



**Environmental Protection Act 1986 (WA) Section 38 Referral Supporting Document**

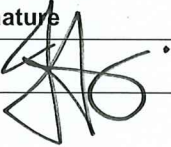
## **Winu Project**

Rio Tinto Winu Pty Limited

November 2023

## Approvals

Document Number: C0007-0750-U-REP-00001

| Status | Name            | Position         | Signature  |
|--------|-----------------|------------------|--|
| Final  | Jaco Hugo (RTW) | Program Director |  |

## Revision History

| Revision | Date             | Comments       | Originator | Reviewed  | Approved |
|----------|------------------|----------------|------------|-----------|----------|
| 1        | 17 November 2023 | EPA submission | ELA/RTW    | GD and PK | JH       |

## EXECUTIVE SUMMARY

Rio Tinto Winu Pty Limited plans to develop a new copper-gold mine, referred to as the Winu Project (the Proposal), approximately 300 km south of Broome and 320km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta people's and Martu people's Native Title Determination Areas.

This document has been prepared to provide supporting information for the referral of the Proposal by the Proponent.

**ES Table 1: General Description of the Proposal**

| General Proposal Description |  |
|------------------------------|--|
| <b>Proposal Title</b>        | Winu Project   |
| <b>Proponent Name</b>        | Rio Tinto Winu Pty Limited   |
| <b>Short Description</b>     | <p>Winu Copper-Gold Mine Project</p> <p>The Proposal involves developing an open pit that extends below water table and associated infrastructure, including material waste and waste management infrastructure, ore processing facilities, mine dewatering infrastructure, water supply infrastructure, linear infrastructure and support facilities</p> <p>The Development Envelope is approximately 37,344 ha in extent, comprising these subset areas of the Winu Project:</p> <ul style="list-style-type: none"> <li>• Mine and Infrastructure Area (MIA)</li> <li>• Road Access Corridor (RAC)</li> <li>• Rimfire Regional Borefield (Rimfire)</li> <li>• Texas Regional Borefield (Texas)</li> <li>• Wallal Borefield (Wallal)</li> </ul> |

Rio Tinto recognises the Nyangumarta and Martu peoples' intrinsic and continuous connection to Country, culture and community of both the land and waters on which the Winu Project is located.

Rio Tinto respects and honours the rights and obligations Nyangumarta and Martu have to Ngurra by caring for Country and is committed to developing the Winu Project in a genuine partnership that is open, honest, culturally appropriate and benefits all.

Through meaningful consultation, co-development and co-management, combining both traditional knowledge and Western science, throughout the development, operation and closure of the Winu Project, Rio Tinto will aim to minimise impact to Country, intangible and tangible culture, and support the economic, social aspirations and opportunities for current and future generations of Nyangumarta People and Martu People.

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## Abbreviations

| Abbreviation | Description   |
|--------------|---|
| ABA          | Acid Base Accounting  |
| ACH          | Aboriginal Cultural Heritage                                    |
| ACH Act      | <i>Aboriginal Cultural Heritage Act (WA) 2021</i>               |
| ACHMP        | Aboriginal Cultural Heritage Management Plan                    |
| AH Act       | <i>Aboriginal Heritage Act (WA) 1972</i>                        |
| AMD          | Acid and Metalliferous Drainage                                 |
| ANC          | Acid Neutralising Capacity                                      |
| ARD          | Acid Rock Drainage  |
| AREH         | Asia Renewable Energy Hub                                       |
| AWT          | Above Water Table   |
| BAM Act      | <i>Biosecurity and Agricultural Management Act 2007</i>         |
| BC Act       | <i>Biodiversity Conservation Act (WA) 2016</i>                  |
| BMP          | Blast Management Plan   |
| BoM          | Bureau of Meteorology   |
| BWT          | Below Water Table   |
| CF           | Conceptual Footprint  |
| CHMS         | Cultural Heritage Management Systems                            |
| CIL          | Carbon in Leach   |
| DAWE         | Department of Agriculture, Water and the Environment            |
| DBCA         | Department of Biodiversity, Conservation and Attractions        |
| DCCEEW       | Department of Climate Change, Energy, the Environment and Water |
| DE           | Development Envelope  |
| DJTSI        | Department of Jobs, Tourism, Science and Innovation             |
| DMA          | Decision-making Authorities                                     |
| DMIRS        | Department of Mines, Industry Regulation and Safety             |
| DPIRD        | Department of Primary Industries and Regional Developments      |
| DPLH         | Department of Planning, Lands and Heritage                      |
| DWER         | Department of Water and Environmental Regulation                |
| EIA          | Environmental Impact Assessment                                 |
| EMP          | Environment Management Plan                                     |
| EP Act       | <i>Environmental Protection Act 1986</i>                        |
| EPA          | Environmental Protection Authority                              |



| Abbreviation | Description  |
|--------------|--|
| EPA Services | Environmental Protection Authority Services                          |
| EPBC Act     | <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| ERD          | Environmental Review Document  |
| ESD          | Environmental Scoping Document                                       |
| ESG          | Environmental, Social and Governance                                 |
| GARD         | Global Acid Rock Management  |
| GDE          | Groundwater Dependent Ecosystem                                      |
| GDV          | Ground Dependent Vegetation  |
| GHG          | Greenhouse Gas   |
| GIS          | Geographic Information Systems                                       |
| GL           | Gigalitres   |
| GL/a         | Gigalitres per annum   |
| GoWA         | Government of Western Australia                                      |
| HDSD         | High-Density Slurry Deposition                                       |
| HSEC         | Health, Safety, Environment and Communities                          |
| HSECQ        | Health, Safety, Environment, Community and Quality                   |
| IBRA         | Interim Biogeographic Regionalisation for Australia                  |
| ICOMOS       | International Council on Monuments and Sites                         |
| JYAC         | Jamukurnu Yapalikurnu Aboriginal Corporation                         |
| LLDPE        | Linear Low Density Polyethylene                                      |
| LNG          | Liquefied Natural Gas  |
| LOM          | Life of Mine   |
| mbgl         | metres below ground level  |
| MCP          | Mine Closure Plan  |
| mg/L         | Milligrams per Litre   |
| MIA          | Mine and Infrastructure Area   |
| Mining Act   | <i>Mining Act 1978</i>   |
| mm/a         | millimetres per annum  |
| MNES         | Matters of National Environmental Significance                       |
| MP           | Mining Proposal  |
| mRL          | minimum reporting level  |
| MS           | Ministerial Statement  |
| Mt           | Million tonnes   |
| Mt/a         | Million tonnes per annum   |

| Abbreviation | Description                                      |
|--------------|--|
| NAF          | Non acid forming                                 |
| NGER         | National Greenhouse and Energy Reporting         |
| NT Act       | <i>Native Title Act 1993</i>                     |
| NVCP         | Native Vegetation Clearing Permit                |
| NWAC         | Nyangumarta Warrarn Aboriginal Corporation RNTBC |
| P            | Priority   |
| p/a          | Per annum  |
| PAF          | Potentially acid forming                         |
| PAF-LC       | Potentially Acid Forming – Low Capacity          |
| PCD          | Proposal Content Document                        |
| PEC          | Priority Ecological Community                    |
| PoW          | Programme of Work                                |
| PPE          | Personal Protective Equipment                    |
| RAC          | Road Access Corridor                             |
| RiWI         | <i>Rights in Water and Irrigation Act 1914</i>   |
| ROM          | Run of Mine                                      |
| RTW          | Rio Tinto Winu                                   |
| SRE          | Short-range Endemic                              |
| TBA          | To Be Assessed/announced                         |
| TBC          | To be Confirmed                                  |
| TEC          | Threatened Ecological Community                  |
| TSF          | Tailings Storage Facilities                      |
| TSI          | Torres Strait Islander                           |
| UCL          | Unallocated Crown Land                           |
| WAM          | Western Australian Museum                        |
| WMP          | Weed Management Plan                             |
| WRB          | Winu Regional Borefields                         |
| WRL          | Waste Rock Landform                              |

## 1. INTRODUCTION

Rio Tinto Winu Pty Limited (the Proponent) plans to develop a new copper-gold mine, referred to as the Winu Project (the Proposal), approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta people's and the Martu people's Native Title Determination Areas (Figure 1-1).

### 1.1. Purpose of this Document

This document has been prepared to provide supporting information for the referral of the Proposal by the Proponent.

This supporting document should be read in conjunction with the forms for the Referral of a Proposal under s 38 of the *Environmental Protection Act 1986 (WA)* (EP Act) and 'How to identify the Content of a Proposal Instructions and template' (EPA 2021a,b).

### 1.2. Proponent Details

The Proponent is a wholly owned subsidiary of Rio Tinto Limited (Rio Tinto). The Proponent details are provided in Table 1-1.

**Table 1-1: Proponent Details**

| Details |   |
|---------|---|
| Company | Rio Tinto Winu Pty Limited  |
| ACN     | 128 066 777   |
| Address | Level 18, Central Park<br>152-158 St Georges Terrace<br>Perth WA 6000 Australia |

### 1.3. Key Proposal Terminology

**The Proposal:** Includes the development of a new below-water table (BWT) copper-gold deposit and associated infrastructure and activities required to access, process and transport ore.

**Development Envelope:** Refers to the combined areas of the mine and infrastructure area, access road and three (3) regional borefields Rimfire, Texas and Wallal. All Proposal activities will occur within this area.

**Conceptual Footprint:** Refers to the indicative direct disturbance of the Proposal. To provide project flexibility, this footprint is indicative only and includes key elements such as mine pit, waste rock landform, tailings storage facility and other infrastructure. The final location of key elements and infrastructure may occur outside the Conceptual Footprint but will be contained within the Development Envelope and within any approval limits.

**Mine and Infrastructure Area (MIA):** Refers to the area containing the mineralised deposit and related infrastructure. This is the Winu mine site.

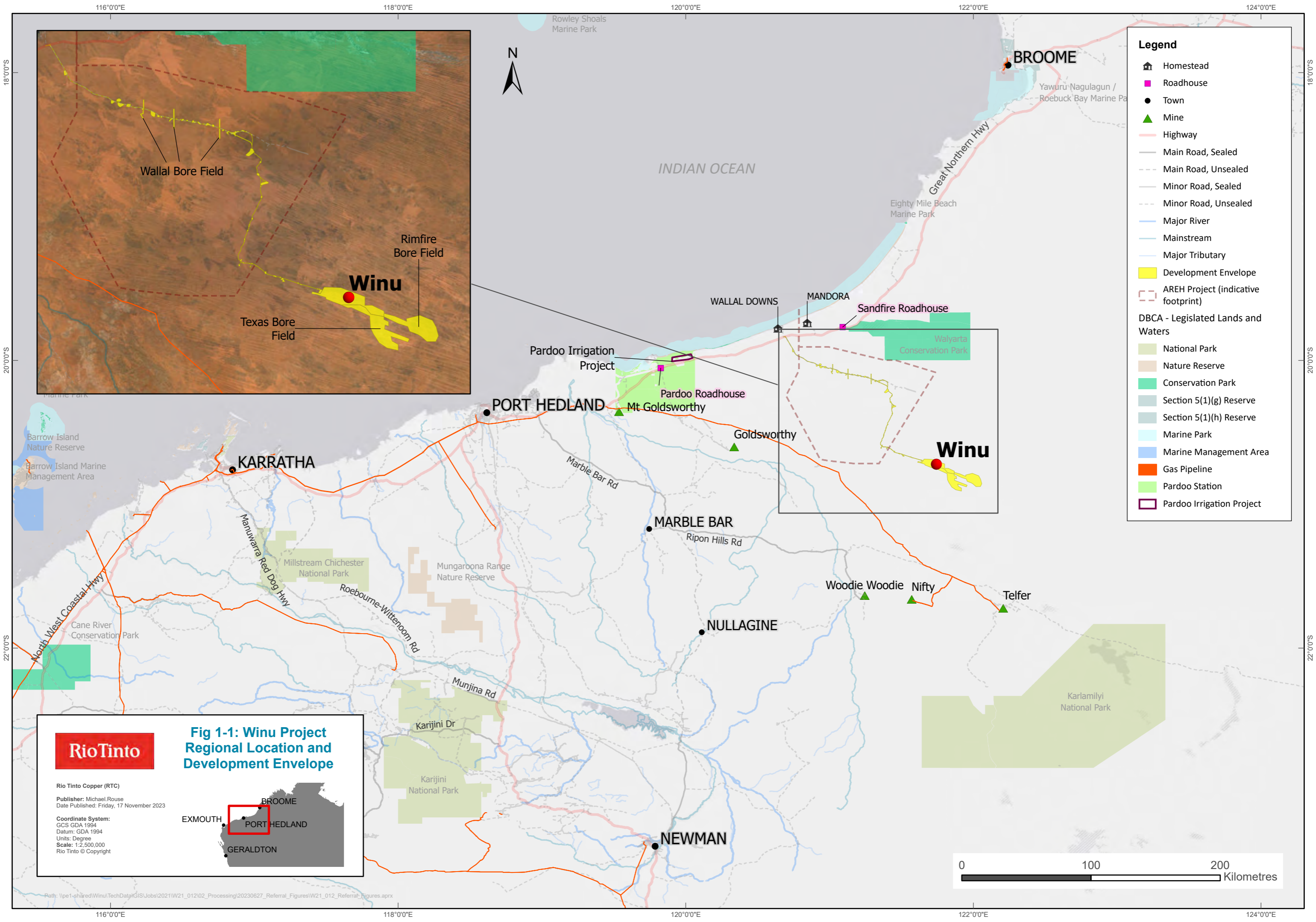
**Winu Regional Borefield (WRB):** Refers collectively to the borefields Rimfire, Texas and Wallal. All are defined further below.

**Rimfire Borefield (Rimfire):** Refers to the regional borefield located at Rimfire, which is approximately 31 km from the MIA. This includes the pipelines, infrastructure and access tracks back to the MIA.

**Road Access Corridor (RAC):** Refers to the Access Road, which encompasses the entire length of the existing Access Road from Great Northern Highway to the MIA.

**Texas Borefield (Texas):** Refers to the regional borefield located at Texas, approximately 22 km from the MIA. This includes the pipelines, infrastructure and access tracks back to the MIA.

**Wallal Borefield (Wallal):** Refers to the regional borefield located approximately 95 km from the MIA. This includes the pipelines, infrastructure and access tracks back to the MIA that will be contained within the RAC.



**Legend**

- Homestead
- Roadhouse
- Town
- Mine
- Highway
- Main Road, Sealed
- Main Road, Unsealed
- Minor Road, Sealed
- Minor Road, Unsealed
- Major River
- Mainstream
- Major Tributary
- Development Envelope
- AREH Project (indicative footprint)

**DBCA - Legislated Lands and Waters**

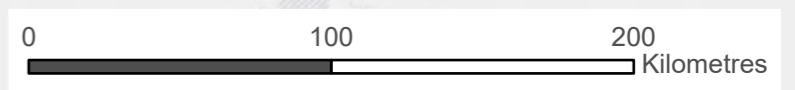
- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve
- Marine Park
- Marine Management Area
- Gas Pipeline
- Pardoo Station
- Pardoo Irrigation Project

**RioTinto**

**Fig 1-1: Winu Project Regional Location and Development Envelope**

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:2,500,000  
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## 2. LOCAL AND REGIONAL CONTEXT, LAND USE AND TENURE

### 2.1. Regional Context

#### 2.1.1. Climate

The Proposal is located in an arid tropical environment, characterised by hot and wet summers (October to April) and mild dry winters (May to September) (BoM 2022).

The region experiences climate extremes, where severe droughts and major floods can follow in close succession.

#### 2.1.2. Regional Geology

The MIA is located on the Anketell Shelf of the Yeneena Basin. The Winu deposit lies within metamorphosed sandstone, siltstone and lesser mafic rocks, which are considered correlatives of the upper Malu Formation of the Yeneena Basin and host to the large Telfer gold-copper deposit. The evolution of the Basin represents the later stages of long-lived convergence of the North and West Australian cratons when plate collision stopped subduction (Hickman and Bagas 1999). In the MIA, copper-gold mineralisation occurs in a series of lodes with strike lengths between 350 and 750 m, northerly trends and moderate easterly dips surrounded by a more extensive halo of low-grade mineralisation. The host rocks are covered by at least 50 m of younger, unmineralized rocks, sand and soil. Largely undeformed Permian sandstone, mudstone and diamictite unconformably overlie the host rocks covered with windblown sand.

On a regional scale (including the locations of the potential aquifers named Rimfire and Texas), the geology comprises a north-northwest trending belt of folded and metamorphosed Proterozoic sedimentary and igneous rocks in north-western Australia. The rocks are >9 km thick and were intruded by dolerite sills, dykes and granite plutons at ~650 to ~600 million years ago. The current interpretation of the lithological succession of the Yeneena Basin is deposition in a series of strike-slip basins in a continental margin setting with a landmass to the southwest (Hickman and Bagas 1999). The Miles Orogeny (>800 million years ago, Cross et al, 2011) produced northeast to north-northwest trending folds and thrusts (Czarnota et al.,2010, Houston et al.,2010).

Phanerozoic sedimentary rocks of the Canning Basin are present in the MIA. These sedimentary units include large confined and unconfined sandstone-hosted aquifers to the north of Winu, part of the Wallal aquifer. Regionally, the sedimentary sequences of the Canning Basin both unconformably overlie, and are faulted against, the older Proterozoic rocks of the Yeneena Basin.

#### 2.1.3. Land Systems

Land systems of the Western Australian rangelands have been mapped and described by the Department of Primary Industries and Regional Development (DPIRD), outlining the distributions and providing comprehensive descriptions of biophysical resources, including soil and vegetation conditions.

The Development Envelope intersects six land systems, with Little Sandy and AB40 covering most of the Development Envelope. The systems are described as follows (Payne 2004):

- **Little Sandy:** Sandplains with linear and reticulate dunes supporting shrubby spinifex grasslands
- **Nita:** Sandplains supporting shrubby spinifex grasslands with occasional trees
- **Callawa:** Highly dissected low hills, mesas and gravelly plains on sandstone and conglomerate supporting spinifex grasslands
- **Buckshot:** Gravelly sandplains and sporadic sand dunes supporting shrubby hard spinifex grasslands

- **AB40:** Gently undulating plain and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone
- **B30:** Largely stable linear dune fields with swales opening locally into sand plains.

#### 2.1.4. Existing and Reasonably Foreseeable Projects

**Table 2-1: Existing and Reasonably Foreseeable Projects within 100 km of the Proposal**

| Project  | Status   | Approximate Distance to MIA (km) | Nearest Distance to Development Envelope (km) |
|--|----------|----------------------------------|---|
| Asian Renewable Energy Hub (now known as the Australian Renewable Energy Hub) (AREH) | Pending  | 33 (to closest boundary of AREH) | Intersects within the RAC                     |
| Telfer Goldmine Expansion and Infrastructure Project                                 | Existing | 122                              | 95  |
| Woodie Continued Operations Project  | Pending  | 112                              | 104   |
| Goldsworthy Iron Ore Mines Extension Project   | Existing | 144                              | 83  |
| Pardoo Irrigated Agriculture Project   | Approved | 200                              | 75  |

*Note – distance to MIA is calculated from the centre of the MIA.*

## 2.2. Land Use

Most of the region around the Proposal is Unallocated Crown Land (UCL). Current land use in and around the Development Envelope mostly involves Nyangumarta people's and Martu peoples' management and enjoyment of, and interaction with, 'Country' in accordance with their Native Title rights and cultural responsibilities.

Additional land use in the region includes pastoral grazing. A small portion of the Development Envelope in the RAC (close to the Great Northern Highway) is within Wallal Downs pastoral lease. The Development Envelope does not cover any other pastoral leases, with the next closest to the MIA being Warrawagine Station, approximately 100 km to the west.

The Great Northern Highway is the only sealed road in the locality. The sparsely populated area otherwise hosts a small number of unsealed, single lane four-wheel drive only tracks. This includes 97 km of the western end of the track known as the Nyangumarta Highway, 54 km of track known as Wirkirri, Wirkirri Road and 32 km of a track named Copperhead Road.

## 2.3. Native Title

The Proposal is located within the boundaries of the Nyangumarta (WAD6281/1998) and Martu (WAD6110/1998) Native Title determination areas (Figure 2-1).

Most of the Proposal, including all active mining areas, occurs within the Nyangumarta Native Title determination area and the Nyangumarta Indigenous Protected Area.

The land subject to the Martu Native Title determination area is restricted to a section in the southeast of the Development Envelope, covering the location of the existing airstrip proposed to be upgraded under this Proposal, as well as Rimfire and Texas.

The Proponent is negotiating specific and separate Winu Project Agreements with Nyangumarta and Martu.

## 2.4. Tenure

Proposal tenure is outlined in Table 2-2 and Figure 2-1.

**Table 2-2: Winu Project Tenements**

| Lease/Licence Number   | Lease/Licence Type | Description   |
|------------------------|--------------------|---|
| M45/1288 (Application) | Mining             | Mine and Infrastructure Area  |
| L45/476 (Granted)      | Miscellaneous      | Existing airstrip   |
| L45/491 (Granted)      | Miscellaneous      | Existing Access Road east of Camp   |
| L45/494 (Granted)      | Miscellaneous      | Existing Access Road to the existing airstrip from the mining lease   |
| L45/548 (Granted)      | Miscellaneous      | Great Northern Highway and the initial western section of the Existing Access Road (section of the Nyangumarta Highway) |
| L45/549 (Granted)      | Miscellaneous      | Access Road and borrow pits - from Great Northern Highway end (section of the Nyangumarta Highway)                      |
| L45/550 (Granted)      | Miscellaneous      | Access Road diversion and borrow pits – start of Wirrkirr Wirrkirr Road   |
| L45/551 (Granted)      | Miscellaneous      | Access Road diversion and borrow pits – start of Wirrkirr Wirrkirr Road   |
| L45/552 (Granted)      | Miscellaneous      | Access Road and borrow pits - Wirrkirr Wirrkirr Road to mining lease  |
| L45/559 (Application)  | Miscellaneous      | New airstrip  |
| L45/623 (Granted)      | Miscellaneous      | Hairpin Bend Access Road  |
| L45/722 (Application)  | Miscellaneous      | Southern Camp Location  |
| L45/723 (Application)  | Miscellaneous      | Northern Monitoring Bores   |
| L45/725 (Application)  | Miscellaneous      | Southern Access Road  |
| L45/754 (Application)  | Miscellaneous      | Texas Regional Borefield  |
| L45/755 (Application)  | Miscellaneous      | Rimfire Regional Borefield  |
| L45/726 (Application)  | Miscellaneous      | Wallal Regional Borefield West  |
| L45/727 (Application)  | Miscellaneous      | Wallal Regional Borefield Central   |
| L45/728 (Application)  | Miscellaneous      | Wallal Regional Borefield East  |

Additional tenure may be applied for to support the Proposal as detailed Project studies and Traditional Owner engagement continues.



120°30'0"E

121°0'0"E

121°30'0"E

122°0'0"E

20°0'0"S

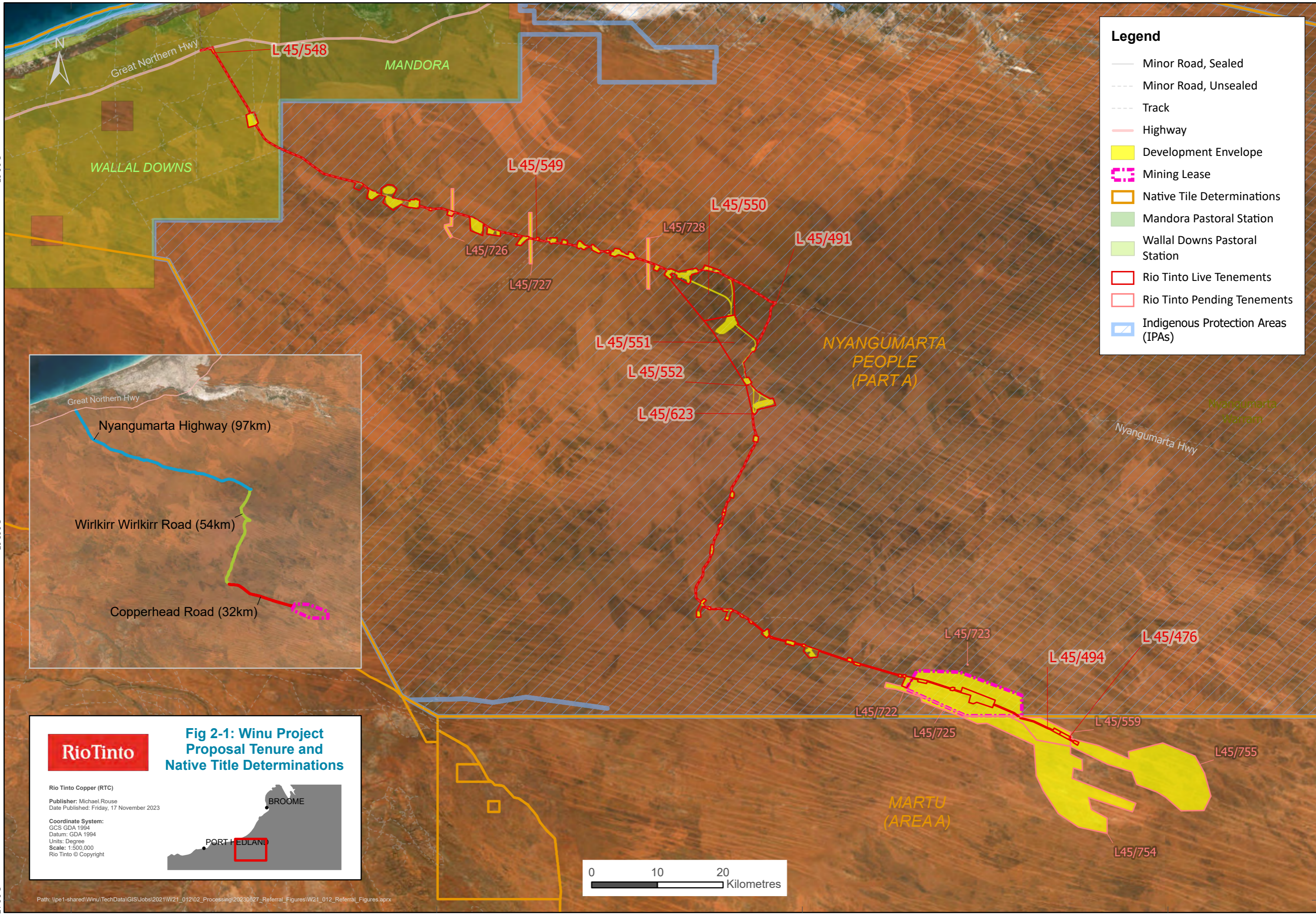
20°0'0"S

20°30'0"S

20°30'0"S

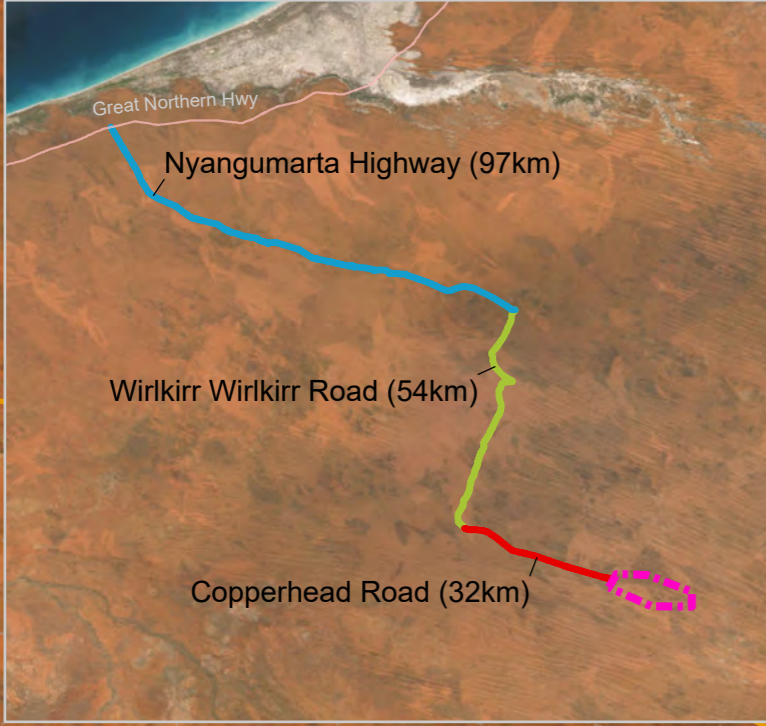
21°0'0"S

21°0'0"S



**Legend**

- Minor Road, Sealed
- - - Minor Road, Unsealed
- - - Track
- Highway
- Development Envelope
- Mining Lease
- Native Title Determinations
- Mandora Pastoral Station
- Wallal Downs Pastoral Station
- Rio Tinto Live Tenements
- Rio Tinto Pending Tenements
- Indigenous Protection Areas (IPAs)



**RioTinto**

**Fig 2-1: Winu Project Proposal Tenure and Native Title Determinations**

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
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### 3. PROPOSAL

#### 3.1. Proposal Content

The Proposal involves developing an open pit that extends below water table and associated infrastructure, including material waste and waste management infrastructure, ore processing facilities, mine dewatering infrastructure, water supply infrastructure, linear infrastructure and support facilities.

A Proposal Content Document (PCD) is provided in Appendix A.

The Development Envelope is 37,344 ha in extent, comprising these subset areas of the Winu Project:

- Mine and Infrastructure Area (MIA) – 10,182 ha
- Road Access Corridor (RAC) – 6,468 ha
- Rimfire Regional Borefield (Rimfire) – 9,577 ha
- Texas Regional Borefield (Texas) – 10,213 ha
- Wallal Borefield (Wallal) – 904 ha.

The Conceptual Footprint refers to the indicative direct disturbance footprint for the Proposal. To provide project flexibility, this footprint is indicative only and includes key elements of the Proposal to a maximum extent of 4,868 ha. The final location of key elements and infrastructure will be within the Development Envelope and any approval limits.

Various exploration and investigation activities have been completed to support this Proposal. These include clearing access tracks and drill pads for resource and groundwater studies. Clearing of approximately 154 ha has occurred for these purposes, with clearing undertaken under the *Mining Act 1978 (WA)* (Mining Act) and clearing for upgrades to existing roads between Great Northern Highway and the MIA under Native Vegetation Clearing Permit (CP9561/1) (expiry February 2028).

All of the Conceptual Footprint falls within the Development Envelope.

#### 3.2. Proposal Exclusions

The scope of this Proposal is subject to assessment under Part IV of the EP Act and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), and therefore, excludes the following low-impact activities:

- Utilisation and/or upgrade of existing infrastructure, including access tracks and accommodation camp
- Ongoing low-impact exploration and investigation activities to inform the environmental impact assessment of this Proposal
- Development and use of groundwater supplies to support the exploration and investigation activities.

Any new ground disturbance to support the above activities will be minimised and located to avoid environmental and heritage values. Approvals for the ongoing exploration and investigations activities will be sought separately under the EP Act, *Mining Act 1978 (WA)* (Mining Act) and *Rights in Water and Irrigation Act 1914 (WA)* (RiWI Act), as required.

The Development Envelope and Conceptual Footprint are shown in Figure 3-1.

121°0'0"E

122°0'0"E

123°0'0"E

20°0'0"S

20°0'0"S

21°0'0"S

21°0'0"S

Great Northern Hwy

Road Access Corridor

Mine Infrastructure Area

NYANGUMARTA PEOPLE (PART A)  
MARTU (AREA A)

0 2 4  
Kilometres

Texas Bore Field

Wallal Bore Field

0 5 10  
Kilometres

Road Access Corridor

NYANGUMARTA PEOPLE (PART A)  
MARTU (AREA A)

Rimfire Bore Field

0 2 4  
Kilometres

Texas Bore Field



**Fig 3-1: Winu Project Development Envelope and Conceptual Footprint**

Rio Tinto Copper (RTC)  
Publisher: Michael Rouse  
Date Published: Friday, 17 November 2023  
Coordinate System:  
GCS GDA 1994  
Datum: GDA 1994  
Units: Degree  
Scale: 1:800,000  
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**Legend**

- Highway
- Development Envelope
- Native Title Determinations
- Conceptual Footprint**
- Aerodrome
- ANFO
- Bore Fields and Pipelines
- Camps
- Mine Construction Areas
- Mine Pit
- Ore Stockpiles
- Ponds
- Power Generation (Wind and Solar)
- Processing Infrastructure
- Roads and Borrow Pits
- Tailings Storage Facility
- Topsoil Stockpiles
- Waste Rock Landform

0 20 40  
Kilometres

121°0'0"E

122°0'0"E

123°0'0"E

### 3.3. Proposal Elements

Table 3-1 outlines the details of the Proposal elements.

**Table 3-1: Proposal Elements**

| Proposal Element                         | Description   |
|--|---|
| Mining                                   | <p>Mine elements will include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Development of an open pit that extends BWT</li> </ul> <p>Mining operations will comprise:</p> <ul style="list-style-type: none"> <li>• Conventional drill and blast</li> <li>• Load and haul</li> </ul>   |
| Mineral waste, including tailing storage | <p>Mineral Waste management will include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Waste rock landforms (WRLs)</li> <li>• Topsoil stockpiles</li> <li>• Tailings storage facility (TSF)</li> </ul> <p>The TSF will be constructed from waste rock and be a permanent storage location</p> <p>The TSF will build out progressively to the west, rising to a final height of approximately 60 m, and will include the following:</p> <ul style="list-style-type: none"> <li>• Separate cells to store high-sulphur and low-sulphur tailings</li> <li>• Sub-aqueous tailing deposition of high-sulphur tailings</li> <li>• High-Density Slurry Deposition (HDSD) of low-sulphur tailings</li> <li>• Linear Low-Density Polyethylene (LLDPE) lining for high-sulphur cells and Bitumen impregnated lining for the low-sulphur cells</li> <li>• A dry cover at closure maintains the high-sulphur tailings' saturation and reduces acidification risk</li> </ul> |
| Ore processing                           | <p>Ore processing facilities will include:</p> <ul style="list-style-type: none"> <li>• Run of Mine (ROM) pad</li> <li>• Crushing, stockpiling, and reclaiming</li> <li>• Grinding with oversized recycle pebble crushing</li> <li>• Flotation, concentrate dewatering and handling</li> <li>• Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption</li> <li>• Carbon reactivation, electrowinning, doré production and cyanide detoxification</li> <li>• Tailings thickening</li> <li>• Reagent receipt, storage and delivery systems</li> </ul>   |

| Proposal Element  | Description  |
|---|--|
| <p>Water management, water supply and surplus water</p> | <p>Water management will include, but not be limited to:</p> <ul style="list-style-type: none"> <li>• Mine pit dewatering infrastructure including:               <ul style="list-style-type: none"> <li>○ In-pit and ex-pit bores</li> <li>○ Pumps</li> <li>○ Pipelines</li> </ul> </li> <li>• Regional borefields - Rimfire, Texas and Wallal with infrastructure including:               <ul style="list-style-type: none"> <li>○ Bores</li> <li>○ Pumps</li> <li>○ Pipelines</li> <li>○ Pumping stations</li> <li>○ Access Tracks and Roads</li> </ul> </li> <li>• Surface water management infrastructure will include but not limited to:               <ul style="list-style-type: none"> <li>○ Water diversion channels, catchment ponds and dams</li> <li>○ Segregation via pumping and piping</li> <li>○ Collection, storage and modelling</li> <li>○ Clean water and potentially contaminated water will be managed through the implementation of the Site Water Management Plan</li> </ul> </li> <li>• Water supply will consist of:               <ul style="list-style-type: none"> <li>○ Groundwater from mine dewatering</li> <li>○ Re-use of water from processing activities</li> <li>○ Groundwater from Rimfire, Texas and/or Wallal</li> </ul> </li> </ul> <p>The process plant will be the most water-intensive activity and will involve a high degree of water recycling</p> <p>Other uses include dust suppression and potable water</p> <p>Surplus water discharge management, which will be through the use of Infiltration areas</p> <p>Most water loss from operations will be by evaporation</p> <p>Post-mining, a pit lake will develop within the open void. A permanent groundwater sink will persist as the groundwater rebound will not reach pre-mining water levels</p> |
| <p>Mine Support Facilities and Infrastructure</p>       | <p>Support facilities and infrastructure include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Accommodation camp</li> <li>• Energy supply infrastructure, including LNG-fired thermal generation, wind turbines, solar panels, and battery storage</li> <li>• Mine workshops and maintenance infrastructure</li> <li>• Bores, pipelines, turkeys nests and facilities to support road construction works and ongoing maintenance works</li> <li>• Ancillary buildings, including offices, warehouse-workshops, telecommunications structures, sheds</li> <li>• Wastewater treatment plants and reverse osmosis plants</li> <li>• Explosives storage and preparation facilities and hydrocarbon storage</li> <li>• Laydown areas</li> <li>• Drill core processing and storage facilities</li> <li>• Information and communications technology, laboratories</li> <li>• Waste management including landfill facilities</li> <li>• Site fire emergency and medical facilities</li> <li>• Aerodrome facilities including an airstrip</li> </ul>   |

| Proposal Element           | Description   |
|----------------------------|---|
| Ore Handling and Transport | <p>Linear infrastructure will include, but is not limited to:</p> <ul style="list-style-type: none"><li>• Heavy vehicle and light vehicle access roads</li><li>• Upgrades to existing access roads</li><li>• Pipelines, powerlines, fibre-optic cable, and communications distribution networks</li><li>• A possible copper concentrate transfer area</li><li>• Concentrate transportation will be by truck via the RAC and Great Northern Highway to the Port for export</li><li>• Doré (unrefined gold bar) is expected to be transported via the regular air charter</li></ul> |

### 3.4. Proposal Alternatives

The location of the economic mineral deposit defines the location of the Proposal. No alternative copper-gold deposits have been identified as suitable for the development. However, the Proposal design and scope have been optimised to minimise environmental and social impacts through various considerations such as design, layout and mitigation strategies. This includes:

- Re-designing the RAC to avoid rocky outcrops that are known and potential Black-footed Rock Wallaby/Moororong habitats
- Locating infrastructure within the Development Envelope to minimise impacts on environmental and cultural values
- Relocating the location of the accommodation camp to avoid cultural heritage sites and undertaking a co-design process with the Nyangumarta people to incorporate culturally important tree strands
- Locating the TSF to avoid known heritage sites
- The use of infiltration areas to manage occasional surplus water following a review and rejection of the option to re-inject surplus water into the aquifer.

## 4. LEGISLATIVE CONTEXT

### 4.1. Environmental Impact Assessment Process

The Proposal is subject to assessment under the EPBC Act and EP Act.

The content, format and environmental assessment in this supporting document were developed with consideration of the following EPA guidance:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures (EPA 2021c) (Administrative Procedures)
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA 2021d) (Procedures Manual)
- Statement of Environmental Principles, Factors and Objectives and Aims of EIA (EPA 2023a)
- Instructions for the referral of a Proposal under s38 of the *Environmental Protection Act 1986* (EPA 2021e)
- Instructions for preparing data packages for the Index of Biodiversity Surveys for Assessments (IBSA) (EPA 2021f)
- Instructions – How to identify the content of a Proposal (EPA 2021a)
- Interim Guidance- Taking Decision-Making Processes into Account in EIA (EPA 2021g).

#### 4.1.1. *Environmental Protection Act 1986*

WA's primary environmental legislation governing environmental protection and impact assessment is the EP Act. Part IV, Division 1 of the EP Act, provides for the referral and assessment of proposals that may significantly impact the environment. The Environmental Protection Authority Services (EPA Services) division within the Department of Water and Environmental Regulation (DWER) administers the impact assessment process in accordance with the relevant policies and guidelines.

#### 4.1.2. *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act is the primary Commonwealth environmental legislation protecting Matters of National Environmental Significance (MNES). It is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Referral of the Proposed Action to DCCEEW under the EPBC Act occurred in June 2020. On 13 August 2020, DCCEEW (previously Department of Agriculture, Water and the Environment [DAWE]) determined that the Proposed Action is a Controlled Action under s 75 of the EPBC Act (EPBC 2020/8707), with listed threatened species and communities (ss 18 and 18a) as the controlling provisions. Since then, the Proposal has expanded to include the regional borefields and the RAC.

The original EPBC referral (EPBC 2020/8707) will be withdrawn and replaced with a new referral that aligns with the updates to the Proposal.

The EPBC Referral will be assessed separately under the EPBC Act and an accredited assessment is not being sought.



## 4.2. Other Approvals and Regulations

Tenure licences held relevant to the Proposal are outlined in Table 2-2.

### 4.2.1. Decision-Making Authorities and Other Approvals

The Relevant Decision-Making Authorities (DMAs) identified by the Proponent are listed in Table 4-1. Additional DMAs may be identified during the EPA's assessment of the Winu Proposal.

**Table 4-1: Other Relevant Approvals**

| Decision Making Authority     | Legislation or Agreement Regulating the Activity | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment?   |  |
|-------------------------------|--|---|--|--|
|                               |  |   | Relevant Potential Impact  | Can the DMA Mitigate Potential Impacts? How?   |
| Chief Executive Officer, DWER | <i>EP Act 1986 – Part V</i>                      | <p><b>Works Approval and Licence:</b></p> <p>Activities and prescribed premise categories applicable to the Proposal include, but are not limited to:</p> <ul style="list-style-type: none"> <li>5 – Processing of ore (including containment of tailings)</li> <li>6 – Mine dewatering</li> <li>7 – Vat or in situ leaching of metal</li> <li>12 – Screening, etc. of materials</li> <li>52 – Electric power generation</li> <li>54 – Sewage facility</li> <li>57 – Used tyre storage (general)</li> <li>64 – Class II Putrescible landfill</li> <li>73 – Bulk storage of chemicals etc</li> </ul> | <p>Alteration of groundwater levels through:</p> <ul style="list-style-type: none"> <li>• Mine pit dewatering</li> <li>• Water supply, including borefield abstraction</li> </ul> <p>Impacts on ground and/or surface water quality due to mineral waste management and/or stormwater runoff from disturbed areas</p> <p>Habitat degradation associated with construction and operational activities, including an increase in weeds, dust and abundance of introduced species, and altered fire regimes</p> | <p><b>Yes</b></p> <p>Works approvals and licences regulate industrial emissions and discharges to air, land or water and apply to ‘prescribed premises’ categories defined in Schedule 1 of the Environmental Protection Regulations</p> <p>Applications are open for public comment, and the public and licence holder can appeal decisions. DWER will seek comments and advice from people and public authorities deemed to be interested during the assessment</p> <p>Assessments consider the environmental risk, public health and amenity and the controls proposed to mitigate these risks</p> <p>Compliance monitoring and reporting are included in standard conditions of approval</p> |

| Decision Making Authority   | Legislation or Agreement Regulating the Activity  | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment?  |   |
|---|---|---|---|---|
|   |   |   | Relevant Potential Impact   | Can the DMA Mitigate Potential Impacts?<br>How?   |
| Minister for Environment and Chief Executive Officer, Department of Biodiversity, Conservation and Attractions (DBCA) | <i>Biodiversity Conservation Act 2016</i> (BC Act)  | <b>Section 40 Authorisation</b> is required from the Minister to take and/or disturb threatened flora and/or fauna species  | <p>Clearing of native vegetation</p> <p>Loss of fauna habitat as a result of clearing and habitat fragmentation</p> <p>Loss of fauna individuals</p>  | <p><b>Yes</b></p> <p>Unless approval is granted or exemption under the EP Act, authorisation to take threatened species is always required</p> <p>The BC Act provides the ability to impose conditions on authorisations to take threatened species that mitigate or offset the impact of such actions</p> <p>There is no provision for public comment or appeal concerning the issue of an authorisation to take threatened species</p>  |
| Minister of Aboriginal Affairs, Department of Planning, Lands and Heritage (DPLH)                                     | <p><i>Aboriginal Heritage Act 1972</i> (AH Act) (up to 1 July 2023; however, is now intended to be reinstated)</p> <p><i>Aboriginal Cultural Heritage Act 2021</i> (ACH Act) (replaced AH Act 1 July 2023; however, is now subject to repeal)</p> | <p><b>AH Act consents:</b></p> <p><b>Section 16 Authorisation</b> is required to enter, excavate, examine or remove anything on an Aboriginal site</p> <p><b>Section 18 Notices</b> from the Minister is required where the impact on an Aboriginal site is unavoidable</p> <p><b>ACH Act permit:</b></p> <p><b>ACH Management Plan</b> for 'Tier 3' activities, agreed with Aboriginal knowledge holders</p> | <p>Impacts to ground and/or surface water quality due to mineral waste management and/or stormwater runoff from disturbed areas</p> <p>Degradation of Aboriginal social, cultural and heritage values</p> | <p><b>Yes</b></p> <ul style="list-style-type: none"> <li>For direct impacts to heritage sites under the AH Act</li> <li>For direct and indirect impacts to Aboriginal cultural heritage under the ACH Act</li> </ul> <p><b>No under the AH Act for indirect impacts on heritage sites</b></p> <p>AH Act ss 16 and 18 authorisations are predominantly related to authorisations to impact heritage sites and, therefore, are not expected to regulate environmental impacts</p> <p>The AH Act provides automatic protection to Aboriginal heritage places and objects and manages direct impacts on those sites</p> <p>The ACH Act replaced the AH Act on 1 July 2023; however, the State Government has since announced that the ACH Act is to be repealed and the AH Act reinstated. This process remained pending at the time of preparation</p> <p>Under the ACH Act, areas containing Aboriginal cultural heritage (ACH) of outstanding significance</p> |

| Decision Making Authority | Legislation or Agreement Regulating the Activity | Approval Required and Relevant Proposal Element | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment? |  |
|---------------------------|--|---|--|--|
|                           |  |   | Relevant Potential Impact  | Can the DMA Mitigate Potential Impacts?<br>How?  |
|                           |  |   |  | <p>can be declared as 'protected areas' subject to special protection from disturbance activities</p> <p>Subject to a Due Diligence Assessment, activities outside protected areas with potential to harm ACH must be conducted in accordance with an ACH Management Plan (ACHMP) agreed with appropriate Aboriginal knowledge holders (as informed consent), and approved by the ACH Council (set up under the act) or Minister. Direct and indirect impacts, as relevant, are expected to be addressed by ACHMPs</p> <p>Resolution of the process to reinstate the AH Act is required before it is understood to what extent any related amendments to the act, if any, will affect Aboriginal cultural heritage assessment and management. Under the repealed AH Act, management of impacts to Aboriginal heritage sites can be subject to a Cultural Heritage Management Plan (CHMP). Aboriginal heritage surveys are conducted under the AH Act to inform s 18 applications and CHMPs</p> |

| Decision Making Authority | Legislation or Agreement Regulating the Activity | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment? |  |
|---------------------------|--|---|--|--|
|                           |  |   | Relevant Potential Impact  | Can the DMA Mitigate Potential Impacts?<br>How?  |
| Minister for Water, DWER  | RiWI Act   | <p><b>Section 26D licence</b> required to construct dewatering and water supply bores</p> <p><b>Section 5C licence</b> is required for the abstraction of groundwater</p> | Abstraction of groundwater from mining activities.   | <p><b>Yes</b></p> <p>RiWI Act processes regulate the extraction of water associated with mine dewatering, but not disposal</p> <p>The licence application is advertised for public comment when a significant impact on the water resource is expected or the request is to take more than 1 gigalitre per annum (GL/a). No appeal rights exist to the public on licence decisions</p> <p>Assessments of licence applications to take groundwater include consideration of environmental and social impacts, including effects on:</p> <ul style="list-style-type: none"> <li>• Groundwater resource - availability, allocation and quality</li> <li>• Groundwater dependent ecosystems</li> <li>• Other groundwater users</li> </ul> <p>Hydrogeological studies are required to inform the assessment, including the potential impacts of taking water</p> <p>Licence conditions will usually include requirements to undertake and report groundwater volume and quality monitoring to ensure detrimental impacts on the environment, other users and the groundwater resource are no more than predicted</p> <p>Surface water impacts may be considered in the assessment but are not essential</p> |

| Decision Making Authority   | Legislation or Agreement Regulating the Activity                                       | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment?  |  |
|---|--|---|---|--|
|   |  |   | Relevant Potential Impact   | Can the DMA Mitigate Potential Impacts?<br>How?  |
| Minister for Water, DWER  | RiWI Act   | <b>Groundwater Licence</b> required to manage significant volumes of water proposed to be taken from several sources and multiple bores   |   | <p><b>Yes</b></p> <p>The Groundwater Operating Strategy supplements a section 5C licence detailing how the licensee will manage its operations to address broader management issues associated with taking and using water (DWER 2020). The operating strategy must include the following:</p> <ul style="list-style-type: none"> <li>• Details of the water source to be used</li> <li>• Land use, water abstraction regime and methods and infrastructure used to abstract and distribute water</li> <li>• Monitoring and reporting requirements</li> <li>• Methods to manage impacts on the aquifer, the environment and other water users</li> <li>• Contingency plans</li> <li>• Water efficiency measures</li> </ul> |
| Minister for Mines and Petroleum, Department of Mines, Industry Regulation and Safety (DMIRS) | <i>Work Health and Safety Act 2020</i><br>Mines Safety and Inspection Regulations 1995 | <b>A Project Management Plan</b> imposes a general duty of care and provisions to maintain safe and healthy workplaces at mining operations and protect people at work from hazards | Habitat degradation associated with construction and operational activities, including an increase in weeds, dust and abundance of introduced species, and altered fire regimes | <p><b>No</b></p> <p>A Project Management Plan is concerned with occupational health and safety</p>   |

| Decision Making Authority               | Legislation or Agreement Regulating the Activity | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment? |  |
|---|--|---|--|--|
|   |  |   | Relevant Potential Impact  | Can the DMA Mitigate Potential Impacts?<br>How?  |
| Minister for Mines and Petroleum, DMIRS | <i>Mining Act 1978</i>                           | A <b>Mining Proposal</b> (MP) is required for any mining-related disturbance within tenements | Clearing of native vegetation  | <p><b>Yes</b></p> <p>DMIRS has developed its own environmental objectives, which approximate EPA factor objectives for Inland Water, Flora and Vegetation, Terrestrial Fauna and Terrestrial Environmental Quality</p> <p>Mining Proposals address all Proposal elements and activities and consider the likely environmental impacts within an 'Environmental Group Site' (a grouping of mining tenements that make up a mining operation). DMIRS aims to assess factors not regulated elsewhere (e.g. key environmental factors assessed under Part IV of the EP Act). Environmental factors assessed include:</p> <ul style="list-style-type: none"> <li>• Land and soils (including subsurface materials) – geochemical and physical characteristics</li> <li>• Biodiversity (e.g. flora, vegetation, terrestrial fauna)</li> <li>• Water resources (surface water and groundwater)</li> <li>• Rehabilitation and mine closure – a mining proposal must contain a mine closure plan</li> </ul> <p>Stakeholder engagement will occur during preparation, but there is no provision for public comment or appeal on a Mining Proposal. Approved Mining Proposals will typically be made available to the public on the DMIRS website</p> <p>Approval of a Mining Proposal will usually include environmental monitoring and reporting requirements</p> |

| Decision Making Authority               | Legislation or Agreement Regulating the Activity                | Approval Required and Relevant Proposal Element  | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment?  |  |
|---|---|--|---|--|
|   |   |  | Relevant Potential Impact   | Can the DMA Mitigate Potential Impacts?<br>How?  |
| Minister for Mines and Petroleum, DMIRS | Mining Act - Statutory Guidelines for Mine Closure Plans (2020) | <b>Mine Closure Plan (MCP)</b> (for areas administered under the Mining Act tenure) is required to address mine closure and rehabilitation | <p>Impacts to ground and/or surface water quality due to mineral waste management and/or stormwater runoff from disturbed areas</p> <p>Habitat degradation associated with construction and operational activities, including increased weeds, dust and abundance of introduced species, and altered fire regimes</p> <p>Unauthorised access post-closure</p> | <p><b>Yes</b></p> <p>Environmental objectives defined by DMIRS approximate EPA objectives</p> <p>A preliminary MCP will be developed per the Mine Closure Plan Guidance; How to prepare per Part I of the Statutory Guidelines for Mine Closure Plans (DMIRS, 2020)</p> <p>MCPs address all requirements applicable to mine rehabilitation and closure, including:</p> <ul style="list-style-type: none"> <li>• Baseline and closure data that inform successful rehabilitation, environmental closure risks, monitoring and performance and closure objectives</li> <li>• Post-mining land use</li> <li>• Closure risk, outcomes and completion criteria</li> <li>• Implementation, including abandonment bunding and other measures to minimise potential unauthorised access</li> <li>• Monitoring and maintenance</li> </ul> <p>There is no provision for public comment or appeal on an MCP (although stakeholder engagement will be undertaken to support the development of the MCP and ongoing revision). MCPs are reviewed every three years to ensure continual improvement and coverage of knowledge gaps identified in previous iterations</p> |



| Decision Making Authority               | Legislation or Agreement Regulating the Activity   | Approval Required and Relevant Proposal Element   | Whether and How Statutory Decision-Making Processes Can Mitigate Potential Impacts on the Environment?   |  |
|---|--|---|--|--|
|   |  |   | Relevant Potential Impact  | Can the DMA Mitigate Potential Impacts?<br>How?  |
| Minister for Mines and Petroleum, DMIRS | Mining Act   | <b>Programme of Work (PoW) Application</b> is required to undertake ground-disturbing activities with mechanised equipment in a mining tenement (i.e. exploration activities) | Habitat degradation associated with construction and operational activities, including an increase in weeds, dust and abundance of introduced species, and altered fire regimes  | <b>Yes</b><br>PoW includes requirements to rehabilitate disturbed areas  |
| Chief Dangerous Goods Officer, DMIRS    | <i>Dangerous Goods Safety Act 2004</i>   | <b>Dangerous Goods Licence</b> is required for the storage and handling of hazardous materials during construction  | Contamination of soils and groundwater (hydrocarbon spills)<br><br>Fire (combustion of stored hydrocarbons)  | <b>Yes</b><br>Dangerous goods licence applications require risk assessments demonstrating the dangerous goods site can be operated with minimal risk to people, property and the environment<br><br>DMIRS will notify DWER of all new licence applications or amendments to existing licences, resulting in additional environmental assessment and approval (i.e. under the EP Act) |
| Local Government                        | <i>Building Act 2011</i><br><i>Planning and Development Act 2005</i><br><i>Local Government Act 1995</i><br><i>Health Act 1911</i> | <b>Building and Health approvals</b> are required   | Habitat degradation associated with construction and operational activities, including an increase in dust, and altered fire regimes<br><br>Disturbance from light, noise and/or vibration associated with construction and operation activities | <b>No</b>  |

## 5. STAKEHOLDER ENGAGEMENT

Ongoing consultation has been an important part of Proposal planning.

Key stakeholders identified and consulted with for the Proposal include DMAs, other relevant State government agencies and local government authorities, local communities and environmental non-government organisations. The consultation will continue to occur throughout the development of the Proposal as part of the environmental impact assessment (EIA) process.

The consultation process has involved and will continue to involve:

- Identification of stakeholders associated with the Proposal
- Development of a plan of communications and engagement with stakeholders
- Incorporation of stakeholder feedback into project planning.

In undertaking consultation, the Proponent has incorporated stakeholder feedback into its planning to ensure the Proposal can be implemented in a manner that does not compromise significant environmental and social values or the interests of key stakeholders.

One of the Proponent's strategic pillars is to 'create value with our partners' with the objective to 'connect, partner and restore trust with the community'. Since the exploration phase of the Proposal in 2019, the Proponent has developed and implemented annual Consultation and Engagement Plans. These Plans define the engagement approach, principles, and objectives to inform stakeholders of the project and establish positive relationships and partnerships.

The Proponent is committed to establishing a genuine partnership with Nyangumarta and Martu, the Traditional Owners on whose land the Proposal is situated and to achieve free prior informed consent (FPIC) for the Proposal. As the Proponent will be the first mining operation on Nyangumarta Country, there has been a strong focus on building the capacity of Nyangumarta to ensure a transparent co-design process is implemented throughout the lifecycle of the Proposal, working together to minimise the impact on Country and increase mutual benefit. The Proponent has been engaging with Nyangumarta Warrarn Aboriginal Corporation RNTBC (NWAC) and Yamatji Marlpa Aboriginal Corporation (YMAC) since 2019 through a range of engagement methods, including monthly Technical Meetings and Board of Director and Nyangumarta Elders Meetings, as well as providing financial support, training, and the cost of resourcing subject matter experts to ensure the Nyangumarta people are fully informed.

The Proponent has facilitated many visits on Country for Nyangumarta people and most recently a visit to the Proponent's Oyu Tolgoi copper-gold mine in Mongolia to understand the impacts of an operating copper mine. This aligns with the Proponent's commitment to complete openness and transparency around the potential impacts of the developing the Proposal on their lands. During this visit, there was recognition by Nyangumarta Elders and NWAC Board members of previous information provided by the Proponent through consultations over the past two years, with the visit helping to solidify these discussions. The Nyangumarta Winu Project Planning Agreement was endorsed at the Nyangumarta Common Law Holders Meeting in July 2023 and then signed by the parties in September 2023, a significant milestone for the relationship between NWAC, the Nyangumarta people and the Proponent.

Similarly, with Martu, the Proponent has been working with Jamukurnu Yapalikurnu Aboriginal Corporation (JYAC) since 2019 to uncover the potential impacts and opportunities the Proposal will create. With a regional focus on Martu ngurra (Country), eventual ownership transfer of the airstrip and exploring water stewardship the engagement with Martu has been consistent. The Karlkayn Stage 1 Agreement was endorsed at the Martu Common Law Holders meeting in September 2023, another significant milestone in the Proposal journey.

The Proponent has also recognised the cumulative impacts of the Proposal and working with Nyangumarta and Martu to understand further and co-design strategies and management plans to

minimise impact for mutual and positive gain. The progression of this work, as well the recent signing of both Planning Agreements highlights the positive relationship with Nyangumarta and Martu and emphasises the Proponent's commitment to maintaining mutual respect and trust.

## 6. ENVIRONMENTAL PRINCIPLES

The principles of environmentally sustainable development are incorporated into s 4A of the EP Act. These principles have been considered for the Proposal as summarised in Table 6-1.

**Table 6-1: Environmental Principles of the EP Act**

| Principle   | Consideration Given in the Proposal  |
|---|--|
| <p>1. Precautionary principle</p> <p>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation</p> <p>In the application of the precautionary principle, decisions should be guided by:</p> <p>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment</p> <p>(b) an assessment of the risk-weighted consequences of various options</p> | <p>Comprehensive biological surveys have been undertaken, others are underway, and further studies are planned. The results of the biological surveys are being used to guide the design phase of the Proposal. Where significant potential environmental impacts are identified, measures have been and will continue to be, incorporated into the Proposal design and management to avoid or minimise these impacts where practical</p>  |
| <p>2. Intergenerational equity</p> <p>The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations</p>   | <p>The Proposal will make a long-term contribution to the economic prosperity of Western Australia</p> <p>The Proposal will not compromise the area's current or foreseeable future land use options. Consultation with Nyangumarta and Martu people, including co-design of relevant planning and collaboration on relevant management, will remain ongoing through all Proposal phases to ensure adverse effects on Country and cultural heritage are minimised, employment opportunities are provided and future generations can continue the enjoyment of Country and maintain their cultural heritage</p> <p>The Proposal can be effectively managed through avoidance, management and mitigation measures to ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations</p> |

| Principle   | Consideration Given in the Proposal   |
|---|---|
| <p>3. Conservation of biological diversity and ecological integrity</p> <p>Conservation of biological diversity and ecological integrity should be a fundamental consideration</p>  | <p>Comprehensive biological surveys have been undertaken, others are underway and further studies are planned to identify environmental aspects of conservation significance. Where significant potential environmental impacts are identified measures have been, and will continue to be, incorporated into the Proposal design and management to avoid or minimise these impacts where practical</p> <p>The Proponent's HSECQ Management System has established rehabilitation procedures for restoring disturbed environments</p> |
| <p>4. Improved valuation, pricing and incentive mechanisms</p> <p>(a) Environmental factors should be included in the valuation of assets and services</p> <p>(b) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement</p> <p>(c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes</p> <p>(d) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentives structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems</p> | <p>The Proposal will be subject to an MCP prepared in accordance with the Statutory <i>Guidelines for Mine Closure Plans</i> (DMIRS 2023a) and the Rio Tinto Closure Standard. This will provide the basis for ensuring that post- mining land use objectives are identified (through a consultative process) and can be met. The Proponent will undertake land rehabilitation activities to underpin the mine closure process</p>  |
| <p>5. Waste minimisation</p> <p>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment</p>  | <p>Application of the Proponent's management policies, systems and procedures, combined with the MCP, will provide the basis for minimising waste generation and its discharge into the environment. Mine planning objectives to minimise stripping ratios, thereby reducing mineral waste materials volumes, will assist in meeting the aims of this principle</p>   |

## 7. SOCIAL SURROUNDINGS

### 7.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023a) lists the following as its objective for Social Surroundings:

**To protect social surroundings from significant harm**

Section 3(2) of the EP Act states: “In the case of humans, the reference to social surroundings in the definition of environment in subsection (1) is a reference to aesthetic, cultural, economic and other social surroundings to the extent to which they directly affect or are affected by physical or biological surroundings.”

### 7.2. Relevant Policy and Guidance

Social Surroundings policy and guidance considered relevant for this Proposal include:

- Statement of Environmental Principles, Factors, Objectives and Aims for EIA (EPA 2023a)
- Environmental Factor Guideline: Social Surroundings (EPA 2023b)
- Interim Technical Guidance – Environmental impact assessment of Social Surroundings – Aboriginal cultural heritage (EPA 2023c)
- Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2021h)
- Statutory Guidelines for Mine Closure Plans (MCP) (DMIRS 2023a)
- Mine Closure Plan Guidance – How to Prepare in Accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans (DMIRS 2023b)
- Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act (DCCEEW 2023)
- ESG: Change for the Better (MCA 2021)
- Integrated Mine Closure Good Practice Guide (ICMM 2019)
- Communities and Social Performance Standard (Rio Tinto 2022a)
- Communities and Social Performance Commitments Disclosure Interim Report (Rio Tinto 2021a)
- The Burra Charter the Australia International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance (ICOMOS 2013).

## 7.3. Receiving Environment

### 7.3.1. Consultation and Studies

The Proponent has commenced dedicated consultation with key stakeholders focusing on the Social Surroundings environmental factor to inform the assessment. Key stakeholders who have been or are to be consulted with are outlined in Table 7-1.

**Table 7-1: Key Stakeholders for Social Surroundings Consultation**

| Traditional Owner Group | Registered Native Title Bodies Corporate | Pastoral Station | Community                                      | Other Relevant Parties |
|-------------------------|--|------------------|--|------------------------|
| Nyangumarta             | NWAC                                     | Wallal Downs     | Community, including the Shire of East Pilbara | N/A                    |
| Martu                   | JYAC                                     | Mandora          |  |                        |

Table 7-2 summarises the heritage (archaeological and ethnographic) surveys undertaken within the Development Envelope to date. Further detail on heritage surveys and all other surveys, studies or assessments undertaken to inform the Social Surroundings assessment will be provided within the ERD.

Supplementary heritage surveys are planned for Rimfire, Texas and Wallal along with other studies as necessary and as required because of Social Surroundings consultation (also refer to Section 7.3.4.2) to establish a complete image of potential impacts on Social Surroundings within the Development Envelope.

**Table 7-2: Summary of Archaeological and Ethnographic Heritage Surveys within the Development Envelope**

| Cultural Heritage Surveys | Survey Type  | Year | Level of Assessment | Surveys Completed  |
|---------------------------|--|------|---------------------|--|
| Nyangumarta               | Archaeological<br>(Gavin Jackson Cultural Resource Management) | 2017 | Site Avoidance      | Report of an Aboriginal Archaeological and Ethnographic work Program Clearance Survey of the Paterson West Project (E45/4833) on the Nyangumarta people Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |  | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Work Program Clearance Survey of the Proposed Winu Drilling Program (E45/4588 and E45/4212) on the Nyangumarta Native Determination Area, Great Sandy Desert, Pilbara, Western Australia   |
|                           |  | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Work Program Clearance Survey of the Proposed Winu Drilling Program (E45/4833, E45/5118, E45/5120, E45/5121, E45/5124 and E45/5200) on the Nyangumarta People Native Determination Area, Great Sandy Desert, Pilbara Western Australia   |
|                           |  | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Work Program Clearance Survey of the Proposed Winu Camp & Drilling Project (E45/4833, E45/5118 & E45/5214) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia   |
|                           |  | 2019 |                     | Report of an Aboriginal Archaeological Work Program Clearance Survey of the proposed Winu and Paterson Drilling Program and Ancillary Areas (RTX tenements E45/4833, E45/5119, E45/5120, E45/04833, E45/05118 and L45/00491, Northern Reserves Pty Ltd tenement E45/05045, and Newcrest Mining Limited tenement L45/00110) on the Nyangumarta People Native Title Determination Area and an Unclaimed Area, Great Sandy Desert, Pilbara, Western Australia |
|                           |  | 2019 |                     | Report of an Aboriginal Archaeological Work Program Clearance Survey of the Proposed Winu and Paterson Drilling Program and Ancillary Areas (E45/4833, E45/5118, E45/5120, E45/5124, E45/5200 and L45/491) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia   |
|                           |  | 2019 |                     | Report of an Aboriginal Archaeological Survey of the Proposed Winu and Paterson Drilling and Road Upgrade programme and Ancillary Areas (E45/4833, E45/5118, E45/5124, E45/5200, E45/4832, E45/5167, E45/5168, E45/4212, E45/2876, L45/521, L45/491 and L45/493) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia   |



| Cultural Heritage Surveys | Survey Type | Year | Level of Assessment | Surveys Completed   |
|---------------------------|-------------|------|---------------------|---|
|                           |             | 2019 |                     | Report of an Archaeological Work Program Clearance Survey of the Proposed Winu Dune Drilling Program (E45/4833) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia   |
|                           |             | 2020 |                     | Report of an Aboriginal Archaeological Report Site Avoidance Survey of proposed works within the Tailings Storage Facility, Reinjection Bores, Process Plant, Waste Rock Landform, North of Winu Pit, South of Winu Pit, Mine Area Borrow Pits, Mine Access Road, Camp, Comms Tower and Access, Explosives facility, Topsoil stockpiles, Camp and mine access road alternative, Reinjection access road, Mine Access Road Alternative, Future TSF Locations Work Area at RTX Winu Project Area (E45/4833, E45/5118, E45/560, and L45/552) within the Nyangumarta People Native Determination Area, Great Sandy Desert, Pilbara, Western Australia |
|                           |             | 2020 |                     | Report of an Aboriginal archaeological Site Avoidance Survey of proposed works within the Process Plant, Tailings Storage Facilities, Waste Rock Landform, Cam (incl. Access Road and Comms Tower), Borrow Pits, North of Winu Pit, South of Winu Pit, Reinjection Bores (Incl. Tracks), Explosives Facility (Incl. Access Road) and Future TSF Locations Work Areas (E45/4833, E45/5118, L45/560 and L45/552) within the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |             | 2020 |                     | Report of an Aboriginal Archaeological Site Avoidance Survey of proposed additional road areas, access and borrow pits within the Winu Work Area (E45/5200, E45/5124, L45/0491, L45/0493, L45/548, L45/549, L45/0550, L45/0551 and L45/0552) within the Nyangumarta People native title Determination Area, Great Sandy Desert, Pilbara, Western Australia. Trip 1  |
|                           |             | 2020 |                     | Report of an Aboriginal Archaeological Site Avoidance Survey of proposed additional road areas, access and borrow pits within the Winu Work Area (E45/5200, E45/5124, L45/0491, L45/0493, L45/548, L45/549, L45/0550, L45/0551 and L45/0552) within the Nyangumarta People native title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |             | 2020 |                     | Report of an Aboriginal archaeological Work Program Clearance Survey of proposed drilling activities, access tracks and camp/laydown locations within the Paterson North, Iron Hill and Winu Orbit Work Areas (E45/5121, E45/5241, E45/5349, E45/5454, E45/5119, E45/5120, E45/4832, E45/5118, E45/5124, E45/5200, E45/4833 and L45/0491), within the Nyangumarta People native title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |

| Cultural Heritage Surveys | Survey Type  | Year | Level of Assessment | Surveys Completed   |
|---------------------------|--|------|---------------------|---|
|                           |  | 2021 |                     | Report of an Aboriginal archaeological Site Avoidance survey of proposed works within the process plant, TSF, WRD, camp (incl access road and comms tower), bps, north of Winu pit, south of Winu pit, reinjection bores(incl tracks), explosives facility (incl access road) and future TSF location work areas (E45/4833, E45/5118, L45/560 and L45/552) at Rio Tinto Explorations Winu Project are, within the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, WA |
|                           |  | 2021 |                     | Report of an Aboriginal archaeological Work Program Clearance Survey of proposed access tracks, drilling activities, camps and laydowns at Rio Tinto Exploration's Paterson West and Paterson North Project Areas (E45/4832, E45/4833, E45/5118, E45/5119, E45/5120, E45/5121, E45/5124, E45/5168, E45/5200, E45/5241, E45/5349, L45/0563 and E45/5045), within the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia                                |
|                           |  | 2022 |                     | Report of an Aboriginal archaeological Site Avoidance Survey of areas for proposed drilling activities and tracks (E45/4833, M45/1288, L45/0563 and L45/0552) at Rio Tinto Exploration's Winu Project Area, within the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia   |
|                           |  | 2022 |                     | Report of an Aboriginal Archaeological Site Avoidance survey of areas associated with mine related infrastructure planning in the Rio Tinto Exploration's Winu Project Area (E45/4833, E45/5118, E45/5125, L45/0560, L45/0552 and M45/1288), within the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           | Ethnographic (Yamatji Marlpa Aboriginal Corporation) | 2022 | Site Avoidance      | Final Report regarding an archaeological heritage survey for Rio Tinto Exploration's Winu Project areas undertaken by Nyangumarta participants and Yamatji Marlpa Aboriginal Corporation  |
|                           | Ethnographic (Nyaparuu Consulting)                   | 2017 | Site Avoidance      | Report of an Aboriginal Archaeological and Ethnographic work Program clearance of the Paterson West Project (E45/4833) on the Nyangumarta People Native Title Determination, the Great Sandy Desert, Pilbara Western Australia  |
|                           | Ethnographic (Nyaparuu Consulting)                   | 2018 | Site Avoidance      | Report of an Aboriginal Archaeological and Ethnographic work program clearance survey of the proposed Winu Drilling Program (E45/4833 and E45/4212) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara Western Australia  |

| Cultural Heritage Surveys | Survey Type  | Year | Level of Assessment | Surveys Completed  |
|---------------------------|--|------|---------------------|--|
|                           |  | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Work Program clearance survey of the proposed Winu Drilling program (E45/4833, E45/5118, E45/5120, E45/5121, E45/5124 and E45/5200) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara Western Australia                                       |
|                           | Ethnographic (Stevens Heritage Services)             | 2018 | Site Avoidance      | Report of an Aboriginal and Ethnographic work Program work Program clearance survey of the proposed Winu camp and Drilling Project (E45/4833, E45/5118, & E45/5214) on the Nyangumarta People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |  | 2019 |                     | Report of an Ethnographic Site Avoidance Heritage Survey at Winu Project Orbit and Paterson Regional Target, Located in the East Pilbara Region of Western Australia   |
|                           | Ethnographic (Yamatji Marlpa Aboriginal Corporation) | 2019 | Site Avoidance      | Final report regarding the ethnographic work program clearance survey of Rio Tinto Exploration's Paterson West (Scope RTX 2019_06 and RTX 2019_08) and Winu (Scope RTX 2019_03, RTX 2019_05, and RTX 2019_09) project areas undertaken by Nyangumarta Warrarn Native Title Group representatives and Yamatji Marlpa Aboriginal Corporation |
|                           | Ethnographic (Stevens Heritage Services)             | 2019 | Site Avoidance      | Report Regarding the Winu and Paterson Ethnographic Site Avoidance Heritage Survey in the East Pilbara Region of Western Australia   |
|                           |  | 2019 |                     | Report of an Ethnographic Site Avoidance Heritage Survey at Winu Project Orbit and Paterson Regional Target, Located in the East Pilbara Region of Western Australia   |
|                           |  | 2020 |                     | Report of a Nyangumarta Ethnographic Work Program Clearance and Work Area Clearance Heritage Survey in Relation to Rio Tinto Explorations RTX_2020_01 Winu Project Drilling Program in the East Pilbara Region of Western Australia  |
|                           |  | 2020 |                     | Report of a Nyangumarta Ethnographic Site Avoidance Heritage Survey in Relation to Rio Tinto Exploration's RTX_2020_02_Part A Winu Project Access Road, in the East Pilbara Region of Western Australia  |
|                           |  | 2020 |                     | Report of a Nyangumarta Ethnographic Work Program Clearance Heritage Survey in Relation to Rio Tinto Exploration's RTX_2020_04 Drilling Programs in the Paterson Region; including Winu Orbit and Iron Hill, in the East Pilbara Region of Western Australia   |

| Cultural Heritage Surveys | Survey Type   | Year | Level of Assessment | Surveys Completed  |
|---------------------------|---|------|---------------------|--|
|                           |   | 2021 |                     | Report of a Nyangumarta Ethnographic Site Avoidance Heritage Survey in Relation to Rio Tinto Exploration's Winu Project in the East Pilbara Region of Western Australia. RTX 2020_02 (Part B Ethno) April 2021   |
|                           |   | 2021 |                     | Report of a Nyangumarta Ethnographic Site Avoidance Heritage Survey in relation to Rio Tinto's Winu Project in the East Pilbara Region of WA. RTX_2020_02_V5 Ethno, September 2021   |
|                           |   | 2021 |                     | Report of a Nyangumarta Ethnographic Work Program Clearance Heritage Survey for the RTX_2021_06 scope at Rio Tinto Exploration's Paterson and Winu Project Areas in the East Pilbara of Western Australia  |
|                           | Ethnographic (Yamatji Marlpa Aboriginal Corporation)        | 2022 | Site Avoidance      | Report for a Nyangumarta Ethnographic Site Avoidance Survey within Rio Tinto's Winu Project Area, Great Sandy Desert, Western Australia  |
|                           |   | 2022 |                     | Site Avoidance Ethnographic Survey Final Report for NWAC, YMAC and Rio Tinto Exploration on Nyangumarta Country  |
| Martu                     | Archaeological (Gavin Jackson Cultural Resource Management) | 2018 | Site Avoidance      | Report of an Aboriginal Archaeological and Ethnographic Work Program Clearance Survey of the Proposed Winu Drilling Project & Airstrip (E45/4833 & E45/2876) on the Martu and Ngurrara People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |   | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Clearance Survey of the Proposed Winu Drilling Program (E45/4833 & E45/2876) on the Martu and Ngurrara People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |
|                           |   | 2021 |                     | Report of an Aboriginal archaeological Site Avoidance Survey of proposed works within the Mine access road, Aerodrome Area borrow pits and Aerodrome Work Areas ( E45/2876, E45/4833, L45/0476, L45/0494 and L45/0559), in the Winu Project Area within the Martu People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia |
|                           |   | 2022 |                     | Report of an Aboriginal archaeological Work Program Clearance Survey of proposed works within the Paterson Regional Project Area (E45/2876) within the Martu People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia  |

| Cultural Heritage Surveys | Survey Type                                | Year | Level of Assessment | Surveys Completed   |
|---------------------------|--|------|---------------------|---|
|                           |  | 2022 |                     | Report of an Aboriginal archaeological Work Program Clearance Survey of proposed works within the Paterson Regional Project Area (E45/4833) within the Martu People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia                           |
|                           | Ethnographic<br>(Stevens Heritage Service) | 2018 | Site Avoidance      | Report of an Aboriginal Archaeological and Ethnographic Work Program Clearance Survey of the Proposed Winu Drilling Project & Airstrip (E45/4833 & E45/2876) on the Martu and Ngurrara People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia |
|                           |  | 2018 |                     | Report of an Aboriginal Archaeological and Ethnographic Clearance Survey of the Proposed Winu Drilling Program (E45/4833 & E45/2876) on the Martu and Ngurrara People Native Title Determination Area, Great Sandy Desert, Pilbara, Western Australia                         |
|                           |  | 2019 |                     | Report of Pitjjarli- Nyangumarta Ethnographic Site Avoidance Survey at Winu and Paterson in the East Pilbara Region of Western Australia, May 2019  |
|                           | Ethnographic<br>(Stevens Heritage Service) | 2019 | Ethnobotanical      | Report of a Preliminary Pitjjarli Nyangumarta Ethnobotanical Investigation  |
|                           | Ethnographic<br>(Nyaparu Consulting)       | 2021 | Site Avoidance      | Report of an Ethnographic Work Program Clearance Survey within E45/2876, E45/4833, L45/476, L45/494 and L45/559 Martu and Ngurrara Native Title Determination, WA   |
|                           |  | 2022 |                     | Report of an Ethnographic Work Program Clearance Survey within E45/2876, Martu and Ngurrara Native Title Determination, Western Australia   |
|                           |  | 2022 |                     | Report of an Ethnographic Work Program Clearance Survey within E45/4833, Martu and Ngurrara Native Title Determination, Western Australia   |

### 7.3.2. Overview

The Development Envelope is within the Nyangumarta and Martu Native Title Determination areas and the Shire of the East Pilbara, which is the largest shire in Australia, covering an area of 372,571 km<sup>2</sup> and a sparsely populated region of approximately 11,000 residents (ABS 2021). This population is concentrated in the Shire's main towns – Newman, Marble Bar and Nullagine, and several smaller Aboriginal communities, including Jigalong, Punmu, Pargurr, Irrungadji (at Nullagine) and Parnpajinya (at Newman).

Marble Bar and Nullagine are the nearest townsites to the MIA, Texas and Rimfire, approximately 190 km southwest and 210 km south-southwest, respectively. The nearest Aboriginal communities in the Shire are Punmu, approximately 200 km southeast and Irrungadji at Nullagine. The RAC intersection with the Great Northern Highway is 1 km north of the Eighty Mile Beach Caravan Park turnoff, approximately 40 km west-southwest of the Sandfire Roadhouse and approximately 90 km east-northeast of the Pardoo Roadhouse. The RAC is approximately 160 km from Marble Bar at its nearest point. Wallal is adjacent to the RAC on the Nyangumarta Highway section, approximately 50 km south-southeast of Sandfire Roadhouse.

### 7.3.3. Nyangumarta and Martu Land Use

The Nyangumarta people and the Martu people have a long history of land use of the areas on which the Proposal sits over time scales that predate European colonisation by many thousands of years, as evidenced by the Nyangumarta and Martu Native Title determinations (Section 2.3) and related rights and interests (Section 7.3.4).

### 7.3.4. Nyangumarta and Martu Native Title Rights and interests

The Nyangumarta and Martu Native Title Rights and Interests are presented below.

#### 7.3.4.1. Nyangumarta Native Title Rights and Interests (WCD2009/001-WAD6281/1998)\*

These rights and interests are within areas relevant to the Development Envelope.

1. Except in relation to flowing and underground waters, an entitlement as against the whole world to possession, occupation, use and enjoyment of the land and waters of that part to the exclusion of all others.  
In relation to flowing and underground waters, the right to use and enjoy the flowing and underground waters, including the right:
  - To hunt on and gather and fish from the flowing and underground waters for personal, domestic or non-commercial communal needs
  - To take and use the flowing and underground waters for personal, domestic or non-commercial communal needs.
2. The right to access and move freely through and within each part of the Determination Area referred to in Schedule 4 (of the determination).
3. The right to live, being to enter and remain on the land, to camp and erect shelters and other structures for that purpose.
4. The right:
  - To hunt and fish for personal, domestic and non-commercial communal needs
  - To take flora and fauna
  - To take other natural resources of each part of the Determination Area referred to in Schedule 4 (of the determination) including soil, sand, clay, gravel, ochre, timber and stone for personal, domestic and non-commercial communal needs

- To share and exchange natural resources of each part of the Determination Area referred to in Schedule 4 (of the determination) including soil, sand, clay, gravel, ochre, timber and stone for personal, domestic and non-commercial communal needs
- To engage in cultural activities in the area, including the transmission of cultural heritage knowledge
- To conduct ceremonies
- To conduct burials and burial rites
- To hold meetings
- To visit, maintain and protect from physical harm places and sites of importance in each part of the Determination Area referred to in Schedule 4
- To access and take water for personal, domestic or non-commercial communal purposes, and for the sake of clarity and the avoidance of doubt, this right does not include the right to take or use water lawfully captured or controlled by the holders of pastoral leases numbered 3114/485 (Mandora), 3114/1079 (Wallal Downs) and 3114/1154 (Anna Plains).

#### **7.3.4.2. Martu (WCD2002/002- WAD6110/1998)**

1. The right to possess, occupy, use and enjoy the area to the exclusion of all others, including the right:
  - To live on the area
  - To make decisions about the use and enjoyment of the area
  - To hunt and gather and to take the waters for the purpose of satisfying their personal, domestic, social, cultural, religious, spiritual, ceremonial, and communal needs
  - To control access to, and activities conducted by others on, the land and waters of the area
  - To maintain and protect sites and areas which are of significance to the common law holders under their traditional laws and customs
  - As against any other Aboriginal group or individual to be acknowledged as the traditional Aboriginal owners of the determination area
2. The right to use the following traditionally accessed resources: ochre, soils, rocks and stones and flora and fauna; for the purpose of satisfying their personal, domestic, social, cultural, religious, spiritual, ceremonial and communal needs
3. The right to take, use and enjoy the flowing and subterranean waters in accordance with their traditional laws and customs for personal, domestic, social, cultural, religious, spiritual, ceremonial and communal needs, including the right to hunt on and gather and fish from the flowing and subterranean waters.

#### **7.3.5. Nyangumarta and Martu Social Surroundings Values**

Upcoming planned fieldwork and on country consultation are intended to confirm the Social Surroundings themes, values, issues of concern for, and recommendations of the Nyangumarta people and Martu people with respect to the Proposal. This work will aim to characterise Nyangumarta and Martu aesthetic, cultural, economic and other Social Surroundings values that have the potential to be affected by impacts to physical or biological surroundings caused by the Proposal to inform the EIA. Although further consultation is expected to improve the Proponent's appreciation of Nyangumarta and Martu Social Surroundings values, it is understood that Nyangumarta people's and Martu people's relationship and connection with Country is of paramount importance to them. A holistic view of the environment underpins this, that is, including all aspects of society, culture and heritage – such as people, sense of place, cultural landscapes, stories, beliefs, cultural activities, special places, plants and animals, water, landforms and more – are all interconnected and inseparable.

For the purpose of EIA and subject to further consultation, Nyangumarta and Martu Social Surroundings values may be understood in the context of two broad and overarching themes:

- **Amenity:** Relating to the use, enjoyment of and desire to be on Country.
- **Cultural heritage:** Relating to cultural practices, traditional Law, customary lore, sites, places, songs, stories and beliefs.

Acknowledging each group (and individuals' members of each group) will have a range of views to be explored and defined further in the aforementioned consultation, the Proponent's preliminary understanding of amenity and cultural heritage values and issues as raised by Nyangumarta people and Martu people in consultation to date include, for example:

- **Care for Country:** The Proponent understands that one of the foundations of Nyangumarta and Martu culture is the important concept of Country and 'caring for Country', involving a cultural responsibility to 'healthy Country' that recognises the holistic interconnection between the broad dimensions of land, water and sky and includes plants and animals, people and spirits as well as special places, songlines, Law/lore and other associated cultural elements.
  - While there are parts that have been subject to relatively low-level disturbance (e.g. tracks, mineral exploration), much of the Development Envelope is recognised by Nyangumarta and Martu as in pristine or near-pristine condition, with, for example, negligible weed presence on top of the overall lack of built development or pastoral and other significant activity in the region. It is noted that the Proposal will be the first major mining development for Nyangumarta Country and People.
  - As such, avoiding and minimising disturbance, including minimising footprint and any potential to introduce weeds and encourage feral fauna, achieving appropriate rehabilitation and closure outcomes and supporting Nyangumarta and Martu to care for Country are recognised by the Proponent as important aspects of the Proposal. In this regard, the Proponent also acknowledges the importance of consulting with and involving Nyangumarta and Martu through mine design, rehabilitation and closure planning and implementation.
- **Plants and animals:** The Development Envelope is expected to include plants and animal species that are not only of 'conservation significance' (i.e. generally the focus of the key environmental factors Flora and Vegetation [Section 9] and Terrestrial Fauna [Section 10]), but that hold social and cultural significance with respect to food, medicine, stories, ceremonial uses, for clothing, for shelters and toolmaking. As cultural custodians of their lands Nyangumarta and Martu are concerned with not only plants and animals that have specific cultural associations, but their Care for Country ethos means that they are culturally responsible for maintaining healthy Country, meaning they are obliged to care for all plants and animals that occur on Country.
- **Water:** The Proponent understands water is important, culturally significant and central to Nyangumarta and Martu culture and heritage. Surface water and groundwater attributes of the Development Envelope and surrounding areas are described in Inland Waters (Section 8). The region experiences little to no surface water runoff, surface water features tend to be ephemeral and sparse, and no major watercourses are in the Development Envelope. Initial Nyangumarta and Martu concerns regarding water include potential impacts on:
  - Special Places associated with, or reliant on, surface and/or groundwater, such as soaks and waterholes. Important places within or near the Development Envelope on Nyangumarta Country.
  - Groundwater aquifers. This includes aquifer depletion. Martu has expressed concerns about the natural flow gradient of groundwater from their Country to Nyangumarta Country and the effect of any change the Proposal may have to this flow interfering with their cultural and spiritual obligations and beliefs associated with water. Nyangumarta have expressed concern with the risk to groundwater quality associated with the permanency of some infrastructure, such as the TSF.



- Water use. Given their sacred nature, Nyangumarta and Martu are concerned with minimising water abstraction and use for mining operations.
- Excess water disposal.
- **Access, use and enjoyment of Country:** Maintaining safe access to Country to allow for its use and enjoyment and maintenance of amenities in ways that contribute to Nyangumarta's and Martu's quality of life and expression of their cultural heritage. This recognises the holistic sense of place Nyangumarta and Martu are likely to attach to Country, the importance of the ability to exercise their Native Title rights and interests and undertake cultural activities (e.g. camp and hunt, perform rituals and take bush resources).
- **Special Places:** Special places may include places, sites or sand dunes that have cultural heritage values for Aboriginal people (and which are recognised under State Aboriginal heritage legislation), such as waterholes and soaks, as well as other places, places of special amenity or that give important sense of place, or otherwise are important for the exercising of native title rights and cultural activities, that may require extra levels of protection or management relative to other areas of Country. Special Places that are not known heritage sites will be discussed with Nyangumarta and Martu (acknowledging that cultural Law/lore may restrict the level of detail the groups are able or willing to share) during upcoming social surroundings consultation. No DPLH registered or other heritage sites exist within or near the Development Envelope. Through cultural heritage surveys undertaken to date, the Proponent and Nyangumarta have identified several sites that will be managed through further consultation and Management Plans.

### 7.3.6. Other Land Use and Social Surroundings Values

The Development Envelope is remote from population centres and predominantly surrounded by unallocated crown land (UCL). Most of the Proposal, including all active mining areas, occurs within the Nyangumarta Indigenous Protected Area which is actively managed by the Nyangumarta Rangers through the implementation of the Nyangumarta Warrarn IPA Management Plan 2022-2032.

#### 7.3.6.1. Pastoral Stations

There are no pastoral stations within 100 km of the MIA, with the closest being Warrawagine Station, which sits approximately 100 km west. Approximately 16 km of the RAC is located on the Wallal Downs Station pastoral lease, with the intersection at the Great Northern Highway approximately 8 km south of the station homestead. The Mandora Station homestead is approximately 20 km east-northeast of the intersection. Both stations are located approximately 80 km north of Wallal borefield (Figure 2-1).

#### 7.3.6.2. Conservation Estate

There is no conservation estate near the Proposal, with the nearest being Walyarta Conservation Park (encompassing the Mandora Marsh), which is located approximately 40 km north of the RAC and Wallal at its nearest point (Figure 1-1).

#### 7.3.6.3. Other Projects

The Development Envelope intersects the proposed (yet-to-be-constructed) Australian Renewable Energy Hub (AREH) Development Envelope along the Nyangumarta Highway section of the RAC. The nearest existing significant mining operations are at Telfer, Nifty and Woodie Woodie, all approximately 100 km south or southeast of the Development Envelope (Figure 1-1). It is also noted that since the initial exploration programs in the Winu area by the Proponent, there has been a significant increase in exploration activity in the area by numerous tenement holders.

#### **7.3.6.4. Tourism and Recreation**

There are no known significant recreation or tourism activities that occur within or near the Development Envelope, with the potential exception of any activity that may be associated with the Great Northern Highway (such as access to Eighty Mile Beach Caravan Park), occasional intrepid four wheel drive visits along the Nyangumarta Highway (actively managed by NWAC through the Nyangumarta Highway permit system) or on the pastoral leases near the RAC.

### **7.4. Potential Environmental Impacts and Mitigation Hierarchy**

Preliminary potential impacts from the Proposal relevant to Social Surroundings are shown in Table 7-3. The character and definition of potential impacts relevant to Nyangumarta and Martu social surroundings are subject to ongoing consultation with both groups; therefore, those described here are preliminary.

Table 7-4 outlines proposed measures to mitigate potential impacts to Social Surrounding values associated with the Proposal. As informed by Nyangumarta and Martu consultation, the Proponent has changed the Development Envelope layout through several iterations to avoid and minimise impact to significant social and cultural values.

**Table 7-3: Social Surroundings – Potential Environmental Impacts**

| Potential Environmental Impacts                  | Relevant Proposal Elements and their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|--|--|--|
| <b>Nyangumarta and Martu Social Surroundings</b> |  |  |
| Direct and indirect                              | Direct disturbance of Country (which may include Special Places - such as waterholes, camping sites, hunting grounds, other important cultural places and heritage sites – as well as plants and animals and their habitat, physical changes to landscape and water features, which may interfere with cultural obligations and spiritual beliefs tied to Country, water, flora and fauna) | <p>There are currently no registered and other heritage sites and places listed by DPLH in the Development Envelope. However, recent surveys have identified cultural heritage location site(s) on Nyangumarta and Martu Country that will require appropriate management in consultation with Traditional Owners. Such Special Places and other aspects of Country that may be considered significant in relation to potential direct disturbance will be confirmed through the upcoming social surroundings consultation for inclusion in the ERD</p> <p>Landform changes and other disturbances will affect plant and animal habitat characteristics and the area available as habitat</p> <p>Vegetation clearing is expected to include plants that have cultural uses or are otherwise culturally important</p> <p>Animal injury and mortality can result from construction, operation and closure activities – potentially impacted animals are expected to include species that have cultural uses or are otherwise culturally important</p> <p>The Proponent aims to understand better key concerns regarding culturally important plants and animals through upcoming social surroundings consultation for inclusion in the ERD</p> |
|  | Restriction of access to Country (which may affect the ability of Traditional Owners to exercise Native Title rights and undertake cultural activities during Proposal operation and post mining)  | <p>For safety, Nyangumarta and Martu access to Country will be temporarily (i.e. for life of mine) restricted within operational areas. Increased road traffic along Nyangumarta Highway, which is a key access route for Nyangumarta peoples to access their Country, will need further consideration to ensure safe access can be maintained.</p> <p>Permanent access restrictions will occur on sections of Country due to post-mining prohibitions (i.e. within the pit void and abandonment bunds)</p> <p>Other areas and infrastructure are expected to be decommissioned and/or rehabilitated in accordance with the MCP and any agreements reached with NWAC and JYAC, with access restored</p> <p>Access may also be restricted to Special Places, including heritage sites, within the Development Envelope during construction and operation; however, this is subject to ongoing design and social surroundings consultation, including further identification of relevant places</p>  |

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|---|---|
|                                 | <p>Permanent changes to natural landforms and installation of infrastructure may result in altered visual landscapes amenity (social and cultural dimensions, use, experience, and enjoyment of Country) and interference with cultural obligations and spiritual beliefs tied to Country</p> | <p>Mining, by its nature, permanently alters natural landforms, particularly concerning the pit void, WRLs and the TSF, therefore, it impacts the visual character and sense of place and aspects of culture and spiritual beliefs tied to Country for not only the directly impacted area but the surrounding landscape</p> <p>Planned Social Surroundings consultation will explore this concern with Nyangumarta and Martu for inclusion in the ERD</p>  |
| <p>Indirect</p>                 | <p>Alteration of amenity and sense of place due to dust, noise, vibration, light and waste/litter may affect social and cultural dimensions, use, experience and enjoyment of Country</p>   | <p>Construction and operation of the Proposal is anticipated to potentially impact amenity within, and surrounding, the Development Envelope</p> <p>Nyangumarta and Martu use and enjoyment of Country may be affected by, for example:</p> <ul style="list-style-type: none"> <li>• WRLs, TSF and supporting infrastructure, such as wind turbines, which will rise above the level of the surrounding dunes</li> <li>• Construction activities</li> <li>• Blasting and excavation of the mine pit</li> <li>• Ore handling and transport and other vehicle movement and noise</li> <li>• Poor waste management and practices</li> <li>• Dust pollution through the RAC and MIA associated with heavy vehicle movements</li> <li>• Light pollution</li> </ul> <p>Planned social surroundings consultation will explore the above potential concerns, impacts and mitigation with Nyangumarta and Martu for inclusion in the ERD</p>         |
|                                 | <p>Indirect disturbance to cultural heritage – Special Places including heritage sites or other areas – as a result of active mining (dust and vibration)</p>   | <p>Blasting and excavation of the mine pit, and associated activities such as ore handling, has the potential to generate dust and vibration emissions that may:</p> <ul style="list-style-type: none"> <li>• Diminish the physical character and attributes of Special Places including heritage sites or other areas through excessive dust deposition</li> <li>• Disturb the structural integrity of Special Places including heritage sites or other areas vulnerable to the effects of vibration</li> </ul> <p>Nyangumarta have identified one cultural heritage site within the Conceptual Footprint, which will be directly impacted by the Proposal and will require further consultation and management. Nyangumarta have identified several other heritage sites outside the Conceptual Footprint that require specific management such as dust reduction measures to ensure the cultural values of the places are maintained</p> |

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|--|---|
|                                 | <p>Indirect impact to cultural heritage and amenity, including interference with cultural obligations and spiritual beliefs tied to water, as a result of altered hydrological regimes</p> | <p>Planned social surroundings consultation will explore the above potential concerns, impacts and mitigation with Nyangumarta and Martu for inclusion in the ERD</p> <p>Any change to groundwater and surface waters – in terms of quality, flows, volumes/levels and mixing of water from one source to another – as well as the use of water, are anticipated to be key concerns for Nyangumarta and Martu; however, planned social surroundings consultation will explore related potential concerns, impacts and mitigation with Nyangumarta and Martu for inclusion in the ERD</p> <p>The Proposal will involve alteration (drawdown or mounding) of groundwater levels for mine pit dewatering, water supply (including borefield abstraction) and surplus water storage in TSF, infiltration areas and other facilities. Drawdown:</p> <ul style="list-style-type: none"> <li>• Is expected to primarily impact the metasediments aquifer, related to the pit dewatering</li> <li>• May also occur in the unconfined aquifer, related to water supply</li> </ul> <p>Due to the distance of the nearest drainage line or creek, it is generally unlikely that there will be any impacts on other surface water features; however, upgrading of the RAC has the potential to disrupt surface water flows</p> <p>Water quality of groundwater aquifers has the potential to be impacted due to seepage from TSF and WRLs associated with the long-term function of PAF encapsulation strategies</p> <p>Changes to hydrological regimes have the potential to impact culturally important plants and animals that rely on the water sources</p> <p>Planned social surroundings consultation will explore the above potential concerns, impacts and mitigation with Nyangumarta and Martu for inclusion in the ERD</p> |
|                                 | <p>Disturbance, or reduced presence of, plants and animals which are used socially or culturally, or which have cultural associations, due to dust, noise and vibration</p>                | <p>The Proposal will emit dust, noise and vibration with the potential to affect animal behaviour, including reduced prevalence and distribution within and near the Development Envelope, which may impact Nyangumarta and Martu amenity (enjoyment and use of Country) and cultural heritage (e.g., cultural activities, beliefs and stories linked to animals)</p> <p>Similarly, dust emissions can also potentially affect the health of culturally important plants through excessive dust deposition</p> <p>Planned social surroundings consultation will explore the above potential concerns, impacts and mitigation with Nyangumarta and Martu for inclusion in the ERD</p>  |

| Potential Environmental Impacts   | Relevant Proposal Elements and their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|---|--|--|
| Cumulative  | <p>Cumulative impacts to cultural heritage and amenity as a result of impacts from this Proposal and surrounding projects including:</p> <ul style="list-style-type: none"> <li>• Direct disturbance of special places</li> <li>• Loss of access to Country</li> <li>• Changes to landforms and altered visual landscapes</li> </ul> | <p>The Proposal will add to existing impacts to Nyangumarta and Martu social surroundings, including effects upon amenity, heritage and culture, and care for Country practises and outcomes</p> <p>The Proposal will add to permanent cumulative impacts related to landscape changes, sense of place, use and enjoyment of Country and heritage sites, and temporary cumulative impacts with respect to dust</p>   |
| <b>Other Social Surroundings (Pastoral Stations, Conservation Estate, Tourism and Recreation, Other Projects)</b> |  |  |
| Indirect  | <p>Alterations to groundwater hydrological regimes from abstraction of groundwater which may affect pastoral leasehold water supplies</p>  | <p>Abstraction of water from Wallal has the potential to impact the Wallal Downs and Mandora pastoral station water supplies</p> <p>Given the distance between Wallal and the station bores, the Proponent does not anticipate any impact. However, hydrogeological studies are ongoing and will be completed to inform water licensing, consultation with pastoral leaseholders and for inclusion in the ERD</p> <p>Rimfire and Texas are not located near any pastoral leases (or other licensed groundwater users) and will not impact supplies</p>   |
|   | <p>Changes to local landforms and installation of infrastructure which may result in altered visual landscapes and amenity</p>   | <p>Landscapes within the boundaries of the Wallal Downs Pastoral Station and areas adjacent to the Great Northern Highway RAC intersection and Nyangumarta Highway RAC sections have the potential to be altered, which may affect station amenity and the amenity for tourists and other road users</p> <p>Given Proposal elements in these parts of the Development Envelope involve only road upgrades, the ore transfer area and borefield infrastructure (i.e. no prominent elements) the Proposal is not expected to have a significant impact on visual landscapes</p> <p>Increased road usage and activity associated with the potential transfer area may affect station amenity in relation to the Wallal Downs homestead. Once a final location has been detailed, further consultation with station stakeholders is expected to identify any relevant concerns, and inform the need for further studies (e.g. noise modelling) for inclusion in the ERD</p> <p>The most prominent landform changes will occur within the MIA and, given its remoteness, is not expected to significantly impact any potential stakeholders outside Nyangumarta and Martu, as addressed above</p> |

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|---------------------------------|---|--|
| Cumulative                      | Changes to landforms and installation of infrastructure which may result in altered visual landscapes and amenity | Given the remote location of the MIA, within which the most prominent landform changes will occur, it is not expected to significantly impact any potential stakeholders outside Nyangumarta and Martu |

**Table 7-4: Social Surroundings – Mitigation Hierarchy**

| Mitigation Hierarchy                             | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant?   | Effectiveness of the Nominated Controls   |
|--|---|---|---|
| <b>Nyangumarta and Martu Social Surroundings</b> |   |   |   |
| Avoid  | <p>The Conceptual Footprint may undergo revision or other controls implemented (e.g. limitations or exclusions on relevant activities), to avoid direct disturbance to Special Places identified or confirmed through planned social surroundings consultation with Nyangumarta and Martu, to be detailed in the ERD</p>  | <p>Yes – State Aboriginal heritage legislation</p> <p>Impacts to known heritage values will also be subject to the terms of the final Winu Project Agreement with the Nyangumarta people and the Martu people</p> | <p>All potential disturbances will be subject to State Aboriginal Heritage legislation processes</p> <p>The limit on clearing will ensure that disturbance of any site will be no more than is unavoidable to implement the Proposal</p> <p>The Rio Tinto Internal Approvals system ensures clearing does not occur in heritage (or other important) site boundaries as part of the Rio Tinto Cultural Heritage Management Systems (CHMS)</p> |
|  | <p>Disturbance will be managed using the Proponent’s Integrated Heritage Management Process (IHMP), CHMS, Blast Management Plans and the Rio Tinto Approvals system to avoid unauthorised disturbance of Special Places</p> <p>Information derived from surveys and consultations is used in the Proponent’s GIS to spatially manage Special Places, including heritage sites, such as by creating exclusion boundaries so that personnel designing a project can seek to avoid significant places where possible</p> | <p>Yes – State Aboriginal heritage legislation</p>  | <p>All potential disturbances will be subject to State Aboriginal Heritage legislation processes</p> <p>Refer above regarding clearing controls and the Rio Tinto CHMS</p>  |
|  | <p>Before any disturbance, a heritage clearance survey will be conducted to ensure all heritage sites are identified within the Development Envelope</p>  |   |   |
|  | <p>The Proponent will avoid as far as practicable, restricting Nyangumarta and Martu access to Country</p>  | <p>Yes - Indigenous Land Use Agreements (ILUAs) administered under the NT Act</p>   | <p>Ongoing engagement and agreement with Nyangumarta and Martu peoples regarding access to Country</p>  |
|  | <p>Also refer to Sections 8, 9 and 10 with respect to other avoidance measures relevant to water, plants and animals, respectively</p>  |   |   |
| Minimise   | <p>The Conceptual Footprint may undergo revision or other controls implemented (e.g. limitations on relevant activities) to minimise indirect impacts to Special Places, identified or confirmed</p>  | <p>Yes – State Aboriginal heritage legislation</p>  | <p>All potential disturbances will be subject to State Aboriginal Heritage legislation approval processes</p>   |



| Mitigation Hierarchy | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant?                               | Effectiveness of the Nominated Controls                        |
|----------------------|---|---|--|
|                      | through planned social surroundings consultation with Nyangumarta and Martu, to be detailed in the ERD  |   | Refer above regarding clearing controls and the Rio Tinto CHMS |
|                      | The Conceptual Footprint, including the location and extent of the mine pit and key infrastructure components, has been minimised through project optimisation to reduce the total extent of disturbance and minimise impacts to Nyangumarta and Martu access to Country                | Yes – State Aboriginal heritage legislation<br>Yes – ILUAs under the NT Act | Refer above regarding ongoing engagement and agreement         |
|                      | The Proponent will continue to consult with Nyangumarta and Martu to confirm all areas required to remain accessible (within health and safety limitations) and investigate mine design and access design options to further minimise restrictions                                      |   |  |
|                      | The Proponent will collaborate with Nyangumarta and Martu to develop and implement Land Access Protocols (LAPs) to facilitate access to Special Places<br><br>LAPs are expected to include restrictions on workforce access to Special Places throughout implementation of the Proposal |   |  |
|                      | The Proponent will minimise as far as practicable, restricting Nyangumarta and Martu access to Country  |   |  |
|                      | Nyangumarta and Martu access to Special Places that may be identified through ongoing surveys and consultation will be facilitated throughout the life of the Proposal  |   |  |
|                      | The Proponent will consult with Nyangumarta and Martu regarding post-closure access in relation to final landform design  |   |  |
|                      | Potential impacts on visual and overall amenity from taller structures (WRLs, TSF and wind turbine) have been minimised through design optimisation   | Yes – DMIRS   |  |
|                      | Consultation and engagement will be undertaken, as agreed with Nyangumarta and Martu to inform decisions to relocate activities to minimise disturbance to Special Places   | No  | Refer above regarding ongoing engagement and agreement         |

| Mitigation Hierarchy   | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls  |
|--|---|---|--|
|  | Pre-disturbance heritage surveys will inform decisions to relocate activities to minimise potential impacts to heritage sites where possible  | Yes – State Aboriginal heritage legislation   | All potential disturbances will be subject to State Aboriginal Heritage legislation processes<br><br>Refer above regarding clearing controls and the Rio Tinto CHMS  |
|  | Mine design optionality and potential impacts to Special Places will be assessed with Nyangumarta and Martu through appropriate consultation forums   | Yes – State Aboriginal heritage legislation   | Refer above regarding ongoing engagement and agreement   |
|  | The Proponent will engage with Nyangumarta and Martu to provide Proposal workforce with cultural awareness training including importance of avoiding areas outside approved disturbance and other Aboriginal cultural heritage requirements | No  | This will be enforced through the Proponent's training system and monitoring of implementation of agreements and any applicable management plans   |
|  | The Proponent will implement dust management measures to minimise indirect impacts to Country and amenity   | No  | Standard practice  |
|  | The Proponent will implement vibration management measures, such as Blast Management Plans to minimise indirect impacts to vulnerable Special Places  | Yes – State Aboriginal heritage legislation   | Standard practice for blast management, with a high level of certainty that BMP measures minimise substantial impacts from blasting<br><br>Vibration limits will be set, subject to identification of vulnerable sites<br><br>All management of potential disturbance will be subject to State Aboriginal Heritage legislation processes |
|  | Management of all waste and litter will be subject to standard site operating procedures, which require all waste and litter to be contained and disposed of appropriately  | Yes – DWER                                    | Waste management will be subject to EP Act Part V licensing to manage landfills  |
| Also refer to Sections 8, 9 and 10 with respect to other minimisation measures relevant to water, plants and animals, respectively |   |   |  |

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls  |
|----------------------|--|---|--|
| Rehabilitate         | Modelling will be used to ensure the integrity of legacy structures, such as WRLs, is retained over the long term  | Yes – DMIRS                                   | <p>Ministerial conditions requiring preparation and implementation of an MCP is expected</p> <p>Statutory Guidelines for MCPs are available and are consistent with industry-leading practice. The MCP must detail all consultation and legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMIRS 2023a)</p> |
|                      | <p>WRLs and other landforms will be stabilised and revegetated at closure. The MCP will include objectives to ensure vegetation on rehabilitated land is safe, stable, non-polluting, and capable of sustaining the agreed post-mining land use. Final landforms will be stable and consider ecological and hydrological factors</p> <p>The proposed outer wall design for the TSF is rock armoured to promote stability. Based on stakeholder feedback, the proponent is currently assessing the ability to revegetate this surface at closure so that environmental outcomes can be increased with no compromise to safety. This will continue to be assessed and trialled during life of operations</p> |   |  |
|                      | <p>The MCP will be updated to reflect consultation with Nyangumarta and Martu on a regular basis to ensure its objectives remain relevant and are informed by the groups' expectations, including post-closure access and final landform designs</p> <p>Consultation on closure will be ongoing throughout the life of the operation in consultation with the Traditional Owners</p>   |   |  |
|                      | Post-closure continued access to Country will be maintained in accordance with relevant health and safety requirements   |   |  |
|                      | <p>The Proponent will implement a MCP following DMIRS Guidelines (DMIRS 2023a), detailing measures to manage public safety and post-closure access</p> <p>Nyangumarta and Martu consultation and engagement directly relevant to closure planning and implementation, including access</p>   |   |  |
|                      | Revegetation and rehabilitation will be implemented to minimise ongoing erosion and creation of dust following operations  |   |  |

| Mitigation Hierarchy   | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls   |
|--|---|---|---|
|  | The Proponent will implement standard environmental operating procedures to ensure all waste and litter is removed and correctly disposed of for closure  | Yes – DWER                                    | Waste management will be subject to EP Act Part V licensing to manage landfills   |
|  | Also refer to Sections 8, 9 and 10 with respect to other rehabilitation measures relevant to water, plants and animals, respectively  |   |   |
| Other Social Surroundings (Pastoral Stations, Conservation Estate, Tourism and Recreation, Other Projects) |   |   |   |
| Minimise   | The Conceptual Footprint, including the location and extent of infrastructure, has been minimised through project optimisation to reduce the total extent of disturbance and minimise impacts to visual and general amenity         | No  | High level of certainty that the measure minimises substantial impacts resulting from construction and operational activities   |
| Rehabilitate   | Revegetation and rehabilitation to minimise erosion and creation of dust following operations will be undertaken. Self-sustaining ecosystems that are compatible with the surrounding environment are intended to be re-established | Yes – DMIRS                                   | Ministerial conditions requiring preparation and implementation of an MCP is expected<br><br>Statutory Guidelines for MCPs are available and are consistent with industry-leading practice. The MCP must detail all consultation and legal obligations for rehabilitation and closure that affect post-mining land use and closure outcomes (DMIRS 2023a) |

### 7.5. Assessment and Significance of Residual Direct and Indirect Impacts

A preliminary assessment of the residual direct and indirect impacts and the significance of these impacts is provided in Table 7-5.

**Table 7-5: Social Surroundings – Assessment and Significance of Residual Direct and Indirect Impacts**

| Assessment and Significance of Residual Direct and Indirect Impacts | Assessment   | Conclusion on Significance   |
|---|--|--|
|   | <b>Nyangumarta and Martu Social Surroundings</b>   |  |
|   | Direct disturbance of Country including: <ul style="list-style-type: none"> <li>The clearing of up to 4,868 ha of native vegetation within the Development Envelope</li> </ul>   | Conclusion on significance will be informed by mitigation measures (Table 7-4) and subject to further consultation with Nyangumarta and Martu and detailed in the ERD                      |
|   | Restrictions to access of Country, including temporary restrictions within operational areas and permanent restrictions on prohibited areas post-mining  | Conclusion on significance will be informed by mitigation measures (Table 7-4) and subject to further consultation with Nyangumarta and Martu and detailed in the ERD                      |
|   | Permanent changes to natural landforms including construction of the pit void, WRLs, and the TSF   | Conclusion on significance will be informed by mitigation measures (Table 7-4) and subject to further consultation with Nyangumarta and Martu and detailed in the ERD                      |
|   | Temporary changes visual landscapes through installation of infrastructure, that will be removed and rehabilitated or otherwise retained in line with the MCP and any agreement with Nyangumarta and Martu   | Conclusion on significance will be informed by rehabilitation and closure management (Table 7-4) and subject to further consultation with Nyangumarta and Martu to be detailed in the ERD  |
|   | Alteration of amenity and sense of place due to dust, noise, vibration, light and waste/litter   | Conclusion on significance will be informed by rehabilitation and closure management (Table 7-4) and subject to further consultation with Nyangumarta and Martu to be detailed in the ERD  |
|   | Changes to groundwater levels due to pit dewatering and abstraction for water supply   | Conclusion on significance will be informed by rehabilitation and closure management (Table 7-4) and subject to further consultation with Nyangumarta and Martu to be detailed in the ERD  |
|   | The groundwater hydrology and water quality of four soaks (Winu, Toramah, Djimakarra and Bulgamulgardy) in the vicinity of the Development Envelope are not expected to be impacted by abstraction for dewatering/water supply due to distance from abstraction activities<br><br>Plants and animals associated with or reliant on the soaks are not expected to be impacted | Not expected to be considered significant (refer to Section 8); however, any such conclusion will be subject to further consultation with Nyangumarta and Martu to be detailed in the ERD  |
|   | Disturbance, or reduced presence of, plants and animals due to dust, noise and vibration   | Conclusion on significance will be informed by mitigation measures (Table 7-4, Sections 9 and 10) and subject to further consultation with Nyangumarta and Martu to be detailed in the ERD |

| Other Social Surroundings  |   |
|--|---|
| Alterations to groundwater hydrological regimes from abstraction of groundwater are not expected to affect Wallal Downs and Mandora pastoral station water supplies  | Not expected to be considered significant |
| Changes to local landforms and installation of infrastructure may impact visual amenity at Wallal Downs and areas adjacent to the Great Northern Highway RAC intersection and Nyangumarta Highway RAC sections | Not expected to be considered significant |

## 7.6. Cumulative Impacts

Given the Proposal's separation from other projects (Table 2-1), the Proponent anticipates the cumulative impacts to Nyangumarta and Martu and other social surroundings will not be significant; however, the Proponent recognises that Nyangumarta and Martu consider cumulative impact on a regional scale and this concern will be addressed through planned social surroundings consultation for inclusion in the ERD.

## 7.7. Likely Environmental Outcomes

The Proponent expects that the Proposal is likely to meet the EPA objective to protect social surroundings from significant harm; however, further consultation with Nyangumarta and Martu, and other potential stakeholders, will inform this assessment. Additional consultation and studies will be undertaken to ensure all potential impacts are adequately assessed.

## 8. INLAND WATERS

### 8.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Inland Waters:

**To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected**

For assessment by the EPA, Inland Waters include groundwater, such as superficial and confined aquifers, and surface water, such as waterways, wetlands and estuaries (EPA 2018). A 'waterway' is any river, creek, stream, or brook, including its floodplain, estuary, or inlet. This includes systems that flow permanently, for part of the year or occasionally, and waterways that have been artificially modified.

### 8.2. Relevant Policy and Guidance

Inland Waters policy and guidance considered relevant for this Proposal include:

- Statement of Environmental Principles, Factors and Objectives (EPA 2023a)
- Environmental Factor Guideline: Inland Waters (EPA 2018)
- Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes (DER 2015a)
- Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)
- Western Australian Water in Mining Guidelines (DoW 2013)
- Operational Policy 5.12 – Hydrogeological Reporting Associated with a Groundwater Well Licence (DoW 2009)
- Use of Operating Strategies in the Water Licensing Process (DWER 2020)
- Water Quality Protection Notes (DoW, various)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2019 (ANZG 2018).

### 8.3. Receiving Environment

#### 8.3.1. Studies

Table 8-1 summarises the types and timing for each of the surveys/studies and which guidelines/procedures they are considered to be in accordance with.

Supplementary surveys and ongoing groundwater monitoring are planned for Rimfire, Texas and Wallal to establish a complete image of potential impacts to inland waters within the Development Envelope.

Table 8-1: Summary of Key Studies for Inland Waters

| Studies/Survey/Prepared for   | Study Area, Type and Timing   | Consistency with Guidance  |
|---|---|--|
| Winu Dewatering Strategy and Groundwater Supply Update 2022 (Advisian 2022)<br>Prepared for Rio Tinto                         | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Dewatering and groundwater supply model and strategy<br><b>Timing:</b> June 2022    | N/A  |
| Winu Project: Site-Wide Water Balance Update (Golder 2022a)<br>Prepared for Rio Tinto   | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Water balance modelling<br><b>Timing:</b> March 2022 (to be updated Q1 2024)        | N/A  |
| H3 Hydrogeological Assessment of the Winu Project (Golder 2022b)<br>Prepared for Rio Tinto                                    | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Hydrogeological assessment<br><b>Timing:</b> March 2022 (to be updated Q1 2024)     | Consistent with the EPA Guideline for Inland Waters (EPA 2018) and the Water in Mining Guidelines (DoW 2013)   |
| Winu Final Study: Operational Surface Water Management Plan (Golder 2021a)<br>Prepared for Rio Tinto                          | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Surface water management plan<br><b>Timing:</b> August 2021 (to be updated Q4 2023) | Consistent with the Water in Mining Guidelines (DoW 2013)  |
| Pit Lake Water Balance and Geochemical Model (Golder 2021b)<br>Prepared for Rio Tinto   | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Pit lake water balance and geochemical model<br><b>Timing:</b> August 2021          | N/A  |
| Winu Final Study: Updated Flood Risk Assessment - Access Route (Golder 2020a)<br>Prepared for Rio Tinto                       | <b>Survey Area:</b> Winu Road Access Area<br><b>Type:</b> Flood risk assessment<br><b>Timing:</b> October 2020 (to be updated Q4 2023)    | The objective of this assessment is in line with the EPA's objective for Inland Waters, as outlined in the Environmental Factor Guideline (EPA 2018) |
| Winu Final Study: Construction Phase Surface Water Management Plan - Mine Site Areas (Golder 2020b)<br>Prepared for Rio Tinto | <b>Survey Area:</b> Winu Project Area<br><b>Type:</b> Surface water management plan<br><b>Timing:</b> October 2020                        | N/A  |



### 8.3.2. Surface Water

The Greater Sandy Desert region experiences little to no surface water runoff to water courses, and surface water features tend to be ephemeral and sparse (V&C Semeniuk Research Group 2000). There are no major surface water courses within the region (Golder 2022b). The MIA and its surrounds include a series of depressions along interdunal corridors, each forming relatively small, individual catchments (Golder 2020b). Rainfall has been observed to pond in these topographic lows, where it either evaporates or infiltrates the soil. Where cover is porous/permeable and sandy, infiltration is rapid. Runoff in the area is expected to be very low; however, infrequent floods may result in significant inundation due to low channel grades and the internally draining interdunal depressions (Golder 2022b). This is not expected to result in the formation of clear flow paths and creeks (Golder 2020b).

Surface water features around the Proposal are sparse (Golder 2022b) and are shown in Table 8-2 and include Figure 8-1. The distance from the RAC has not been included in Table 8-2, given its length.

**Table 8-2: Surface Water Features in the Vicinity of the Proposal**

| Surface Water Feature                  | Distance from MIA (km) | Distance from WRB (km) |         |        |
|--|------------------------|------------------------|---------|--------|
|  |                        | Texas                  | Rimfire | Wallal |
| Winu Soak                              | 22                     | 37                     | 40      | 58     |
| Toramah Soak                           | 54                     | 65                     | 75      | 98     |
| Djimakarra Soak                        | 45                     | 54                     | 50      | 65     |
| Bulgamulgardy Soak                     | 93                     | 108                    | 115     | 12     |
| Oakover River                          | 100                    | 93                     | 105     | 83     |
| Mandora Salt Marsh Ramsar wetland area | >100                   | 100                    | 97      | 25     |
| Lake Waukarlycarly                     | 60                     | 43                     | 48      | 140    |

All soaks are understood to have significant cultural value and have been used by the Nyangumarta, Martu and/or other Aboriginal people for drinking water and cultural purposes (Section 7).

### 8.3.3. Groundwater

The hydrogeology of the Proposal region consists of Quaternary (Cenozoic) surficial deposits that may form perched aquifers, deeper metasediment of the Yeneena Basin, which host groundwater, and sandstones of the Canning Basin that form a major regional aquifer known as the Wallal Aquifer (Golder 2022b). The Wallal Aquifer overlies the metasediments aquifer. It is unconfined near the MIA and becomes confined towards the coast. Vertical recharge from the overlying unconfined sandstone aquifer to the metasediments aquifer is inferred to occur near the topographic divide south of MIA. Regional survey data has mapped large granitoid intrusions within the Proterozoic basement, which are assumed to inhibit groundwater flow in the metasediments aquifer north, north-east and south of MIA where present (Golder 2022b).

The depth to groundwater surrounding the MIA is typically more than 50 m below ground level (mbgl). Therefore, the upper Cenozoic strata is typically unsaturated (Golder 2022b). No perching of shallow (<10 mbgl) groundwater has been observed at MIA. Groundwater modelling contours indicate that the regional hydraulic gradient in the MIA is 0.002 to the north north-west, towards the coastline.

The unconfined sandstone aquifer is not expected to be directly recharged by rainfall in the short term, given depth to groundwater is 50 to 60 m (Golder 2022b). Recharge to the metasediments aquifer is expected to occur through discharge from the overlying unconfined aquifer where mudstone does not occur in the area surrounding the MIA.

### 8.3.3.1. Existing Groundwater Use

The Proposal occurs in the Canning-Kimberley Groundwater Sub-Area of the Canning-Kimberley Groundwater Area (Golder 2022b). Within the Canning-Kimberley Groundwater Area licence holders that abstract water from the Canning-Wallal aquifer are detailed in below in Table 8-3 (DWER 2023).

**Table 8-3: Groundwater Licences within the Canning-Kimberley Groundwater Area**

| Licence Holder                    | Licence Number(s)                        | Sub Area          | Allocation kL/a |
|-----------------------------------|--|-------------------|-----------------|
| Armada Mining Pty Ltd             | 204919                                   | Canning-Kimberley | 150             |
| Buru Energy Limited               | 174785                                   |                   | 40,500          |
| Fortescue Metals Group Limited    | 208075                                   |                   | 99,000          |
| Gungalla Mackay Pty Ltd           | 178689                                   |                   | 600             |
| Hans Willem Leenaarts             | 202100                                   |                   | 1,500           |
| Kennaugh, Gregory                 | 169502                                   |                   | 2,000           |
| Kenworthy, Margaret Jean          | 161175                                   |                   | 8,000           |
| Kimberley Meat Company Pty Ltd    | 177809                                   |                   | 157,000         |
| Main Roads                        | 168483                                   |                   | 60,000          |
| Mowanjum Aboriginal Corporation   | 180441                                   |                   | 750,000         |
| New Standard Onshore Pty Ltd      | 175438                                   |                   | 25000           |
| Newcrest Mining Limited           | 202749                                   |                   | 260,000         |
| Nifty Copper Pty Ltd              | 66212                                    |                   | 75,000          |
| Rio Tinto Exploration Pty Limited | 200009, 201165, 201819<br>204033, 206212 |                   | 351,900         |
| Titherington, Michael Roy         | 169580                                   | 5,000             |                 |
| Areva Resources Australia Pty Ltd | 180180                                   | West Canning      | 270             |
| BHP Iron Ore Pty Ltd              | 107451                                   |                   | 1,200,000       |
| Grenleigh Pty. Ltd.               | 150360                                   |                   | 1,462,5000      |
| Kycodaheam Pty Ltd                | 202011                                   |                   | 20,000          |
| Pardoo Beef Corporation Pty Ltd   | 158616                                   |                   | 14,822,250      |

| Licence Holder                    | Licence Number(s) | Sub Area | Allocation kL/a |
|-----------------------------------|-------------------|----------|-----------------|
| Pilbara Water and Power Pty Ltd   | 175700            |          | 10,000,000      |
| Rio Tinto Exploration Pty Limited | 208436            |          | 5,000           |
| Shire of East Pilbara             | 181345            |          | 35,000          |

It should be noted that Table 8-3 is not a complete list of Canning-Wallal aquifer allocations, there are several licences outside of the Canning-Kimberley Groundwater Area that abstract from the aquifer most notably within the Derby Groundwater Area (DWER 2023).

#### Wallal Aquifer Allocations

The allocation limit for the Wallal Aquifer (50 GL/year) is at capacity, with no more water available for licencing (DWER 2018). However, DWER is reviewing allocation limits and has indicated the need to assess the effects of the current allocation on groundwater resources and groundwater dependent systems. The three most important impacts being assessed include:

- Impacts of taking large volumes of water on regional artesian pressure
- Impacts of potential seawater incursion into the aquifer
- Impacts to the health of wetlands dependent on groundwater.

Testing by the Department of Water (DoW) in 2016 indicated the Wallal Aquifer in the testing region is homogeneous and highly transmissive, with water levels recovering immediately after drawdown. This suggests large volumes can be discharged quickly and over extended periods with little to no impact. Investigations by the Proponent are ongoing to assess the impact of additional abstraction from the Canning-Basin-Wallal Aquifer. The DWER review of allocation limits for the Wallal Aquifer will likely be in 2024.

#### 8.3.3.2. Groundwater Dependent Ecosystems

Based on the Groundwater Dependent Ecosystems (GDEs) Atlas (BoM 2020), the region is considered to have a moderate to low potential for GDEs, with the nearest mapped GDE more than 20 km north of the MIA (Golder 2022b) and Mandora Salt Marsh mound springs (refer below) approximately 40 km north of Wallal.

Refer to Section 9.3.2.4 regarding Groundwater Dependent Vegetation (GDV).

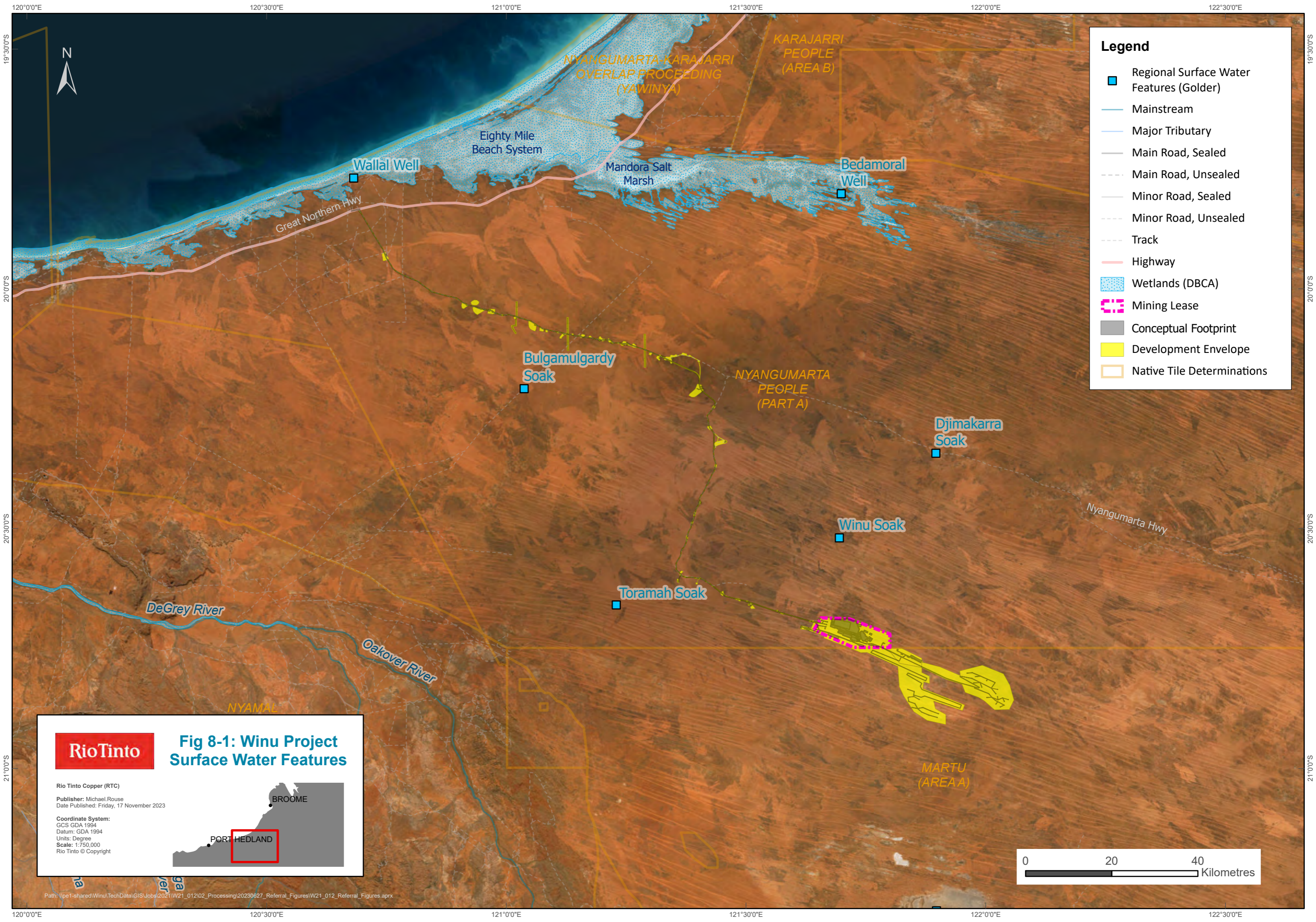
#### Soaks

Investigation of the Toramah and Winu Soaks (Golder 2022b) indicates that surface water runoff and shallow groundwater perching likely form the soaks.

Studies indicate that regional soaks are ephemeral, with surface water or a persistently moist sub-surface only identified for Toramah Soak. Rio Tinto (2020) conducted remote sensing analysis to identify areas of potential GDV, including the soaks surrounding the MIA. Toramah Soak was observed to have healthy vegetation on aerial photography, with a correlation between soak location and the potential for surface water persistence throughout the year and low to moderate levels of vegetation cover persistence (Golder 2022b). No vegetation detected by remote sensing or water/moisture persistence values indicating connectivity to regional scale aquifer were identified at the other three soaks (Winu, Djimakarra and Bulgamulgardy).

**Eighty Mile Beach Wetland System and Walyarta (Mandora) Salt Marsh**

The Eighty Mile Beach wetland system, 135 km north-west of the MIA and 70 km north of Wallal, is a Ramsar-listed site (Figure 8-1). This wetland and marsh system includes intertidal mudflats along Eighty Mile Beach and Mandora Salt Marsh, also known as Walyarta (Golder 2022b). Both surface water and groundwater feed the Mandora Salt Marsh and Walyarta wetland. The Mandora Salt Marsh, interdunal ephemeral wetlands dominated by Coolibah (*Eucalyptus victrix*) and *Melaleuca leucadendra* closed forest are located 25 km north of Wallal (Golder 2022b).



### Legend

- Regional Surface Water Features (Golder)
- Mainstream
- Major Tributary
- Main Road, Sealed
- - - Main Road, Unsealed
- Minor Road, Sealed
- - - Minor Road, Unsealed
- - - Track
- Highway
- Wetlands (DBCAs)
- Mining Lease
- Conceptual Footprint
- Development Envelope
- Native Tile Determinations

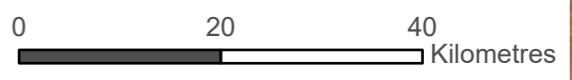
RioTinto

## Fig 8-1: Winu Project Surface Water Features

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:750,000  
 Rio Tinto © Copyright





### 8.4. Potential Environmental Impacts and Mitigation Hierarchy

Potential impacts from the Proposal relevant to Inland Waters are shown in Table 8-4.

Table 8-5 outlines the proposed measures to mitigate potential impacts to Inland Waters values associated with the Proposal.

**Table 8-4: Inland Waters – Potential Environmental Impacts**

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|---|---|
| Direct                          | <p>Alteration (drawdown or mounding) of groundwater levels through:</p> <ul style="list-style-type: none"> <li>• Mine pit dewatering</li> <li>• Water supply, including borefield abstraction</li> <li>• Surplus water storage in TSF, infiltration areas and other facilities</li> </ul> | <p>Groundwater abstraction for water supply and pit dewatering within the MIA will result in localised groundwater drawdown. This is expected to primarily impact the metasediments aquifer, as it is the main source of groundwater that needs to be dewatered. Drawdown may also occur in the unconfined aquifer</p> <p>Groundwater abstraction from Wallal has the potential to impact mound springs in the Mandora Salt Marsh. The mound springs are potentially fed by groundwater upwelling from the confined Wallal Aquifer. Several ecosystems are dependent on these springs and may also be impacted. Mitigation and assessment of potential impacts to the mound springs are addressed under Flora and Vegetation (Section 9)</p> <p>Potential to create groundwater mounding beneath storage structures due to seepage</p> <p>Potential to impact GDEs (refer to Flora and Vegetation Section 9)</p> <p>A rebounding water table post-mining will create a lake in the pit void post-mining. The water table will not recover to the pre-mining water levels, hence a groundwater terminal sink will form</p> |
|                                 | <p>Changes to hydrological regimes from the development of mine landforms and placement of infrastructure</p>   | <p>Due to the distance of the nearest drainage line or creek, it is unlikely that there will be any impacts to the hydrological regimes in the area as a result of mine development or the placement of infrastructure within the MIA</p> <p>Upgrading of the RAC may disrupt surface water flows</p> <p>Disruption of surface water flows may alter the hydrology of four soaks (Winu, Toramah, Djimakarra and Bulgamulgardy)</p>  |
| Indirect                        | <p>Changes to ground and/or surface water quality due to mineral waste management and/or stormwater runoff from disturbed areas</p>   | <p>Mining and processing of materials generate unavoidable large volumes of mineral waste, which may be Non-Acid Forming (NAF) or Potentially Acid Forming (PAF)</p> <p>Potential contamination of the unconfined aquifer (potentially connected to the Wallal Aquifer (unconfined)) associated with the TSF and WRLs</p> <p>The pit lake post-mining will likely concentrate in salinity and metals due to ongoing evapo-concentration</p>   |
| Indirect                        | <p>Degradation of Country and sites of social, cultural and heritage</p>  | <p>Addressed in Social Surroundings (Section 7)</p>   |

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|---------------------------------|---|--|
|                                 | significance in regard to water along with interference with cultural obligations and spiritual beliefs tied to water |  |
|                                 | Creation of a saline pit lake after mine closure  | Post closure, once mine dewatering ceases a pit lake will develop as it fills up with water from groundwater inflow and pit wall runoff  |
| Cumulative                      | Cumulative impacts to aquifers as a result of groundwater drawdown from this Proposal and surrounding projects        | The Proposal has the potential to impact aquifers due to groundwater drawdown cumulatively. This potential impact will be assessed during the environmental impact assessment following final design of the MIA, borefields, and MCP |

**Table 8-5: Inland Waters – Mitigation Hierarchy**

| Mitigation Hierarchy | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant?                           | Effectiveness of the Nominated Controls  |
|----------------------|---|---|--|
| Avoid                | Potentially contaminating substances, such as solid and liquid wastes, bulk hydrocarbons, etc., will be stored in accordance with legislated requirements and industry guidelines, including within secondary containment   | Yes – DWER  | Careful placement of at-risk substances is included in many water quality protection guidelines  |
| Minimise             | Undertake further hydrogeological investigations and modelling to improve understanding of the potential impacts of groundwater abstraction, including from borefields  | No  | This is standard practice  |
|                      | Monitor groundwater levels and abstraction rates during operations with ongoing validation of the hydrogeological modelling   | No  | This is standard practice  |
|                      | Development of a monitoring and management plan, with trigger and threshold level actions, to ensure no significant detrimental impact to the identified environmental values within the vicinity of the Proposal   | No  | This is standard practice  |
|                      | Minimise the generation of AMD by implementing an AMD Management Strategy (Rio Tinto 2023a), including (but not limited to) the following measures: <ul style="list-style-type: none"> <li>• Within WRLs. encapsulate PAF material within NAF material to protect runoff quality, minimise infiltration, build PAF layers in small lifts and control wind erosion</li> <li>• Minimise contact of pit lake with receptors</li> </ul> | No  | This is an industry-leading practice. Control AMD from commencement rather than rely on management measures at closure   |
|                      | Minimise the potential contamination of groundwater and surface water through storage of tailings in a TSF constructed to ensure: <ul style="list-style-type: none"> <li>• Segregation of high sulphur and low sulphur materials</li> </ul>   | Yes –DWER, a licence is required for the TSF under Part V of the EP Act | DMIRS regulates the design, construction and management of TSFs in accordance with the <i>Tailings storage facilities in Western Australia - code of practice</i> (DMP 2013), which aims to describe: <ul style="list-style-type: none"> <li>• A set of outcomes to meet the approval requirements of the project management plan under legislation</li> </ul> |



| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls  |
|----------------------|--|---|--|
|                      | <ul style="list-style-type: none"> <li>Seepage control through liners</li> <li>Subaqueous storage of high sulphur tailings under a water cover</li> <li>Drainage controls to contain and segregate TSF water from natural catchment flows and re-direction to processing plant for re-use</li> </ul> | Yes - DMIRS                                   | <ul style="list-style-type: none"> <li>The variables to be considered to demonstrate that a TSF is safe, stable, non-polluting, erosion-resistant and self-sustaining</li> <li>Recommended hazard management process</li> <li>The broader occupational health and safety requirements for operating in accordance with legislation</li> </ul> <p>The code promotes a proactive approach to monitoring during construction, operation, and before closure so it is possible to predict a TSF's long-term performance and potential environmental impact after closure</p> <p>The desulfurization of the tailings and the subsequent subaqueous design for the smaller fraction of high sulphur tailings in the TSF utilises leading practice principles for reactive tailings management outlined in Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)</p> |
|                      | Minimise groundwater mounding from TSF, infiltration areas and other storage facilities' seepage   | Yes - DMIRS                                   | <p>All facilities will be constructed to engineering and design standards</p> <p>DMIRS regulates the design, construction and management of TSFs in accordance with the <i>Tailings storage facilities in Western Australia - code of practice</i> (DMP 2013)</p>  |
|                      | Operational water demand will be supplied from mine dewatering in the first instance (where feasible), reducing the requirement for water supply volumes   | Yes – DWER Groundwater Licence (5C)           | <p>This is standard practice</p> <p>Models used to optimise and balance the dewatering programs are recognised across the industry and have been used successfully by the Proponent across numerous projects in WA</p>   |
|                      | All personnel involved in storing and handling potentially contaminated materials will be appropriately trained and supported by adequate resources including signage, spill kits and personal protective equipment (PPE)  | Yes – DWER                                    | This is a standard practice  |
| Rehabilitate         | Groundwater level recovery timeframes will be modelled in the MCP  | No  | <p>Modelling will confirm the recovery rate of aquifers</p> <p>The water quality of the pit lake post-mining will become increasingly saline over time due to evapo-concentration. Modelling of the long-term predictions of the pit lake demonstrates that the pit lake will be classified as a terminal pit</p>  |

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls   |
|----------------------|--|---|---|
|                      |  |   | sink, limiting the potential for migration of saline water beyond the immediate vicinity of the pit void<br><br>Projects operated by the Proponent's parent company in the Pilbara have recorded groundwater recovery trends where dewatering programs have concluded |
|                      | All dewatering and production bores no longer required will be decommissioned in accordance with relevant guidelines | No  | The bore decommissioning guidelines in place at the time would be recognised by industry and relevant government stakeholders   |
|                      | All contamination will be appropriately managed at closure, as per the <i>Contaminated Sites Act 2003</i>            | Yes – DWER                                    | Legislated instrument   |
|                      | All solid and liquid wastes and other contaminated material will be appropriately managed during and post-closure    | No  | This is a standard approach recommended in most mine closure planning guidelines  |

**8.5. Assessment and Significance of Residual Direct and Indirect Impacts**

A preliminary assessment of the residual direct and indirect impacts, and significance of these impacts, is provided in Table 8-6.

**Table 8-6: Inland Waters – Assessment and Significance of Residual Direct and Indirect Impacts**

|  | <b>Assessment</b>   | <b>Conclusion on Significance</b>  |
|--|---|--|
| <b>Assessment and Significance of Residual Direct and Indirect Impacts</b> | <p>Alteration of groundwater levels for mine pit dewatering and water supply within the MIA is not expected to impact any soaks (or GDV [Section 9]). The drawdown extent within the metasediments aquifer is predicted to be limited to the immediate surrounding of the MIA, with a maximum drawdown of 1 m at a location 14 km north of the MIA. All potential GDV is predicted to be beyond the drawdown extent of the Proposal</p>   | <p>Not expected to be considered significant. No impact to soaks (or GDV [Section 9]) are anticipated</p> <p>Additional surveys will be undertaken to quantify potential impacts and inform mitigation measures</p>  |
|  | <p>Abstraction of groundwater from the WRB may alter groundwater levels, pressure and quality in the Wallal Aquifer. Alteration to water pressure and quality may impact the potentially Wallal Aquifer-fed Mound springs and the systems dependent on them in the Mandora Salt Marsh. It is predicted that water levels and pressure will not be altered due to additional groundwater abstraction. DoW testing in 2016 suggested water levels recover immediately after drawdown, indicating large volumes can be discharged quickly and over extended periods with little to no impact</p> | <p>Not expected to be considered significant</p> <p>Additional studies will be undertaken to quantify potential impacts and inform mitigation measures</p>   |
|  | <p>Impacts to ground and/or surface water quality due to mineral waste management and/or stormwater runoff from disturbed areas</p>   | <p>The WRL and TSF footprints are located within the immediate catchment of the pit void. Any seepage from these landforms is expected to report to the pit lake, which is predicted to form a terminal groundwater sink post-mining. Supplementary groundwater modelling is planned to confirm this</p> |
|  | <p>A pit lake will remain in the long-term after mining has been finished. Water levels in this lake will not rise enough to overtop and are predicted to recover below the pre-mining water table</p> <p>The pit lake is likely to be a groundwater sink and become saline</p> <p>The pit lake will be made safe and stable at closure</p>   | <p>Not expected to be considered significant</p> <p>There is no significant pathway for groundwater or surface water discharge from the pit lake</p>   |

**8.6. Assessment and Significance of Residual Cumulative Impacts**

There is potential for groundwater drawdown to impact aquifers associated with the Proposal cumulatively.

These potential cumulative impacts on Inland Waters will be assessed as part of the environmental impact assessment.

**8.7. Likely Environmental Outcome**

The Proponent considers that the Proposal is likely to meet the EPA objective to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. Additional studies will be undertaken to ensure all potential impacts are adequately assessed.

## 9. FLORA AND VEGETATION

### 9.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Flora and Vegetation:

**To protect flora and vegetation so that biological diversity and ecological integrity are maintained**

For assessment by the EPA, flora is defined as native vascular plants, and vegetation is defined as groupings of different flora patterned across the landscape that occur in response to environmental conditions (EPA 2016a). Significant flora and vegetation are defined as any flora species or vegetation community protected under legislation, listed as a Priority by DBCA or otherwise important locally.

### 9.2. EPA Policy and Guidance

Flora and Vegetation policy and guidance considered relevant for this Proposal include:

- Statement of Environmental Principles, Factors and Objectives (EPA 2023a)
- Environmental Factor Guideline – Flora and Vegetation (EPA 2016a)
- EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA2016b)
- Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006).

### 9.3. Receiving Environment

#### 9.3.1. Studies

Table 9-1 provides the location, types and timing for each of the surveys/studies and summarises their limitations and to which guidelines/procedures they are considered to be in accordance. Figure 9-1 shows the survey coverage and sampling effort within and surrounding the Development Envelope.

Supplementary surveys are planned for Rimfire, Texas and Wallal to establish a complete understanding of the flora and vegetation within the entire Development Envelope.

**Table 9-1: Summary of Technical Studies for Flora and Vegetation**

| Project / Component | Area (ha) | Survey Description  | Survey Dates  | Season                             |
|---------------------|-----------|---|---|------------------------------------|
| <b>MIA</b>          | 13,401.9  | Two-phase detailed flora and vegetation survey (completed over the entire Mine Survey Area)<br><br>Two reconnaissance level flora and vegetation surveys were completed by Astron (2018, 2019a)<br><br>33 quadrats, 2 relevés | <ul style="list-style-type: none"> <li>October 2018 (Astron 2018)</li> <li>March 2019 (Astron 2019a)</li> <li>Phase 1: 12–17 May 2019</li> <li>Phase 2: 18–24 September 2019</li> </ul> | Sampling conducted in both seasons |
| <b>RAC</b>          | 290.7     | Single phase reconnaissance flora and vegetation survey<br><br>8 quadrats, 5 relevés. 7 additional sites  | <ul style="list-style-type: none"> <li>Section 1: 22–27 August 2019</li> </ul>  | Dry season                         |
|                     | 1,893.1   | Two-phase detailed flora and vegetation survey previously completed for the AREH Project (Biota 2018a)<br><br>Single phase reconnaissance level flora and vegetation survey by Astron (2019b)                                 | <ul style="list-style-type: none"> <li>Section 2: Phase 1: 24 August – 5 September 2017</li> <li>Phase 2: 13–21 March 2018</li> <li>May 2019 (Astron)</li> </ul>                        | Sampling conducted in both seasons |
|                     | 361       | Single phase reconnaissance flora and vegetation survey   | <ul style="list-style-type: none"> <li>Section 3: 22–27 August 2019</li> </ul>  | Dry season                         |
|                     | 2,554     | Single phase reconnaissance flora and vegetation survey   | <ul style="list-style-type: none"> <li>Diversion: 22–27 August 2019</li> <li>Diversion option: 12–20 July 2020</li> </ul>   | Dry season                         |

| Project / Component                       | Area (ha) | Survey Description  | Survey Dates   | Season                             |
|---|-----------|---|--|------------------------------------|
|   | 8,978.6   | Single phase reconnaissance flora and vegetation survey   | <ul style="list-style-type: none"> <li>12–20 July 2020</li> </ul>  | Dry season                         |
| <b>WRIB (Winu Re-injection Borefield)</b> | 2679.5    | Single-phase survey, inc. veg mapping and limited priority flora searches   | <ul style="list-style-type: none"> <li>Single Phase 15-16 July 2020</li> </ul>   | Dry conditions                     |
| <b>AREH</b>                               | 660,306   | Four-phase detailed flora and vegetation survey   | <ul style="list-style-type: none"> <li>Phase 1: 24 August – 4 September 2017</li> <li>Phase 2: 13–22 March 2018</li> <li>Phase 3: 10-20 March 2021</li> <li>Phase 4: April 2023</li> </ul> | Sampling conducted in both seasons |
| <b>Winu MIA</b>                           | 13,401.9  | Assessment of seasonal limitations of previous botanical survey work across the MIA<br>Targeted Priority flora surveys across the MIA<br>Annual weed survey | <ul style="list-style-type: none"> <li>15th-17th June 2022</li> <li>24th - 28th March 2023</li> </ul>  | Prolonged wet season<br>Wet season |
| <b>Winu MIA Extensions</b>                | 3,533     | Two-phase detailed flora and vegetation survey  | <ul style="list-style-type: none"> <li>Phase 1: 19th-23rd June 2022</li> <li>Phase 2: 8th-11th October 2022</li> </ul>   | Sampling conducted in both seasons |
| <b>Winu RAC</b>                           | 6,477.3   | Second phase detailed flora and vegetation survey (rescore WRAC quadrats >5 yrs)<br>Targeted Priority flora searches  | <ul style="list-style-type: none"> <li>29th March - 5th April 2023</li> <li>16th -22nd June 2023</li> </ul>  | Wet season                         |

| Project / Component            | Area (ha) | Survey Description   | Survey Dates  | Season                             |
|--------------------------------|-----------|--|---|------------------------------------|
| <b>Winu Rimfire Bore Field</b> | 8,006.8   | Two-phase detailed flora and vegetation survey (The survey only covers the proposed drill pads and access tracks) Phase 2: broader survey area)<br>13 quadrats, 15 relevés | <ul style="list-style-type: none"> <li>Phase 1: 12th- 16th October 2022</li> <li>Phase 2: 24th- 29th June 2023</li> </ul> | Sampling conducted in both seasons |
| <b>Winu Texas Bore Field</b>   | 3,293.5   | Two-phase detailed flora and vegetation survey (The survey only covers proposed drill pads and access tracks)<br>8 quadrats, 12 relevés                                    | <ul style="list-style-type: none"> <li>Phase 1: 12th- 16th October 2022</li> <li>Phase 2: 24th- 29th June 2023</li> </ul> | Sampling conducted in both seasons |
| <b>Winu Wallal Bore Field</b>  | 471       | Reconnaissance survey<br>5 quadrats  | <ul style="list-style-type: none"> <li>29th March - 5th April 2023</li> </ul>   | Wet season                         |

A consolidated report containing all surveys/studies for the Winu project will be provided with the Environmental Review Document.



121°0'0"E

121°30'0"E

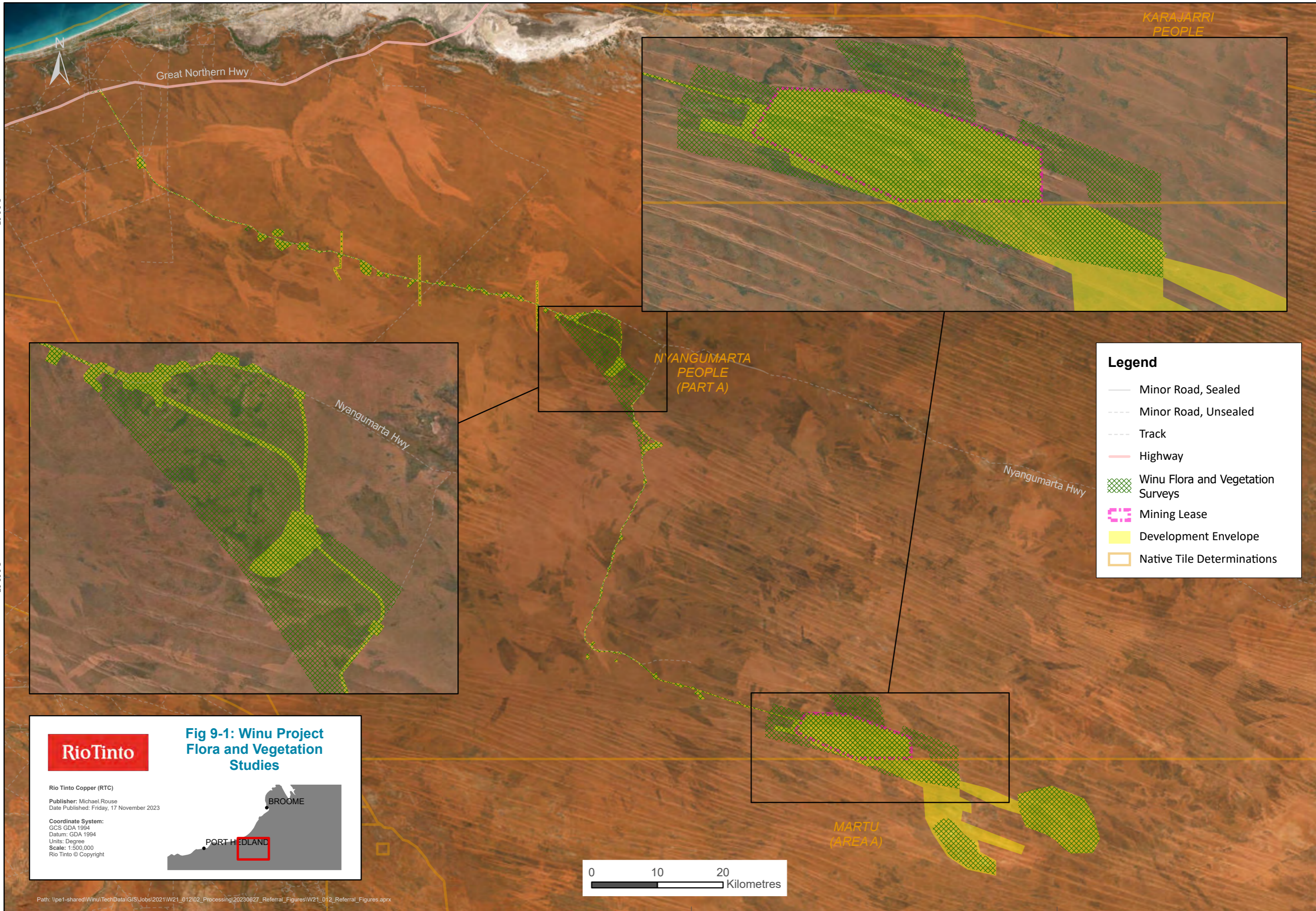
122°0'0"E

20°0'0"S

20°30'0"S

20°0'0"S

20°30'0"S



KARAJARRI  
PEOPLE

NYANGUMARTA  
PEOPLE  
(PART A)

MARTU  
(AREA A)

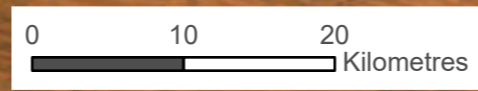
**Legend**

- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Winu Flora and Vegetation Surveys
- Mining Lease
- Development Envelope
- Native Tile Determinations



**Fig 9-1: Winu Project  
Flora and Vegetation  
Studies**

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023  
 Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
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121°0'0"E

121°30'0"E

122°0'0"E

## 9.3.2. Vegetation

### 9.3.2.1. IBRA Regions

The Proposal is predominantly situated within the Great Sandy Desert Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (DCCEEW 2021). This bioregion is divided into six subregions, of which the Mackay and McLarty subregions are relevant to the Proposal. The MIA is within the Mackay subregion, while the RAC, Rimfire, Texas and Wallal stretch from the south in the Mackay subregion through the McLarty subregion in the north. Part of the RAC, approximately 6 km at its westernmost end - is located in the Pindanland subregion of the Dampierland bioregion.

### 9.3.2.2. Vegetation Mapping

The first broad-scale vegetation mapping of Western Australia was conducted by J.S. Beard in 1979. Several revisions and updates have been made since then, resulting in the most recent and comprehensive iteration, detailed in Beard et al. (2013). The Proposal extends across five of Beard's Vegetation Systems. Table 9-2 describes their distribution within the proposal.

**Table 9-2: Beard Vegetation Mapping that Occurs within the Development Envelope**

| Vegetation System      | Description  | Area (ha) within DE | % of DE |
|------------------------|--|---------------------|---------|
| Great Sandy Desert 134 | Mosaic: Hummock grasslands, open low tree steppe; Desert Bloodwood and Feathertop Spinifex ( <i>Triodia schinzii</i> ) on sandhills / Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills | 32,116.6            | 86.0    |
| Mandora East 80        | Hummock grasslands and low tree steppe with Desert Walnut over soft spinifex between sand ridges   | 1,078.4             | 2.9     |
| Mandora East 101       | Hummock grasslands and shrub steppe with <i>Acacia pachycarpa</i> over soft spinifex   | 832.9               | 2.2     |
| Mandora East 117       | Hummock grasslands and grass steppe with soft spinifex   | 3,184.8             | 8.5     |
| Pindan 32              | Pindan sandplain with <i>Acacia</i> shrubland with scattered low trees over <i>Triodia</i> spp   | 130.7               | 0.3     |

### 9.3.2.3. Local Vegetation Types

Thirty vegetation types have been identified and mapped within the mapped sections of the Development Envelope (Western Botanical 2023). Table 9-3 describes the vegetation association identified through survey work to date.

**Table 9-3: Consolidated List of Vegetation Associations Occurring within the Development Envelope**

| Landform          | Vegetation Code | Vegetation Association Description  |
|-------------------|-----------------|---|
| Linear Sand Dunes | D1              | <i>Corymbia chippendalei</i> Low Open Woodland over <i>Triodia schinzii</i>   |
|                   | D2              | <i>Owenia reticulata</i> Scattered Low Trees over <i>Triodia schinzii</i>   |
|                   | D3              | <i>Grevillea stenobotrya</i> , <i>Grevillea wickhamii</i> & <i>Acacia anaticeps</i> Tall Shrubland over <i>Triodia schinzii</i> |
| Interdunal Plains | P1              | <i>Acacia platycarpa</i> ( <i>Acacia tumida</i> var. <i>kulparn</i> ) Open Shrubland over <i>Triodia schinzii</i>               |

| Landform | Vegetation Code | Vegetation Association Description   |
|----------|-----------------|--|
|          | P2              | <i>Acacia ancistrocarpa</i> Tall Shrubland over <i>Triodia schinzii</i>  |
|          | P3              | <i>Acacia drepanocarpa</i> subsp. <i>latifolia</i> Tall Shrubland over <i>Triodia schinzii</i>   |
|          | P4              | <i>Acacia orthocarpa</i> Open Shrubland over <i>Triodia schinzii</i>   |
|          | P5              | <i>Acacia</i> spp. Scattered Shrubs over <i>Triodia schinzii</i>   |
|          | P6              | <i>Owenia reticulata</i> & <i>Erythrophleum chlorostachys</i> Scattered Low Trees over <i>Triodia schinzii</i> ( <i>Triodia epactia</i> )  |
|          | P7              | <i>Acacia ancistrocarpa</i> Low Open Shrubland over <i>Eulalia aurea</i> & <i>Triodia epactia</i>  |
|          | P8              | <i>Acacia eriopoda</i> & <i>Acacia sericophylla</i> Tall Open Shrubland over <i>Triodia schinzii</i> ( <i>Triodia epactia</i> )  |
|          | P9              | <i>Acacia ancistrocarpa</i> & <i>Acacia monticola</i> Tall Open Shrubland over <i>Triodia schinzii</i> ( <i>Triodia epactia</i> )  |
|          | P10             | <i>Corymbia zygophylla</i> Scattered Low Trees over <i>Triodia schinzii</i>  |
|          | P11             | <i>Grevillea refracta</i> ( <i>Acacia ancistrocarpa</i> & <i>Acacia monticola</i> ) Scattered Tall Shrubs over <i>Triodia epactia</i>  |
|          | P12             | <i>Grevillea refracta</i> , <i>Acacia monticola</i> & <i>Acacia colei</i> var. <i>colei</i> Tall Open Shrubs over <i>Acacia adoxa</i> var. <i>adoxo</i> & <i>Triodia epactia</i> |
|          | P13             | <i>Gardenia pyriformis</i> subsp. <i>keartlandii</i> Scattered Low Trees over <i>Triodia schinzii</i>  |
|          | P14             | <i>Acacia monticola</i> & <i>Acacia drepanocarpa</i> ( <i>Acacia orthocarpa</i> & <i>Acacia ancistrocarpa</i> ) Open Shrubland over <i>Triodia schinzii</i>                      |
|          | P15             | <i>Corymbia candida</i> Open Woodland over <i>Triodia schinzii</i>   |
|          | P16             | <i>Eucalyptus odontocarpa</i> Low Mallee Woodland over <i>Triodia schinzii</i>   |
|          | P17             | <i>Eucalyptus victrix</i> Open Woodland over <i>Triodia epactia</i>  |
|          | P18             | <i>Corymbia opaca</i> Open Woodland over <i>Triodia schinzii</i>   |
|          | P19             | <i>Melaleuca lasiandra</i> Low Open Shrubland over <i>Triodia schinzii</i>   |
|          | P20             | <i>Acacia ancistrocarpa</i> & <i>Acacia orthocarpa</i> Open Shrubland over <i>Triodia</i> spp.   |

| Landform                  | Vegetation Code | Vegetation Association Description   |
|---------------------------|-----------------|--|
| Gentle Rocky Outcroppings | R1              | <i>Acacia bivenosa</i> ( <i>Acacia ancistrocarpa</i> ) Low Open Shrubland over <i>Triodia brizoides</i> ( <i>Triodia schinzi</i> )                               |
|                           | R2              | <i>Grevillea wickhamii</i> Scattered Tall Shrubs over <i>Mirbelia viminalis</i> ( <i>Acacia hilliana</i> ) & <i>Triodia brizoides</i> ( <i>Triodia epactia</i> ) |
|                           | R3              | <i>Acacia hilliana</i> ( <i>Acacia adoxa</i> var. <i>adoxo</i> ) Low Open Shrubland over <i>Triodia epactia</i>  |
|                           | R4              | <i>Ficus brachypoda</i> Low Open Woodland over <i>Acacia monticola</i> , <i>Grevillea pyramidalis</i> & <i>Triodia epactia</i>                                   |
|                           | R5              | <i>Acacia bivenosa</i> Scattered Low Shrubs over <i>Triodia brizoides</i> & <i>Triodia epactia</i> ( <i>Triodia schinzi</i> )                                    |
|                           | R6              | <i>Grevillea wickhamii</i> , <i>Acacia monticola</i> & <i>Acacia ancistrocarpa</i> Shrubland over <i>Triodia epactia</i>   |
|                           | R7              | <i>Acacia bivenosa</i> ( <i>Acacia stellaticeps</i> ) Low Shrubland over <i>Triodia epactia</i>  |

A detailed survey of Rimfire, Texas and Wallal is planned to complete vegetation mapping across those areas.

Approximately 442 ha of the Development Envelope comprises disturbed areas, including roads and tracks that were already in existence before the Proponent undertook any exploration activities in the area.

#### 9.3.2.4. Groundwater Dependent Ecosystems and Vegetation

No evidence of GDV has been identified by vegetation surveys (Biota 2021 a).

Vegetation dependence on groundwater is considered unlikely in the vicinity of the Proposal, given the great depth to groundwater (>50 m) and the aquifers confined nature (Golder 2022b). Similarly, the depth to groundwater (>40 m) within the unconfined aquifer also indicates that GDV is unlikely. Vegetation associated with the Mandora Salt Marsh mound springs has the potential for groundwater dependence.

Refer to Section 8.3.3.2 regarding GDEs.

### 9.3.2.5. Significant Vegetation

- None of the vegetation types identified in the MIA, RAC or regional borefields within the Development Envelope represent Threatened Ecological Communities (TECs) listed under either the EPBC Act, BC Act, or Priority Ecological Communities (PECs) listed by the DBCA (Western Botanical 2023)
- Vegetation units D1, D2, and P1 support Priority flora populations and are considered locally significant (Biota 2021a).

### 9.3.2.6. Vegetation Condition

Table 9-4 describes the vegetation condition within the surveyed sections of the Development Envelope. A complete vegetation condition description will be provided upon completing the supplementary Rimfire, Texas and Wallal surveys.

**Table 9-4: Vegetation Condition of Remnant Vegetation in the Development Envelope**

| Condition | Extent within the Development Envelope (ha) |
|-----------|---|
| Excellent | 36,902                                      |
| Disturbed | 442   |

### 9.3.2.7. Weeds

Weeds are largely absent across the project, with small populations noted in the pastoral lease at the north western section of Nyangumarta Highway. Annual targeted weed monitoring is currently occurring with some recordings of *Cenchrus ciliaris* (Buffel Grass) and *Solanum lycopersicum* (Tomato) around the exploration camp, which have all been manually removed (Western Botanical 2023).

## 9.3.3. Flora

A total of 302 native flora species were recorded within the Development Envelope from 134 genera and 50 families. Ten priority flora species have been encountered during the survey effort, nine of these have been found within the Development Envelope and are detailed in Table 9-5 and shown in Figure 9-2.

The Fabaceae family was the most dominant across the Development Envelope, with a total of 67 different species belonging to this family. This was followed by the Poaceae family, with a total of 44 species. The Acacia was the most prevalent genus across the Project, with 30 Acacia species recorded across the Project to date.

Further detail on flora within Rimfire, Texas and Wallal will be provided upon completing the additional supplementary surveys.

### 9.3.3.1. Threatened, Priority and Other Significant Flora

*Seringia exastia* was recorded within the surveyed sections of the Development Envelope Biota (2021a). This species was formerly listed as Threatened under the BC Act but has been re-classified as non-threatened, as it has been merged with ex-*Seringia elliptica*. This species is still currently listed as Critically Endangered under the EPBC Act; however, the Proponent expects this classification to change in line with the State conservation ranking (pers com. M. Smith [DBCA] 2020). This referral does not address this species.

During recent surveys of Rimfire and Texas, the species *?Brachyachne anisocarpa* was encountered, which is not currently recognised in Western Australia. "Although *B. anisocarpa* is known to occur in Western Australia (based on the Petheram specimen in NT) there are currently no specimens of the species in the Western Australian Herbarium (R.Barrett, pers. comm.)..."

“Due to the paucity of collections, a coding of data deficient is suggested. Given the vast tracts of country that could support the species, it is probable that further fieldwork will reveal that this taxon is neither rare nor threatened. Although known populations are highly localised, plants within a population can be locally abundant. For Western Australia, it will be listed as Priority One under Conservation Codes for Western Australian Flora (Tanya Llorens, pers. comm.)...” (Western Botanical 2023).

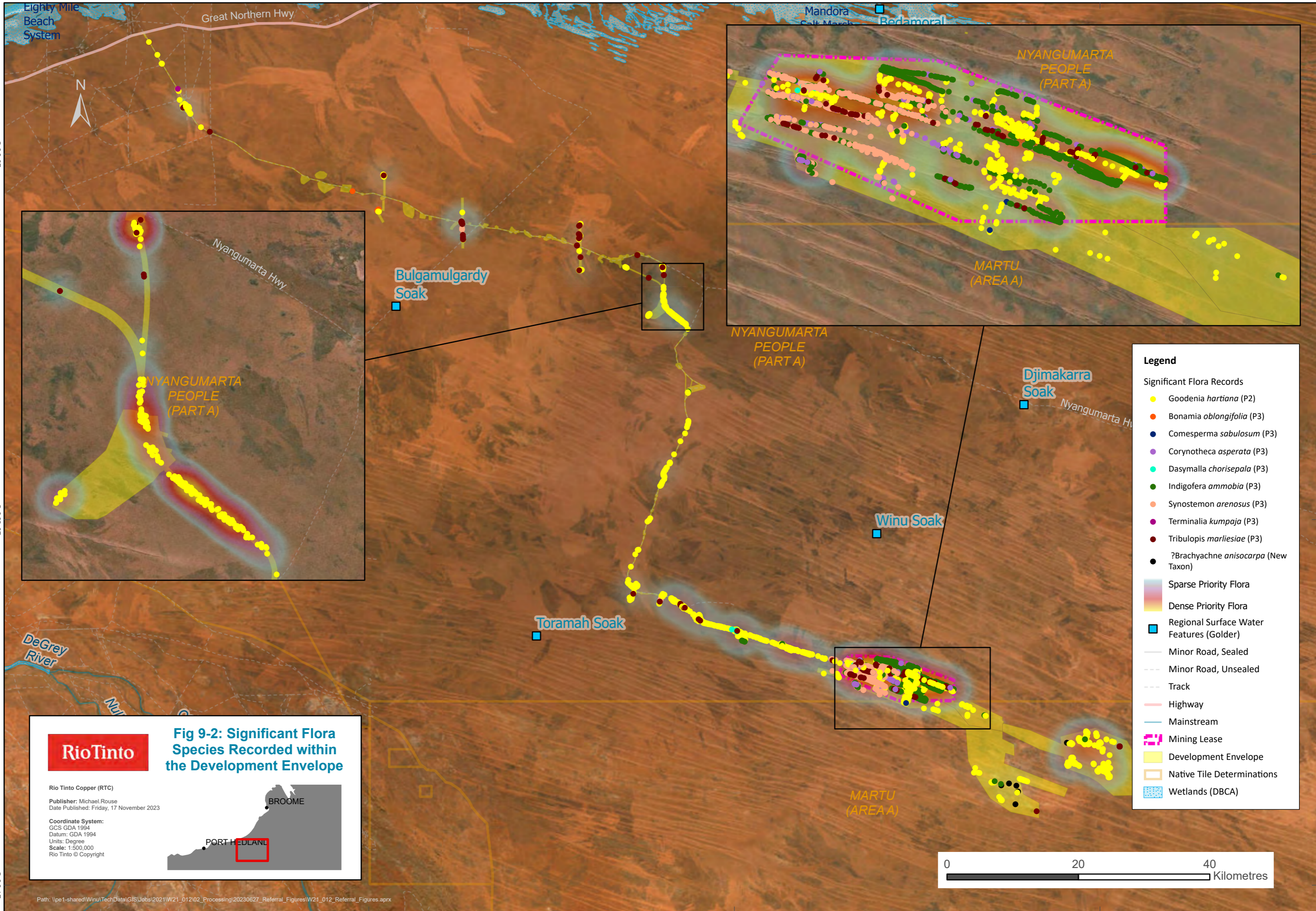
Additional targeted survey work will be undertaken at Rimfire and Texas to quantify these populations before the ERD submission.

One Priority 2 and eight Priority 3 taxa were identified in the surveyed sections of the Development Envelope (Astron 2019; Biota 2021a; Western Botanical 2023). The Priority 2 species *Goodenia hartiana* was the most abundant and occurred in substantial numbers across numerous plains and vegetation types in both the MIA and RAC. As such, this species is expected to be common within the surrounding area, including the Rimfire and Texas borefields (Biota 2021a). Table 9-5 outlines the Priority flora present within the Development Envelope.

Further detail will be provided on the completion of the regional borefields supplementary surveys.

**Table 9-5: Priority Flora Recorded with the Development Envelope**

| Taxon                          | Priority  |
|--------------------------------|-----------|
| <i>Goodenia hartiana</i>       | P2        |
| <i>Bonamia oblongifolia</i>    | P3        |
| <i>Comesperma sabulosum</i>    | P3        |
| <i>Corynotheca asperata</i>    | P3        |
| <i>Dasymalla chorisepala</i>   | P3        |
| <i>Indigofera ammobia</i>      | P3        |
| <i>Synostemon arenosus</i>     | P3        |
| <i>Terminalia kumpaja</i>      | P3        |
| <i>Tribulopsis marliesiae</i>  | P3        |
| <i>?Brachyachne anisocarpa</i> | New Taxon |



**RioTinto**

**Fig 9-2: Significant Flora Species Recorded within the Development Envelope**

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
 Rio Tinto © Copyright

**Legend**

**Significant Flora Records**

- Goodenia hartiana (P2)
- Bonamia oblongifolia (P3)
- Comesperma sabulosum (P3)
- Corynotheca asperata (P3)
- Dasymalla chorisepala (P3)
- Indigofera ammobia (P3)
- Synostemon arenosus (P3)
- Terminalia kumpaja (P3)
- Tribulopsis marliesiae (P3)
- ?Brachyachne anisocarpa (New Taxon)

**Sparse Priority Flora**

**Dense Priority Flora**

**Regional Surface Water Features (Golder)**

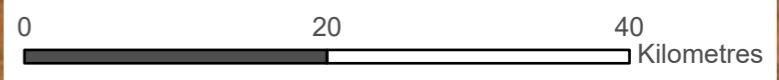
- Minor Road, Sealed
- - - Minor Road, Unsealed
- - - Track
- Highway
- Mainstream

**Mining Lease**

**Development Envelope**

**Native Title Determinations**

**Wetlands (DBCA)**



## 9.4. Potential Environmental Impacts and Mitigation Hierarchy

Potential impacts from the Proposal relevant to Flora and Vegetation are shown in Table 9-6. Table 9-7 outlines the proposed measures to mitigate potential impacts to Flora and Vegetation values associated the Proposal. Relevant details in the table will be updated in subsequent stages of assessment on completion of the Rimfire and Texas surveys.

**Table 9-6: Flora and Vegetation - Potential Environmental Impacts**

| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|---------------------------------|---|--|
| Direct                          | Clearing of native vegetation   | Clearing up to 4,868 ha of native vegetation   |
|                                 | Clearing of individuals of Priority and other significant flora species   | <p>Potential disturbance of significant flora species including:</p> <ul style="list-style-type: none"> <li>• <i>Goodenia hartiana</i> (P2)</li> <li>• <i>Bonamia oblongifolia</i> (P3)</li> <li>• <i>Comesperma sabulosum</i> (P3)</li> <li>• <i>Corynotheca asperata</i> (P3)</li> <li>• <i>Dasymalla chorisepala</i> (P3)</li> <li>• <i>Indigofera ammobia</i> (P3)</li> <li>• <i>Synostemon arenosus</i> (P3)</li> <li>• <i>Terminalia kumpaja</i> (P3)</li> <li>• <i>Tribulopsis marliesiae</i> (P3)</li> <li>• ?<i>Brachyachne anisocarpa</i> (New Taxon)</li> </ul> |
| Indirect                        | Degradation or alteration of GDEs and GDV as a result of groundwater drawdown from mine pit dewatering and abstraction for water supply | <p>No GDEs or GDV have been identified within the Development Envelope to date</p> <p>Groundwater abstraction from the Wallal Borefield has the potential to impact mound springs in the Mandora Salt Marsh. The mound springs are potentially fed by groundwater upwelling from the confined Wallal Aquifer. Several ecosystems are dependent on these springs and may also be impacted</p>   |
|                                 | Degradation or alteration of vegetation as a result of altered hydrological regimes   | Potential for the establishment of GDV due to the discharge of excess clean water into infiltration areas. However due to the temporal nature of any discharge, the risk of establishing GDV is very low   |
|                                 | Degradation of vegetation conditions due to the introduction of weed species  | <p>The increased vehicle movement, personnel movements and earthmoving activities associated with implementing the Proposal can introduce weeds into the Development Envelope. Introducing weeds into an area of native vegetation can cause an increase in fuel loads and potentially alter the vegetation's natural fire regimes. Weeds can also cause the degradation of native vegetation, as the weed species outcompete native flora</p> <p>Weeds are largely absent across the project (Western Botanical 2023))</p>  |
|                                 | Degradation of vegetation from dust deposition  | In high wind conditions, dust can be generated during clearing and operation, which may deposit on vegetation and result in the degradation of the native vegetation   |



| Potential Environmental Impacts | Relevant Proposal Elements and their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|--|---|
|                                 | Degradation of Country and sites of social, cultural and heritage significance in regard to flora, along with interference with cultural obligations and spiritual beliefs tied to flora | Addressed in Social Surroundings (Section 7)  |
| Cumulative                      | Clearing of vegetation<br>Clearing of individuals of Priority and other significant flora species  | The Proposal has the potential to cumulatively impact native vegetation and Priority flora species present within the Development Envelope<br><br>All vegetation and Priority flora species that occur or are likely to occur within the Development Envelope may be affected by cumulative impacts from existing or foreseeable projects. Projects within a 100 km radius of the Development Envelope that have publicly available accessible data will be investigated to determine their impact on vegetation and flora species that are relevant to the Proposal during the environmental impact assessment |

**Table 9-7: Flora and Vegetation - Mitigation Hierarchy**

| Mitigation Hierarchy | Proposed Mitigation Measures  | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls  |
|----------------------|---|---|--|
| Avoid                | The Development Envelope and Conceptual Footprint have been designed to avoid areas with high populations of Priority Flora species. Mining Exclusions Zones (MEZs) will be utilised where required, as the Proposal design is refined and as informed by completion of supplementary surveys | No  | <p>Project optimisation and reduction of clearing required is the most effective control to ensure impacts are as low as reasonably practicable. Avoidance is the first and preferred step in the mitigation hierarchy</p> <p>The Proponent will implement an Approvals Request system, a well-established process for Rio Tinto operations, and ensure clearing does not occur in areas of vegetation that are meant to be avoided or beyond authorised limits</p>  |
| Minimise             | The Proponent will minimise clearing within the Development Envelope to the extent mandatory for safe and adequate construction and operation   | No  | This is standard practice, based on the Approvals Request system   |
|                      | The Proponent has commissioned supplementary flora and vegetation surveys to improve understanding of the potential impacts of vegetation clearing and inform refinements in the Conceptual Footprint and/or Development Envelope, as appropriate   | No  | This is standard practice  |
|                      | The Proponent will minimise dust using dust suppression techniques (water carts etc.)   | No  | This is standard practice  |
|                      | The Proponent will develop and implement a co-designed Weed Management Plan (WMP) with the Nyangumarta and Martu Traditional Owners to minimise the introduction and spread of weeds  | No  | <p>This is above standard practice and uses the highest industry benchmark</p> <p>The Weed Management Plan will focus on rigorous prevention controls and include monitoring and eradication where required. Preventative controls will include hygiene and inspection processes for plant and equipment, construction materials and personnel boots and clothing. Complementary to the preventative controls a monitoring program focussing on early detection and eradication will be implemented</p> <p>The Proponent will work with NWAC on supporting regional weed management programs</p> |

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-Making Processes Relevant? | Effectiveness of the Nominated Controls  |
|----------------------|--|---|--|
|                      | Refer to Table 8-5 regarding hydrogeological investigations and modelling and groundwater monitoring, which will inform the assessment and mitigation of impacts to GDEs/GDV   |   |  |
| Rehabilitate         | <p>The Proponent will prepare and regularly update an MCP consistent with DMIRS <i>Guidelines for Preparing Mine Closure Plans</i> (DMIRS 2023b)</p> <p>Topsoil will be recovered and stockpiled before all clearing activities to ensure a surplus of growth media available for revegetation of disturbed lands and permanent landforms post-mining</p> <p>The Proponent commits to undertake progressive rehabilitation to minimise cleared areas and revegetate using local native species. The MCP will include a Closure Objective to ensure that vegetation on rehabilitated land is self-sustaining and compatible with the final land use</p> | Yes – DMIRS for implementation of the MCP     | <p>These measures follow the Statutory Guidelines for MCPs and are consistent with industry-leading practices</p> <p>The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes (DMIRS 2023b)</p> <p>Rehabilitation will be required to provide a vegetated and stable landform with habitat features. However, the uncertainty in relation to the re-creation of habitat values following mining is acknowledged. Therefore, clearing is treated as a long-term or permanent impact for this assessment</p> <p>The Proponent is currently undertaking location-specific research to improve topsoil management strategies that will help optimise the quality of stored topsoil at closure and reduce the area required for storage</p> |

## 9.5. Assessment and Significance of Residual Direct and Indirect Impacts

Table 9-8 outlines the likely residual impacts on flora and vegetation values as a result of the Proposal.

**Table 9-8: Assessment and Significance of Residual Direct and Indirect Impacts on Flora and Vegetation**

|  | Assessment  | Conclusion on Significance  |
|--|---|---|
| <b>Assessment and Significance of Residual Direct and Indirect Impacts</b> | The progressive clearing of up to 4,868 ha of native vegetation within the Development Envelope   | Expected to be considered significant   |
|  | The progressive clearing of individual Priority flora species   | Expected to be considered significant   |
|  | Degradation or alteration of vegetation as a result of altered hydrological regimes. All surface water discharge will be discharged into an infiltration area. Any surface expression from infiltration will stay within the Development Envelope. There is potential for GDVs to establish in areas surrounding infiltration temporarily. However, due to the temporal nature of any discharge, the risk of establishing GDV is very low | Not expected to be significant  |
|  | Alteration of groundwater levels for mine pit dewatering and water supply within the MIA is not expected to impact any GDEs/GDV. Drawdown extent is predicted to be limited to the immediate surrounding of MIA (Section 8). All known and potential GDEs/GDV is predicted to be beyond the drawdown extent of the Proposal   | Not expected to be considered significant. No impact to GDEs/GDV are anticipated<br><br>Additional surveys will be undertaken to quantify potential impacts and inform mitigation measures      |
|  | The potential for localised impacts from the introduction of weeds  | Potential to be significant, in the context of the current excellent flora and vegetation condition.<br><br>This is dependent on the application of mitigation and control measures (Table 9-7) |
|  | The potential for localised impacts from dust   | Not expected to be considered significant due to the application of mitigation measures and controls (Table 9-7)  |

## 9.6. Assessment and Significance of Residual Cumulative Impacts

The Proposal will clear up to 4,868 ha of native vegetation within the 37,344 ha Development Envelope of which – based on the completed survey data – 36,902 ha is in Excellent condition. The currently mapped vegetation within the Development Envelope comprises 5 vegetation associations based on Beard (1975) mapping. Each vegetation association represents approximately 0.24% (GSD134), 0.09% (ME101), 0.65% (ME117), 0.37% (ME80) and 0.05% (P32) of the current pre-European extent within the 3 subregions. These estimates will be updated upon completing the supplementary surveys and confirming any further available data from existing and reasonably foreseeable projects.

The National Objectives and Targets for Biodiversity Conservation include avoiding clearance of existing vegetation with a pre-European extent below 30% (Commonwealth of Australia 2001).

Based on current mapping and noting the relatively limited extent of clearing expected concerning reasonably foreseeable projects, the Proposal is expected to have negligible cumulative effects at the regional scale, with approximately 99.5% of native vegetation estimated to remain intact within the three subregions following the implementation of the Proposal, including at least 94.7% of the pre-European extent of each vegetation association expected to remain intact.

Clearing vegetation in Excellent condition is considered a significant impact even though the remaining extent of vegetation associations potentially impacted by the Proposal and their representation in areas managed for conservation indicates no significant residual impacts on vegetation at the regional scale.

## **9.7. Likely Environmental Outcome**

Considering the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Flora and Vegetation include:

- The Proponent shall clear no more than 4,868 ha of native vegetation in Excellent condition.

The Proponent considers that the Proposal can be managed to meet the EPA's objective to protect flora and vegetation to maintain biological diversity and ecological integrity.

## 10. TERRESTRIAL FAUNA

### 10.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Terrestrial Fauna:

**To protect terrestrial fauna so that biological diversity and ecological integrity are maintained**

For assessment by the EPA, terrestrial fauna is defined as animals living on land or using land for all or part of their lives. Terrestrial fauna includes vertebrates (birds, mammals including bats, reptiles and amphibians) and invertebrates (arachnids, crustaceans, insects, molluscs and worms) (EPA 2016c). Aquatic fauna are not expected to be relevant to this Proposal and, therefore, are not addressed further.

Fauna habitat is defined as the natural environment of an animal or assemblage of animals, including biotic and abiotic elements, that provides a suitable place for them to live (e.g. breed, forage, roost or seek refuge) (EPA 2016c).

### 10.2. Relevant Policy and Guidance

Terrestrial Fauna policy and guidance considered relevant for this Proposal include:

- Statement of Environmental Principles, Factors and Objectives (EPA 2023a)
- Environmental Factor Guideline: Terrestrial Fauna (EPA 2016c)
- Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020)
- Technical Guidance: Sampling of Short-Range Endemic Invertebrate Fauna (EPA 2016d)
- EPBC Act referral guideline for the endangered Northern Quoll (*Dasyurus hallucatus*) (DoE 2016)
- Guidelines for surveys to detect the presence of Bilbies and assess the importance of habitat in Western Australia (DBCA 2017)
- Interim guideline for the preliminary surveys of Night Parrot (*Pezoporus occidentalis*) in Western Australia (DPaW 2017)
- Survey guidelines for Australia's threatened bats (DEWHA 2010a)
- Survey guidelines for Australia's threatened birds (DEWHA 2010b)
- Survey guidelines for Australia's threatened mammals (DSEWPC 2011a)
- Survey guidelines for Australia's threatened reptiles (DSEWPC 2011b)
- Survey guidelines for Australia's threatened frogs (DEWHA 2010c)
- Matters of National Environmental Significance Significant Impact Guidelines 1.1 (DoE 2013).

### 10.3. Receiving Environment

#### 10.3.1. Studies

Table 10-1 provides the location, types and timing for each of the surveys/studies and summarises their limitations and to which guidelines/policies they are considered to be in accordance. Figure 10-1 shows the survey coverage and sampling effort within and surrounding the Development Envelope.

Supplementary surveys are planned for Rimfire, Texas and Wallal to establish a complete image of the fauna species and habitat within the entire Development Envelope.

Table 10-1: Summary of Technical Studies for Terrestrial Fauna Environmental Factor

| Location within the Development Envelope | Survey Description   | Survey Dates   | Season   |
|--|--|--|--|
| MIA                                      | Two-phase Level 2 fauna survey   | Phase 1: 12 – 20 May 2019<br>Phase 2: 18 – 25 September 2019           | Phase 1 slightly later than optimal for reptiles (September – April) for Great Sandy Desert region<br>Phase 2 within optimal range |
|  | Level 1 habitat assessment<br>Desktop and targeted survey  | 15 – 17 July 2022  | N/A  |
|  | Targeted survey, Bilby population abundance and occupancy modelling  | 19 and 21 July 2021  | Targeted survey timing not constrained for mammals   |
| RAC                                      | Level 1 reconnaissance, fauna habitat mapping, targeted Bilby assessment and Black-footed Rock-wallaby assessment  | 24 and 26 August 2019<br>22 and 26 September 2019<br>12 – 20 July 2020 | Targeted survey timing not constrained for mammal  |
|  | Two-phase Level 2 fauna survey completed as part of the AREH project   | Phase 1: 24 August – 5 September 2017<br>Phase 2: 13 – 21 March 2018   | Both phases fall within the optimal range for reptile detection (September – April)  |
|  | Targeted fauna survey to comply with Native Vegetation Clearing Permit   | 25 – 28 July 2023  | Targeted survey timing not constrained for mammals   |
| MIA and adjoining area to the north      | Basic and targeted<br>Foot traverses to map the broad habitat types present<br>Unbounded transect searches in unburnt habitat to record sign evidence of the Bilby | 15 - 16 July 2020  | Targeted survey timing not constrained for mammals   |

| Location within the Development Envelope          | Survey Description   | Survey Dates      | Season   |
|---|--|-------------------|--|
| Adjoining areas to the north and south of the MIA | Basic and targeted assessment primarily for the detection of Bilby, Northern Marsupial Mole and Night Parrot<br>Habitat assessment | 15 – 17 July 2022 | Targeted survey timing not constrained for mammals |
| Proposed Borefields - Texas and Rimfire           | Targeted fauna survey and habitat assessment   | 16 – 22 July 2022 | Targeted survey timing not constrained for mammals |
| Wallal Borefield                                  | Basic and targeted fauna survey  | 19 – 28 July 2023 | Targeted survey timing not constrained for mammals |

A consolidated report containing all surveys/studies for the Winu project will be provided with the Environmental Review Document.



121°0'0"E

121°30'0"E

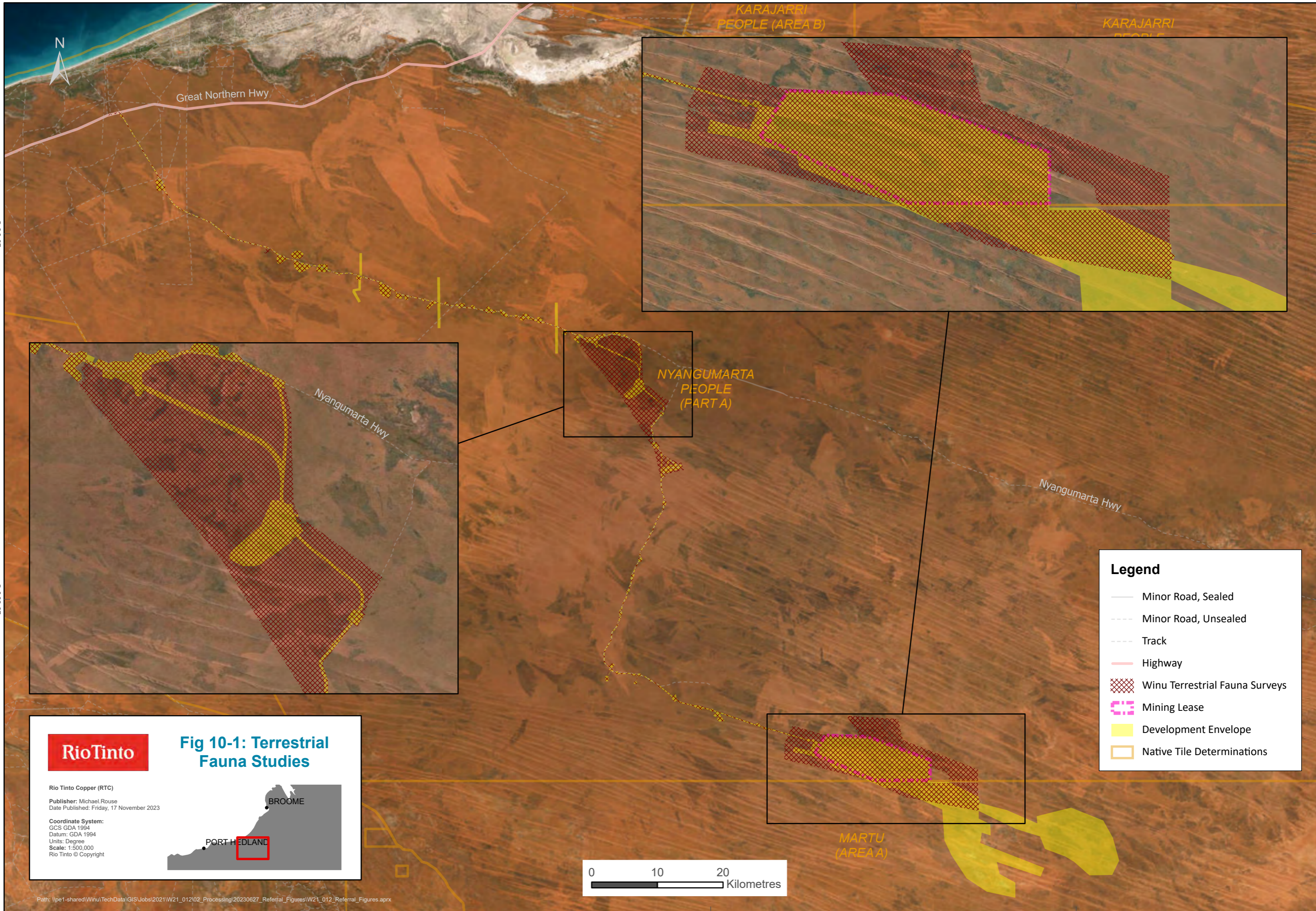
122°0'0"E

20°0'0"S

20°30'0"S

20°0'0"S

20°30'0"S



KARAJARRI  
PEOPLE (AREA B)

KARAJARRI  
PEOPLE

Great Northern Hwy

NYANGUMARTA  
PEOPLE  
(PART A)

Nyangumarta Hwy

Nyangumarta Hwy

MARTU  
(AREA A)

### Legend

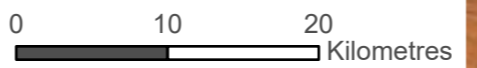
- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Winu Terrestrial Fauna Surveys
- Mining Lease
- Development Envelope
- Native Tile Determinations



### Fig 10-1: Terrestrial Fauna Studies

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
 Rio Tinto © Copyright



121°0'0"E

121°30'0"E

122°0'0"E

### 10.3.2. Fauna Habitat

No significant habitat features such as rock piles, caves or surface water pools have been identified within the Development Envelope to date. A small (approximately 1 ha) area of rocky outcropping was identified within the RAC that has the potential to be utilised by the Northern Quoll, although is not considered core habitat. This habitat area is not considered structurally complex enough to provide shelter to Black-footed Rock-wallaby and would not represent habitat for that species.

Seven broad fauna habitat types have been mapped across the Development Envelope (Figure 10-2):

- Clayey Sand Plain with Termitaria
- Ephemeral Claypan
- Gravelly Lateritic Rises
- Inland Sand Dunes
- Rocky Outcropping
- Disturbed/cleared
- Shrub and Spinifex on Sandplain.

Fauna habitat within Rimfire, Texas and Wallal will be described on completion of the planned surveys.

121°0'0"E

121°30'0"E

122°0'0"E

20°0'0"S

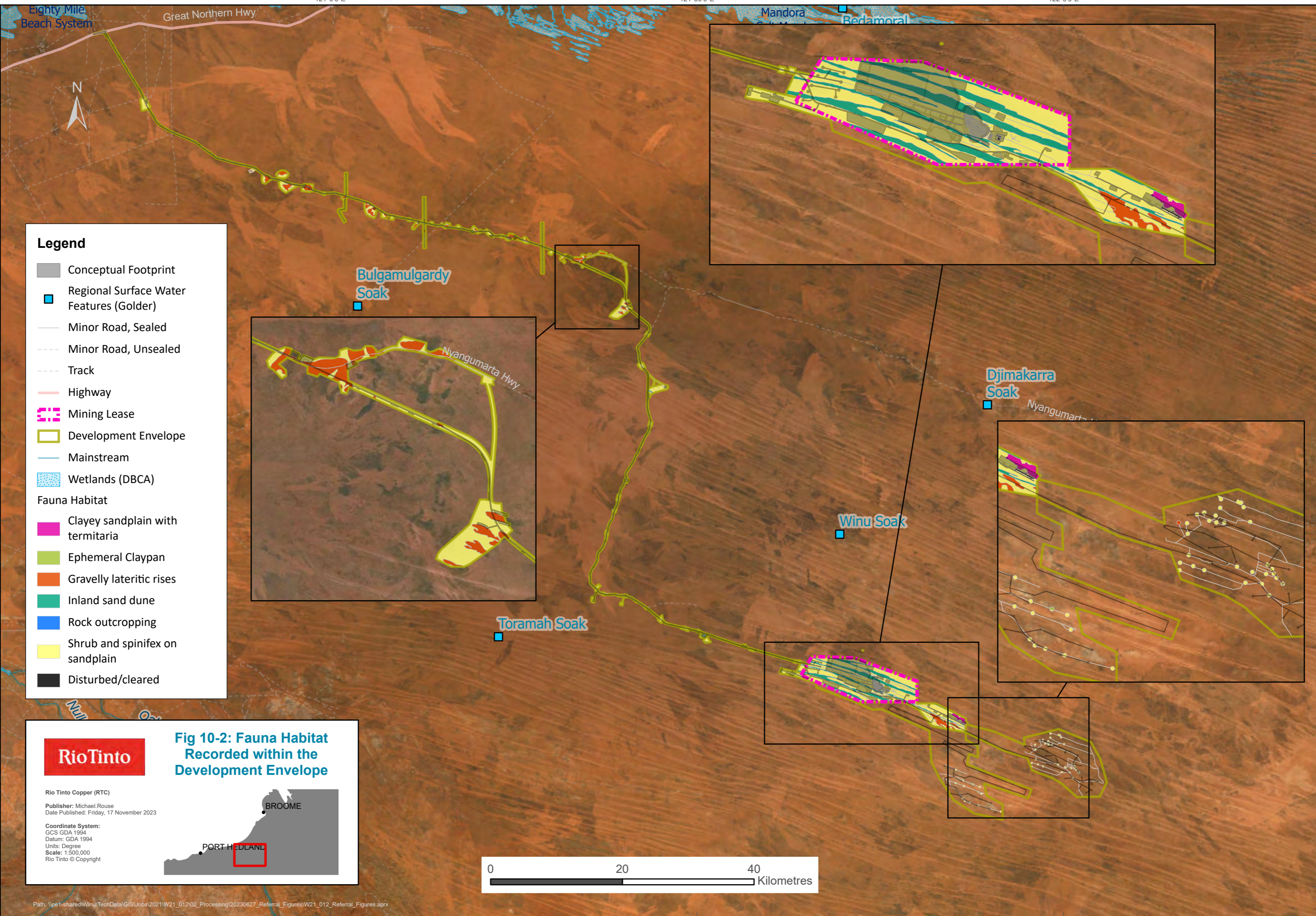
20°0'0"S

20°30'0"S

20°30'0"S

21°0'0"S

21°0'0"S



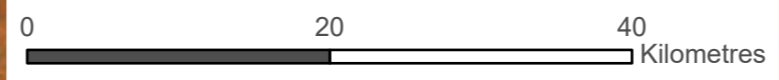
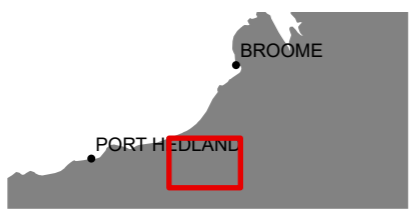
**Legend**

- Conceptual Footprint
- Regional Surface Water Features (Golder)
- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Mining Lease
- Development Envelope
- Mainstream
- Wetlands (DBCA)
- Fauna Habitat**
- Clayey sandplain with termitaria
- Ephemeral Claypan
- Gravelly lateritic rises
- Inland sand dune
- Rock outcropping
- Shrub and spinifex on sandplain
- Disturbed/cleared



**Fig 10-2: Fauna Habitat Recorded within the Development Envelope**

Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023  
 Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
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### 10.3.3. Vertebrate Fauna Assemblage and Species Diversity

A total of 157 vertebrate fauna species have been recorded to date within the Development Envelope (Table 10-2; Figure 10-3).

**Table 10-2: Summary of Vertebrate Fauna Species**

| Fauna Group             | Status     | Number of Species | Number of Conservation Significant Species |
|-------------------------|------------|-------------------|--|
| Amphibians              | Native     | 1                 | -  |
| Reptiles                | Native     | 72                | 1  |
| Ground-dwelling Mammals | Native     | 15                | 4  |
|                         | Introduced | 5                 | -  |
| Bats                    | Native     | 5                 | -  |
| Birds                   | Native     | 59                | 3  |
| <b>Total</b>            |            | <b>157</b>        | <b>8</b>                                   |

During the surveys, a similar total of 154 species were recorded from the locality outside the Development Envelope, with a very similar species composition to that recorded within the Development Envelope. This includes seven additional significant species which, while not confirmed from within the Development Envelope, provide contextual information for the Winu Project and were used to inform likelihood of occurrence assessments in the Development Envelope.

#### Regional Borefields

Details on the vertebrate fauna assemblage for Wallal, Rimfire and Texas will be provided upon completion of the relevant surveys.

#### 10.3.3.1. Significant Vertebrate Fauna

Table 10-3 presents a likelihood of occurrence assessment for significant vertebrate fauna within surveyed sections of the Development Envelope.

Table 10-3: Significant Fauna Recorded or Considered Likely or May Occur within the Development Envelope

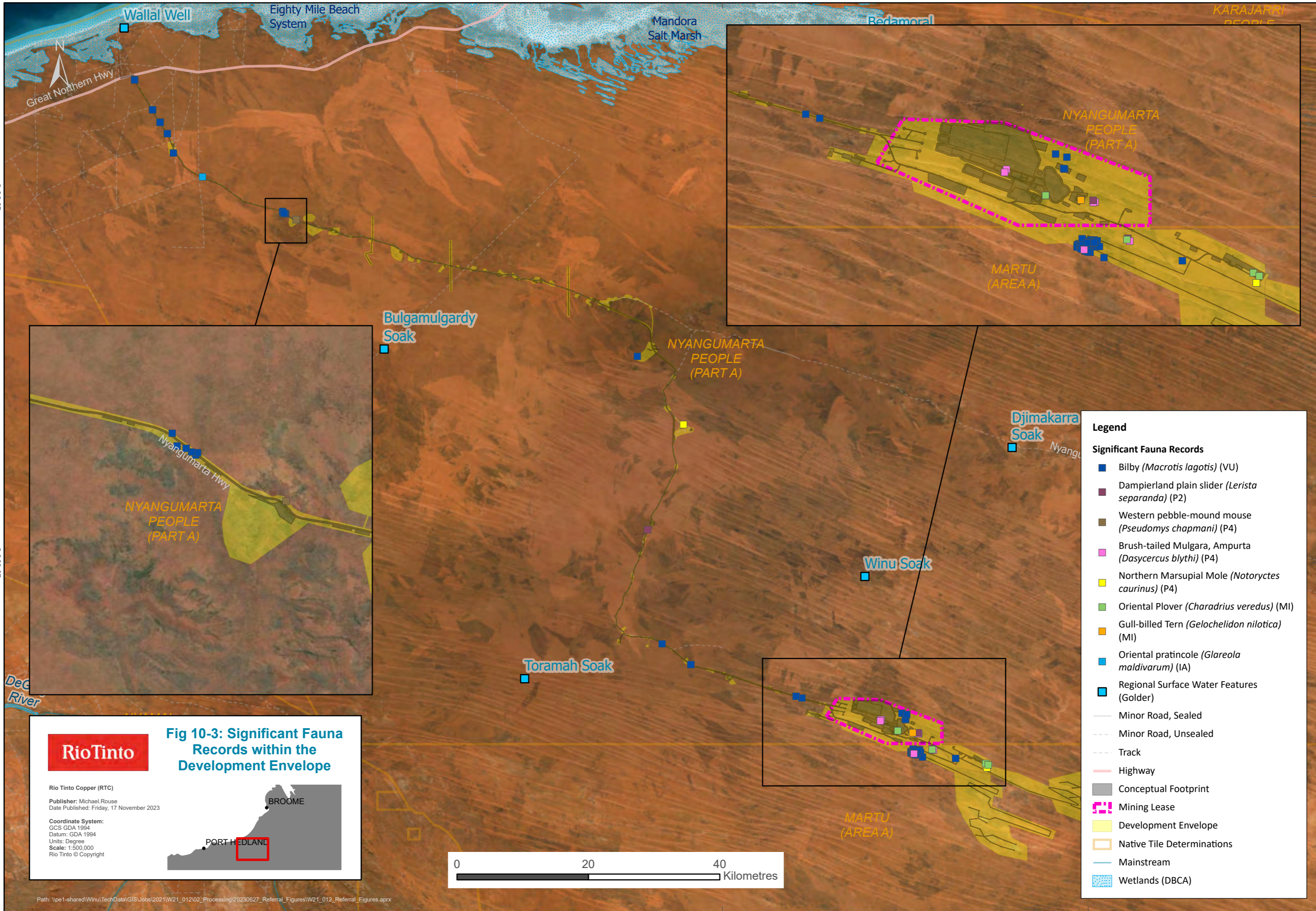
| Species  | Conservation Status              | Presence within Development Envelope                            | Comment  |
|--|----------------------------------|---|--|
| <b>Mammals</b>   |                                  |   |  |
| Black-footed Rock-wallaby/Moororong ( <i>Petrogale lateralis lateralis</i> ) | Endangered (EPBC Act and BC Act) | <b>Likely to Occur</b> within RAC                               | This species is known to occur in a series of isolated, patchily distributed populations in Western Australia and the Northern Territory (Biota 2023a). Records from immediately outside the RAC section of the Development Envelope occur within the small area of rockpiles that are scattered throughout this locality  |
| Northern Quoll ( <i>Dasyurus hallucatus</i> )                                | Endangered (EPBC Act and BC Act) | <b>Likely to Occur</b> within RAC                               | The species is known to occur throughout the Pilbara and north-west Kimberley regions of Western Australia. Although the species has been recorded immediately adjacent to the Development Envelope, it is considered likely that the species only occurs primarily as a transient visitor and/or at low density, given the paucity of records despite extensive survey effort (Biota 2023a)   |
| Bilby ( <i>Macrotis lagotis</i> )  | Vulnerable (EPBC Act and BC Act) | <b>Recorded</b> within MIA and RAC                              | This species often occupies only temporary home ranges and relatively rapid changes in distribution have been observed in response to habitat resources. Evidence of the Bilby was recorded from burrows, scats and diggings at the western and eastern ends of the Development Envelope, within the Shrub and spinifex on sandplain habitat type. Although suitable habitat was found and searched extensively, no further evidence was found over the remainder of the Development Envelope (Biota 2023a)                            |
| Northern Marsupial Mole ( <i>Notoryctes caurinus</i> )                       | Priority 4 (DBCA)                | <b>Recorded</b> within MIA and RAC                              | This species is adapted to an almost entirely subterranean habitat, inhabiting dunes and, to a lesser extent, adjacent swales where sand is suitably deep and loose. The Northern Marsupial Mole is cryptic in nature. Mole holes have been recorded within the Development Envelope (Biota 2023a)   |
| Brush-tailed Mulgara ( <i>Dasyercus blythi</i> )                             | Priority 4 (DBCA)                | <b>Recorded</b> within MIA<br><b>Likely to Occur</b> within RAC | This species is known to inhabit spinifex grasslands on sandy plains and sandy swale between low dunes from south-western Queensland across the Simpson, Tanami and Great Sandy Deserts of southern and central Northern Territory and central Western Australia. It is also known to inhabit areas on gibber (rock and pebble covered flat plains). It is closely associated with gently sloping to flat topographic positions rather than steep-sided sand ridges (Pavey et al. 2011). This species has been recorded within the MIA |

| Species   | Conservation Status              | Presence within Development Envelope | Comment   |
|---|----------------------------------|--------------------------------------|---|
| Western Pebble-mound Mouse ( <i>Pseudomys chapmani</i> )                  | Priority 4 (DBCA)                | <b>Recorded</b> within RAC           | This species occurs on gentle slopes of rocky ranges where hard spinifex covers the ground with a stony mantle and vegetation. The Western Pebble-mound Mouse is known to occur widely throughout the Pilbara region and into the Gascoyne. Both active and inactive mounds have been recorded within the within the western portion of the Development Envelope from Gravelly laterite rises habitat   |
| Spectacled Hare-wallaby ( <i>Lagorchestes conspicillatus leichardti</i> ) | Priority 4 (DBCA)                | <b>Likely to Occur</b>               | There are scattered records of this species from the Kimberley and Pilbara regions of Western Australia. This species was recorded via tracks from one location in the locality surrounding the DE. This species can be hard to detect and is most commonly recorded incidentally when flushed from its daytime shelter in spinifex hummocks. Considerable walking of spinifex habitat targeting the Bilby was conducted during the current survey, with no more detections found (Biota 2023a)   |
| Short-tailed Mouse ( <i>Leggadina lakedownensis</i> )                     | Priority 4 (DBCA)                | <b>May Occur</b> within RAC          | In Western Australia the distribution of <i>Leggadina lakedownensis</i> includes the Pilbara and Kimberley regions (Menkhorst and Knight 2011) although historical NatureMap records also place it within the Great Sandy Desert. Regional records suggest the primary habitat for the species includes areas of cracking clay and adjacent habitats. However, other sources indicate habitat also includes open tussock and hummock grassland areas, Acacia shrubland and savannah woodlands, sandy soils and cracking clays (Morris et al. 2008). Some areas of mixed grasslands and shrublands occur through undisturbed portions of the RAC, although these are not entirely typical habitat for this species. Given this, a precautionary assessment was that this species may occur (Biota 2023a)   |
| <b>Reptiles</b>   |                                  |                                      |   |
| Great Desert Skink ( <i>Liopholis kintorei</i> )                          | Vulnerable (EPBC Act and BC Act) | <b>Unlikely to Occur</b> within RAC  | <p>This species has a patchy distribution in the Great Sandy Desert, Gibson Desert and Tanami Desert. It occurs in various desert habitats on sandy, clay and loamy soils. It is known to inhabit burrow complexes, which are distinctive, especially when latrines are present. Suitable habitat for this species is available throughout undisturbed portions of the Development Envelope</p> <p>While the habitat in the Development Envelope is apparently suitable, there is no evidence the species occurs. The Development Envelope is considerably outside the species' confirmed range, with the nearest record being nearly 200 km away, and the Development Envelope is also considerably outside the EPBC Act modelled range of the species. Extensive survey effort expended in the Development Envelope over a four-year period with no records of this species (Biota 2023a)</p> |

| Species   | Conservation Status   | Presence within Development Envelope | Comment   |
|---|---|--------------------------------------|---|
| Dampierland Plain Slider ( <i>Lerista separanda</i> ) | Priority 2 (DBCAs)  | <b>Recorded</b> within MIA and RAC   | Records of this species are scarce. The records within the Development Envelope indicate that the species' distribution is broader than what was previously known (Biota 2021b)   |
| <b>Birds</b>  |   |                                      |   |
| Night Parrot ( <i>Pezoporus occidentalis</i> )        | Endangered (EPBC Act)<br><br>Critically Endangered (BC Act) | <b>May Occur</b> within MIA          | The preferred nesting habitat of the Night Parrot includes old growth spinifex hummocks, at least 40-50 cm in size. This nesting habitat is likely associated with a favourable foraging habitat, which typically includes chenopod shrubs (Hamilton et al. 2017; Jones 2017). The Development Envelope contains spinifex on sandplain, potentially supporting suitable-sized hummocks for nesting; however, much of the locality has been recently and repeatedly burnt. Fire reduces habitat suitability for the Night Parrot by removing large and mature spinifex hummocks from the landscape. Targeted survey effort has been undertaken for this species and while it is possible that this species may exist within the Development Envelope, no evidence has been recorded, along with no suitable nesting habitat or foraging habitat being recorded (Biota 2023a) |
| Grey Falcon ( <i>Falco hypoleucos</i> )               | Vulnerable (EPBC Act and BC Act)                            | <b>Recorded</b> within MIA           | This species typically occurs in timbered lowland plains, particularly Acacia shrublands near tree-lined watercourses. It has been observed in treeless areas and tussock grassland, open woodland (Garnett et al. 2011). A single record of the species was observed within the MIA. It is likely to occur in the DE as a foraging visitor given the diverse range of habitats utilised, however no suitable nesting habitat (major drainages) is present (Biota 2023a)  |
| Peregrine Falcon ( <i>Falco peregrinus</i> )          | Other specially protected species (BC Act)                  | <b>Likely to occur</b>               | Regional records are known from the locality, however, core breeding habitat in high cliff faces is absent from the DE. The Peregrine Falcon is likely to occur as a foraging visitor in the DE (Biota 2023a)   |
| Princess Parrot ( <i>Polytelis alexandrae</i> )       | Vulnerable (EPBC Act)<br><br>Priority 4 (DBCAs)             | <b>May Occur</b> within MIA          | This species is highly nomadic and occupies eastern deserts of WA. Its nomadic nature means it could be present within the Development Envelope, where it would likely forage on spinifex during seeding events; however, it would not rely on the habitat present within the Development Envelope. This species was not recorded during any of the surveys and there have been no records from the locality  |
| Oriental Pratincole ( <i>Glareola maldivarum</i> )    | Migratory (EPBC Act and BC Act)<br><br>Marine (EPBC Act)    | <b>Recorded</b> within RAC           | This species is a non-breeding migrant to Australia. One specimen was recorded within the Development Envelope. A suitable foraging habitat for the species exists within the Development Envelope; however, it is not considered dependent on the habitat present  |

| Species   | Conservation Status                                  | Presence within Development Envelope                            | Comment  |
|---|--|---|--|
| Oriental Plover ( <i>Charadrius veredus</i> )     | Migratory (EPBC Act and BC Act)<br>Marine (EPBC Act) | <b>Recorded</b> within MIA<br><b>Likely to Occur</b> within RAC | This species forages on and over inland plains. It has been recorded within the Development Envelope and is likely to utilise open plain habitat for foraging on occasion  |
| Gull-billed Tern ( <i>Gelochelidon nilotica</i> ) | Migratory (EPBC Act and BC Act)<br>Marine (EPBC Act) | <b>Recorded</b> within MIA                                      | The Australian Gull-billed Tern is a nomadic species that occurs widely across Australia. The species was recorded in the MIA and is considered likely to forage within the MIA only after large rainfall events. Breeding habitat is not expected to occur  |
| Fork-tailed Swift ( <i>Apus pacificus</i> )       | Migratory (EPBC Act and BC Act)                      | <b>Likely to Occur</b>  | The Pacific Swift has been recorded from the locality surrounding the Development Envelope. No other regional records were identified during the desktop review. Still, the species occurs widely over the Kimberley, and the survey area falls within published distributions of the species (e.g. Johnstone and Storr 1998, Menkhorst et al. 2017). It is likely to occur in the airspace over the Development Envelope sporadically between September and April (Biota 2023a) |
| Little Curlew ( <i>Numenius minutus</i> )         | Migratory (EPBC Act and BC Act)<br>Marine (EPBC Act) | <b>Likely to Occur</b> within RAC                               | This species forages in large numbers on and over the plains inland from Eighty Mile Beach and Broome (approximately 250 km north of the Development Envelope); some suitable habitat exists within the Development Envelope. This species is considered likely to occur in the DE as a non-breeding visitor, primarily from September to April (Biota 2023a)  |
| Barn Swallow ( <i>Hirundo rustica</i> )           | Migratory (EPBC Act and BC Act)                      | <b>May Occur</b>  | Although no Barn Swallows were recorded during any of the surveys, suitable habitat in the form of open country, low vegetation and man-made structures is present within the Development Envelope, and there are known historical records from the locality (Biota 2023a)   |

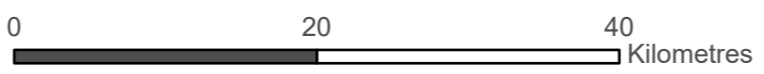
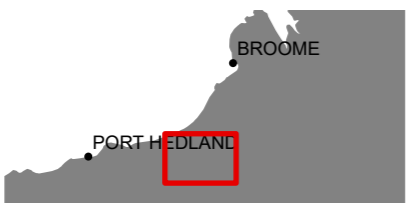




**Fig 10-3: Significant Fauna Records within the Development Envelope**



Rio Tinto Copper (RTC)  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023  
 Coordinate System:  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:500,000  
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- Legend**
- Significant Fauna Records**
- Bilby (*Macrotis lagotis*) (VU)
  - Dampierland plain slider (*Lerista separanda*) (P2)
  - Western pebble-mound mouse (*Pseudomys chapmani*) (P4)
  - Brush-tailed Mulgara, Ampurta (*Dasycercus blythi*) (P4)
  - Northern Marsupial Mole (*Notoryctes caurinus*) (P4)
  - Oriental Plover (*Charadrius veredus*) (M1)
  - Gull-billed Tern (*Gelochelidon nilotica*) (M1)
  - Oriental pratincole (*Glareola maldivarum*) (IA)
  - Regional Surface Water Features (Golder)
  - Minor Road, Sealed
  - Minor Road, Unsealed
  - Track
  - Highway
  - Conceptual Footprint
  - Mining Lease
  - Development Envelope
  - Native Tile Determinations
  - Mainstream
  - Wetlands (DBCAs)

### 10.3.4. Short-range Endemic Invertebrate Fauna

#### 10.3.4.1. Regional Context

Short-range endemism refers to the restriction of a species’ distribution at a local scale. It is influenced by several factors, including life history, physiology, habitat requirements, dispersal capabilities, biotic and abiotic interactions and historical conditions (Harvey 2002).

Some better documented short-range endemic (SRE) invertebrate fauna species have been listed under State or Commonwealth legislation or as Priority species by the DBCA; however, most SRE species have not been listed, often due to a lack of data. In the absence of formal listings, fauna belonging to groups prone to short-range endemism are assigned an SRE status: Confirmed SRE, Potential SRE or widespread (i.e. not an SRE). This categorisation indicates the potential for distribution restriction and, thus, informal conservation significance. These groupings are based on the Western Australian Museum’s (WAM) categorisation for SRE invertebrates. As many SRE invertebrate fauna are taxonomically poorly known, the majority of morphospecies or molecular taxa are assigned to ‘Potential SREs’ and often fall within one (or several) of the five ‘Potential SRE’ sub-categories described in Table 10-4 (i.e. data deficient, habitat indicators, morphology indicators, molecular evidence and/or research/expertise).

**Table 10-4: SRE Categorisation Used by WAM Taxonomists**

| Distribution                         | Taxonomic Certainty  | Taxonomic Uncertainty   |
|--------------------------------------|--|---|
| Distribution <10,000 km <sup>2</sup> | <p><b>Confirmed SRE:</b></p> <ul style="list-style-type: none"> <li>• A known distribution of &lt;10,000 km<sup>2</sup></li> <li>• Taxonomy well-known group is represented in collections and/or via comprehensive sampling</li> </ul>                | <p><b>Potential SRE:</b></p> <ul style="list-style-type: none"> <li>• Patchy sampling resulting in incomplete knowledge of geographic distribution</li> <li>• Incomplete taxonomic knowledge</li> <li>• Group not well represented in collections</li> <li>• Category applies where there are significant knowledge gaps</li> </ul> <p><b>Potential SRE sub-categories (may apply):</b></p> <ul style="list-style-type: none"> <li>• Data deficient</li> <li>• Habitat indicators</li> <li>• Morphology indicators</li> <li>• Molecular evidence</li> <li>• Research and expertise</li> </ul> |
| Distribution >10,000 km <sup>2</sup> | <p><b>Widespread (not an SRE):</b></p> <ul style="list-style-type: none"> <li>• A known distribution of &gt;10,000 km<sup>2</sup></li> <li>• Taxonomy well known group is well represented in collections and/or via comprehensive sampling</li> </ul> | N/A   |

#### 10.3.4.2. SRE Invertebrate Fauna Habitat

Potential SRE species have been identified within the Development Envelope to date (Section 10.3.4.3). The broader fauna habitats described in Section 10.3.2 provide potential SRE habitat.

**10.3.4.3. SRE Invertebrate Fauna Assemblage, Species Diversity and potential SRE Invertebrate Fauna Records**

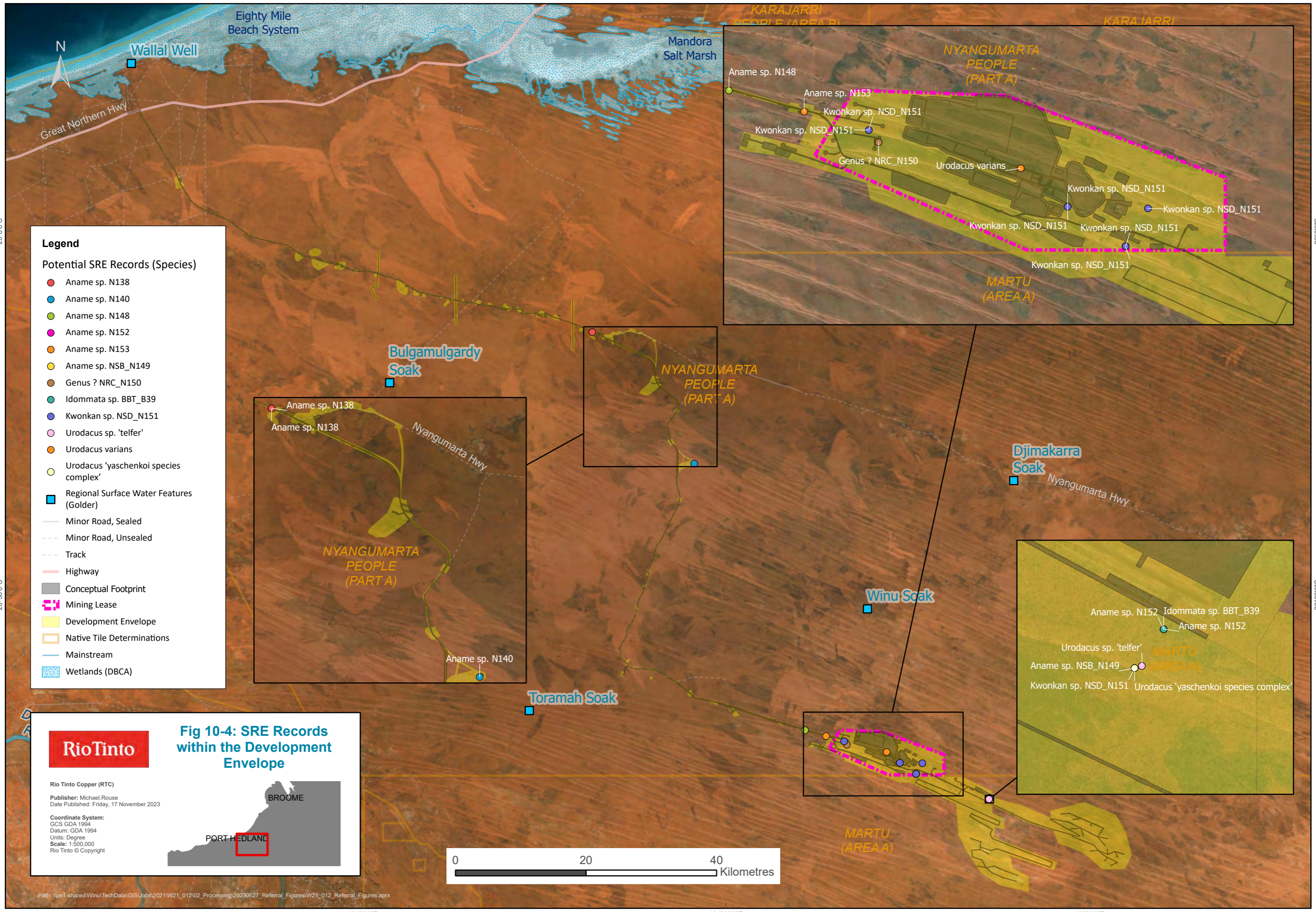
A total of 15 species belonging to invertebrate groups prone to short-range endemism have been recorded from the Development Envelope, comprising ten mygalomorph (trapdoor) spider species and five scorpion species (Table 10-5; Figure 10-4).

Nine of the mygalomorph species are newly recorded and known only from within the Development Envelope and are thereby potential SREs. Three scorpion taxa are also potential SREs but have been previously recorded outside the Development Envelope from elsewhere in the region. The remaining three species are widespread and are not considered SREs. These latter results are consistent with the overall character of the landscape within and adjoining the Development Envelope, which is dominated by very extensive and contiguous sandplain and interconnected linear dune habitats. These landforms have no obvious geographic barriers to dispersal that might restrict gene flow and promote short-range endemism (EPA 2016d), suggesting the low risk of species being restricted in distribution at a very small scale.

Therefore, while the nine newly detected species are conservatively treated here as potential SREs, it is probable that they are also more widely distributed. While all were recorded from small numbers of specimens, which hampers a true assessment of distributions, an assessment can be derived by considering the habitats from which the records were obtained within the development envelope and their predicted clearing impacts.

**Table 10-5: Potential SREs Recorded within the Development Envelope**

| Family              | Potential SRE Species                         | SRE Status    |
|---------------------|---|---------------|
| <b>Barychelidae</b> | <i>Idommata</i> sp. BBT_B39                   | Potential SRE |
| <b>Nemesiidae</b>   | <i>Aname</i> N138                             | Potential SRE |
|                     | <i>Aname</i> N140                             | Potential SRE |
|                     | <i>Aname</i> N7                               | Not an SRE    |
|                     | <i>Aname</i> sp. N148                         | Potential SRE |
|                     | <i>Aname</i> sp. N149                         | Potential SRE |
|                     | <i>Aname</i> sp. N152                         | Potential SRE |
|                     | <i>Aname</i> sp. N153                         | Potential SRE |
|                     | Genus? sp. N150                               | Potential SRE |
|                     | <i>Kwonkan</i> sp. N151                       | Potential SRE |
| <b>Buthidae</b>     | <i>Lychas adonis</i>                          | Not an SRE    |
|                     | <i>Lychas annulatus</i>                       | Not an SRE    |
| <b>Urodacidae</b>   | <i>Urodacus varians</i>                       | Potential SRE |
|                     | <i>Urodacus</i> sp. 'telfer'                  | Potential SRE |
|                     | <i>Urodacus</i> 'yaschenkoi' species complex' | Potential SRE |



**Legend**

**Potential SRE Records (Species)**

- Aname sp. N138
- Aname sp. N140
- Aname sp. N148
- Aname sp. N152
- Aname sp. N153
- Aname sp. NSB\_N149
- Genus ? NRC\_N150
- Idommata sp. BBT\_B39
- Kwonkan sp. NSD\_N151
- Urodacus sp. 'telfer'
- Urodacus varians
- Urodacus 'yaschenkoi species complex'

**Regional Surface Water Features (Golder)**

- Bulgamulgardy Soak
- Winu Soak
- Toramah Soak
- Djimakarra Soak

**Infrastructure**

- Minor Road, Sealed
- - - Minor Road, Unsealed
- - - Track
- Highway

**Other Features**

- Conceptual Footprint
- Mining Lease
- Development Envelope
- Native Tile Determinations
- Mainstream
- Wetlands (DBCA)

**NYANGUMARTA PEOPLE (PART A)**

**MARTU (AREA A)**

**KARAJARRI PEOPLE (AREA B)**

**KARAJARRI**

Species records in this inset include: Aname sp. N148, Aname sp. N153, Kwonkan sp. NSD\_N151, Genus ? NRC\_N150, Urodacus varians, and multiple Kwonkan sp. NSD\_N151 records.

**NYANGUMARTA PEOPLE (PART A)**

Species records in this inset include: Aname sp. N138 and Aname sp. N140.

**MARTU (AREA A)**

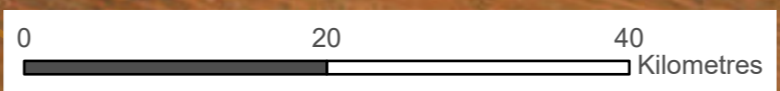
Species records in this inset include: Aname sp. N152, Idommata sp. BBT\_B39, Aname sp. NSB\_N149, Urodacus sp. 'telfer', Kwonkan sp. NSD\_N151, and Urodacus 'yaschenkoi species complex'.

**RioTinto**

**Fig 10-4: SRE Records within the Development Envelope**

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 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

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 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
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**10.4. Potential Environmental Impacts and Mitigation Hierarchy**

Potential impacts of the Proposal relevant to Terrestrial Fauna are shown in Table 10-6. Table 10-7 outlines the proposed measures to mitigate potential impacts on Terrestrial Fauna values associated with the Proposal. Relevant details in the table will be updated in subsequent stages of assessment on completion of the Rimfire, Texas and Wallal surveys.

**Table 10-6: Terrestrial Fauna – Potential Environmental Impacts**

| Potential Environmental Impacts | Relevant Proposal Elements and Their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|--|---|
| Direct                          | Clearing and fragmentation of fauna habitat  | Approximately 4,868 ha of native vegetation comprising fauna habitat will be cleared for the Proposal   |
|                                 | Loss of fauna individuals as a result of clearing and infrastructure and mining operations   | <p>Injury and mortality of fauna can result from construction, operation and closure activities, potentially decreasing local fauna abundance. Species at risk of vehicle strike include slow-moving animals, easily startled species and nocturnal animals. Vehicles at night are more likely to strike native fauna when visibility is reduced and more animals move through the landscape. Species such as birds of prey are also likely to feed off dead carcasses on roads and may be subject to vehicle strikes</p> <p>Trenches, excavations and water storage structures often have steep, slippery sides which prevent fauna that fall into them from escaping. Fauna may also be attracted to waste storage bins or domestic waste facilities and become trapped. Entrapment may lead to fauna injury or death from starvation, dehydration, drowning, bogging or injury</p> <p>Birds may become entangled in barbed-wire fences, or struck by the blades of wind turbines, causing injury or death</p>  |
| Indirect                        | Degradation of fauna habitat associated with construction and operational activities, including an increase in weeds, dust and abundance of introduced species, and altered fire regimes | <p>The increased vehicle movement and earthmoving activities associated with implementing the Proposal can potentially increase the spread of weeds within the Development Envelope. The introduction or spread of weeds into an area of native vegetation can cause an increase in fuel loads and potentially alter the vegetation's natural fire regimes. Weeds can also cause the degradation of the native vegetation, as the weed species outcompete native flora and cause structural changes in habitat affecting native fauna</p> <p>In high wind conditions, dust can be generated during clearing and operation, which may deposit on vegetation, adversely affecting fauna habitat quality</p> <p>Five feral fauna species have been recorded within the Development Envelope and are known from the region surrounding the Development Envelope. The development of new tracks and, increased water points, and the production of domestic waste has the potential to attract and increase the abundance and diversity of introduced species. This may increase competition with, and predation of, native fauna species</p> <p>Fire may directly impact fauna or modify habitat through altered frequency and intensity. Too frequent, hot, or extensive fires during hot, dry times of the year can</p> |

| Potential Environmental Impacts | Relevant Proposal Elements and Their Predicted Potential Impacts  | Initial Quantification and/or Consideration of the Predicted Potential Impacts   |
|---------------------------------|---|--|
|                                 |   | <p>reduce habitat capacity to support diverse fauna assemblages by altering vegetation structure and composition, resulting in changes in food quantity and quality and changes in cover and microhabitats (Griffiths and Brook 2014)</p>  |
|                                 | <p>Disturbance and displacement of fauna as a result of light, noise and/or vibration</p>   | <p>Light emissions can disorient flying birds, particularly during migration, and cause them to divert from efficient migratory routes or collide with infrastructure (DoEE 2020). Artificial light may interfere with activities governed by the length of the day, including reproduction, dormancy, foraging and migration. Light emissions may attract invertebrates and alter the foraging activities of nocturnal species, potentially making small mammals vulnerable to predation</p> <p>Increased noise can disturb fauna and cause an interruption in feeding and resting behaviour, reduced population densities, nest failure, abandonment of habitat area and roost sites and reduced hunting efficiency (Newport et al. 2014). Noise emissions will arise from the construction and operation of the mine, particularly from blasting within the pit. Other noise sources will include light and heavy vehicles and plant, ore and mineral waste crushing, handling and processing, and wind turbines</p> <p>These emissions generally attenuate with distance, with the habitats near the pit and areas of operational activity expected to have the most potential to be affected</p> <p>Vibrations, which will mostly be associated with intermittent blasting are not expected to have any impacts on fauna as there are no fauna habitats vulnerable to vibration in the vicinity. The operation of the PV Solar panels is not expected to cause any impacts from light, noise or vibration once they are operational</p> |
|                                 | <p>Degradation of Country, and sites of social, cultural and heritage significance in regard to fauna along with interference with cultural obligations and spiritual beliefs tied to fauna</p> | <p>Addressed in Social Surroundings (Section 7)</p>  |
| <p>Cumulative</p>               | <p>Cumulative loss of fauna habitat as a result of clearing from this Proposal and surrounding projects</p>   | <p>The Proposal has the potential to cumulatively impact fauna habitats and species present within the Development Envelope. The Proposal also has the potential to cumulatively impact fauna habitats and species present within the surrounding region</p> <p>All significant fauna species that occur or are likely to occur within the Development Envelope may be affected by cumulative impacts from existing or foreseeable projects. Projects within a 100 km radius of the Development Envelope that have publicly available accessible data will be investigated to determine their impact on significant fauna and habitats that are relevant to the Proposal during the environmental impact assessment</p>  |

**Table 10-7: Terrestrial Fauna – Mitigation Hierarchy**

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-making Processes Relevant?  | Effectiveness of the Nominated Controls   |
|----------------------|--|--|---|
| Avoid                | The Development Envelope and Conceptual Footprint will continue to be refined during the design phase to avoid direct impacts to high significance fauna habitats as much as practicable                                     | Yes – approval is required under the BC Act for the disturbance of habitat for significant species | Project optimisation and reduced clearing required is the most effective control to ensure impacts are as low as reasonably practicable. Avoidance is the first and preferred step in the mitigation hierarchy<br><br>The Approvals Request System to be applied is well-established and ensures clearing does not occur outside of approved ground disturbance areas. The system also tracks clearing where limits apply to habitat types<br><br>Avoidance of significant habitat is a key recommendation for species conservation |
|                      | Re-design of the RAC has avoided critical rocky Black-footed Rock-wallaby habitat  |  |   |
|                      | The Proponent will ensure clearing only occurs within approved ground disturbance areas through continued implementation of the Proponent’s Approvals Request system   |  |   |
|                      | Pre-clearance burrow surveys for Bilby will be undertaken to ascertain no active individuals are present within highly suitable habitats   |  |   |
| Minimise             | The Development Envelope and Conceptual Footprint will continue to be refined to minimise, where practicable, disturbance of high significance fauna habitat and clearing limits within these habitat types will be proposed | Yes – approval is required under the BC Act for the disturbance of habitat for significant species | These measures are best practice<br><br>The Approvals Request System to be applied is well-established and ensures clearing does not occur outside of approved ground disturbance areas. The system also tracks clearing where limits apply to habitat types<br><br>Retention of high significance fauna habitat is a key recommendation for species conservation   |
|                      | The Proponent's GIS system will include known locations of significant fauna habitat types to ensure impacts are minimised and adhere to authorised extents  |  |   |
|                      | Implementation of management actions for the Black-footed Rock-wallaby and Bilby within the EMP to reduce potential interactions and impacts for these species   | No   | Where avoidance is not possible, minimising impacts is the next preferred step in the mitigation hierarchy<br><br>These measures will minimise impacts to fauna species but will not avoid all injuries<br><br>Measures for managing dust suppression will be implemented to meet the current industry best practice standards  |
|                      | Weed minimisation measures are described in Section 9  |  |   |
|                      | Clearing will be undertaken progressively to allow fauna to migrate away from clearing activities or machinery movements   |  |   |

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-making Processes Relevant? | Effectiveness of the Nominated Controls |
|----------------------|--|---|---|
|                      | Speed limits will be implemented to minimise the risk of fauna injury or mortality from vehicle strike   |   |   |
|                      | Vehicle traffic will be confined to defined roads and tracks   |   |   |
|                      | Site induction programs will provide information on significant fauna, including their appearance and habitats. Training would also discuss standard operating procedures in the event of fauna interactions |   |   |
|                      | Artificial water sources will have egress points   |   |   |
|                      | Artificial water sources will be kept to the minimum required for operations. Leaking water sources will be repaired and minimised   |   |   |
|                      | The Proponent will implement management measures such as dust suppression to minimise degradation of fauna habitats  |   |   |
|                      | Vehicles will be required to travel at safe operating speeds on all roads and will be restricted from accessing rehabilitated surfaces except for management purposes  |   |   |
|                      | The Proponent will undertake feral animal monitoring and subsequent control in high-risk areas within the Development Envelope and in cooperation with regional control programs and Traditional Owners      |   |   |
|                      | Landfill facilities will be fenced, and putrescible wastes will be regularly covered to minimise the attraction of animals   |   |   |
|                      | Fire breaks will be maintained, and hot works procedures and fire equipment will be available in buildings and vehicles  |   |   |



| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-making Processes Relevant?             | Effectiveness of the Nominated Controls   |
|----------------------|--|---|---|
|                      | <p>Fire response procedures, equipment and personnel training will be provided, including site induction on fire prevention and management</p> <p>Wind turbine design will include mitigation controls to reduce the likelihood of avian fauna strike</p> <p>Lighting will be designed and managed in accordance with the National Light Pollution Guidelines (DoEE 2020)</p> <p>Permanent lighting will only be installed where required, mainly in-pit and operational areas</p> <p>Permanent lighting and temporary lighting will be shielded and directed to active mine areas to minimise light spill</p> <p>Equipment design will be specified to be within Australian standard noise limits and/or fitted with noise mufflers in accordance with manufacturing specifications</p> |   |   |
| Rehabilitate         | <p>The Proponent will prepare and regularly update an MCP consistent with DMIRS <i>Guidelines for Preparing Mine Closure Plans</i> (DMIRS 2023b)</p> <p>Habitat element to be considered for Terrestrial Fauna as part of rehabilitation design includes:</p> <ul style="list-style-type: none"> <li>• Vegetation that is known to provide preferred food or shelter preference</li> <li>• Retaining and replacing woody debris</li> <li>• Rehabilitation will be undertaken progressively to minimise disturbed areas, reducing fragmentation and barriers to fauna movement</li> </ul>   | Yes – DMIRS for implementation of the MCP                 | <p>These measures follow the Statutory Guidelines for MCPs and are consistent with industry-leading practices</p> <p>The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes (DMIRS 2023b)</p> <p>Rehabilitation will be required to provide a vegetation and stable landform with habitat features. However, the uncertainty in relation to the re-creation of habitat values following mining is acknowledged. Therefore, clearing is treated as a long-term or permanent impact for this assessment</p> |
| Offset               | Offsets are expected to be required for significant residual impacts to supporting and/or critical habitat for conservation significant species  | Yes – Commonwealth Minister for the Environment and Water | This is standard practice   |

## 10.5. Assessment and Significance of Residual Direct and Indirect Impacts

A preliminary assessment of the residual direct and indirect impacts, and the significance of these impacts, is provided in Table 10-8.

**Table 10-8: Terrestrial Fauna – Assessment and Significance of Residual Direct and Indirect Impacts**

| Assessment and Significance of Residual Direct and Indirect Impacts  | Assessment   | Conclusion on Significance  |
|--|--|---|
|  | The Proposal is expected to result in the progressive clearing of up to 4,868 ha of native vegetation, incorporating fauna habitat | Expected to be significant. The clearing of 4,868 ha of native vegetation, incorporating fauna habitat, for significant species will likely be considered a significant residual impact. Further investigations will be undertaken to assess and quantify the potential impacts, and offsets will be proposed where appropriate |
| The Proponent expects that the proposed mitigation measures for loss of fauna individuals from dust, feral animals, weeds, light, noise and vibration will ensure that there are no adverse impacts to fauna or fauna habitat associated with the Proposal | Not expected to be considered significant due to the application of mitigation measures and controls                               |   |

## 10.6. Assessment and Significance of Residual Cumulative Impacts

All significant fauna species that occur or are likely to occur within the Development Envelope may be affected by cumulative impacts from existing or foreseeable projects. Mitigation measures, such as retaining high significance fauna habitat where possible, will minimise the impact on significant fauna species in the area.

A quantitative assessment of the cumulative impacts on Terrestrial Fauna will be undertaken as part of the environmental impact assessment.

## 10.7. Likely Environmental Outcome

Considering the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Terrestrial Fauna include:

- Clearing up to 4,868 ha of native vegetation within the Development Envelope.

The Proponent considers that the Proposal can be managed to meet the EPA's objective to protect Terrestrial Fauna so that biological diversity and ecological integrity are maintained.

## 11. TERRESTRIAL ENVIRONMENTAL QUALITY

### 11.1. EPA Environmental Factor and Objectives

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Terrestrial Environmental Quality:

To maintain the quality of land and soils so that environmental values are protected

### 11.2. Relevant Policy and Guidance

Terrestrial Environmental Quality policy and guidance considered relevant for this Proposal include the following:

- Statement of Environmental Principles, Factors and Objectives (EPA 2023a)
- Environmental Factor Guideline: Terrestrial Environmental Quality (EPA 2016e)
- Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2021h).

### 11.3. Receiving Environment

#### 11.3.1. Studies

Table 11-1 provides the location, types and timing for each of the surveys/studies and summarises their limitations and to which guidelines/policies they are considered to be in accordance.

Studies supporting an impact assessment on the Terrestrial Environmental Quality focus on the MIA as the key risk activities associated with this environmental factor are expected to apply only to the MIA. Similar detailed studies are therefore not expected to be required for the RAC, Rimfire, Texas, or Wallal at this stage. Desktop assessments will determine if further investigations are required to support EIA concerning these sections of the Development Envelope.

Table 11-1: Summaries of Studies

| Report Title   | Location/Description/Date                     | Guidance  |
|--|---|---|
| Winu Soil Characteristics Report: Rio Tinto Copper and Diamonds (Landloch 2020)                  | MIA – Soil Characterisation<br>November 2020  | Statutory Guidelines for Mine Closure Plans (DMIRS 2023a)<br>Environmental Factor Guideline: Terrestrial Environmental Quality (EPA 2016e)<br>Guidelines for Survey Soil and Land Resources (McKenzie et al 2008)<br>Draft Guidance – Material Characterisation Baseline Data Requirements for Mining Proposal (DMP 2016)   |
| Winu Mine Operations Acid and Metalliferous Drainage (AMD) Management Strategy (Rio Tinto 2023a) | MIA – AMD Management Strategy<br>June 2023    | Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br>Global Acid Rock Drainage (GARD) Guide (INAP 2018)<br>Environmental performance standard E13: Chemically Reactive Mineral Waste Control Standard (Rio Tinto 2017)   |
| Winu Waste Rock Characterisation Report: Primary Sulphide Zone (Rio Tinto 2021b)                 | MIA – Waste Rock Characterisation<br>May 2021 | ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002)<br>Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br>Global Acid Rock Drainage (GARD) Guide (INAP 2018)<br>Acid Rock Drainage Prediction Manual (MEND Program 1991) |
| Winu Waste Rock Characterisation Report: Upper Zone (Rio Tinto 2021c)                            | MIA – Waste Rock Characterisation<br>May 2021 | ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002)<br>Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br>Global Acid Rock Drainage (GARD) Guide (INAP 2018)<br>Acid Rock Drainage Prediction Manual (MEND Program 1991) |

| Report Title   | Location/Description/Date                        | Guidance  |
|--|--|---|
| Winu Waste Rock Characterisation Report: Secondary Sulphide zone (Rio Tinto 2021d) | MIA – Waste Rock Characterisation<br>May 2021    | ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002)<br>Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br>Global Acid Rock Drainage (GARD) Guide (INAP 2018)<br>Acid Rock Drainage Prediction Manual (MEND Program 1991) |
| Winu Tailings Characterisation Report (Rio Tinto 2022b)                            | MIA – Tailings Characterisation<br>February 2022 | ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage (AMIRA 2002)<br>Preventing Acid and Metalliferous Drainage: Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br>Global Acid Rock Drainage (GARD) Guide (INAP 2018)<br>Acid Rock Drainage Prediction Manual (MEND Program 1991) |

### 11.3.2. Soils

The Proposal consists of two soil mapping units within the MIA (Table 11-2; Landloch 2020):

- Deep Sands – Wind-blown Aeolian sands associated with sand dunes throughout the landscape. Coarse sands dominate these soils with no appreciable silt or clay content and no pedological development
- Gradational Sands – Similar to Deep Sands, except for a change in texture from sands in the surface soils to sandy loams in the deep B horizons.

The soil mapping units will likely occur across the region, as they are considered to represent the Great Sandy Desert.

**Table 11-2: Soil Mapping Unit Characteristics within the MIA**

| Deep Sands   | Gradational Sands  |
|--|--|
| Loamy sand to clayey sand texture                          | Loamy sand to sandy loam at depths >500 mm                 |
| Weak surface structure to massive structure at depth       | Weak surface structure to massive structure at depth       |
| Weak surface consistency to firm consistent at depth       | Weak surface consistency to firm consistent at depth       |
| Moderately acidic to circum-neutral throughout the profile | Moderately acidic to circum-neutral throughout the profile |
| Non-saline   | Non-saline   |
| Non-sodic to highly sodic throughout the profile           | Non-sodic to sodic at depth                                |

### 11.3.3. Waste Rock

A key concern for the Proposal relating to waste rock is its ability to safely store material to prevent emissions from acidic, metalliferous and/or saline leachate through water or wind erosion (Rio Tinto 2023b).

The Winu deposit was divided into three lithological strata: an Upper zone, a Secondary Sulphide zone and a Primary Sulphide zone (Rio Tinto 2021b; Figure 11-1). This sequence is not uniform across the deposit, and each zone has highly localised expressions.

An extensive geochemical characterisation program has been undertaken, which includes:

- 41 Oxide and overburden samples
- 86 Secondary Sulphide samples
- 115 Primary Sulphides.

Acid-base accounting (ABA), whole rock assays, liquid extracts and mineralogy tests were undertaken in accordance with leading practice (INAP 2018; AMIRA 2002; Australian Government 2016). In addition, there have been 21 Kinetic leach columns (AMIRA 2002), and some columns are still running (> 3 years). Sequential extractions have also been undertaken via the Chemistry Centre. This work has enabled the following key outcomes:

- Material in the Upper (Oxide and Overburden) Zone is predominately NAF but does not contain significant neutralising minerals
- PAF material is predominantly present in the Primary and Secondary Sulphide Zones
- Pre-mineral mafic and metasediment (Metasediment 2) lithologies have the highest likelihood of being PAF materials
- 20-30% of waste rock is classified as PAF

- The neutralising potential and acid-forming potential in the Primary Sulphides will be considered to designate material as PAF or NAF (Rio Tinto 2023a).

#### 11.3.4. Tailings

A tailings geochemistry study involving 40 samples from metallurgical test was undertaken. This test work involved ABA, whole rock assays, liquid extracts and mineralogy tests were undertaken in accordance with leading practice (INAP 2018; AMIRA 2002; Australian Government 2016). In addition, there have been five Kinetic leach columns (AMIRA 2002; ASTM 2022), two Saturated columns (US EPA 2013) and three columns are still running. Sequential extractions have also been undertaken via the Chemistry Centre. This work has enabled the following key findings (Rio Tinto 2022b):

- All high sulphur tailings are PAF, with limited acidification lag
- Low sulphur tailings were classified as NAF or PAF with low capacity for acid generation
- Acid generation potential of low sulphur tailings is variable and range up to 20 kg H<sub>2</sub>SO<sub>4</sub>/t. For comparison, high sulphur tailings contained over 300 kg H<sub>2</sub>SO<sub>4</sub>/t (excluding oxides)
- Neutralisation potential of tailings is low-nil (<20 kg H<sub>2</sub>SO<sub>4</sub>/t). Slow-reacting silicates are present and may assist neutralisation in the long-term seepage chemistry
- Metal leaching at elevated concentrations was typically associated with low pH conditions (NAG pH leachate)
- Fluoride release into solution was observed for most samples
- Cyanide concentrations into solution were generally low. Kinetic test work is currently underway to investigate water quality after cyanide detoxification
- Low and high sulphur tailings from oxide feed are NAF and barren (meaning low-nil neutralising capacity).

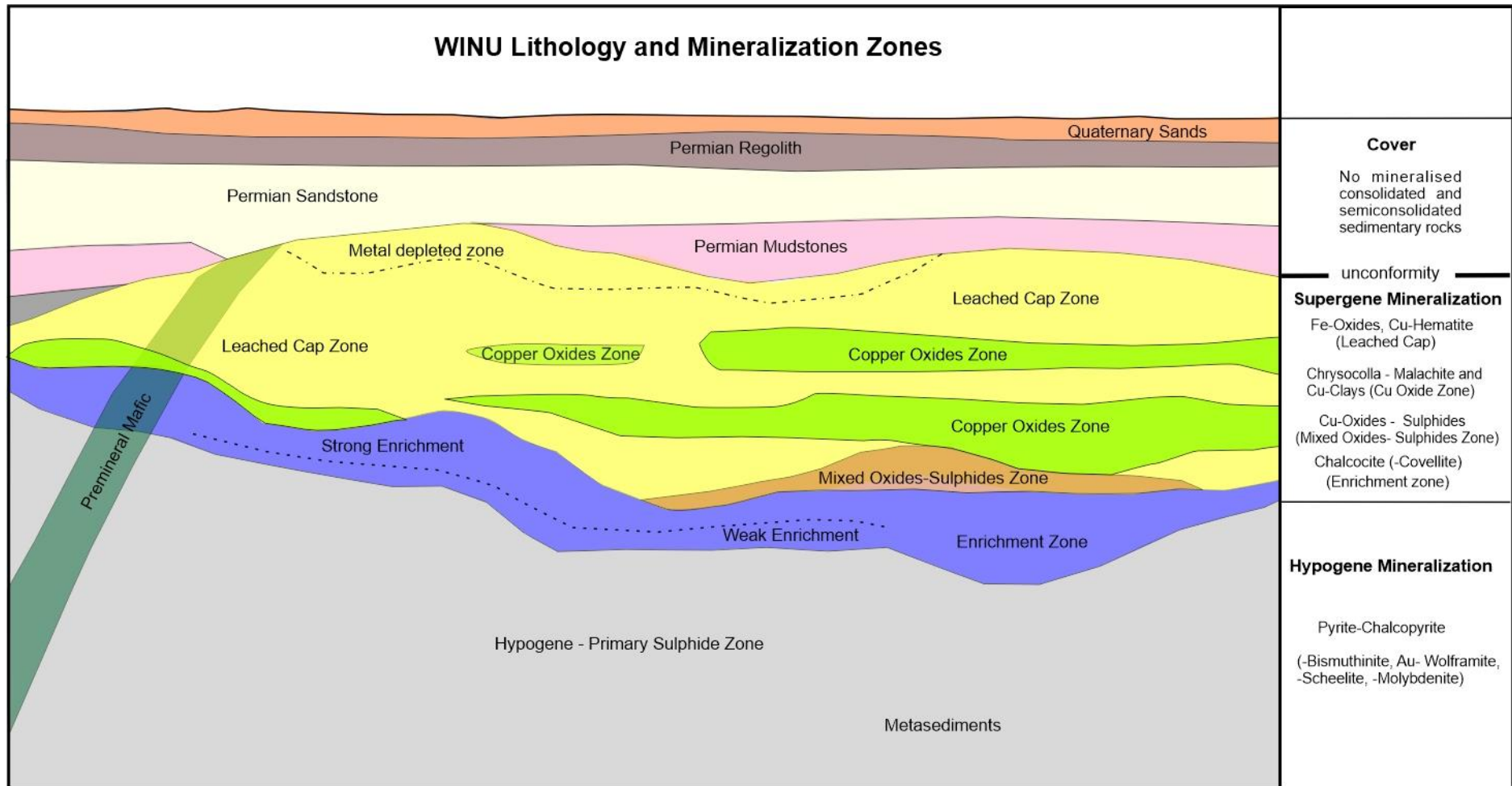


Figure 11-1: Lithological Zones of the Winu Deposit



#### 11.4. Potential Environmental Impacts and Mitigation

The potential impacts of the Proposal relevant to Terrestrial Environmental Quality are shown in Table 11-3. Sections 11.4.1 and 11.4.2 and Table 11-4 outline the proposed measures to mitigate potential impacts on Terrestrial Environmental Quality values associated with the Proposal. Relevant details in the table will be updated in subsequent stages of assessment on completion of the Rimfire, Texas and Wallal surveys.

**Table 11-3: Terrestrial Environmental Quality – Potential Environmental Impacts**

| Potential Environmental Impacts | Relevant Proposal Elements and Their Predicted Potential Impacts   | Initial Quantification and/or Consideration of the Predicted Potential Impacts  |
|---------------------------------|--|---|
| Direct and indirect             | Clearing of native vegetation and construction of landforms causing erosion  | The clearing of native vegetation may expose soil and cause erosion, and erosion may occur on the slopes of constructed landforms (TSF, WRLs), especially after rainfall events                                       |
|                                 | Storage of stockpiled ore leading to soil contamination from runoff  | Due to runoff from significant rainfall events, AMD may occur in surrounding soils<br><br>Discharge of concentrated metals may negatively impact soil ecosystem values if left unmanaged                              |
|                                 | Contamination of soil as a result of TSF failure or spillage from the TSF  | TSF wall failure may result in tailing solids and water contamination to the surrounding environment  |
|                                 | Contamination of soil as a result of Seepage from the TSF  | Stored Tailings and/or tailings water may seep through the embankment or through the TFS foundation(s) with the potential for adverse impacts to soil ecosystem values if left unmitigated                            |
|                                 | Storage and handling of hydrocarbons and other chemicals (e.g. reagents) leading to soil contamination from spills | Spills from hydrocarbons, chemicals or saline water may contaminate surrounding soils<br><br>Contamination caused by chemical spills are typically highly localised and have a relatively short-term potential impact |

#### 11.4.1. Waste Rock Landforms

WRLs will be constructed from multiple waste rock lithology types. PAF waste rock predominantly present in the Primary and Secondary Sulphide Zones will be encapsulated with NAF material during operations, primarily from the Upper and Primary Sulphide zones. Figure 11-2 depicts how the PAF will be encapsulated within the WRL.

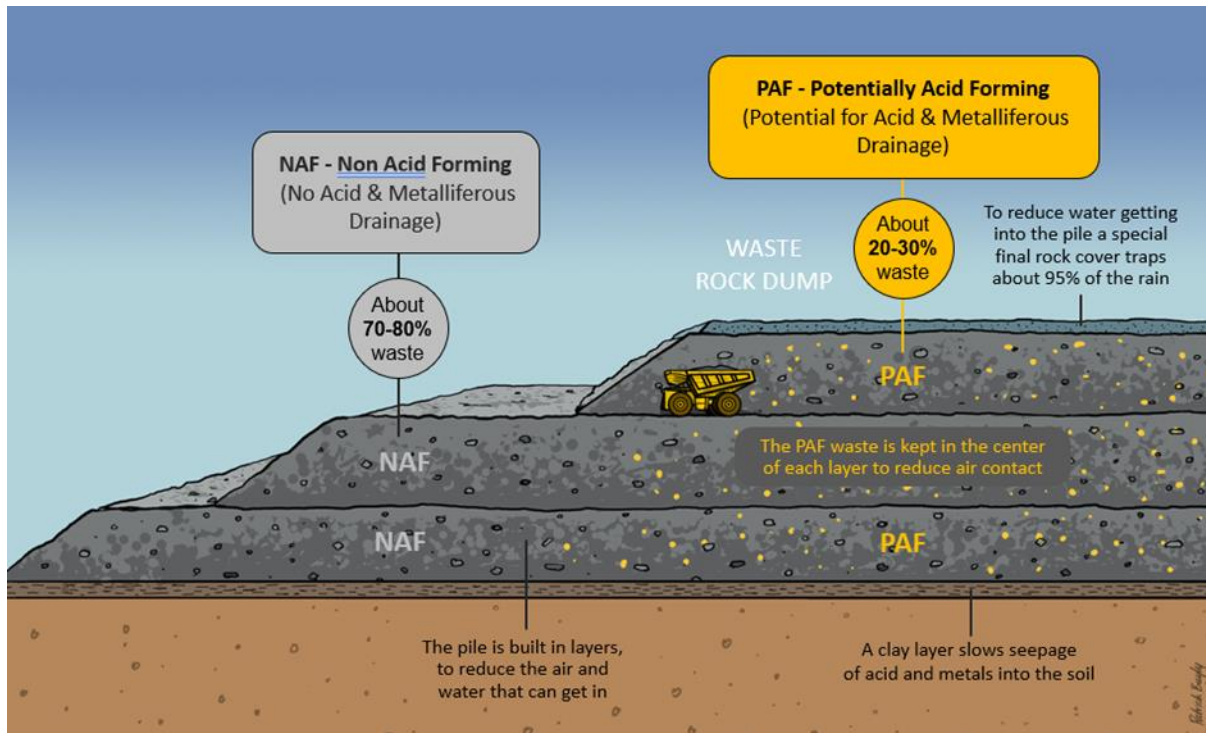


Figure 11-2: Waste Rock Landform Conceptual Design

#### 11.4.2. Tailings

Modifications to the processing design have been undertaken, including:

- 'Desulphurisation' during metallurgical processing to ensure most of the TSF receives NAF or low-capacity PAF tailings
- Reduction of sulphur levels in the larger volume of Low Sulphur tailings is balanced by an increase in sulphur in the low volume High sulphur tailings (approximately 6%).

##### 11.4.2.1. Operating

The tailings generated during processing will be stored in a TSF spilt into storage areas, one containing Low Sulphur tailings and one containing High Sulphur tailings (Figure 11-3; WWL 2022). The outer TSF embankments will be designed, and TSF bulk fill placed to minimise dune disturbance – i.e. by utilising natural dune formation to define TSF shape and preserve natural dune structure as much as is practicable.

The High Sulphur cell(s) will be lined with linear low-density polyethylene (LLDPE) or equivalent geomembrane with a downstream-raised zoned embankment. The High Sulphur cell(s) will be operated to ensure constant saturation of the high sulphur tailings to reduce the potential for acid generation. This saturation will also be maintained when the cell(s) is progressively raised.

The Low Sulphur cell(s) will be lined with bitumen-impregnated liner or equivalent and upstream raises using soil with rockfill backing for closure. The Low Sulphur cell(s) will be equipped with filter drainage over the base liner to promote tailings consolidation and reduce hydraulic head on the liner. Drainage

water will drain to a sump from which it will be pumped to the processing plant, along with reclaimed supernatant water (discussed below).

To reduce the risk of potentially contaminated water runoff, TSF drainage will be internal. The surface water from the internal slopes of the embankments will be directed into the TSF cells. Water runoff from the outer slopes will be directed into catchment paddocks and allowed to evaporate. Paddock design will ensure water from surrounding catchments is segregated from them.

To minimise the disturbance of dunes, provision has been made for two reclaimed water ponds to receive supernatant from the Low Sulphur cell(s) on the west side of the TSF (i.e. the ponds will be located in dune valleys) (Figure 11-4). Supernatant from the High Sulphur cell(s) will be directed to these ponds for re-processing during periods of excess water. The High Sulphur slurry will be heavily dosed with lime to ensure water pumped to the ponds and used for processing is close to neutral, or alkaline, pH.

#### 11.4.2.2. Closure

The TSF will be developed with a final cover ensuring the high Sulphur tailings can maintain saturation at closure. Installing a suitable dry cover will encapsulate the deposited tailings and sustain vegetation over the long term (Figure 11-5).

This cover system objective is achieved by preventing the upward movement of water from the High Sulphur tailings by decoupling the saturated High Sulphur tailings from the evapotranspiration zone. Based on preliminary cover design modelling studies, the cover over the high sulphur tailings may need to be 3 to 6 m thick.

The cover over the low sulphur tailings is not intended to maintain saturation of the tailings; hence, the cover thickness will likely be 0.5 to 1 m thick.

The final design and location of the TSF will be confirmed after further Traditional Owner Consultation and further investigations. The final cover design for the TSF will be confirmed through further test work and field cover trials.

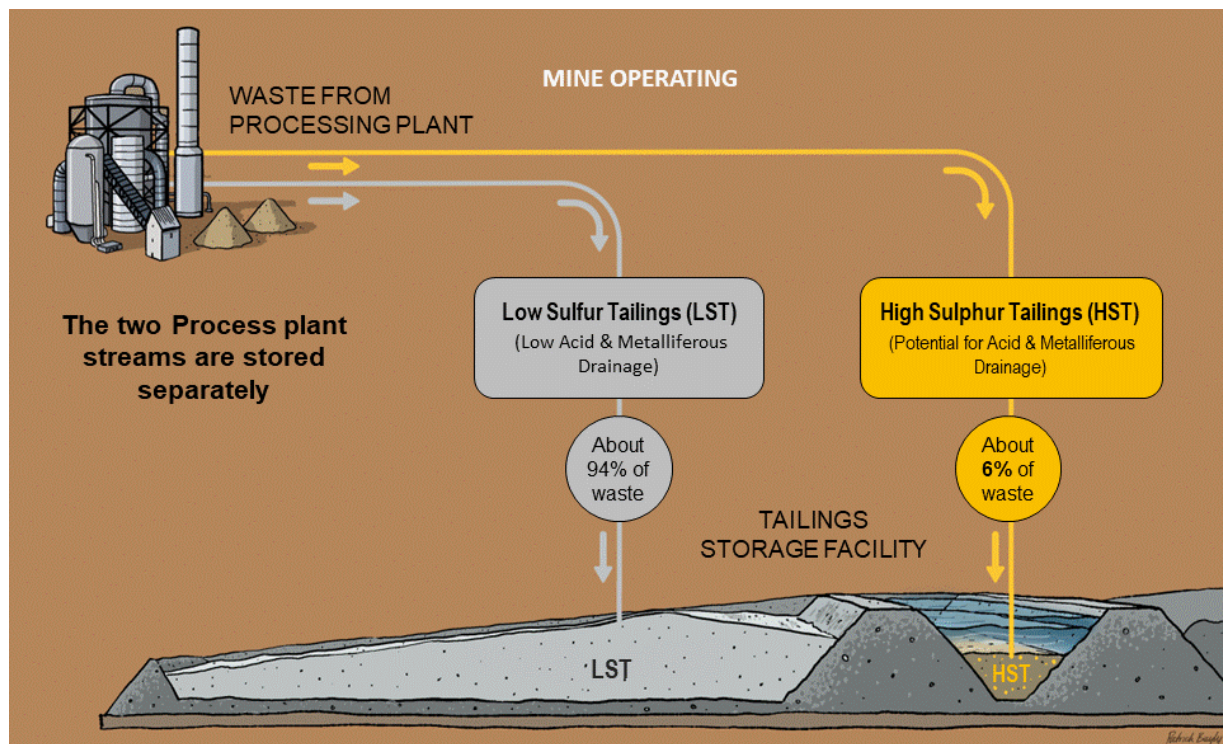
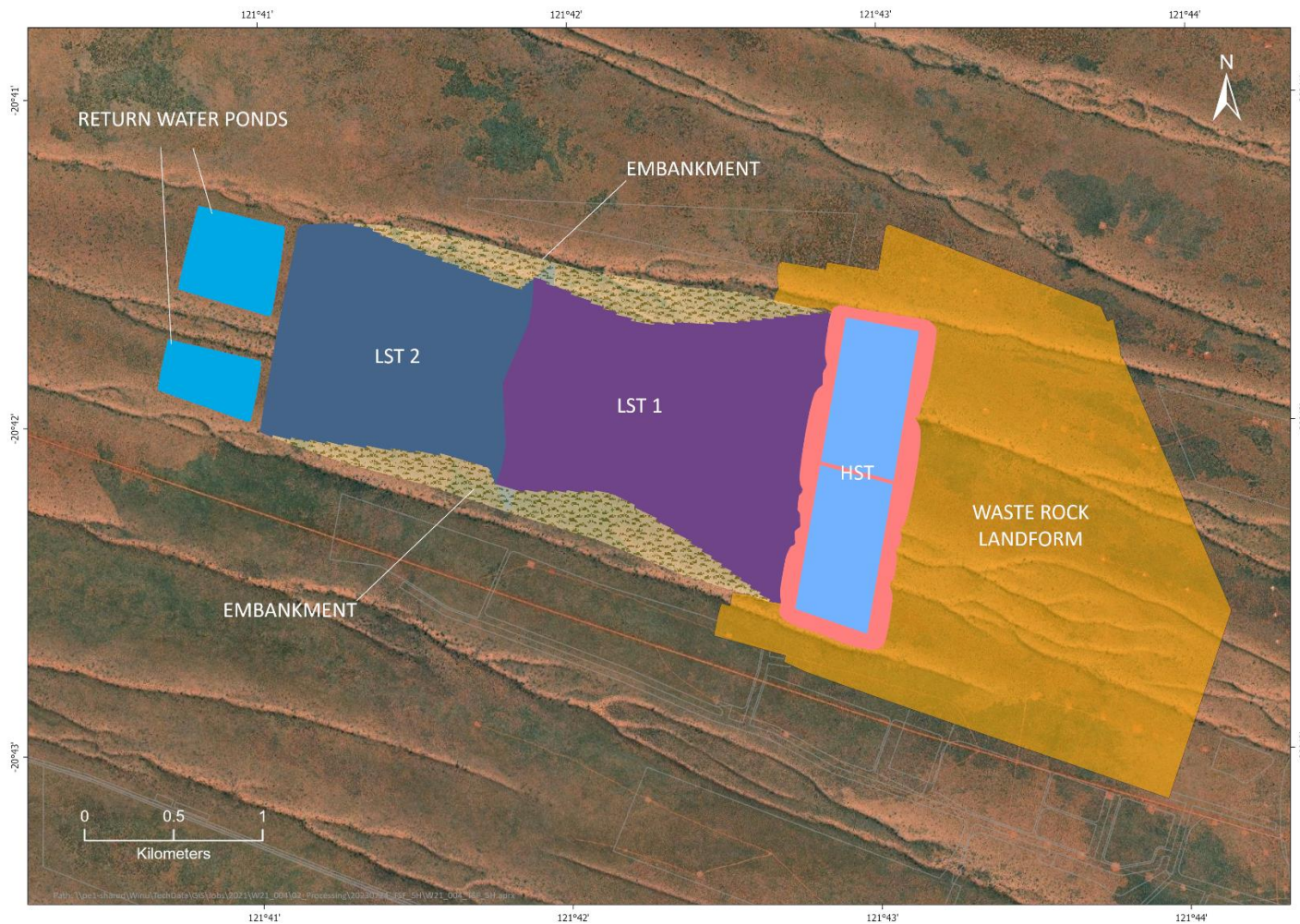


Figure 11-3: TSF Conceptual Design (During Mining Operations)



*Note final location and design of TSF is subject to change pending ongoing studies and consultation with Traditional Owners*  
Source: WWL 2022

**Figure 11-4: TSF Conceptual Design**

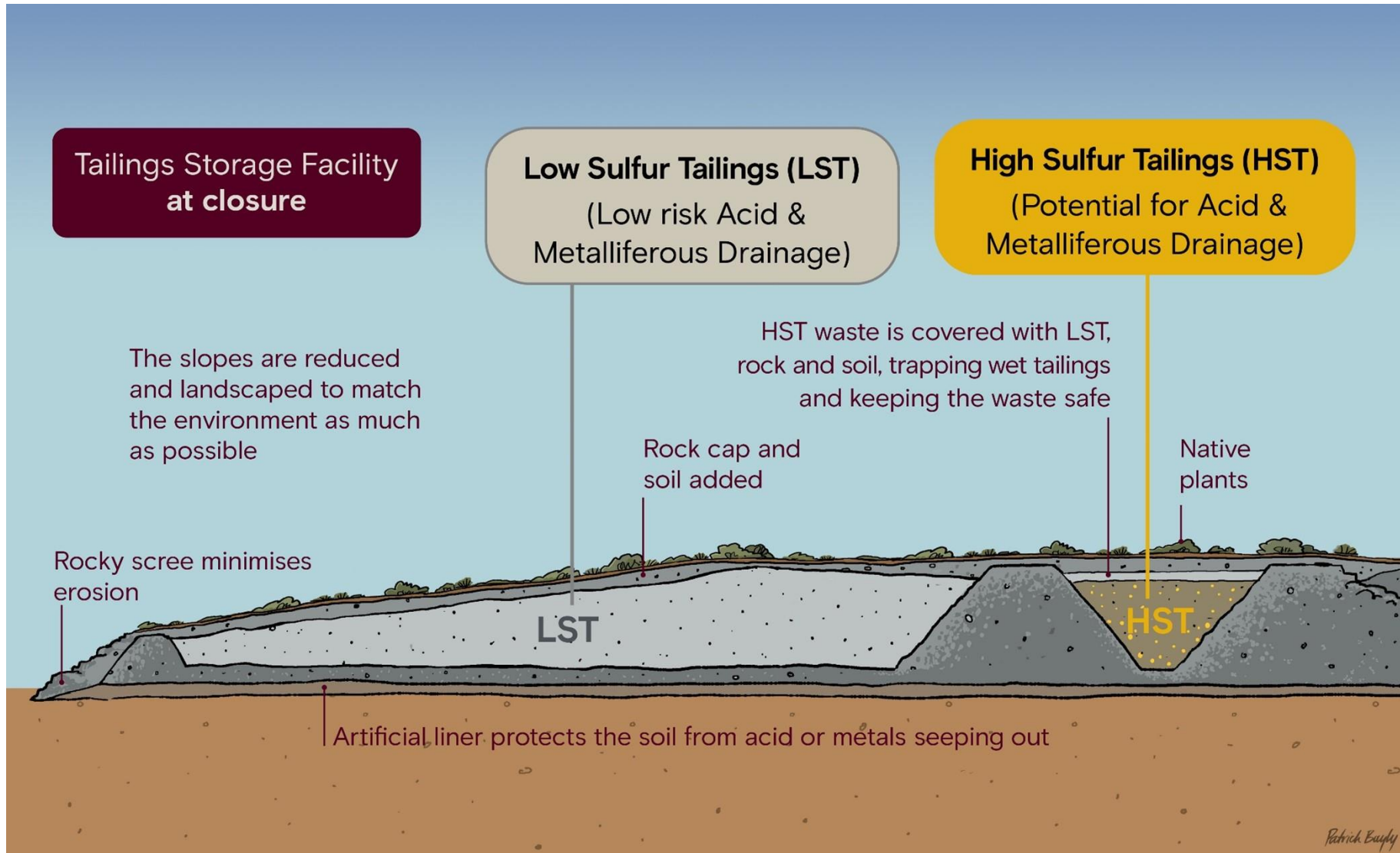


Figure 11-5: TSF Conceptual Design (After Closure)

**Table 11-4: Terrestrial Environmental Quality – Mitigation Hierarchy**

| Mitigation Hierarchy   | Proposed Mitigation Measures  | Are Other Decision-making Processes Relevant?   | Effectiveness of the Nominated Controls  |
|--|---|---|--|
| Avoid  | Potentially contaminating substances, such as solid and liquid wastes and bulk hydrocarbons will be stored in accordance with legislated requirements and industry guidelines, including within secondary containment | Yes – DWER licence required for bulk hydrocarbon and waste storage and management       | Careful placement of at-risk substances is included in many water quality protection guidelines  |
| Minimise   | Minimise clearing where possible  | No  | Project optimisation and reduction of clearing required is the most effective control to ensure impacts are as low as reasonably practicable. Avoidance is the first and preferred step in the mitigation hierarchy  |
|  | Topsoil stockpiles will not exceed 2 m in height and will be placed in the direction of the natural sand dunes to minimise wind erosion   | No  | This is standard practice  |
|  | A Winu Spill Response Management Plan will be in place during construction and operation  | No  | This is standard practice  |
|  | Spill kits will be located strategically throughout the MIA, and employees trained in their use   | No  | This is the industry's best practice   |
|  | Appropriate drainage design to manage run-off and surface water flow to prevent erosion   | No  | This is standard practice  |
|  | All waste rock will be characterised to inform the design of WRL  | Yes – DMIRS approval is required under the Mining Act and for implementation of the MCP | These measures are consistent with industry-leading practices and the Australian Government mining industry best practice guidelines for preventing acid and metalliferous drainage (Australian Government 2016)<br><br>The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes (DMIRS 2023b) |
|  | WRLs will be rock armoured with competent material  |   |  |
|  | Dispersive or PAF material to be stored within the core of the WRL, requiring ongoing waste rock identification and segregation of AMD-generating waste   |   |  |
| Encapsulate PAF waste rock with NAF material, including a low permeability basal layer during operations and closure to protect runoff water quality, minimise infiltration, control wind erosion and allow vegetation establishment |   |   |  |

| Mitigation Hierarchy | Proposed Mitigation Measures  | Are Other Decision-making Processes Relevant?  | Effectiveness of the Nominated Controls  |
|----------------------|---|--|--|
|                      | AMD runoff from ore stockpiles will be collected in perimeter drains and transported to the concentrator for amendment during short term processing   | No   | These measures are consistent with industry leading practices  |
|                      | WRL operating procedures will include: <ul style="list-style-type: none"> <li>• Inspections and monitoring of perimeter drainage sumps, pumps as well as ground and surface water quality</li> <li>• Visual inspections of the landform for degradation of outer NAF encapsulation</li> </ul> | No   | These measures are consistent with industry leading practices  |
|                      | The Proponent will prepare and regularly update an AMD Management Strategy Plan consistent with the Leading Practise Sustainability Development Program for the Mining Industry (Australian Government 2016)  | No   | These measures follow the Australian Government mining industry best practice guidelines for preventing acid and metalliferous drainage (Australian Government 2016)   |
|                      | Subaqueous storage of high sulphur tailings (Section 11.4.2)  | Yes – DWER licence is required for the TSF under Part V of the EP Act<br><br>Yes - DMIRS | Subaqueous deposition prevents the sulphuric tailings from reacting, i.e. becoming acid generating as per Leading Practice Sustainability Development Program for the mining industry (Australian Government 2016)<br><br>DMIRS regulates the design, construction and management of TSFs in accordance with the <i>Tailings storage facilities in Western Australia - code of practice</i> (DMP 2013) |
|                      | TSF design includes segregation of high sulphur and low sulphur materials and seepage control by adopting different cells for High Sulphur tailings and for Low Sulphur Tailings, (Section 11.4.2)  |  | The separation of High and Low sulphur tails prevents the whole tailings to become acid generating<br><br>TSF design and operation maximises drainage and water recovery from the low sulphur cells into ponds, minimising water on the beach slopes   |
|                      | The TSF is designed and operated in accordance with Global Industry Standard on Tailings Management (ICMM 2020) and Rio Tinto D5 standards and general good international practice  |  | By adopting the referenced standards, the TSF will have been subject to rigorous design and design review processes, minimising the risk of design flaws which may lead to failure. Further, by adopting the reference standards, the TSF will be subject to governance, which includes periodic review (ITRB) and detailed monitoring and instrumentation   |

| Mitigation Hierarchy | Proposed Mitigation Measures   | Are Other Decision-making Processes Relevant?  | Effectiveness of the Nominated Controls  |
|----------------------|--|--|--|
|                      | TSF design includes the WRL abutting and wrapping around the high sulphur storage cell as an increased control preventing failure  |  | The adopted WRL design minimises the risk of high sulphur cell failure   |
|                      | All ore will be characterised to inform the transport to the appropriate stockpile   | No   | These measures are consistent with industry leading practices and with the Winu AMD Management Strategy Plan (Rio Tinto 2023a)   |
|                      | Ore stockpiles will be built in small lifts and have a low permeability layer directly underneath to minimise percolation of AMD   | No   |  |
|                      | AMD runoff from ore stockpiles will be collected in perimeter drains and transported to the concentrator for short term processing   | No   |  |
|                      | Ore Stockpile operating procedures will include inspections and monitoring of drainage sumps, pumps, and ground and surface water quality  | No   |  |
|                      | The Proponent will prepare and regularly update an AMD Management Strategy Plan consistent with the Leading Practise Sustainability Development Program for the Mining Industry (Australian Government 2016) | No   | These measures follow the Australian Government mining industry best practice guidelines for preventing acid and metalliferous drainage (Australian Government 2016)             |
|                      | The Proponent will prepare and implement a Cyanide Management Plan consistent with the International Cyanide Management Institute Code (the Cyanide Code (ICMI 2023))  | Yes – DMIRS for licensing regarding the transport, handling and storage of cyanide under dangerous goods regulations | The Cyanide Code is amongst the most established certification programs in the mining sector, focused on the safe management of cyanide in gold production and cyanide transport |
| Rehabilitate         | The Proponent will prepare and regularly update an MCP consistent with DMIRS Guidelines for Preparing Mine Closure Plans (DMIRS 2023b)   | Yes – DMIRS for implementation of the MCP  | These measures follow the Statutory Guidelines for MCPs and are consistent with industry-leading practices   |
|                      | Topsoil (from the two main soil units, Deep Sand and Gradational Sand) will be stockpiled from subsoils for use in rehabilitation  |  | The MCP must detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes (DMIRS 2023b)                                     |



| Mitigation Hierarchy | Proposed Mitigation Measures  | Are Other Decision-making Processes Relevant? | Effectiveness of the Nominated Controls   |
|----------------------|---|---|---|
|                      | Recovery and stockpiling of topsoil is intended for future use as a growth medium in rehabilitation works               |   | Rehabilitation will be required to provide a vegetation and stable landform with habitat features |
|                      | At closure the high sulphur tailings will be encapsulated with NAF material to maintain saturation and reduce oxidation |   | These measures are consistent with industry leading practices                                     |

**11.5. Assessment and Significance Direct and Indirect Impacts**

Potential for seepage of contaminants associated with PAF material into the surrounding soils and groundwater may occur. However, it is considered manageable through the TSF design and management measures and regulated under the Mining Act and Part V of the EP Act (Table 11-5).

**Table 11-5: Terrestrial Environmental Quality - Assessment and Significance of Impacts**

|  | <b>Assessment</b>  | <b>Conclusion on Significance</b>   |
|--|--|---|
| <b>Assessment and Significance of Residual Direct and Indirect Impacts</b> | Minimising clearing areas, the flat/low relief landscape on sandy soils, and design controls on the TSF and WRLs, are expected to ensure the potential impacts of soil erosion are kept as low as reasonably practicable   | Not expected to be considered significant due to the application of control measures (Table 11-4)                 |
|  | Ore stockpiles - Potential for soil contamination due to the presence of PAF materials is expected to be low given design and construction parameters to minimise percolation, installation of a NAF base layer and drainage controls to direct potentially contaminated run off to the processing plant<br><br>Primary Sulphide ore (with some neutralising potential) will be processed before AMD is formed. If the ore is not processed in time, or for those ore stockpiles that lack neutralising minerals, the runoff will be collected and sent to the process plant | Not expected to be considered significant due to the application of mitigation measures and controls (Table 11-4) |
|  | Waste Rock Landforms – Potential for soil contamination due to the presence of PAF materials is expected to be low given design and construction parameters to minimise percolation, installation of a NAF base layer, encapsulation of PAF within the interior of the WRL, small lift heights and placement of a final cover to limit net percolation at closure. Sufficient material is available to encapsulate the WRL. Waste rock management is the industry standard (INAP 2020)   | Not expected to be considered significant due to the application of mitigation measures and controls (Table 11-4) |
|  | Tailings - Potential for soil contamination due to the presence of PAF materials is expected to be low given design and construction parameters to minimise percolation, segregation of High Sulphur and Low Sulphur materials, installation of appropriate base liners, sub-aqueous storage of High Sulphur materials to reduce AMD potential. A final dry cover over the high sulphur tailings at closure to limit desaturation. The TSF design has the capacity for the deposition of tailings  | Not expected to be considered significant due to the application of mitigation measures and controls (Table 11-4) |
|  | Hydrocarbon and chemicals - Potential for soil contamination is expected to be low given application of standard management processes  | Not expected to be considered significant due to the application of mitigation measures and controls (Table 11-4) |

## 11.6. Assessment and Significance Residual Cumulative Impacts

No more than negligible cumulative impacts from other reasonably foreseeable projects are expected in relation to Terrestrial Environmental Quality due to the isolated nature of the Proposal.

## 11.7. Likely Environmental Outcomes

Considering the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the anticipated environmental outcomes that apply to Terrestrial Environmental Quality include:

- Clearing of up to 4,868 ha of native vegetation will expose topsoil and subsoils, which may result in some minor localised erosion following rainfall
- Some negligible soil erosion may occur on slopes of constructed landforms (i.e. TSF and WRLs)
- Some AMD is likely to occur from ore stockpiles during mine operations and will need to be managed following rainfall events and sent to the processing plant. The TSFs and WRLs are designed to minimise closure impacts and the potential for contamination of underlying and surrounding soils are expected to be negligible.

Implementing the aforementioned industry-leading mitigation measures regarding the transport, storage and handling of tailings, waste rock, hydrocarbons and other chemicals will minimise adverse impacts to Terrestrial Environmental Quality. The Proponent considers that the Proposal can be managed to meet the EPA's objective to protect Terrestrial Environmental Quality so that the quality of land and soils are protected.

## 12. OTHER ENVIRONMENTAL FACTORS

### 12.1. Landforms

#### 12.1.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Landforms:

**To maintain the variety, integrity, ecological functions and environmental values of landforms**

#### 12.1.2. Receiving Environment

The Development Envelope occurs within the Great Sandy Desert Bioregion, stretching across:

- Three subregions: McLarty, Mackay, Pindanland
- Five land systems: Little Sandy, Nita, Callawa, Buckshot and Atlas.

The regional geology of the Development Envelope is described in Section 2.1.2.

The dune systems, represented by Little Sandy land system, that occur in and around the Development Envelope are the region's most prominent and widespread landforms.

The Little Sandy System consists red sands and red sandy earth near the sand dunes. It can be inferred that the dunes will have similar characteristics to the Deep Sands (Section 11.3; Landloch 2020).

The Development Envelope occupies approximately 13,983 ha of the Little Sandy land system within the McLarty and, Mackay subregions. Thus, the Development Envelope represents approximately 2.6% of the regional extent of the dominant dune system landform.

No other potentially significant landform is considered to occur within the Development Envelope, with no prominent, unusual or poorly represented hills, ranges, outcrops, watercourses, wetlands or other distinct or unique features in the Proposal area.

#### 12.1.3. Potential Environmental Impacts

- Permanent changes within the MIA through the construction of WRL, TSF and mining pit
- Reversible changes to landform within the MIA for the construction of infrastructure and access tracks
- Increased erosion within disturbed areas.

#### 12.1.4. Assessment of Significance

- The Proposal design has considered minimising landform disturbance by ensuring the construction of the WRL, TSF and pit will be no higher than necessary
- Clearing activities will be minimised to ensure clearing is limited to that necessary for the safe construction and operation of the Proposal
- Disturbed areas will be rehabilitated when they become available.

The potential impact to Landforms is not considered significant to the degree that necessitates its assessment as a Potential Key Environmental Factor. The dune system and other local landform features may potentially support social cultural or heritage values, in which case this will be addressed through the Social Surroundings key environmental factor (Section 7).

The final Landform design for the Proposal will be developed as part of the MCP. The main aim is to create a safe, stable non-polluting landform.

## 12.2. Greenhouse Gas Emissions

### 12.2.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Greenhouse Gas:

**To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change**

### 12.2.2. Western Australia Policy and Guidelines

On 28 August 2019, the WA Government released its State Government Greenhouse Gas Emissions Policy for Major Projects (State GHG Policy) for major projects assessed by the EPA. The policy is intended to apply to new significant proposals that meet the criteria of a designated large facility under the Australian Government's Safeguard Mechanism.

The State GHG Policy aims to facilitate flexible approaches to greenhouse gas reduction, promoting innovation, emerging best practice technologies and potential new industries and opportunities for WA. It supports the development of Greenhouse Gas Management plans for Proponents, which:

- Outline strategies to avoid, reduce, mitigate and offset the project's direct (Scope 1) emissions contributing toward the State's aspiration of net zero by 2050
- Are unique to a proposal's specific circumstances
- Allow Proponents to take account of opportunities at either facility level or across national operations
- Allow Proponents to propose their own timeframes and interim targets
- Include requirements for periodic public reporting against their targets
- Account for and align with Commonwealth requirements.

### 12.2.3. Greenhouse Gas Emission Sources

Potential Greenhouse Gas (GHG) emissions attributable to the Winu Project have been identified as:

- Direct emissions from the combustion of diesel for mobile (including concentrate transport to port by contractor) and stationary energy demands and changes in land use (clearing of vegetation) (Scope 1 emissions)
- Burning of Liquefied Natural Gas (LNG) for the production of electricity via a Power Purchase Agreement (PPA) (Scope 2 emissions)
- Scope 3 indirect emissions (other than Scope 2 emissions) as a consequence of the activities of the Proponent's suppliers and customers from sources not owned or controlled by the Proponent's business. In this case, the downstream processing of copper concentrate, purchased goods and services, upstream and downstream transportation and indirect emissions from fuel use (production and supply).

### 12.2.4. GHG Emissions Estimates

A GHG emissions inventory has been calculated for the Proposal using the methods and criteria from the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (DISER 2008) (NGER Determination). The major emission types of GHG emissions from the Proposal are carbon dioxide (CO<sub>2</sub>), nitrogen oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>).

The Proposal will mitigate emissions of CO<sub>2</sub>-e by constructing substantial solar and wind power generation within the Development Envelope for the commencement of operations. This investment in

infrastructure will reduce the Proposals scope 1 and 2 emissions of CO<sub>2</sub>-e by 108,165 tonnes on average per annum and by over 4.3 million tonnes of CO<sub>2</sub>-e over the life of the Proposal.

The estimated emissions of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) and their sources are presented in Table 12-1.

**Table 12-1: GHG Emissions Estimates**

| Activity                               | Annual Average Emission (t CO <sub>2</sub> -e/ annum) | Peak Annual Emission (t CO <sub>2</sub> -e/ annum) | Total Emission over Life of Proposal (~41 years) (t CO <sub>2</sub> -e) |
|--|---|--|---|
| <b>Scope 1 Emissions</b>               |   |  |   |
| Land clearing                          | 1,114   | 21,081 (2028)                                      | 44,573  |
| Diesel emissions                       | 45,657  | 69,548 <sup>#</sup> (2047)                         | 1,826,281   |
| <b>Total Scope 1</b>                   | <b>46,771</b>   | <b>69,859 (2047)</b>                               | <b>1,870,854</b>  |
| <b>Scope 2 Emissions</b>               |   |  |   |
| LNG power generation                   | 37,953  | 44,493 (2054)                                      | 1,442,209   |
| <b>Total Scope 1 &amp; 2 Emissions</b> | <b>82,827*</b>  | <b>111,353 (2047)</b>                              | <b>3,313,063</b>  |
| <b>Scope 3 Emissions</b>               |   |  |   |
| <b>Total Scope 3</b>                   | <b>74,763</b>   | <b>127,879 (2035)</b>                              | <b>3,065,265</b>  |
| <b>Total Emissions</b>                 | <b>157,590</b>  | <b>220,947 (2035)</b>                              | <b>6,378,328</b>  |

\* Annual average total scope 1 and 2 emission are not aggregated due to the LNG power generation not commencing until year 3 of the Proposal.

# The large variation between peak and annual average diesel emissions is due to high mining rates in the first half of the Proposal life followed by ongoing processing of stockpiles leading to lower diesel usage in the second half of the Proposal life.

A comparison of GHG emissions without investment in renewables technology for the Proposal is provided in Table 12-2.

**Table 12-2: GHG Emissions Estimates Without Mitigation**

| Activity                               | Annual Average Emission (t CO <sub>2</sub> -e/ annum) | Peak Annual Emission (t CO <sub>2</sub> -e/ annum) | Total Emission over Life of Proposal (~41 years) (t CO <sub>2</sub> -e) |
|--|---|--|---|
| <b>Scope 1 Emissions</b>               |   |  |   |
| Land clearing                          | 1,114   | 21,081 (2028)                                      | 44,573  |
| Diesel emissions                       | 45,657  | 69,548 <sup>#</sup> (2047)                         | 1,826,281   |
| <b>Scope 2 Emissions</b>               |   |  |   |
| LNG power generation                   | 151,811*  | 177,972 (2054)                                     | 5,768,836   |
| <b>Total Scope 1 &amp; 2 Emissions</b> | <b>190,992</b>  | <b>235,834 (2054)</b>                              | <b>7,639,690</b>  |

\* Annual average total scope 1 and 2 emission are not aggregated due to the LNG power generation not commencing until year 3 of the Proposal.

# The large variation between peak and annual average diesel emissions is due to high mining rates in the first half of the Proposal life followed by ongoing processing of stockpiles leading to lower diesel usage in the second half of the Proposal life.

### 12.2.5. Potential Environmental Impacts

Total Scope 1 and 2 emissions of 3,313,063 t CO<sub>2</sub>-e/ over the life of the Proposal.

### 12.2.6. Assessment of Significance

The EPA considers GHG emissions a significant factor if Scope 1 or Scope 2 emissions are reasonably likely to exceed 100,000 tonnes CO<sub>2</sub>-e of emissions in any year (EPA 2023d). The Scope 1 emissions are below the threshold regardless of mitigation measures and are not considered significant. The mitigation of CO<sub>2</sub>-e emissions due to the Proposals' investment in renewable power generation reduces the expected Scope 2 emissions below this threshold. Therefore, the expected CO<sub>2</sub>-e emissions for the Proposal are not considered significant.

## 12.3. Subterranean Fauna

### 12.3.1. EPA Environmental Factor and Objective

The EPA Statement of Environmental Principles, Factors and Objectives (EPA 2023a) lists the following as its objective for Subterranean Fauna:

To protect subterranean fauna so that biological diversity and ecological integrity are maintained

### 12.3.2. Receiving Environment

The MIA, Texas and Rimfire sit within the Mackay subregion. The MIA lies in between the Percival and Wallal palaeodrainage lines and shows no evidence of any association to calcrete deposits. Texas and Rimfire are between two major paleovalleys, the Percival and Wallal paleovalleys (Biota 2023b).

Wallal is located within the McLarty subregion and just north of the Wallal paleovalley.

The basic subterranean survey and desktop studies conducted by Biota (2022a,b; 2023b) found no obvious habitat suitable for subterranean fauna, with local stratigraphy showing an absence of fractures and caverns. Most geological units within the Development Envelope had a Low prospectivity to support stygofauna (Biota 2022b).

Within the MIA, the sandstone and tillite geological units appeared porous. These units have some small spaces that may represent habitat for both troglofauna and stygofauna. The prospectivity for this unit was assessed as Moderate. The other geological units within the MIA were assessed as Low and would not be suitable habitat for subterranean fauna (Biota 2022a).

Based on an assessment of drill holes at Texas, all geological units (which occur below the water table) are considered to have Low prospectivity to act as stygofauna habitat (Biota 2023b).

Within Rimfire the sandstone and granite geological units (occurring below the water table) were assessed as Moderate (Biota 2022b).

Biota 2022b concluded that evidence suggests the geologies within the Development Envelope are unlikely to support a significant assemblage, even within the units assessed as Moderate (Biota 2022b).

### 12.3.3. Troglofauna

The basic subterranean survey conducted by Biota (2022a) of the MIA recorded no troglobitic fauna, consistent with the conclusions of the desktop studies. In total, 29 sites were sampled for troglofauna with up to three traps installed at each site. Overall, 84 traps were installed across the MIA, and 77 were successfully retrieved (Biota 2022a).

#### **12.3.4. Stygofauna**

The basic subterranean survey conducted by Biota (2022a) of the MIA recorded no stygofauna from any of the samples collected within the MIA (Biota 2022a). In total, 25 sites were sampled for stygofauna, of which 20 were deemed optimal for sampling.

Stygofauna sampling conducted at Wallal also recorded no stygofauna from any samples. In total eight sites were sampled during the basic survey (Biota 2023c).

A desktop study of the regional borefields indicated low prospectivity of stygofauna presence for Wallal and Texas and a moderate prospectivity for Rimfire (Biota 2022a). Further sampling will be undertaken within the regional borefields as part of the ERD.

#### **12.3.5. Potential Environmental Impacts**

- Degradation of subterranean fauna habitat through excavation (MIA only) and groundwater dewatering
- Localised drawdown of the water table due to groundwater abstraction at the regional borefields, which will be minimal and temporary for what is necessary to operate the mine.

#### **12.3.6. Assessment of Significance**

Potential impacts on Subterranean Fauna are not considered significant due to the lack of evidence for either troglifaunal or stygofauna within the Development Envelope and the low likelihood of significant habitat for either ecological group being present. The temporary nature of groundwater abstraction at the regional borefields will ensure the aquifers will not be overdrawn. Furthermore, the subterranean fauna survey conducted by Biota (2022a) concluded that it is unlikely that any disturbance caused by the Proposal would be of subregional significance on Subterranean Fauna within the Great Sandy Desert bioregion.

The Proponent considers that the Proposal can be managed to meet the EPA's objective to protect subterranean fauna so that biological diversity and ecological integrity are maintained.



### **13. HOLISTIC IMPACT ASSESSMENT**

The holistic impact assessment seeks to understand the environment as a whole. It is informed by understanding environmental values and processes and the holistic views and concerns raised through consultation.

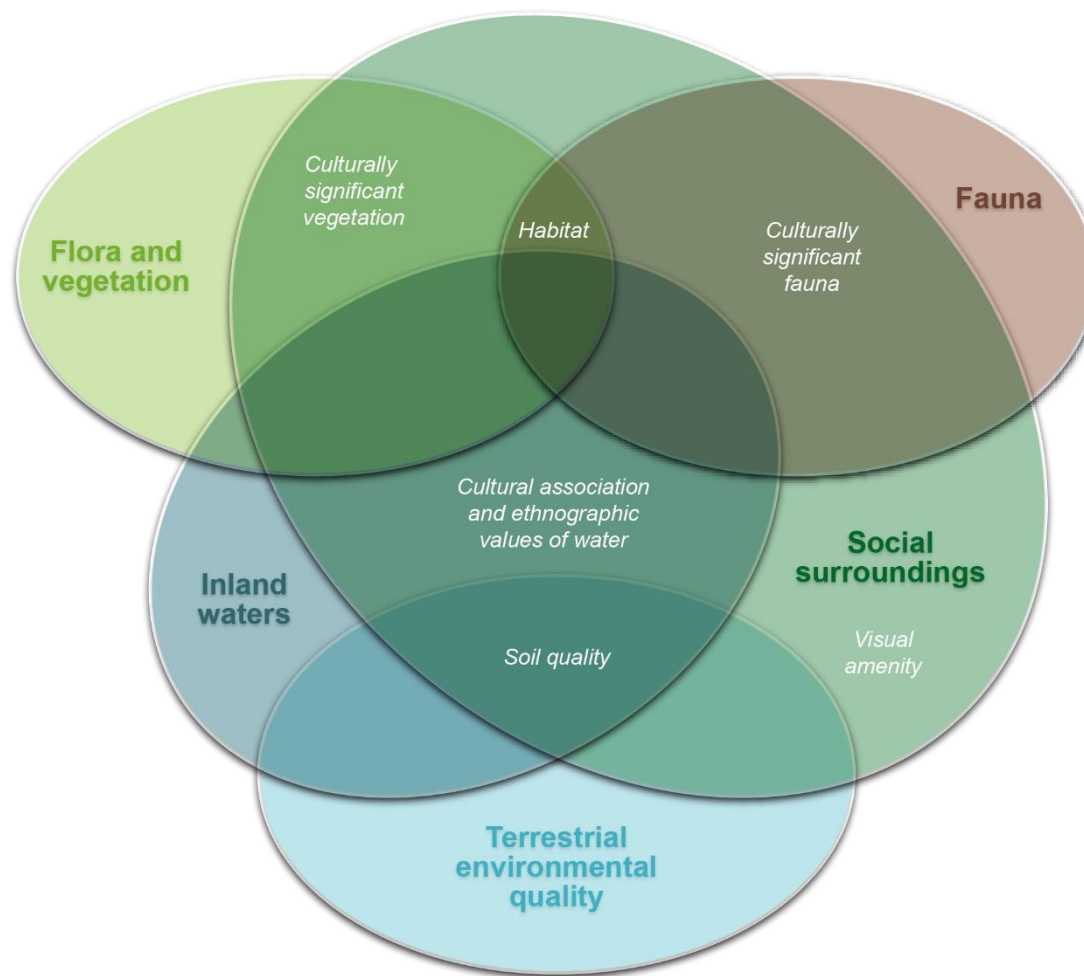
The preliminary expected connections and interactions of environmental factors for the Proposal are listed in Table 13-1 and shown in Figure 13-1.

During the environmental impact assessment, the Proponent will consider and assess all potential direct and indirect impacts from the Proposal. The mitigation hierarchy will be applied to the Proposal to address each impact, and significant impacts will be assessed following the application of the mitigation hierarchy. Each impact will be assessed concerning connection and interaction with other environmental values and factors to provide a holistic impact assessment of the Proposal.

**Table 13-1: Connections and Interactions Between Key Environmental Factors for the Proposal**

| Environmental Factor  | Connection and Interaction Pathway   | Potential Combined Impact  | Key Mitigation and Management Measures  |
|---|--|--|---|
| <p><b>Flora and Vegetation</b></p> <ul style="list-style-type: none"> <li>• Terrestrial Fauna</li> <li>• Social Surroundings</li> </ul> | <p>Implementation of the Proposal will result in clearing up to 4,868 ha of native vegetation. This will result in a loss of available habitat for terrestrial fauna</p> | <ul style="list-style-type: none"> <li>• Loss of vegetation</li> <li>• Loss of fauna habitat</li> <li>• Loss of connection to Country through loss of vegetation</li> </ul>  | <ul style="list-style-type: none"> <li>• Complete baseline surveys to understand the flora, vegetation and fauna values within the Development Envelope</li> <li>• Undertake progressive rehabilitation</li> <li>• Complete Social Surroundings assessment, including ongoing engagement with Nyangumarta and Martu people and development of co-designed SCHMPs</li> </ul>   |
|   | <p>Implementation of the Proposal may result in increased abundance, distribution and introduction of new weed species to the Development Envelope</p>                   | <ul style="list-style-type: none"> <li>• Loss or degradation of native vegetation</li> <li>• Loss or degradation of fauna habitat</li> <li>• Loss of connection to Country through degradation of vegetation</li> </ul>                                | <ul style="list-style-type: none"> <li>• Complete baseline surveys to understand the flora, vegetation and fauna values within the Development Envelope</li> <li>• Develop and undertake weed management and hygiene measures. This will be co-designed with the Traditional Owners</li> <li>• Complete Social Surroundings assessment, including ongoing engagement with Nyangumarta and Martu people and development of co-designed SCHMPs</li> </ul> |
|   | <p>Implementation of the Proposal can potentially encourage or introduce feral fauna activity to the Development Envelope</p>  | <ul style="list-style-type: none"> <li>• Loss of fauna</li> <li>• Loss or degradation of fauna habitat</li> <li>• Loss or degradation of native vegetation</li> <li>• Loss of connection to Country through impacts to vegetation and fauna</li> </ul> | <ul style="list-style-type: none"> <li>• Complete baseline surveys to understand the flora, vegetation and fauna values within the Development Envelope</li> <li>• Develop and undertake feral fauna management measures. This will be co-designed with the Traditional Owners</li> <li>• Complete Social Surroundings assessment, including ongoing engagement with Nyangumarta and Martu people and development of co-designed SCHMPs</li> </ul>      |

| Environmental Factor   | Connection and Interaction Pathway  | Potential Combined Impact   | Key Mitigation and Management Measures  |
|--|---|---|---|
| <p><b>Inland Waters</b></p> <ul style="list-style-type: none"> <li>• Flora and Vegetation</li> <li>• Terrestrial Fauna</li> <li>• Social Surroundings</li> </ul> | <p>Implementation of the Proposal will require groundwater abstraction and surplus water disposal</p> <p>Lowering the watertable can impact flora, vegetation, and fauna habitat</p> <p>Disposal of surplus water can impact flora, vegetation, and fauna habitat</p> | <ul style="list-style-type: none"> <li>• Lowering of the watertable as a result of groundwater abstraction may impact GDEs (if present)</li> <li>• Loss of vegetation from changes to hydrological regimes may result in loss of fauna habitat</li> <li>• Loss of connection to Country through loss of vegetation and changes to the hydrological regimes</li> </ul> | <ul style="list-style-type: none"> <li>• Complete baseline surveys to understand the extent of groundwater drawdown and the extent of potential GDEs</li> <li>• Complete Social Surroundings assessment including ongoing engagement with Nyangumarta and Martu people and development of co-designed SCHMPs</li> </ul>   |
|  | <p>Implementation of the Proposal has the potential for localised groundwater and/or surface water contamination</p>  | <ul style="list-style-type: none"> <li>• Loss of flora and fauna individuals</li> <li>• Impacts to GDE through contamination</li> <li>• Impacts to sites of heritage significance (such as Soaks) through surface water contamination</li> </ul>  | <ul style="list-style-type: none"> <li>• Complete baseline studies for material characterisation</li> <li>• Planning of WRL construction and hazardous material management</li> <li>• Implement the AMD Management Strategy</li> <li>• Complete Social Surroundings assessment, including ongoing engagement with Nyangumarta and Martu people and development of co-designed SCHMPs</li> </ul> |



**Figure 13-1: Holistic View of Links Between Environmental Factors**

## 14. CUMULATIVE ENVIRONMENTAL IMPACT ASSESSMENT

Cumulative environmental impacts are the successive, incremental, and interactive impacts on the environment of a proposal with one or more past, present and reasonably foreseeable future activities (EPA 2021d).

The EPA (2021d) defines reasonably foreseeable future activities as third party (or Proponent) activities that are already approved or in a government approvals process or are otherwise reasonably likely to proceed.

Existing and reasonably foreseeable projects within 100 km of the Development Envelope are described in Section 2.1.4.

The potential cumulative effects of the Proposal will be further considered as part of a detailed environmental impact assessment. The cumulative impact assessment will consider the potential cumulative environmental effects of the nearby projects concerning the environmental factors relevant to each project (Table 14-1).

**Table 14-1: Environmental Factors with Potential to be Cumulatively Impacted by the Proposal and Nearby Projects**

| Projects within 100 km of the Proposal               | Approximate Distance to MIA (km)    | Nearest Distance to Development Envelope (km) | Environmental Factor Relevant to the Proposal   |
|--|-------------------------------------|---|---|
| Australian Renewable Energy Hub                      | 33 km (to closest boundary of AREH) | Intersects the Proposal within the RAC        | <ul style="list-style-type: none"> <li>• Social Surroundings</li> <li>• Flora and Vegetations</li> <li>• Terrestrial Fauna</li> </ul>   |
| Telfer Goldmine expansion and infrastructure project | 122                                 | 95  | <ul style="list-style-type: none"> <li>• Flora and Vegetation</li> <li>• Inland Waters</li> </ul>   |
| Woodie Continued Operations Project                  | 112                                 | 104   | <ul style="list-style-type: none"> <li>• Social Surroundings</li> <li>• Flora and Vegetation</li> <li>• Terrestrial Fauna</li> <li>• Inland Waters</li> <li>• Subterranean Fauna</li> </ul> |
| Goldsworthy Iron Ore Mines Extension Project         | 144                                 | 83  | <ul style="list-style-type: none"> <li>• Social Surroundings</li> <li>• Flora and Vegetation</li> <li>• Terrestrial Fauna</li> <li>• Inland Waters</li> <li>• Subterranean Fauna</li> </ul> |
| Pardoo Irrigated Agriculture Project                 | 200                                 | 75  | <ul style="list-style-type: none"> <li>• Social Surroundings</li> <li>• Flora and Vegetation</li> <li>• Terrestrial Fauna</li> <li>• Inland Waters</li> </ul>                               |
| North Star Magnetite Project                         | 200                                 | 152   | <ul style="list-style-type: none"> <li>• Flora and Vegetation</li> <li>• Terrestrial Fauna</li> <li>• Inland Waters</li> </ul>  |

## 15. REFERENCES

- Advisian 2022. *Winu Dewatering Strategy and Groundwater Supply Update 2022*. Prepared for Rio Tinto.
- AMIRA International Limited (AMIRA) 2002. *ARD Test Handbook: Project P387A: Prediction and kinetic control of acid mine drainage*.
- ANZG 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
- ASTM International 2022. *Standard Test Method for Laboratory Weathering of Solid Materials Using a Humidity Cell*. United States.
- Astron 2019. *Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna Survey*. Prepared for Rio Tinto Exploration.
- Australian Bureau of Statistics (ABS) 2021. *East Pilbara 2021 Census All Persons Quick Stats*. Available from <https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA53220>
- Australian Government 2016. *Preventing Acid and Metalliferous Drainage: Leading Practise Sustainability Development Program for the Mining Industry*. September 2016. Available from: <https://www.industry.gov.au/sites/default/files/2019-04/lpsdp-preventing-acid-and-metalliferous-drainage-handbook-english.pdf>
- Beard, J.S. 1975. *Vegetation Survey of Western Australia, Pilbara: 1,000,000 Vegetation Series: Explanatory Notes to Sheet 5*. University of Western Australia Press, Western Australia.
- Beard, J. S., Beeston, G. R., Harvey, J. M., Hopkins, A. J. M., & Shepherd, D. P. 2013. *The vegetation of Western Australia at the 1: 3,000,000 scale. Explanatory memoir. Conservation Science Western Australia*, 9(1).
- Biota Environmental Sciences (Biota) 2021a. *Winu Project Detailed Flora and Vegetation Survey*. Prepared for Rio Tinto Winu Pty Ltd.
- Biota Environmental Sciences (Biota) 2021b. *Winu Project Fauna Assessment*. Prepared for Rio Tinto Winu Pty Limited.
- Biota Environmental Sciences (Biota) 2022a. *Winu Project Subterranean Fauna Desktop Study and Basic Survey*. Prepared for Rio Tinto.
- Biota Environmental Sciences (Biota) 2022b. *Winu Production Bores Stygofauna Desktop Study*. Prepared for Rio Tinto Copper.
- Biota Environmental Sciences (Biota) 2023a. *Winu Project Fauna Assessment*. Report prepared for Rio Tinto Winu.
- Biota Environmental Sciences (Biota) 2023b. *Winu Texas Stygofauna Desktop Study*. Prepared for Rio Tinto Copper.
- Biota Environmental Sciences (Biota) 2023c. *Wallal Stygofauna Sampling*. Prepared for Rio Tinto Copper.
- Bureau of Meteorology (BoM) 2020. *Groundwater Dependent Ecosystem Atlas*. Available: <http://www.bom.gov.au/water/groundwater/gde/>. Government of Australia, Canberra ACT.
- Bureau of Meteorology (BoM) 2022. *Climate Data Online*. Available at: <http://www.bom.gov.au/climate/data/index.shtml>
- Commonwealth of Australia 2001. *National Objectives and Targets for Biodiversity Conservation 2001–2005*. Department of the Environment and Heritage, Commonwealth of Australia, Canberra. "

- Cross, A., Jaireth, S., Rapp, R., & Armstrong, R. 2011. Reconnaissance-style EPMA chemical U–Th–Pb dating of uraninite. *Australian Journal of Earth Sciences*, 58(6), 675-683.
- Czarnota, K., Champion, D. C., Goscombe, B., Blewett, R. S., Cassidy, K. F., Henson, P. A., & Groenewald, P. B. 2010. Geodynamics of the eastern Yilgarn Craton. *Precambrian Research*, 183(2), 175-202.
- Department of Biodiversity, Conservation and Attractions (DBCA) 2017. *Guidelines for surveys to detect the presence of Bilbies and assess the importance of habitat in Western Australia*. DBCA Western Australia. August 2017.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2021. *Australia's bioregions (IBRA)*. Australian Government, Canberra.
- Department of Environmental Regulation (DER) 2015a. *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes*
- Department of Environmental Regulation (DER) 2015b. *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes*.
- Department of Industry, Science, Energy and Resources (DISER) 2008. *National Greenhouse and Energy Reporting Regulations 2008*. Australian Government.
- Department of Mines and Petroleum (DMP) 2013. *Tailings storage facilities in Western Australia – code of practice*. DMP, WA.
- Department of Mines and Petroleum 2016 (DMP). *Draft Guidance – Material Characterisation Baseline Data Requirements for Mining Proposal*. March 2016
- Department of Mines, Industry Regulation and Safety (DMIRS) 2023a. *Statutory Guidelines for Mine Closure Plans*.
- Department of Mines, Industry Regulations and Safety (DMIRS) 2023b. *Mine Closure Plan Guidance - How to prepare in accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans*.
- Department of Parks and Wildlife (DPaW) 2017. Interim guideline for the preliminary surveys of Night Parrot (*Pezoporus occidentalis*) in Western Australia. DPaW Western Australia. May 2017.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2011a. Survey guidelines for Australia's threatened mammals. Australian Government, Canberra.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2011b. Survey guidelines for Australia's threatened reptiles. Australian Government, Canberra.
- Department of the Environment (DCCEEW) 2023. *Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act*. Australian Government 2023.
- Department of the Environment (DoE) 2013. *Matters of National Environmental Significance: Significant Impact Guideline 1.1*. Australian Government, Canberra.
- Department of the Environment (DoE) 2016. *EPBC Act Referral Guideline for the Endangered Northern Quoll *Dasyurus hallucatus**. Australian Government, Canberra. January 2016.
- Department of the Environment and Energy (DoEE) 2020. *National Light Pollution Guidelines for Wildlife: Including Marine Turtle, Seabirds and Migratory Shorebirds*. Commonwealth of Australia, January 2020.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) 2010a. *Survey guidelines for Australia's threatened bats*. Australian Government, Canberra.

- Department of the Environment, Water, Heritage and the Arts (DEWHA) 2010b. *Survey guidelines for Australia's threatened birds*. Australian Government, Canberra.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) 2010c. *Survey guidelines for Australia's threatened frogs*. Australian Government, Canberra.
- Department of Water (DoW) 2009. *Operational Policy no. 5.12 - Hydrogeological Reporting Associated with a Groundwater Well Licence*. Department of Water, Government of Western Australia.
- Department of Water (DoW) 2013. *Western Australian Water in Mining Guideline*.
- Department of Water (DOW) 2016. *Testing of the artesian aquifers of the West Canning Basin*. Government of Western Australia 2016.
- Department of Water and Environmental Regulation (DWER) 2020. *Use of Operating Strategies in the Water Licensing Process*. Formerly operational policy 5.08. Government of Western Australia. October 2020.
- Department of Water and Environmental Regulation (DWER) 2023. *Water Register*. Accessed on the 17/08/2023. Available at: <https://maps.water.wa.gov.au/#/webmap/register>
- Department of Water and Environmental Regulation (DWER) 2018. *West Canning Basement - Allocation Statement*. Government of Western Australia 2018.
- Environmental Protection Authority (EPA) 2006. *Guidance Statement 6 - Rehabilitation of Terrestrial Ecosystems*. EPA Western Australia. June 2006.
- Environmental Protection Authority (EPA) 2016a. *Environmental Factor Guideline: Flora and Vegetation*. EPA Western Australia. December 2016
- Environmental Protection Authority (EPA) 2016b. *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. EPA Western Australia. December 2016.
- Environmental Protection Authority (EPA) 2016c. *Environmental Factor Guideline: Terrestrial Fauna*. EPA Western Australia. December 2016
- Environmental Protection Authority (EPA) 2016d. *Technical Guidance: Sampling of Short-Range Endemic Invertebrate Fauna*. EPA Western Australia, December 2016.
- Environmental Protection Authority (EPA) 2016e. *Environmental Factor Guidelines: Terrestrial Environmental Quality*. Perth, Western Australia. Published December 2016
- Environmental Protection Authority (EPA) 2018. *Environmental Factor Guideline: Inland Waters*. EPA Western Australia. June 2018.
- Environmental Protection Authority (EPA) 2020. *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. EPA Western Australia. July 2020.
- Environmental Protection Authority (EPA) 2021a. *Instructions on How to Identify the Content of a Proposal*. EPA, Western Australia. October 2021.
- Environmental Protection Authority (EPA) 2021b. *Template - Proposal Content Document*. EPA, Western Australia. October 2021.
- Environmental Protection Authority (EPA) 2021c. *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures*. PA Western Australia. October 2021.
- Environmental Protection Authority (EPA) 2021d. *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual*. EPA Western Australia. October 2021.
- Environmental Protection Authority (EPA) 2021e. *Instructions for the referral of a Proposal under section 38 of the Environmental Protection Act 1986*. EPA, WA



- Environmental Protection Authority (EPA) 2021f. *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)*. EPA, WA.
- Environmental Protection Authority (EPA) 2021g. *Interim Guidance: Taking Decision Making Processes in Account in EIA*. EPA Western Australia. October 2021.
- Environmental Protection Authority (EPA) 2021h. *Instructions on how to prepare EP Act Part IV Environmental Management Plans*. EPA Western Australia. October 2021
- Environmental Protection Authority (EPA) 2023a. *Statement of Environmental Principles, Factors, Objectives and Aims of EIA*. EPA Western Australia. April 2023
- Environmental Protection Authority (EPA) 2023b. *Environmental Factor Guideline: Social Surroundings*. EPA Western Australia. June 2023.
- Environmental Protection Authority (EPA) 2023c. *Interim technical Guidance – Environmental impact assessment of Social Surroundings – Aboriginal cultural heritage*. June 2023.
- Environmental Protection Authority (EPA) 2023d. *Environmental Factor Guideline: Greenhouse Gas Emissions*. EPA, Western Australia. April 2023.
- Garnett, S., Szabo, J., & Dutson, G. 2011. *The Action Plan for Australian Birds 2010*. Collingwood, Victoria: CSIRO Publishing.
- Golder 2020a. *Winu Final Study: Updated Flood Risk Assessment - Access Route*. Prepared for Rio Tinto.
- Golder 2020b. *Winu Final Study: Construction Phase Surface Water Management Plan - Mine Site Areas*. Prepared for Rio Tinto
- Golder 2021a. *Winu Final Study: Operational Surface Water Management Plan*. Prepared for Rio Tinto.
- Golder 2021b. *Pit Lake Water Balance and Geochemical Model*. Prepared for Rio Tinto.
- Golder 2022a. *Winu Project: Site-Wide Water Balance Update*. Prepared for Rio Tinto.
- Golder 2022b. *H3 Hydrogeological Assessment of the Winu Project*. Prepared for Rio Tinto.
- Griffiths, A. and Brook, B. 2014. *Effect of fire on small mammals: A systematic review*. International Journal of Wildland Fire 2014. 23(7): 1034-1043.
- Hamilton, N., Onus, M., Withnell, B., and Withness, K. 2017. *Recent sightings of the Night Parrot *Pezoporus occidentalis* from Matuwa (Lorna Glen) and Millrose Station in Western Australia*. Australian Field Ornithology. 34: 71-75.
- Harvey, M.S. 2002. *Short-range endemism among the Australian fauna: some examples from non-marine environments*. Invertebrate Systematics, 16: 555-570
- Hickman, A.H., and Bagas, L. 1999. Geological evolution of the Palaeoproterozoic Talbot Terrane and adjacent Meso- and Neo-proterozoic succession, Paterson Orogen, Western Australia. (Vol. 71). Geological Survey of Western Australia
- Huston, D. L., Czarnota, K., Jaireth, S., Williams, N., Maidment, D., Cassidy, K. F., ... & Miggins, D. 2010. Mineral systems of the Paterson region. Geosci. Aust. Rec, 155-218.
- International Council on Mining and Metals (ICMM) 2019. *Integrated Mine Closure Good Practice Guide, Second Edition*. Available from: [https://www.icmm.com/website/publications/pdfs/environmentalstewardship/2019/guidance\\_integrated-mine-closure.pdf?cb=60008](https://www.icmm.com/website/publications/pdfs/environmentalstewardship/2019/guidance_integrated-mine-closure.pdf?cb=60008)

International Council on Mining Metals (ICMM) 2020. Global Industry Standard on Tailings Management. Available at: [https://globaltailingsreview.org/wp-content/uploads/2020/08/global-industry-standard\\_EN.pdf](https://globaltailingsreview.org/wp-content/uploads/2020/08/global-industry-standard_EN.pdf)

International Council on Monuments and Sites (ICOMOS) 2013. *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*. Available from: <https://openarchive.icomos.org/id/eprint/2145/1/ICOMOS-Australia-The-Burra-Charter-2013.pdf>

International Cyanide Management Institute (ICMI) 2023. *The Cyanide Code*. Available at: <https://cyanidecode.org>

International Network for Acid Prevention (INAP) 2018. *The Global Acid Rock Drainage Guide*.

International Network for Acid Prevention (INAP) 2020. Rock Placement Strategies to Enhance Operational and Closure Performance of Mine Rock Stockpiles: Phase 1 Work Program – Review, Assessment & Summary of Improved Construction Methods. January 2020.

Johnstone, R. E., & Storr, G. M. 1998. Handbook of western Australian birds (Vol. 2). Western Australian Museum.

Jones, A. 2017. Night parrot sighting in Western Australia shocks birdwatching world. ABC News. Perth, Western Australia. Retrieved from <http://www.abc.net.au/news/2017-03-23/night-parrot-sighting-in-wa-shocks-birdwatching-world/8377624>

Landloch 2020. Winu Soil Characteristics Report. Prepared for Rio Tinto Copper and Diamonds

McKenzie, N.J., Grundy, M.J., Webster, R., Ringrose-Voase, A.J. 2008. Guidelines for Soil and Land Resources. CSIRO Publishing

Menkhorst, P., & Knight, F. 2011. A field guide to the mammals of Australia. Oxford University Press.

Menkhorst, P., Rogers, D., Clarke, R., & Sullivan, P. 2017. The Australian bird guide (p. 260). Melbourne: CSIRO Publishing.

Mine Environment Neutral Drainage (MEND) Program 1991. *Acid Rock Drainage Prediction Manual*. Available from: <https://mend-nedem.org/wp-content/uploads/2013/01/1.16.1b.pdf>

Minerals Council of Australia (MCA) 2021. *ESG: Change for the Better*. Available from: <https://minerals.org.au/wp-content/uploads/2022/12/ESG-Change-for-the-better.pdf>

Morris, K., J. Woinarski, and K. Aplin 2008. Leggadina lakedownensis. Available from: <http://www.iucnredlist.org/apps/redlist/details/11384/0>.

Newport, J., Shorthouse, D., and Manning, A. 2014. *The effects of light and noise from urban development on biodiversity: Implications for protected areas in Australia*. Ecological Management and Restoration. 15(3): 204-214.

Pavey, C. R., Nano, C. E. M., Cooper, J. B., Cole, J. R., and McDonald, P. J. 2011. *Habitat use, population dynamics and species identification of mulgara, Dasycercus blythi and D. cristicauda, in a zone of sympatry in central Australia*. Australian Journal of Zoology. 59: 156-169. "

Payne. A. L 2004. *An inventory and condition survey of the Pilbara region, Western Australia - Geomorphology*. Department of Primary Industries and Regional Development

Rio Tinto 2017. Environmental performance standard E13: Chemically Reactive Mineral Waste Control Standard. November 2017.

Rio Tinto 2020. *The use of remote sensing to assess the potential presence of groundwater dependent ecosystems and persistent surface water bodies*. Internal memorandum November 2020.

Rio Tinto 2021a. *Communities and Social Performance Commitments Disclosure Interim Report*. September 2021.

Rio Tinto 2021b. *Winu Waste Rock Characterisation: Primary Sulphide Zone*. Internal report prepared by Rio Tinto.

Rio Tinto 2021c. *Winu Waste Rock Characterisation: Upper Zone*. Internal report prepared by Rio Tinto.

Rio Tinto 2021d. *Winu Waste Rock Characterisation: Secondary Sulphide Zone*. Internal report prepared by Rio Tinto.

Rio Tinto 2022a. *Communities and Social Performance Standard*. August 2022. Available from: <https://www.riotinto.com/-/media/Content/Documents/Sustainability/Corporate-policies/RT-Communities-social-performance-standard.pdf>

Rio Tinto 2022b. *Winu Tailings Characterisation*. Internal report prepared by Rio Tinto.

Rio Tinto 2023a. *Winu Mine Operations: AMD Management Strategy Plan*.

US EPA 2013. *Method 1314. Liquid-Solid Partitioning (LSP) as a Function of Liquid-to-Solid Ratio for Constituents in Solid Materials Using an Up-flow Percolation Column Procedure*.

V&C Semenuik Research Group 2000. *Wetlands of the north western Great Sandy Desert in the LaGrange hydrological sub basin*. Unpublished report for Water and Rivers Commission. Perth, WA.

Water, Waste & Land (WWL) 2022. *Winu TSF Conceptual Design*. Prepared for Rio Tinto. Report No. 127-008/3

Western Botanical 2023. *Winu Project Detailed Flora and Vegetation Assessment*. Report Prepared for Rio Tinto Winu.

**16. APPENDICES**

**APPENDIX A PROPOSAL CONTENT DOCUMENT**

# Winu Copper and Gold Project

## Proposal Content Document

**Table 1: General proposal content description**

|                          |  |
|--------------------------|--|
| <b>Proposal title</b>    | Winu Project   |
| <b>Proponent name</b>    | Rio Tinto Winu Pty Limited   |
| <b>Short description</b> | <p>The Winu Project (the Proposal) is a copper-gold mine located approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta people's and the Martu people's Native Title Determination Areas (Figure 1-1).</p> <p>The Proposal includes, but is not limited to, the following:</p> <ul style="list-style-type: none"><li>• An open pit that extends below the watertable</li><li>• Mineral waste management (Waste rock landforms [WRL] and Tailings Storage Facility [TSF])</li><li>• Material stockpiles (ore and topsoil)</li><li>• Groundwater abstraction for water supply and pit dewatering</li><li>• Ore processing facilities (crushing, reclaiming, grinding, flotation, concentrate dewatering and handling, gold extraction, tailings thickening etc)</li><li>• Water supply (mine dewatering, regional borefields, on-site dams)</li><li>• Water management infrastructure (bores, pumps, pipelines, diversion channels, ponds/dams)</li><li>• Surplus water management (controlled discharge of excess water to designated infiltration areas)</li><li>• Support facilities (accommodation camp, power supply [including LNG-fired thermal generation, wind turbines, solar panels, and battery storage], aerodrome facilities including an airstrip, warehouse-workshops, explosives storage, laydown areas, hydrocarbon storage, offices, waste-water treatment plant(s), drill core processing and storage facilities, information and communications technology, laboratories, site roads, waste management, and site fire, emergency, medical facilities)</li><li>• Linear infrastructure (heavy vehicle and light vehicle access roads, upgrades to existing access roads, pipelines, powerlines, fibre-optic cable, communications distribution networks)</li></ul> <p>Concentrate will be transported by truck via the access road and Great Northern Highway to port by a third party for export. Doré (unrefined gold bar) is expected to be transported via the regular air charter.</p> <p>The Proposal is located within a 37,344 ha Development Envelope and will require the clearing of up to 4,868 ha of new native vegetation.</p> |

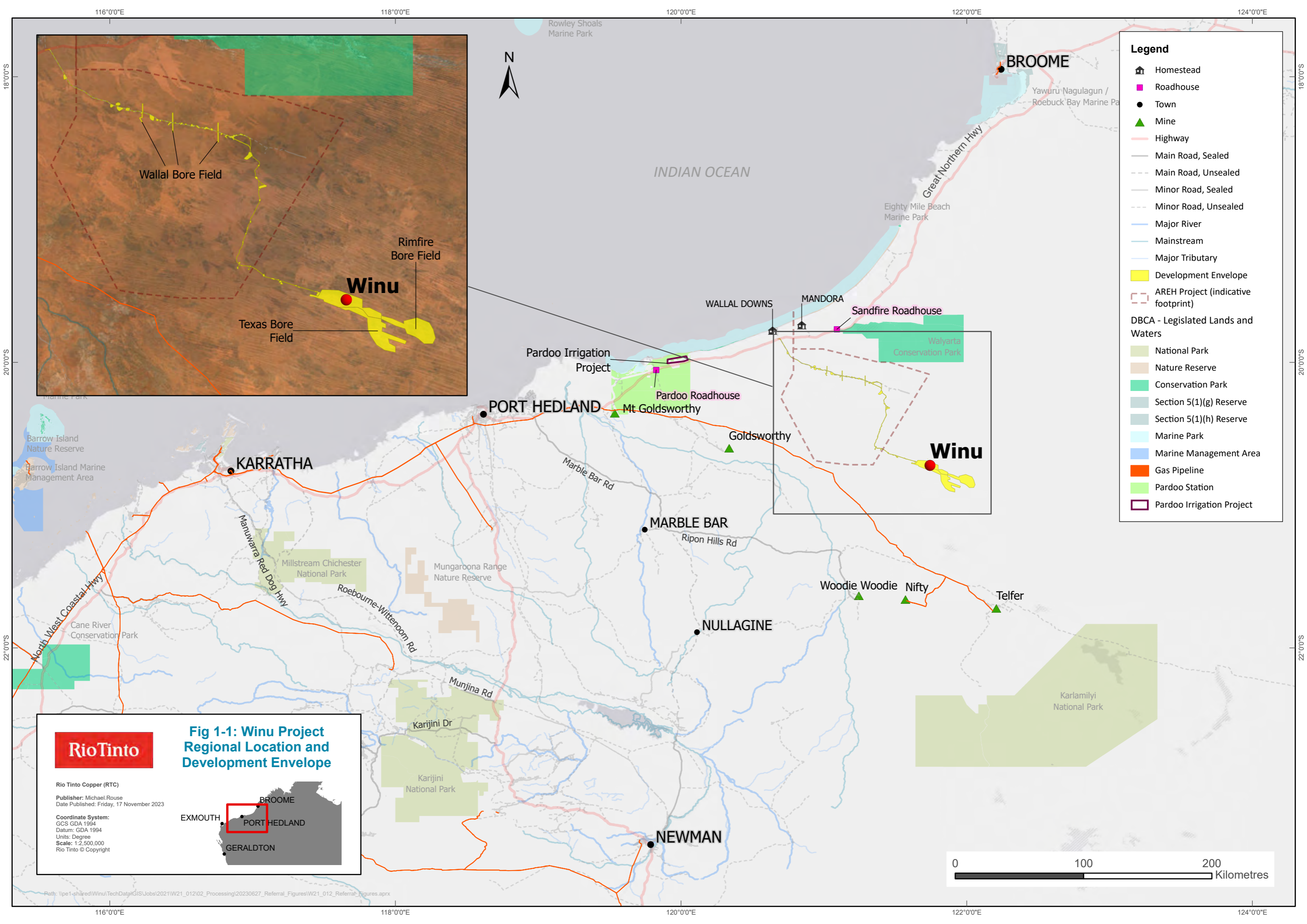
**Table 2: Proposal content elements**

| Proposal Element   | Location/Description   | Maximum Extent, Capacity or Range  |
|--|--|--|
| <b>Physical elements</b>   |  |  |
| Mine elements, including: <ul style="list-style-type: none"> <li>▪ A below watertable open pit</li> </ul>  | Mining Lease 45/1288<br>Figure 2-1<br>Figure 3-1   | Clearing up to 4,868 ha of new native vegetation for the Conceptual Footprint within the 37,344 ha Development Envelope. |
| Mineral waste elements, including: <ul style="list-style-type: none"> <li>▪ Waste rock landform (WRL)</li> <li>▪ Topsoil stockpiles</li> <li>▪ Tailings Storage Facility (TSF)</li> </ul>  | Mining Lease 45/1288<br>Figure 2-1<br>Figure 3-1   |  |
| Processing elements, including: <ul style="list-style-type: none"> <li>▪ Run of Mine (ROM) pad</li> <li>▪ Crushing, stockpiling, and reclaiming</li> <li>▪ Grinding with oversized recycle pebble crushing</li> <li>▪ Flotation, concentrate dewatering and handling</li> <li>▪ Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption</li> <li>▪ Carbon reactivation, electrowinning, doré production and cyanide detoxification</li> <li>▪ Tailings thickening</li> <li>▪ Reagent receipt, storage and delivery systems</li> </ul> | Mining Lease 45/1288<br>Figure 2-1<br>Figure 3-1   |  |
| Water management elements, including: <ul style="list-style-type: none"> <li>▪ Dewatering of pit</li> <li>▪ Borefields and associated infrastructure</li> <li>▪ Process water dams/ponds</li> <li>▪ Water storage dams</li> <li>▪ Water diversion channels and catchment ponds</li> <li>▪ Infiltration areas</li> </ul>  | Mining Lease 45/1288<br>Miscellaneous licences 45/726, 45/727, 45/728, 45/754 & 45/755<br>Figure 2-1<br>Figure 3-1 |  |
| Infrastructure elements, including: <ul style="list-style-type: none"> <li>▪ Accommodation Camp</li> <li>▪ Energy supply infrastructure</li> </ul>   | Mining Lease 45/1288<br>Miscellaneous licences 45/476, 45/491, 45/494, 45/548, 45/549, 45/550,                     |  |

| Proposal Element   | Location/Description  | Maximum Extent, Capacity or Range   |
|--|---|---|
| <ul style="list-style-type: none"> <li>▪ Mine workshops and maintenance infrastructure</li> <li>▪ Bores, pipelines, turkeys nests and supporting facilities</li> <li>▪ Haul, heavy and light vehicle roads</li> <li>▪ Ancillary buildings</li> <li>▪ Waste water treatment plants and reverse osmosis plants</li> <li>▪ Hydrocarbon storage</li> <li>▪ Explosives storage and preparation facilities and hydrocarbon storage</li> <li>▪ Laydown areas</li> <li>▪ Drill core processing and storage facilities</li> <li>▪ Information and communications technology</li> <li>▪ Aerodrome facilities including airstrip</li> <li>▪ Site fire emergency and medical facilities</li> <li>▪ Waste Management and landfill facilities</li> </ul> | <p>45/551, 45/552, 45/559, 45/623, 45/722, 45/723, 45/725, 45/726, 45/727, 45/728, 45/754 &amp; 45/755</p> <p>Figure 2-1<br/>Figure 3-1</p> |   |
| <b>Operational elements</b>  |   |   |
| Groundwater abstraction for mine dewatering  | <p>Mining Lease 45/1288</p> <p>Figure 2-1<br/>Figure 3-1</p>  | Lowering the groundwater table to no greater than a standing water level of -250m RL.   |
| Groundwater abstraction from the regional borefields   | <p>Miscellaneous licences 45/726, 45/727, 45/728, 45/754 &amp; 45/755</p> <p>Figure 2-1<br/>Figure 3-1</p>                                  | Abstraction of no more than 2.5 gigalitres per annum (GL/a).  |
| Waste Rock Landform  | <p>Mining Lease 45/1288</p> <p>Figure 2-1<br/>Figure 3-1</p>  | Approximately 490Mt of waste rock will be mined throughout the life of the Proposal.  |
| Management of surplus water  | <p>Mining Lease 45/1288</p> <p>Figure 2-1<br/>Figure 3-1</p>  | Surplus water, exceeding the operational requirement, is discharged to infiltration areas within the Development Envelope except in emergency |

| Proposal Element   | Location/Description                                | Maximum Extent, Capacity or Range              |
|--|---|--|
|  |   | circumstances linked to major rainfall events. |
| <b>Proposal elements with greenhouse gas emissions</b>   |   |  |
| Peak annual  |   |  |
| Scope 1 (2047)   | Plant and equipment: 69,859 t CO <sub>2</sub> -e    |  |
| Scope 2 (2054)   | Electricity generation: 44,493 t CO <sub>2</sub> -e |  |
| Annual average life of mine  |   |  |
| Scope 1  | Plant and equipment: 46,771 t CO <sub>2</sub> -e    |  |
| Scope 2  | Electricity generation: 37,953 t CO <sub>2</sub> -e |  |
| Scope 3  | Estimated 74,763 t CO <sub>2</sub> -e               |  |
| <b>Rehabilitation and Closure</b>  |   |  |
| <p>Where practicable, progressive rehabilitation will be undertaken over the life of the mine.</p> <p>Areas disturbed through the implementation of the Proposal will be designed to be safe and non-polluting and will be constructed so the final shape, size and stability meet the closure objectives documented in the Mine Closure Plan.</p> |   |  |
| <b>Commissioning</b>   |   |  |
| Commissioning of the processing facility will be undertaken subject to the operational limits above.   |   |  |
| <b>Other elements which affect extent of effects on the environment</b>  |   |  |
| Proposal timeframe   | Maximum project life                                | Approx. 41 years                               |





### Legend

- Homestead
- Roadhouse
- Town
- Mine
- Highway
- Main Road, Sealed
- Main Road, Unsealed
- Minor Road, Sealed
- Minor Road, Unsealed
- Major River
- Mainstream
- Major Tributary
- Development Envelope
- AREH Project (indicative footprint)

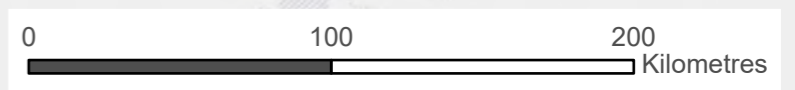
### DBCA - Legislated Lands and Waters

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve
- Marine Park
- Marine Management Area
- Gas Pipeline
- Pardoo Station
- Pardoo Irrigation Project

## Fig 1-1: Winu Project Regional Location and Development Envelope

**Rio Tinto Copper (RTC)**  
 Publisher: Michael Rouse  
 Date Published: Friday, 17 November 2023

**Coordinate System:**  
 GCS GDA 1994  
 Datum: GDA 1994  
 Units: Degree  
 Scale: 1:2,500,000  
 Rio Tinto © Copyright



120°30'0"E

121°0'0"E

121°30'0"E

122°0'0"E

20°0'0"S

20°0'0"S

20°30'0"S

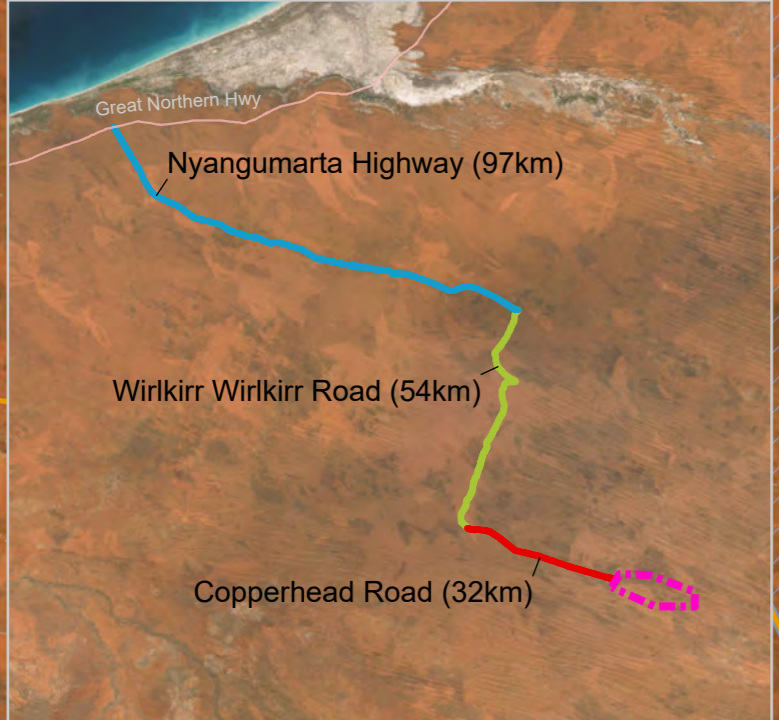
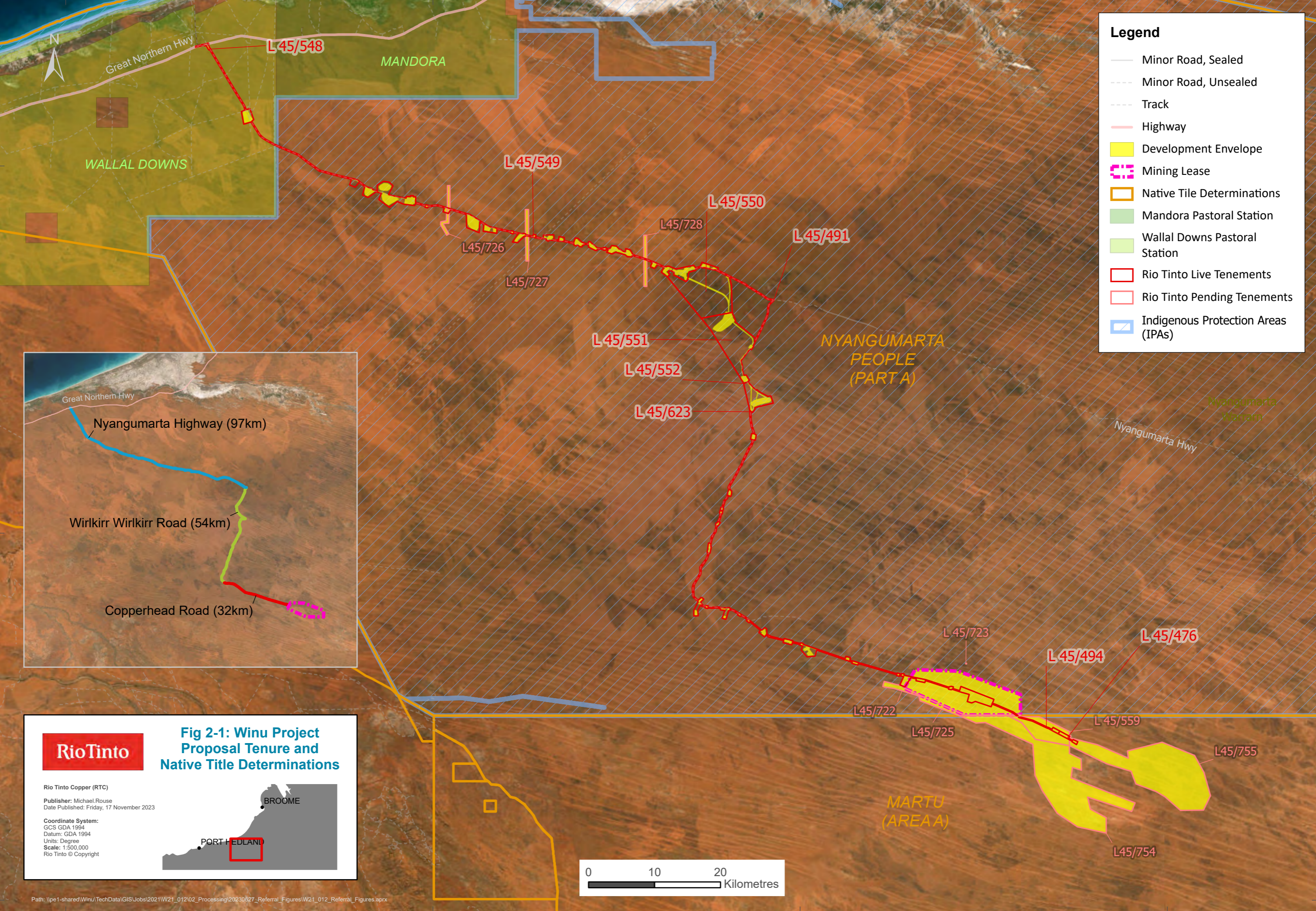
20°30'0"S

21°0'0"S

21°0'0"S

### Legend

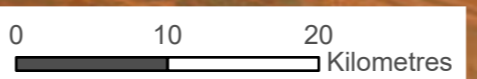
- Minor Road, Sealed
- Minor Road, Unsealed
- Track
- Highway
- Development Envelope
- Mining Lease
- Native Title Determinations
- Mandora Pastoral Station
- Wallal Downs Pastoral Station
- Rio Tinto Live Tenements
- Rio Tinto Pending Tenements
- Indigenous Protection Areas (IPAs)



### Fig 2-1: Winu Project Proposal Tenure and Native Title Determinations

Rio Tinto Copper (RTC)  
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Coordinate System:  
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120°30'0"E

121°0'0"E

121°30'0"E

122°0'0"E

121°0'0"E

122°0'0"E

123°0'0"E

Great Northern Hwy

Road Access Corridor

Mine Infrastructure Area

NYANGUMARTA PEOPLE (PART A)  
MARTU (AREA A)

0 2 4  
Kilometres

Texas Bore Field

Wallal Bore Field

0 5 10  
Kilometres

Road Access Corridor

NYANGUMARTA PEOPLE (PART A)  
MARTU (AREA A)

Rimfire Bore Field

Texas Bore Field

0 2 4  
Kilometres



**Fig 3-1: Winu Project Development Envelope and Conceptual Footprint**

Rio Tinto Copper (RTC)  
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Date Published: Friday, 17 November 2023  
Coordinate System:  
GCS GDA 1994  
Datum: GDA 1994  
Units: Degree  
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**Legend**

- Highway
- Development Envelope
- Native Title Determinations
- Conceptual Footprint**
- Aerodrome
- ANFO
- Bore Fields and Pipelines
- Camps
- Mine Construction Areas
- Mine Pit
- Ore Stockpiles
- Ponds
- Power Generation (Wind and Solar)
- Processing Infrastructure
- Roads and Borrow Pits
- Tailings Storage Facility
- Topsoil Stockpiles
- Waste Rock Landform

0 20 40  
Kilometres

121°0'0"E

122°0'0"E

123°0'0"E

20°0'0"S

20°0'0"S

21°0'0"S

21°0'0"S