale Field Rat (VU/-) Saltwater Crocodile (-/Mi) Howard River Toadlet (unconfirmed(VU/-))	Eastern Curlew (VU/CR) Oriental Cuckoo (-/Mi) Common Sandpiper (-/Mi) Common Greenshank (-/Mi) Whimbrel (-/Mi) Little Tern (-/Mi) Black-footed Tree-rat (VU/EN)	Eastern Curlew (VU/CR) Fork-tailed Swift (-/Mi) Common Sandpiper (-/Mi) Common Greenshank (-/Mi)	Black-footed Tree-rat (VU/EN)

Desktop studies were conducted to identify the benthic habitats and marine fauna likely to be present within the Elizabeth River and Darwin Harbour. These reports are listed in Table 2-3 and available as Appendix S and T of the Draft EIS respectively.

Table 2-3. Studies for the marine environment

Author	Study title	Description
O2 Marine (2019a)	Benthic Habitats and Communities	Baseline assessment of BHC in the area that may be impacted by the Proposal
O2 Marine (2019b)	Marine Fauna	Desktop assessment of Marine Fauna

2.2 BIODIVERSITY OF THE RECEIVING ENVIRONMENT

2.2.1 Vegetation

Eleven vegetation types occur in or near the Project area. These are listed in Table 2-4 and shown in Figure 2-1 in relation to the Development Envelope.

A large proportion of the Site is previously disturbed and the condition of the vegetation ranges from Good condition to Completely Degraded depending on the time since disturbance and the nature of the disturbance. Historic and current disturbances at the Site include:

- historic extraction industry activity that has disturbed 315 ha or 64.5 % of Lot 1817
- fragmentation of the entire Lot 1817 by the presence of the Channel Island Road, the Adelaide Darwin Railway line and the Elizabeth River
- fragmentation within Lot 1817 by the cleared areas, roads and unofficial tracks
- frequent human disturbance within Lot 1817 from unregulated access by the general public who use it for recreational purposes, such as off-leash dog walking, motorbike riding, and rally driving, as well as for illegal rubbish dumping, and intentional and accidental fires
- frequent human disturbance within Lot 1817 for the planned maintenance of existing infrastructure, such as power lines and pipelines, road maintenance, regular slashing of 28.8 ha of land, and machinery and humans performing maintenance activities.
- poor rehabilitation of 61.5 ha, and no rehabilitation in 106.8 ha, with a high abundance of the weedy Gamba grass, known to exacerbate the risk and intensity of fires
- the presence of introduced fauna, such as Feral Cats and Dogs, Cane Toads, Pigs and Black Rats
- frequent fire and vegetation clearing leading to a reduction of structural and floristic diversity

The NT Land Clearing Guidelines define Sensitive and Significant Vegetation. Vegetation types within Lot 1817 that qualify are the Monsoon Closed Forest, Melaleuca Woodland that is fringing the Elizabeth River as Riparian vegetation, Mangroves and a series of small areas in the Eucalypt Woodland totalling 3.5 ha that contain the threshold density of trees ≥ 50 cm diameter at breast height (dbh).

Table 2-4: Vegetation associations and habitats

Vegetation Association	Fauna Habitat Type	Condition	Biodiversity attributes
Eucalyptus woodland	Mixed Woodland	Very Good	Fauna habitat: Black Footed Tree Rat, Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Western Chestnut Mouse, Northern Brushtail Possum, Mulga snake Flora habitat: <i>Cycas armstrongii</i>, <i>Trichoryne elatior</i> Sensitive vegetation where trees >50 cm diameter at breast height (dbh) occur
Regenerating Eucalyptus woodland		Good	Fauna habitat: Black Footed Tree Rat, Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Western Chestnut Mouse, Northern Brushtail Possum, Mulga snake Flora habitat: <i>Cycas armstrongii</i>, <i>Trichoryne elatior</i>
Melaleuca woodland/ open forest	Melaleuca woodland	Excellent	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Northern Brushtail Possum, Mulga snake
		Good	Flora habitat: <i>Polymeria pusila</i> Sensitive Vegetation
Grevillea open shrubland	Native Grasslands	Degraded	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake Flora habitat: <i>Buchnera</i> sp. ciliate bracts
Closed Grassland	Disturbed areas	Degraded	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake
Disturbed rehabilitated Acacia shrubland	Disturbed areas	Degraded	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake Flora habitat: <i>Polymeria pusila</i>
Disturbed not rehabilitated	Disturbed areas	Completely Degraded	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake

Vegetation Association	Fauna Habitat Type	Condition	Biodiversity attributes
Monsoon closed forest	Monsoon closed forest	Good	Fauna habitat: Pale Field Rat, Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake Sensitive Vegetation
Tussock Grassland	Native Grasslands	Excellent	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake
Slashed for Infrastructure	Disturbed areas	Degraded	Fauna habitat: Arnhem Sheath-tailed Bat, Orange Leaf-nosed Bat, Bush Stone Curlew, Northern Brown Bandicoot, Mulga snake
Mangrove closed forest	Mangroves	Excellent	Fauna habitat: Eastern Curlew, Whimbrel, Grey tailed Tattler Sensitive Vegetation
	Saltpan	Excellent	Fauna habitat: Eastern Curlew,

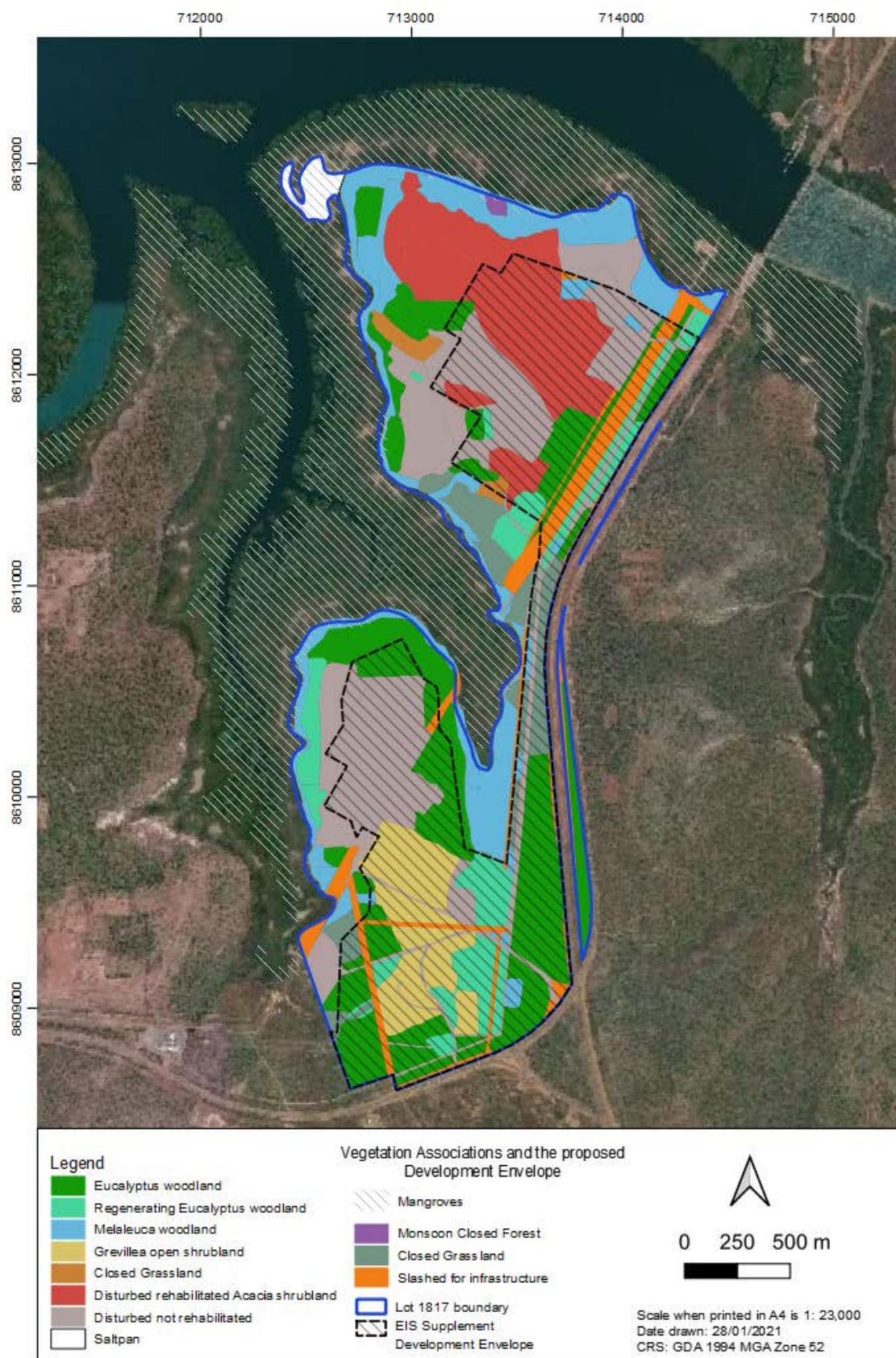


Figure 2-1: Vegetation Associations and the proposed Development Envelope

2.2.2 Conservation significant flora

Four conservation significant flora occur in the Study area (Figure 2-2).

- *Cycas armstrongii* – listed as Vulnerable under the NT TPWC Act
- *Trichoryne elatior* – listed as Near Threatened under the NT TPWC Act
- *Polymeria pusila* – listed as Data Deficient under the NT TPWC Act
- *Buchnera* sp. ciliate bracts – listed as Data Deficient under the NT TPWC Act

Threatened flora information cards are located in Appendix A.

2.2.1 Conservation significant terrestrial fauna

Fourteen significant species have been recorded within the Study Area. These species are listed as Threatened under the categories Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Migratory (Mi) under the EPBC Act or TPWC Act. They are:

- Eastern Curlew (CR and Mi under the EPBC Act, VU under the TPWC Act)
- Greater Sand Plover (VU and Mi under the EPBC Act and TPWC Acts)
- Black-footed Tree-rat (EN under the EPBC Act, VU under the TPWC Act)
- Pale Field Rat (VU under the TPWC Act)
- Common Sandpiper (Mi under the EPBC Act)
- Common Greenshank (Mi under the EPBC Act)
- Whimbrel (Mi under the EPBC Act)
- Little Tern (Mi under the EPBC Act)
- Fork-tailed Swift (Mi under the EPBC Act)
- Oriental Cuckoo (Mi under the EPBC Act)
- Eastern Osprey (Mi under the EPBC Act)
- Saltwater Crocodile (Mi under the EPBC Act)

Fauna species considered to be Near Threatened (NT) in the NT were recorded in the Study Area. These are:

- Bush Stone-curlew (NT under the TPWC Act)
- Northern Brown Bandicoot (NT under the TPWC Act)
- Western Chestnut Mouse (NT under the TPWC Act)
- Orange Leaf-nosed Bat (NT under the TPWC Act)
- Arnhem Sheath-tailed Bat (unconfirmed - NT under the TPWC Act)
- Northern Brushtail Possum (NT under the TPWC Act)
- Mulga Snake (NT under the TPWC Act)

The suitable habitats in the Study Area are listed in **Table 2-4**. Threatened fauna information cards are located in **Appendix B**.

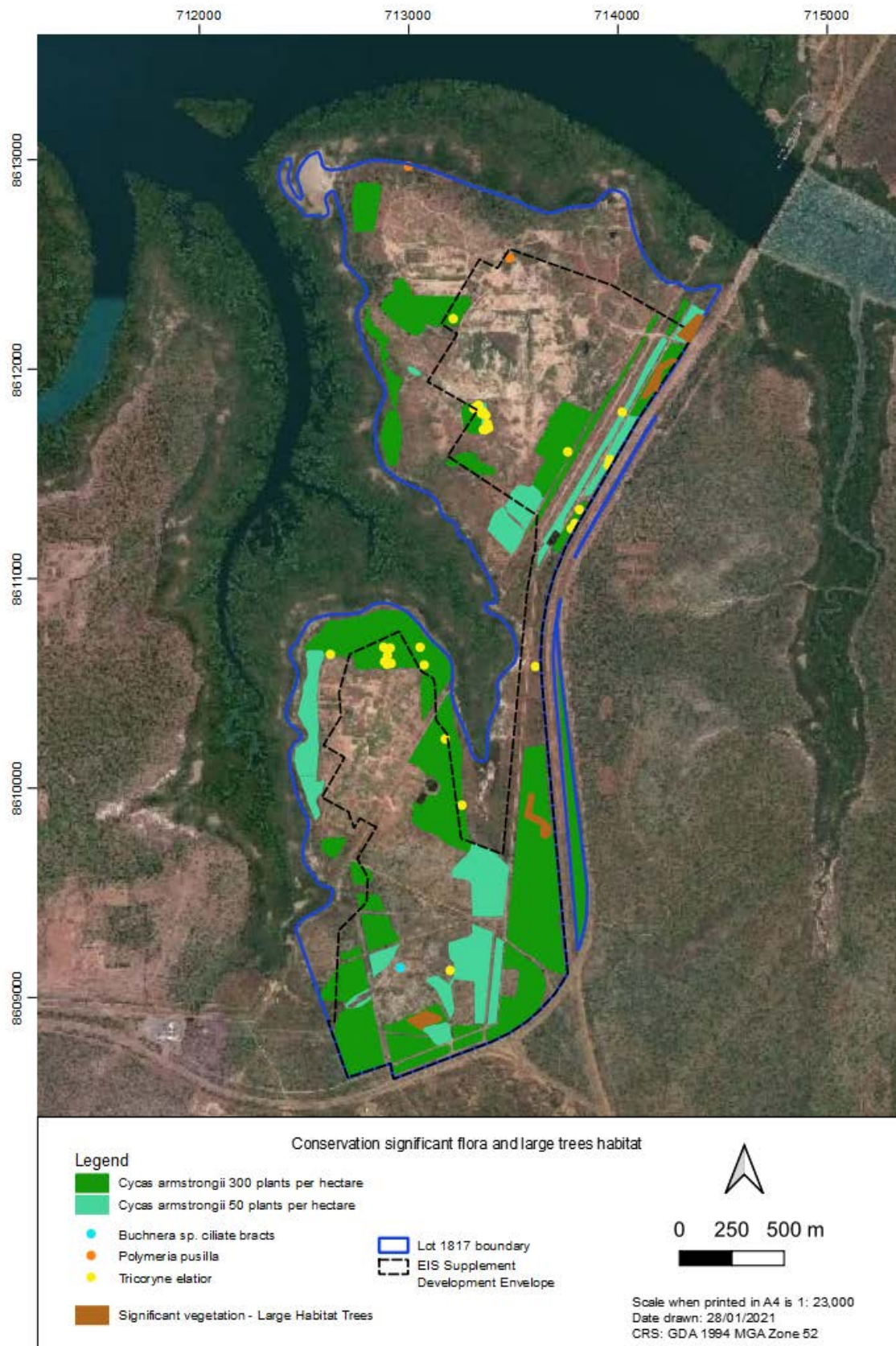


Figure 2-2: Locations of conservation significant flora and large habitat trees

2.2.2 Conservation significant marine environments

The desktop assessment identified that 20 species were regarded as either known (based on historic records) or highly likely to occur given the presence of suitable habitat within Darwin Harbour. These included:

- Six (6) reptile species including:
 - Four (4) Turtles: Green Turtle, Hawksbill Turtle, Flatback Turtle and the Olive Ridley;
 - Two (2) Crocodiles: Freshwater Crocodile and Salt-water Crocodile;
 - Two (2) Sea snakes: Black-ringed Seasnake and Northern Mangrove Seasnake;
- Four (4) mammal species:
 - Dugong; and
 - Three (3) Dolphins: Australian Humpback, Indo-Pacific Bottlenose and Australian Snubfin Dolphin;
- Three (3) elasmobranch species:
 - Dwarf Sawfish;
 - Green Sawfish; and
 - Largetooth Sawfish.
- Five (5) fish species:
 - Short-keel Pipefish;
 - Flat-face Seahorse;
 - Lowcrown Seahorse;
 - Tidepool Pipefish; and
 - Straightstick pipefish (or longnosed pipefish)

The Significant subtidal and intertidal habitats within Darwin Harbour include estuaries, mangroves, stony or hard coral reefs, sponge and soft coral beds, macroalgae-dominated communities, rocky outcrops, and bare sandy/ silty substrates. These are shown in relation to the Project in Figure 2-3.

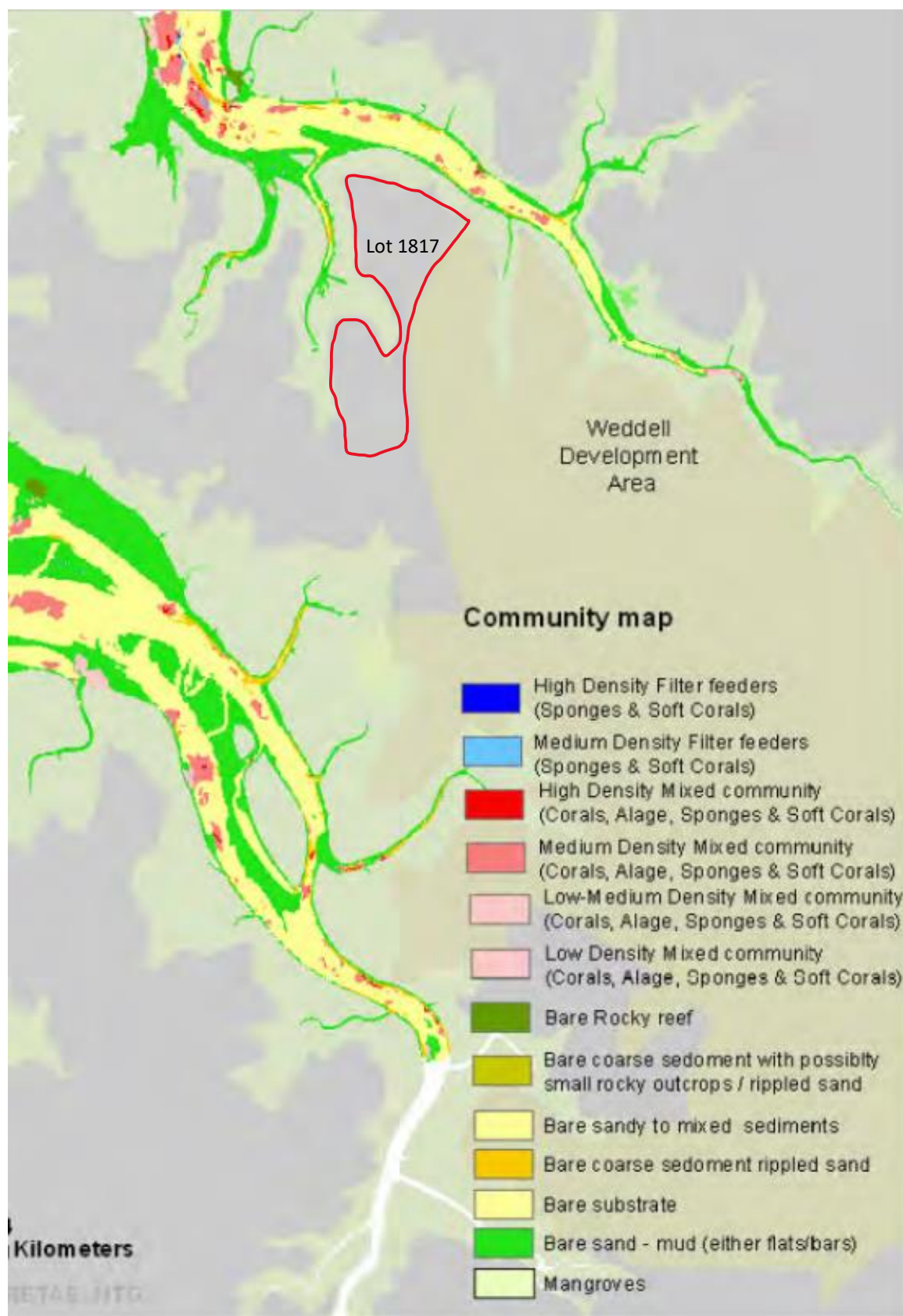


Figure 2-3. Benthic community composition in Darwin Harbour upper estuary (Smit, et al., 2012)

3 RISK ASSESSMENT

Potential impact pathways for flora and fauna are listed in Table 3-1 and 3-2 respectively.

Table 3-1: Potential impact pathways for flora

Source	Pathway	Receptor	Mitigation Guidance
Construction	Vegetation clearing		Ground Disturbance and Vegetation Clearing Procedures
	Sedimentation of waterways from erosion		Stormwater Management Plan
	Uncontrolled fire		Fire Management Plan
	Increase in weed infestations or invasion by new weed species		EMP - Weeds Procedure
	Modification of surface water flows and surface water quality		Stormwater Management Plan
	Dust generated from vehicle movements, cleared surfaces and soil stockpiles	Flora and vegetation	Air and Dust Management Plan
Operation	Saline or contaminated water that has been used for dust control, or has leaked from pipelines or water storage facilities contaminating soil and impacting vegetation		EMP - Incident Reporting Procedure, Ground Disturbance and Vegetation Clearing Procedures, Hazardous Materials Management Procedure
	Uncontrolled fire		Fire Management Plan
	Dust generated from vehicle movements, cleared surfaces, loading and unloading and material stockpiles		Air and Dust Management Plan

Table 3-2: Potential impact pathways for fauna

Source	Pathway	Receptor	Guidance
Construction	Vegetation clearing	Fauna and fauna habitat	Ground Disturbance and Vegetation Clearing Procedures
	Habitat fragmentation		Ground Disturbance and Vegetation Clearing Procedures
	Sedimentation of waterways from erosion		Stormwater Management Plan
	Uncontrolled fire		Fire Management Plan
	Potential vehicle strike		Biodiversity Management Plan
Operation	Increase in abundance of introduced species		Biodiversity Management Plan
	Impact to fauna through the use of incessant lighting, noise, vibration, or human movement		Biodiversity Management Plan
	Fauna entrapment in infrastructure		Biodiversity Management Plan
	Potential vehicle strike		Biodiversity Management Plan

The risk assessment table is included as Table 3-3. Practicable impact mitigation measures were developed for impacts with Very High, High, or Medium risk levels. Impacts with a Low level of inherent risk were still considered for further mitigation where routine controls would further contribute to risk minimisation. Mitigation measures were developed with reference to environmental guidelines, professional and/ or academic experience of technical specialists engaged to work on the Project Environmental Impact Statement and supporting studies, and personnel designing and developing the Project.

Section 4 details the actions required to deliver the proposed mitigations to ensure the stated residual risk is realised.

Table 3-3. Darwin Processing Facility Biodiversity Risk Register – Terrestrial Ecosystems

Environmental Aspect	Risk Pathways	Impacts	Likelihood	Consequence	Risk Rating	Risk Treatment/Management/Mitigation Strategy	Likelihood	Consequence	Residual Risk Rating	Level of Certainty
Construction of processing facility	Vegetation clearing leading to habitat loss	• Mortality or displacement of individuals • Decline in population size • Local extinction • Reduction in the carrying capacity of the environment, or a reduction in the species or individuals that the environment can support • Reduction in diversity	5	2	Medium	Ensure habitat to be cleared is well represented elsewhere on the Middle Arm Peninsula, and in the region. Implement the Ground Disturbance and Vegetation Clearing Procedure (EP-05) contained within the EMP (Appendix D), including: • Development and implementation of an internal Ground Disturbance Permit system whereby no land clearing is undertaken without completing a series of checks to ensure: - o The proposed clearing has been approved; - o Conditions in relation to soil and subsoil recovery, weed management, fauna clearing and other requirements have been assigned; and - o Approved permits are assessed for compliance with permit conditions. - o Proposed area of clearing is demarcated prior to clearing to avoid excessive or prohibited clearing. • Recover topsoil and biomass utilise the seed bank and woodchips and logs to conduct rehabilitation of disturbed areas as they become available.	2	2	Low	High
Construction of processing facility	Project design resulting in disturbance of conservation significant flora and vegetation	Loss of important vegetation types (mangroves, riparian vegetation and large habitat trees) Loss of conservation significant flora species	3	2	Medium	Prior to commencement of construction review the development envelope of the Project to ensure populations of the following flora species are excluded where possible: • <i>Cycas armstrongii</i> (VU); • <i>Tricoryne elatior</i> (NT); • <i>Polymeria pusila</i> (DD); and • <i>Buchnera</i> sp. ciliate bracts (DD). Ensure vegetation clearing occurs only in approved areas in accordance with a Ground Disturbance and Vegetation Clearing Procedure (EP-05) contained within the EMP (Appendix M) Habitat to be cleared is well represented elsewhere on the Middle Arm Peninsula, and in the region. Allocation of the Project to avoid sensitive and significant vegetation where possible.	2	2	Low	High
Site earthworks and addition of infrastructure	Alteration and sedimentation of surface water flows and water quality from erosion.	Scour from runoff velocity Terrestrial erosion Smothering of aquatic flora and fauna Loss of aquatic habitat	3	3	Medium	Implementation of the CCESCP and SBSMP (contained within Appendix C) and Implementation of the Water Management Procedure (EP-07) contained within the EMP (Appendix M) including: • Use of sediment basins where required; and • Use of a dedicated stormwater management system during operations. • Maintain natural flow paths wherever possible.	2	2	Low	High
Construction and operations activities (especially vehicle	Uncontrolled fire	Loss of fire sensitive species or vegetation.	3	3	Medium	Implementation of the Fire Management Plan (Appendix N) including: • Mine personnel will be trained in fire protection; • The site will be equipped with fire suppression equipment;	1	3	Low	High

movement, and workshop activities).		Reduction in habitat quality due to inappropriate fire frequency, or death of individuals.				- A hot work permit system will be implemented; and - Grassy weeds will be eradicated.				
Vehicle movement and earthworks during construction and operations	Increase in weed infestations or invasion by new weed species.	Reduced vegetation quality by competitively excluding native species. Weed infestations providing high fuel loads for fire	3	2	Medium	Implementation of the Weed Management Procedure (EP-06) contained in the EMP (Appendix M) including: - Review existing weed mapping and signpost areas of significant weed infestation; - Induct mine personnel on the identification and management of key weed species; - Implement weed hygiene procedures; - Avoid the spread of weedy grasses by having an objective of eradication; - Assess risk of spreading weeds with the Ground Disturbance Permit System in the Ground Disturbance and Vegetation Clearing Procedure (EP-05) within the EMP (Appendix M); and - Routinely undertake site infestation control measures and monitoring of infestations.	2	2	Low	High
Construction and operations activities	Ineffective or inappropriate rehabilitation	Lost opportunity to restore ecological function	3	3	Medium	A monitoring program, as detailed in the Rehabilitation Management Plan will be implemented to identify issues and management actions triggered by quantitative thresholds.	1	3	Low	High
Construction and operations activities	Dust generated from vehicle movements, cleared surfaces, loading/unloading and material stockpiles.	Reduced photosynthetic potential of vegetation covered in dust.	5	2	Medium	Implementation of the Dust Emission Management Procedure (EP-08) contained within the EMP (Appendix M) including: - Regular watering of active potentially dust generating areas and stockpiles areas; - Efficient and effective machinery operation; - Limit vegetation and soil clearing - Biannual photographic monitoring of vegetation health at site - Maintain the concentrate at Dust Extinction Moisture level; - Use of water sprays or misting nozzles during stacking operations; - Sprays on reclaim feeders; - Physical enclosure of transfer points and operating equipment; - Select operational procedures to take place inside sheds; - Open areas not required for vehicle access for operations will be sprayed with hydro mulch or sealed through the application of dust suppressant chemicals; and - Active road surfaces sealed, treated with a dust suppressant chemical or sprayed with water.	2	2	Low	High
Construction and operations activities	Saline or contaminated water used for dust control or water that has leaked from pipelines or water storage facilities contaminating soil and impacting vegetation.	Loss of vegetation due to salinity or contamination of soil	3	2	Medium	Water storage facilities and /or hazardous materials will be restricted to designated impermeable storage areas located at least 50m from any vegetation. Storage areas will be bunded and have appropriate drainage systems designed to capture any potential spills or leaks. Water used for dust suppression will be of a quality that does not negatively impact flora and vegetation.	2	2	Low	High
Construction and operations activities	Habitat fragmentation	Decline in population size Reduction in the carrying capacity of the environment, or a	4	2	High	Site layout design to be compact and reduce areas of habitat fragmentation where possible.	2	2	Low	High

		reduction in the species or individuals that the environment can support Reduced reproductive success Reduction in diversity				Rehabilitation of disturbed areas identified in the Rehabilitation Management Plan. Monitoring of terrestrial fauna as detailed in the Biodiversity Management Plan in rehabilitation areas.				
Construction and processing activities, and associated human use and waste production	Increase in abundance of introduced species	Mortality of individuals Decline in population size	3	3	Medium	Implementation of the Domestic and Industrial Waste Management Procedure (EP-11) within the EMP (Appendix M) to ensure all putrescible waste is securely stored until removed from site. Monitor sightings of feral fauna and undertake control measures in consultation with stakeholders.	1	3	Low	High
Construction and operations activities	Impact to fauna through the use of lighting, noise, vibration, or human movement	Displacement of individuals Disruption to breeding Reduced fitness	3	2	Medium	All light sources will be aimed towards work areas and away from surrounding habitat, using light shields as necessary to minimise light spill. Implement the Noise Management Procedure (EP-17) within the EMP (Appendix M). Allocate a vegetation buffer between the Project and significant fauna habitat features	2	2	Low	Medium
Earthworks and infrastructure construction and operation.	Fauna entrapment in infrastructure	Death or injury of fauna Decline in population size	4	2	Medium	- Ponds contain water not toxic to fauna - Fence ponds; - Install fauna egress points in water storage dams and/or sumps; - Ensure vegetation around barbed wire fences is kept to a minimum; - Avoid the use of barbed wire in fences where possible; and - Barbed wire fences will be inspected for trapped animals (particularly bats), and mitigation measures explored.	2	2	Low	High
Construction activities	Vehicle strike during vegetation clearing	Death or injury of fauna	4	3	High	Implement the Ground Disturbance and Vegetation Clearing Procedure (EP-05) contained within the EMP (Appendix D), including development and implementation of an internal Ground Disturbance Permit system whereby no land clearing is undertaken without completing a series of checks to ensure conditions in relation to: - fauna clearing and - the presence of a fauna spotter/catcher have been assigned as detailed in the BMP.	2	2	Low	High
Operations activities	Vehicle strike	Death or injury of fauna	2	2	Low	Maintain suitable speed limits. Erect warning signs in any locations where fauna are regularly sighted. Ensure employee and local contractor awareness of local fauna and encourage reporting of sightings and any incidents of vehicle strike or near misses.	1	2	Low	High

4 MANAGEMENT STRATEGIES

4.1 FLORA AND VEGETATION

Management actions for flora and vegetation include general awareness potential impacts to flora and vegetation and how proposed management will mitigate the risk. Awareness of conservation significant and introduced species through induction and avoidance of impacts to conservation significant flora where possible. Species information cards are in Appendix B. All required management actions are outlined in **Error! Reference source not found.**

Table 4-1. Flora and vegetation management

FLORA AND VEGETATION MANAGEMENT	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - Minimise the loss of native vegetation and flora habitats; - Promote the natural return of vegetation and fauna.	
Permits/Approvals All permits and approvals specified in EP-05 Ground disturbance and vegetation clearing will be followed.	
Management - Prior to vegetation clearing the Project layout will be checked against conservation significant flora locations with these locations to be avoided where possible; - Clearing activities will comply with EP-05 Ground disturbance and vegetation clearing; - Sufficient Darwin Cycad to populate rehabilitation areas to 50 plants per hectare will be salvaged prior to or during clearing with methods defined in the Rehabilitation Management Plan. - Open ground fires are not permitted; - Dust control measures will be implemented to minimise impacts on vegetation adjacent to the Project area and roads as per EP-08 Dust Management Procedure; - Established access tracks and paths are to be used to access isolated locations. If a new track is required, then approval is to be obtained as per EP-05 Ground disturbance and vegetation clearing; - If required to supplement rehabilitation areas, native seed is only to be collected from an area of local provenance in consultation with the appropriate NT government department under appropriate permitting. The area of local provenance for the Project will be identified in consultation with NT government and contract botanists – a list of suitable species is available in the Rehabilitation Management Plan; - Non-locally native plants and exotic plant species will not be permitted within the boundaries of the Project. - Weeds will be managed in accordance with EP-06 Weed Management Procedure	
Performance Indicators Clearing will comply the requirements of GDP request procedure, and with the conditions specified in the GDP and relevant regulatory permits;	

FLORA AND VEGETATION MANAGEMENT	
There is no unnecessary or unauthorised vegetation clearing and/or ground disturbance;	
Monitoring - The Environmental Superintendent or delegate will check areas proposed for clearing under clearing permits prior to commencement of clearing. - The Environmental Superintendent will inspect Darwin Processing Facility operation areas during clearing activities to ensure that only authorised clearing is being undertaken.	
Reporting - Unauthorised clearing and non-compliance with GDPs and external approvals shall be reported as per the TNG Incident Reporting process. Reports of unauthorised clearing will include GPS coordinates and photographs of the area cleared. - All incidents involving unauthorised clearing will be reported to the TNG Head Office. The relevant government agency will be notified.	

4.2 FAUNA – GENERAL

Specific management actions for fauna include general awareness potential impacts to fauna and how proposed management will mitigate the risk. Awareness of conservation significant species through induction and avoidance of impacts to conservation significant fauna and fauna habitat where possible. Species information cards are in Appendix B. General fauna management actions are outlined in Table 4-2 with detail on specific management actions described in Sections 4.3 to 4.7.

Table 4-2. General Fauna management

EP - 07 FAUNA	
Responsibilities	Owner HSE Manager
	Task Holder Environmental Superintendent
Objectives - To protect native fauna consistent with EIS commitments - To minimise adverse impacts of operating activities on native fauna species; - To comply with regulatory approval conditions; - To comply with GDP conditions.	
Permits/Approvals A GDP is required prior to commencement of any ground disturbing activity.	

EP - 07 FAUNA

Management

- Site induction will include general fauna protection requirements.
- All employees and contractors will understand GDP request requirements for the Project, to ensure risk to local fauna populations is minimised.
- Prior to vegetation clearing a fauna translocation program will be undertaken (Section 4.3)
- During vegetation clearing a fauna spotter/catcher will be present (Section 4.4)
- Signs will be displayed around the Site, to remind employees and contractors of TNG fauna protection protocols.
- Pets and off-road recreational vehicles are not permitted on site.
- Firearms are not permitted on site.
- Feeding and / or capture of native fauna is not permitted on site.
- Only authorised personnel are permitted to trap feral animals. If there is a requirement to control introduced fauna, advice may be sought from DEPWS Flora and Fauna branch on the appropriate permits and record keeping.
- Killing of snakes is prohibited at site. Only trained snake handlers are authorised to capture and relocate snakes as required.
- Disturbed areas will be rehabilitated as soon as possible to facilitate fauna habitat restoration.
- All lined water retention sumps and excavations will be provided with means of egress to allow entrapped animals to escape;
- Ponds will be fenced and designed in a manner that is not attractive to wading birds (e.g. steep raised embankments with no edges);
- All fauna sightings and fatalities will be recorded in the site fauna register (Section 4.5);
- All fauna deaths will be reported as an incident as per the TNG Incident reporting procedure (EP-03) and investigated;
- All foundation holes, drill holes and trenches will be covered, fenced or bunded to prevent injury to fauna;
- Minimise the likelihood of attracting introduced fauna by ensuring all putrescible waste is securely stored and removed from site;
- Record sightings of introduced fauna in the fauna register (Section 4.5) and if found to be increasing in frequency or abundance undertake control measures in consultation with stakeholders (where necessary);
- Avoid the use of barbed wire in fences and ensure vegetation around any barbed wire fences is kept to a minimum;
- Stormwater impacts will be minimised by applying the Stormwater Management Plan and the Water Procedure (EP-07);
- Noise will be minimised in accordance with Noise Procedure EP-17;
- All light sources will be aimed towards work areas and away from surrounding habitat, using light shields as necessary to minimise light spill;
- A protocol for the handling of sick and injured fauna shall be developed for the site. This will include recovery and care for injured fauna including adoption of joeys to rehabilitation centres or registered carers;
- To mitigate, or avoid where possible, incidents of vehicles striking fauna (Section 4.6);
- Humane techniques will be applied in an ethical manner for the control and euthanasia of feral and critically injured fauna (Section 4-7).

EP - 07 FAUNA**Monitoring**

- Terrestrial fauna monitoring program in rehabilitation areas (Section 5)
- Barbed wire fences are to be checked for trapped animals (particularly bats) with all trapped animals reported in the fauna fatality register and/or fauna register (Section 4.5).
- The Fauna register (Section 4.5) is to be reviewed at regular intervals to identify issues with native or introduced fauna

Reporting

- Accidental injury or fatality of a matter of national environmental significance reported to the DAWE.
- Fauna fatalities reported in the Annual Report.
- Fauna sightings reported in the fauna register
- Unauthorised clearing and non-compliance with GDPs and external approvals shall be reported as per the TNG Incident Reporting process. Reports of unauthorised clearing will include GPS coordinates and photographs of the area cleared.

4.3 FAUNA RELOCATION PROGRAM

Prior to vegetation clearing a trapping and translocation program will seek to remove fauna, particularly fauna of conservation significance.

During clearing a suitably qualified zoologist will be present as a fauna spotter/catcher to relocate any remaining animals.

Suitable relocation sites will be developed in collaboration with the appropriate stakeholders prior to trapping. Relocation sites may be developed on a species by species basis. Prior to trapping and translocation the service provider will ensure all required permits, licences and stakeholder consultation have been attained.

4.3.1 Licences

Capture of native fauna at the Site will be authorised by a fauna taking (relocation) licence. This licence will be obtained by the suitably qualified person prior to trapping commencing.

4.3.2 Trapping Program

The trapping program may include cage traps, Elliot traps, pit traps, and funnel traps. This array will capture many mammal, reptile and amphibian species. Drift fence lines may be set up with each fence line featuring 20L bucket pit traps, and funnel traps.

Fauna will be relocated to an approved area on the day they were captured. All introduced fauna will either be euthanised on site (small rodents or cane toads) or taken to a local veterinary practise (feral cats and dogs).

All traps will be cleared within three hours of sunrise. Traps will not be opened in areas of the Site in which traps are at risk of flooding due to heavy rainfall.

4.3.3 Opportunistic Sightings and Collecting

4.3.3.1 Tree Hollows

Prior to the commencement of clearing, trees present within the clearing area with Diameter at Breast Height > 500 mm as identified by APM (2019) must be inspected for the presence of tree hollows. Hollows will be inspected for native fauna. The inspection of hollows can occur from ground level; however, some particularly tall trees may need to be inspected at close range using a drone or climbing the trees. Arboreal mammals found in tree hollows will be captured and relocated prior to clearing.

Depending on the stage of development and / or the species within the active hollow, it may be decided to remove the animals and transfer to a wildlife carer or relocate.

During clearing, site machine operators will gently shake trees > 50 cm dbh before they are felled in order to ensure no animals are unwittingly injured or killed that may have been unidentified during the survey time or may have migrated to the trees after clearing. Zoologists present during clearing will also inspect trees suspected or confirmed to have hollows when those trees are felled. Any animals located must be given to a wildlife carer or safely relocated if possible.

4.3.4 Foraging

Before clearing commences, opportunistic foraging and collecting will be undertaken to increase the number of reptiles captured and relocated. Foraging involves hand raking of leaf litter and surface soil, shifting dense grasses, or turning over rocks.

4.4 VEGETATION CLEARING REQUIREMENTS

4.4.1 During Clearing

Clearing will employ the use of a raised blade for first vegetation stripping. Vegetation will be piled as it is cleared and taken away from the cleared area. A fauna spotter/catcher will be present to inspect the area for any remaining fauna after the vegetation has been stripped. The fauna spotter/catcher will inspect the vegetation piles for any remaining fauna when it is safe to do so.

Machine operators will be inducted by the fauna spotter/catcher present during clearing to follow some simple procedures that can minimise the potential for injury and mortality of vertebrate fauna and maximise safety for all involved. These procedures may include:

- Communication between clearing operator and on-site zoologists before any fauna are captured near active machinery;
- All trees > 50 cm dbh (stag or living) to be shaken with machinery prior to felling, and confirmed by field biologists that no fauna are present;
- Clearing should aim to be undertaken in a direction that maximises fauna spotter/catcher chances of capturing any fleeing fauna;
- Clearing will likely be undertaken in stages, and will allow fauna spotter/catcher to retreat to the cleared area after the first stage of clearing to ensure no fauna are left in the area when the operator returns to finalise the clearing; and
- Fauna observed by the machine operator must be communicated to the fauna spotter/catcher if they have not sighted it themselves.

4.4.1.1 Injured Fauna

Native vertebrate fauna caught during clearing will be relocated unless they are injured. The extent and severity of injuries will be assessed by the fauna spotter/catcher. If the fauna spotter/catcher (or a veterinarian) considers that an injured native animal can be rehabilitated, it will be transferred to a registered wildlife carer. TNG will provide funding to the wildlife carer to assist with the recovery of injured fauna.

Where the zoologist considers that injured native fauna are unlikely to be satisfactorily rehabilitated, they will be humanely euthanised. Injured introduced fauna (with the exception of registered domestic cats) will be humanely euthanised.

4.4.2 After Clearing

Within 30 days of the completion of clearing, the company responsible for the relocation programme will provide a letter-style report including all licences and permits required for the works described herein, the activities undertaken (dates, number of traps, type, location), results of the survey effort (number of animals relocated or captured / recorded, fate of animals), location of the release site and any other events worth noting, which will be forwarded to DEPWS for their records.

A Fauna taking (relocation) license Return will be completed and submitted to the DEPWS Licensing Branch which will cover the records of all fauna captured over the trapping regime.

4.5 FAUNA SIGHTING AND FATALITY REGISTER

A fauna sighting and fatality register will be kept by the Environmental Superintendent. All personnel will be encouraged to report sightings of fauna at all times. The objective of the reports is to:

- Inform population dynamics of introduced fauna
- Document numbers of fauna (including Threatened species) injured or killed as a result of Project activities
- Document sightings of Threatened species in the Project area.

The following records will be kept in the Fauna Sighting and Fatality Register:

- Introduced fauna sightings
- Injured or killed fauna
- Threatened species sightings
- Fauna near misses on roads or trapped in infrastructure

Input will be opportunistic however all personnel will be encouraged to report all sightings of introduced fauna, Threatened fauna, injured, trapped or killed animals.

The register will allow the adaptation of management programs to:

- Implement or increase introduced fauna control program as required (e.g. if there is a notable increase in sightings of introduced fauna in the Project area).
- Make sure any predator/pest control method does not result in the unintentional capture or death of Threatened fauna species.
- On an annual basis, map the records of fauna killed, injured or in a near miss incident during Project activities. If hotspots occur, then increase or add new mitigation efforts at those locations to reduce the incidence of the particular impact.

- On an annual basis, map the records of Threatened fauna sighted during Project activities. If hotspots occur, then increase or add new mitigation efforts for those species at those locations to minimise the likelihood of impact.

4.6 VEHICLE STRIKE

All onsite personnel are to utilise existing/approved roads and tracks only. All personnel are required to enter and exit site through recognised vehicle access points.

Speed limits on internal roads will be set to minimise the likelihood of fauna and vehicle interactions. Drivers will report all fauna deaths and near misses on roads to the Environmental Superintendent for recording in the appropriate register.

Frequent near misses or fauna deaths identified from specific locations through the fauna registers may be mitigated through signposting and/or reduced speed limits in those locations.

4.7 INJURED OR KILLED FAUNA PROCEDURE

Injured native fauna able to be rehabilitated will be given to a registered wildlife carer. Contact details for registered wildlife carers in the Darwin Region must be kept up to date and available in locations where they can be readily accessed.

Injured native fauna unlikely to be successfully rehabilitated and injured introduced fauna (except domestic cats) will be humanely euthanised.

In the event of roadkill, carcasses will be removed at least 10 m from the side of the road.

Care must be taken in handling trapped, injured or dead bats. Bats can carry diseases that are fatal to humans and protective equipment such as welders gloves should be worn to protect personnel from scratches or contact with blood or saliva.

5 MONITORING

Potential impacts to biodiversity that are managed under other factor specific management plans and procedures (contained within the EMP) have monitoring that is managed under those plans. These are summarised in Table 5-1.

Table 5-1. Monitoring under other factor specific management plans or procedures

Impact	Monitoring	Plan/Procedure
Unnecessary or excessive vegetation clearing	Ground Disturbance Permit System	Ground Disturbance and Vegetation Clearing Procedure
Habitat fragmentation	Revegetation success	Rehabilitation Management Plan
Uncontrolled Fire	Fuel Loads	Fire Management Plan
	Weedy grasses	Weeds Procedure
Contamination and Sedimentation of waterways	Water quality monitoring	Stormwater Management Plan
	Inspection of stormwater infrastructure	Water Procedure
Dust impacting vegetation health	Photo monitoring	Dust Procedure
Attraction of introduced fauna Generation of marine debris	Inspection of waste facilities	Domestic and Industrial Waste Management Procedure

5.1 TERRESTRIAL FAUNA MONITORING

A terrestrial fauna monitoring program will be established in the rehabilitation habitats within Lot 1817 outside of the Development Envelope. The method has been based on the NT DEPWS Flora and Fauna Division's recommended operating procedure for the use of camera traps, as applied on Middle Arm Peninsula. The procedure was designed for biodiversity monitoring as part of the Top End Ecological Monitoring Program. This method is known to effectively detect a suite of species with sufficient power to document change over time.

At each site, 3 cameras will be deployed in a 100 m linear formation with a camera at 0 m, 50 m and 100 m. The cameras at each end (0 m and 100 m) will be set at 45 cm above the ground; one camera will be at 1.5 m and the other at 2.5 m distance from a standard mammal bait (peanut butter, oats and honey). The centre camera (50m) will be installed with a drift fence and cork tile.

Reconyx Hyperfire camera traps will be used and the setup will be as described in the DEPWS Safe Operating Procedure for Camera Trapping. Using the same methods as the DEPWS will allow comparison of trend data to their larger survey area in the Middle Arm Peninsula area.

Camera trapping will also serve to provide data on the presence/population trends of introduced fauna, including Feral Cats.

Table 5-2. Terrestrial fauna trapping program

Factor	Camera Trapping
Timing	Annually in February
Duration	5 weeks per year during the construction phase and in the first year of operations
Number of Traplines	4 x Eucalypt Woodland 4 x Rehabilitated Areas
Trapline Length	100 m
Number of Traps Per Line	3
Total Trap nights	840

6 TRAINING AND AWARENESS

All workers (employees and contractors) will receive a site induction prior to starting work at the Darwin Processing Facility. The induction will make all workers aware of the vegetation, conservation significant flora, and conservation significant terrestrial and marine fauna that may be impacted by Project activities, and the management actions relevant to them.

Inductions will include information on:

- Identification material for Significant flora and fauna
- Identification material for invasive flora and fauna
- Fauna sighting record process
- Fauna fatality reporting process
- Activities in the workplace that may impact flora and fauna and management techniques to minimise impacts

7 COMMUNICATION

The results of all biodiversity management actions will be reported in the Annual Environment Report to the relevant regulatory authorities.

APPENDICES

APPENDIX A: CONSERVATION SIGNIFICANT FLORA***Cycas armstrongii***

Conservation Status

Vulnerable (TPWC Act)

Habitat

Eucalypt woodland



Typhonium praetermissum

Conservation Status	Vulnerable (TPWC Act)	
Habitat	Eucalypt woodland	



Tricoryne elatior

Conservation Status	Near Threatened (TPWC Act)	
Habitat	Eucalypt woodland	



Polymeria pusila

Conservation Status

Data deficient

Habitat

Melaleuca woodland and seasonal
inundations

***Buchnera* sp. ciliate bracts**

Conservation Status

Data deficient

Habitat

Seasonal inundations



APPENDIX B: CONSERVATION SIGNIFICANT FAUNA**Eastern Curlew (*Numenius madagascariensis*)**

Conservation Status:	CR/Mi/Ma (EPBC Act), VU (TPWC Act)	Main threats:	Human disturbance, habitat loss, degraded water quality and hunting
Habitat:	tidal mudflats and mangrove habitat		



Great Knot (*Calidris tenuirostris*)

Conservation Status

CR/Mi/Ma (EPBC Act), VU (TPWC Act)

Habitat

tidal mudflats



5.3.1.3 Northern Quoll (*Dasyurus hallucatus*)

Conservation Status	EN (EPBC Act), CR (TPWC Act)	
Habitat	Eucalypt woodland	



Red Knot (*Calidris canutus*)

Conservation Status

EN/Mi/Ma (EPBC Act), VU (TPWC Act)

Habitat

tidal mudflats



Lesser Sand Plover (*Charadrius mongolus*)

Conservation Status	EN/Mi/Ma (EPBC Act), VU (TPWC Act)	
Habitat	tidal mudflats	



Black-footed Tree-rat (*Mesembriomys gouldii gouldii*)

Conservation Status	EN (EPBC Act), VU (TPWC Act)	
Habitat	Eucalypt woodland	



Greater Sand Plover (*Charadrius leschenaultia*)

Conservation Status	VU/Mi/Ma (EPBC Act), VU (TPWC Act)	
Habitat	tidal mudflats	



Howard River Toadlet (*Uperoleia daviesae*)

Conservation Status	VU (TPWC Act)	
Habitat	Melaleuca woodlands, seasonal inundation, Monsoon forest	



Pale Field-rat (*Rattus tunneyi*)

Conservation Status

VU (TPWC Act)

Habitat

Monsoon forest



Whimbrel (*Numenius phaeopus*)

Conservation Status	Mi/Ma (EPBC Act), NT (TPWC Act)	
Habitat	Mangroves and tidal flats	



Bush Stone-curlew (*Burhinus grallarius*)

Conservation Status

NT (TPWC Act)

Habitat

All of site



Grey-tailed Tattler (*Tringa brevipes*)

Conservation Status	NT (TPWC Act)	
Habitat	Mangroves and tidal mudflats	



Northern Brown Bandicoot (*Isoodon macrourus*)

Conservation Status

NT (TPWC Act)

Habitat

All of site



Western Chestnut Mouse (*Pseudomys nanus*)

Conservation Status

NT (TPWC Act)

Habitat

Eucalypt woodland



Orange Leaf-nosed Bat (*Rhinonicteris aurantia*)

Conservation Status

NT (TPWC Act)

Habitat

All of site



Arnhem Sheath-tailed Bat (*Taphozous kapalgensis*)

Conservation Status

NT (TPWC Act)

Habitat

All of site



Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis*)

Conservation Status	NT (TPWC Act)	
Habitat	Monsoon closed forest, Eucalyptus woodlands, and Melaleuca woodlands	



Mulga Snake (*Pseudechis australis*)

Conservation Status	NT (TPWC Act)	
Habitat	All of site	



Appendix B: Biological Report (This report is included as Appendix J of the Draft EIS)

Appendix C: Socio-Economic Impact Assessment (This report is included as Appendix F of the Draft EIS)

Appendix D: TNG Environmental Policy (Included as Appendix C of the Draft EIS)