



Marandoo Iron Ore Project

Revised Proposal

Hamersley Iron Pty Limited (a member of the Rio Tinto Group)

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Final v2

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PART 1 - INTRODUCTION

1. MARANDOO IRON ORE PROJECT

The Marandoo Iron Ore Project (**the Marandoo Project**) is located in the central Pilbara region of Western Australia, approximately 37 km east of Tom Price and 77 km north-east of Paraburdoo. The Marandoo Project has been developed over two phases and has the following approvals under Part IV and Part V of the *Environmental Protection Act 1986* associated with it:

- Ministerial Statement (**MS**) 286 Marandoo Iron Ore Mine and Central Pilbara Railway (**MMP1**), 6 October 1992.
- MS 598 Hydrogeological Research Programme at Marandoo Trial Dewatering and Re-injection Test Karijini National Park, 2 July 2002.
- MS 833 Marandoo Mine Phase 2 (**MMP2**), 7 July 2010.
- MS 883 Hamersley Agriculture Project (**HAP**), 2 December 2011.
- Native Vegetation Clearing Permits (**NVCPs**) to support minor and preliminary works and investigation works undertaken within the Marandoo Project area.

Rio Tinto, on behalf of the proponent Hamersley Iron Pty Limited (**Hamersley Iron**), is seeking approval to make changes to the existing operation at Marandoo and create one contemporised MS to manage the Marandoo Project, and all associated clearing, in its entirety.

The existing operations are described Section 2 and the associated MSs are provided in Appendix 1.

The following terminology is used throughout this document:

- Proposal – the changes proposed in this document.
- Revised Proposal – all components of the Marandoo Project that are currently authorised under MS 286, MS 598, and MS 833 plus the changes that are described in this Proposal that will be authorised by a new Ministerial Statement, in the event of acceptance of the Proposal by the Minister of the Environment.

Rio Tinto has excluded MS 883 from this Environmental Review document and the Referral application as it is considered that the Hamersley Agriculture Project (**HAP**) is best managed under its own Statement and separate specific conditions relating to irrigated agriculture.

1.1 PROPONENT DETAILS

The Proponent is Hamersley Iron Pty Limited a member of the Rio Tinto Group.

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1.2 PURPOSE OF THIS DOCUMENT

This document is a submission for approval under section 38 of the *Environmental Protection Act 1978 (EP Act)* for the following:

- Revised Proposal to implement changes to the Marandoo Iron Ore Project.
- Statement rationalisation to combine the MS 286, MS 598, and MS 833 in to one new contemporised Ministerial Statement for the Marandoo Project.

The description and implementation conditions will reflect the proposed changes (sought via Part 2 of this document) and the new Statement will bring the Revised Proposal in line with contemporary presentation (refer to Part 5 of this document) respectively.

- Rationalisation of all clearing historically completed, within the Marandoo Development Envelopes, as of 31 December 2013. This includes all clearing completed under MS 286 and MS 833; and under Native Vegetation Clearing Permits (**NVCPs**) approved under Part V of the EP Act. This will result in a new overall Part IV clearing limit for the Marandoo Iron Ore Project which will assist in managing and tracking of all future clearing and progressive rehabilitation on the site.

A proposed Ministerial Statement for the Revised Proposal is included in Appendix 4 for consideration. Rio Tinto proposes that this Ministerial Statement supersedes MS 286, MS 598, and MS 833.

2. EXISTING OPERATIONS

2.1 MARANDOO MINE PHASE 1

On 23 March 1991 Hamersley Iron referred the first phase of the Marandoo Project (**MMP1**) to the Office of the Environmental Protection Authority (**OEPA**)¹, for formal assessment under Part IV of the EP Act. The MMP1 was assessed at an Environmental Review and Management Programme (**ERMP**) (O'Brien 1992) level of assessment and was approved by the Minister for Environment on 6 October 1992 via MS 286.

A summary of the MMP1 is provided below in Table 2-1.

Table 2-1: Summary of Marandoo Mine Phase 1 Project

| Project Title | Marandoo Mine Phase 1 |
|--------------------------|---|
| Short Description | <p>The Marandoo Mine Phase 1 is located in the central Pilbara region of Western Australia, approximately 37 km east of Tom Price and 77 km north-east of Paraburdoo. The mining component of the Project is confined to the existing Marandoo mine lease which was excised from Karijini National Park in 1991. The mining rate is approximately 15 Mtpa and all mining is confined to above the water table. Mining is conducted within a defined area of approximately 4km by 2km.</p> <p>Water for dust suppression and on-site use is sourced from a groundwater aquifer within the Southern Fortescue Borefield (SFB) designed in a linear arrangement with up to eight production bores over 7km in length.</p> <p>The Central Pilbara railway line of approximately 115km will extend from Rosella Siding to Homestead Junction with a spur loop at Marandoo, including three sidings.</p> |

Whilst MS 286 does not identify the Key Characteristics, Rio Tinto considers that the characteristics provided in Table 2-2, and illustrated in Figure 2-1, are appropriate for the MMP1.

Table 2-2: Key Characteristics of the Marandoo Mine Phase 1 Project

| Element | Description |
|------------------------|---|
| Conceptual mining area | Refer to Figure 2-1. Conceptual mining area within a 4 km by 2 km area. Extension to Mine Trail Pit eastwards over an area of 157 ha. |
| Mining rate | 15 Mtpa |
| Waste dump | Five areas of overburden |
| Borrow Sources | <ul style="list-style-type: none"> • Whundo Mine waste rock overburden • Green Pool Siding Borrow Pit • Fox Radio Hill Site • Seven Mile landfill, Karratha |

¹ At the time, MMP1 was referred to the Environmental Protection Authority Service Unit, now called the OEPA.

| Element | Description |
|-------------------------|--|
| Central Pilbara Railway | Refer to Figure 2-1. 115 km heavy railway from Rosella Siding to Homestead Junction with a spur loop at Marandoo. Average width of disturbance of 14 metres. Inclusive of the following sidings on the existing Rosella to Yandi line: <ul style="list-style-type: none"> • Eagle Siding from 284.8 km to 287.5 km mark. • Juna Downs Siding from 359.7km to 363.1 km mark. And on the Dampier to Tom Price line: <ul style="list-style-type: none"> • Dove Siding from 50.6 km to 53.6 km mark. |
| Fibre optic cable | Located on the existing Rosella to Yandi line: <ul style="list-style-type: none"> • From 284.8 km to 287.5 km mark • From 359.7 km to 363.1 km mark |

2.1.1 Environmental factors relevant to the MMP1 Project

The environmental aspects of the MMP1 Project, as considered by the EPA (EPA 643), were:

- protection of conservation values of Karijini National Park;
- the railway line;
- drainage;
- construction, including the workforce;
- weeds;
- rehabilitation;
- fire;
- visual amenity; and
- waste disposal.

The EPA considered that these aspects could be managed via an Environmental Management Programme, which draws together Rio Tinto's commitments and the EPA's recommended conditions as adopted by MS 286.

Rio Tinto considers that the following key environmental aspects remain relevant to the ongoing operation of the Revised Proposal, and can be managed via the conditions proposed in Appendix 4:

- protection of conservation values of Karijini National Park;
- surface water and groundwater;
- weeds; and
- rehabilitation and closure.

2.1.2 Status of MMP1 Project

As of 31 December 2013, approximately 932 ha has been cleared to support construction and operation of the above water table (**AWT**) mine for the MMP1 Project under authorisation of MS 286.

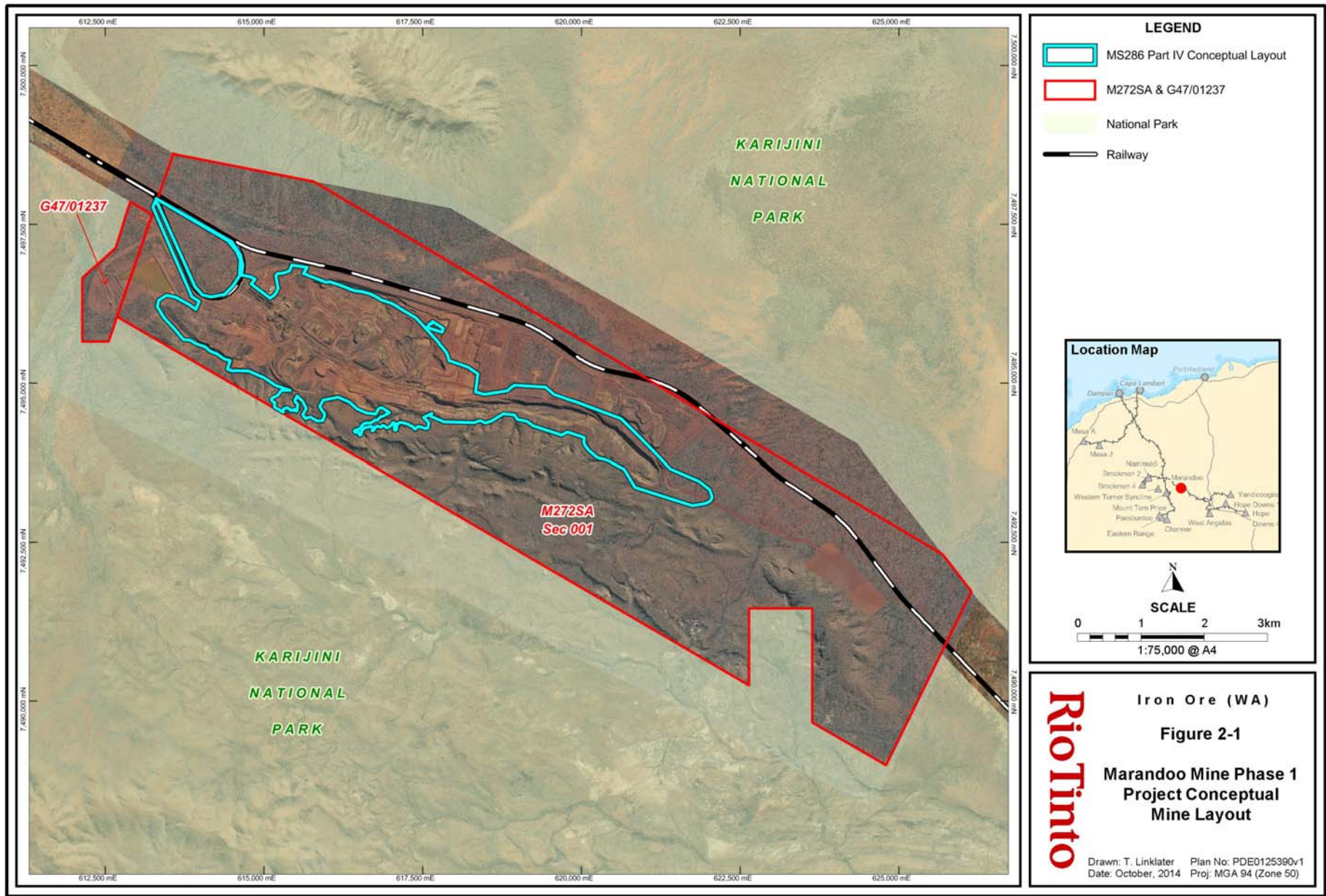


Figure 2-1: Marandoo Mine Phase 1 Project Conceptual Mine Layout

2.2 MARANDOO HYDROGEOLOGICAL RESEARCH PROJECT

In 2002 Hamersley Iron referred a proposal to the OEPA in order to conduct hydrogeological test work on groundwater aquifers at Marandoo and within the Karijini National Park (**KNP**). The proposal was approved by the Minister of the Environment on 2 July 2002 via Ministerial Statement 598. A summary of the Marandoo Hydrogeological Research Project (as per MS 598) is provided below in Table 2-3.

Table 2-3: Summary of the Marandoo Hydrogeological Research Project (MS 598)

| Project Title | Marandoo Above Water Table Project |
|--------------------------|--|
| Short Description | <p>The research programme seeks to clarify the extent of connection of the Marra Mamba orebody aquifer with a deep Wittenoom Dolomite aquifer that extends beneath the Karijini National Park (KNP) and the connection between this Wittenoom Dolomite aquifer and two shallow un-named calcrete aquifers.</p> <p>Understanding the connectivity of the Marra Mamba aquifer with and between these aquifers will provide the basis for:</p> <ul style="list-style-type: none"> • Evaluating the feasibility of dewatering the orebody to access the BWT Marandoo ore. • Predicting the environmental impacts of dewatering on the aquifers and significant vegetation inside the KNP. <p>The research programme incorporates a 60-day trial dewatering programme from the Marra Mamba orebody aquifer during which water will be re-injected into the deep Wittenoom Dolomite aquifer.</p> <p>The production bores will be located in the Marandoo Mining Lease and the re-injection bores will be located in KNP. A temporary pipeline will supply the water from the production bores to the re-injection bores. Piezometers will be used to monitor responses in groundwater levels during the programme.</p> |

The key characteristics of the Marandoo Hydrogeological Research Project (as per MS 598) are listed in Table 2-4 and illustrated in Figure 2-2. It should be noted that development and operation of the Southern Fortescue Borefiled (as depicted in Figure 2-2) is approved for use by the Tom Price Town and is only approved for the Marandoo Project as a surplus water management option.

Table 2-4: Key Characteristics of the Marandoo Hydrogeological Research Project (MS 598)

| Element | Description |
|-----------------------------|---|
| Dewatering Bores | |
| Number of new bores | Five |
| Location of bores | Marandoo Mining Lease (M272SA) |
| Aquifer targeted | Marra Mamba (orebody) aquifer |
| Depth of bores | Between 120 – 240 metres |
| Diameter of bore holes | Approximately 300 mm inside diameter |
| Activities to be undertaken | Drill, construct and short term (3 days) test pumping |

| Element | Description |
|---|---|
| Re-injection bores | |
| Number of new bores | Two |
| Location of bores | Approximately 1.2km inside Karijini National Park |
| Aquifer targeted | Wittenoom Dolomite |
| Depth of bores | Between 130 – 150 metres |
| Diameter of bore holes | Approximately 300 mm inside diameter |
| Activities to be undertaken | Drill, construct and short term (3 days) test pumping |
| Piezometers | |
| Number of new piezometers | Eight sets of multi-aquifer piezometers (i.e. some sets will have three separate monitoring holes) |
| Location of piezometers | <ul style="list-style-type: none"> Two sets in Karijini National Park (existing sets will also be used) Two sets in Transport Corridor Four sets in Mining Lease (existing sets will also be used) |
| Aquifers targeted | Two shallow calcrete aquifers, deep Wittenoom Dolomite aquifer and Marra Mamba (where they occur) |
| Activities to be undertaken | Monitor water level fluctuations during and after the trial |
| Temporary Pipeline | |
| Length | Approximately 5.2 kms, of which approximately 3 kms is in the Mining Lease, 1 km in the Transport Corridor and 1.2 kms in the KNP. |
| Diameter of pipeline | Between 300 – 400 mm |
| Type of pipeline | Black poly |
| Arrangement | Pipeline will link 3 or 4 production bores to each other and then feed water to the re-injection bores |
| Trial dewatering and re-injection | |
| Activities to be undertaken | Pumping of water from the Marra Mamba aquifer and re-injection of discharge into Wittenoom Dolomite Aquifer./ monitoring of dewatering and re-injection impacts via piezometers |
| Duration of test | 60 days |
| Volumes to be dewatered/re-injected | Up to 12 million litres per day |
| Other Infrastructure | |
| Track | A temporary track that runs alongside the pipeline will be established to allow access to the piezometers and re-injection bores |
| Drill pads | Drill pads will be required at each bore and piezometer site to enable drilling to occur |
| Pumps/generators | A generator will be placed next to each production bore to pump water to the re-injection bore |
| Decommissioning and Rehabilitation | |
| Infrastructure to be removed post-trial | Pipeline, vehicular track, down-hole instrumentation and generators/pumps |

| Element | Description |
|---|---|
| Infrastructure to be retained post-trial (until Marandoo is decommissioned) | Production bores (in Mining Lease), re-injection bores (in Karijini National Park) and piezometers (all) |
| Rehabilitation | Disturbed areas (drill pads, track, and pipeline) inside of Karijini National Park and Transport Corridor will be rehabilitated in the manner agreed with CALM. |

2.2.1 Environmental factors relevant to the Hydrogeological Research Project

The environmental factor considered by the EPA (EPA 1048) during the assessment of the Hydrogeological Research Project (HI 2002) was:

- Groundwater – changes to groundwater levels and effects on groundwater dependent ecosystems.

The EPA concluded that the Project was unlikely to have any adverse impact on groundwater dependent ecosystems in the Karijini National Park, provided it was implemented in accordance with the description provided in the referral document and the environmental commitments made by the Rio Tinto. These commitments were subsequently adopted by the Minister as legally binding environmental conditions under Part IV of the EP Act via MS 598.

The remaining aspect of this Project relates to decommissioning and rehabilitation. Rio Tinto considers that this commitment can be adequately managed as part of the overall Marandoo Closure Plan and relevant conditions proposed in Appendix 4.

2.2.2 Status of the Hydrogeological Research Project

Activities associated with this Hydrogeological Research Project commenced in 2002 and were completed in August 2005. The majority of the rehabilitation has been completed with the exception of the Coolibah Western Stand access track which is still in use to support monitoring activities required under MS 833. All pipelines, pumps and in-bore instruments have been removed and decommissioned.

The outcome of this Research Project demonstrated that the confined and unconfined aquifers are not hydraulically connected. This information was used to support studies for the development of the MMP2 Project – now approved and being implemented under MS 833.

As such, Rio Tinto considers that MS 598 is no longer required and should be closed out.

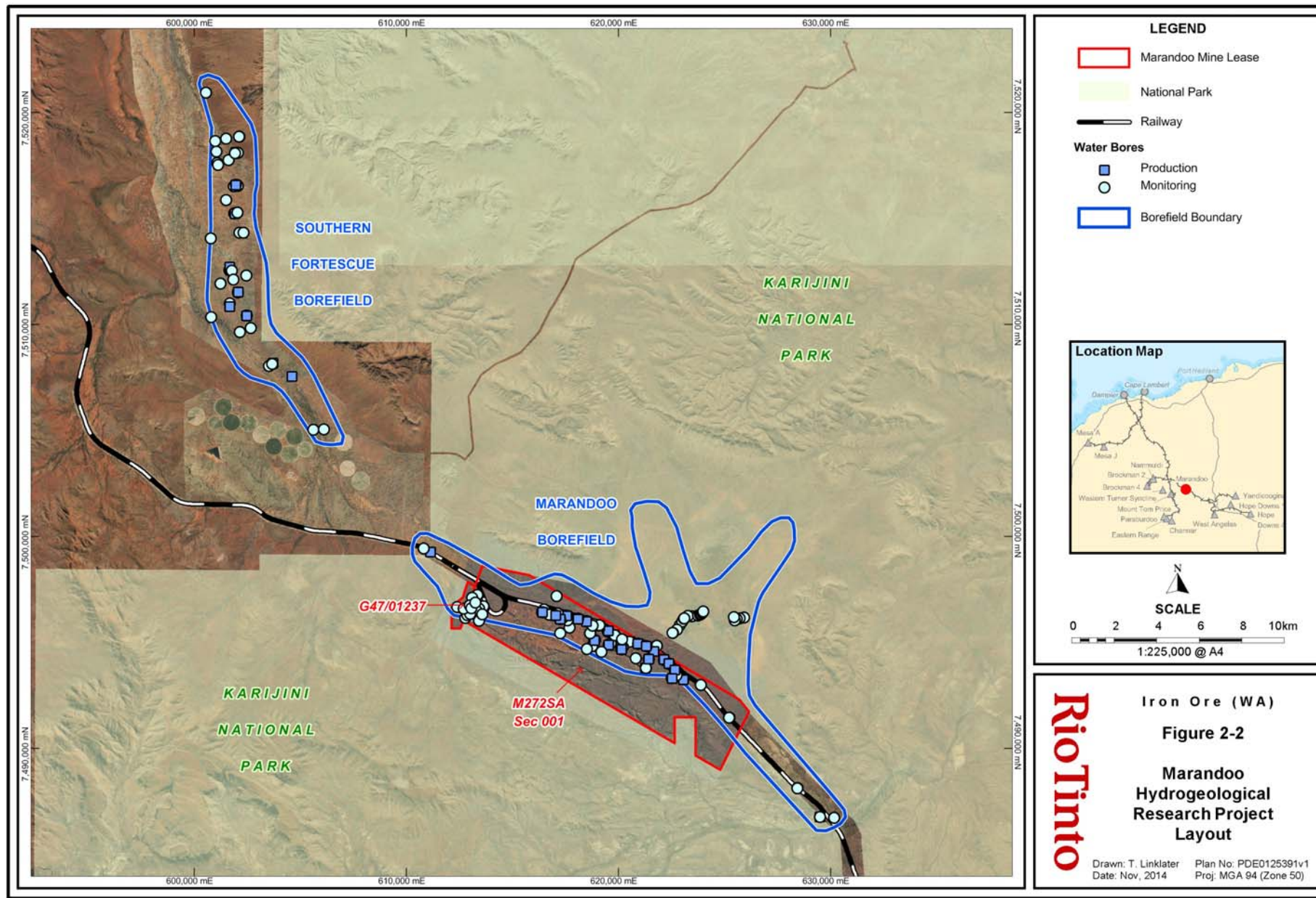


Figure 2-2: Marandoo Hydrogeological Research Project Layout

2.3 MARANDOO MINE PHASE 2

The MMP2 Project was referred to the OEPA on 3 July 2007 and was assessed at the Public Environmental Review (**PER**) level of assessment with an eight week public review period. The MMP2 Project was approved by the Minister for Environment on 7 July 2010 via MS 833. Clearing and construction activities commenced on 21 April 2011 and below water table (**BWT**) mining commenced in 2012. A summary of the MMP2 Project (as per MS 833 and attachments) is provided below in Table 2-5.

Table 2-5: Summary of the MMP2 Project

| Project Title | Marandoo Mine Phase 2 |
|--------------------------|---|
| Short Description | <p>The Marandoo Mine Phase 2 Project expands on the AWT Project by mining below the water table, which entails expansion of the existing mine pit and development of new waste dumps. The mining component of the MMP2 Project is confined to the existing Marandoo mine lease which was excised from Karijini National Park in 1991.</p> <p>The MMP2 Project includes the operation of the dewatering infrastructure and the operations camp.</p> <p>The existing SFB will be adapted to include four new re-injection bores and associated infrastructure to allow for disposal of surplus dewater.</p> |

The key characteristics of the MMP2 Project (as per MS 883 and attachments) are listed in Table 2-6 and illustrated in Figure 2-3. It should be noted that development and operation of the Southern Fortescue Borefield (as depicted in Figure 2-3) is approved for use by the Tom Price Town and is only approved for the Marandoo Project as a surplus water management option.

Table 2-6 Key Characteristics of the MMP2 Project

| Element | Authorised Extent |
|---------------------|---|
| Project life | 15 to 20 years |
| Area of disturbance | Up to 1,000 hectares direct disturbance, localised impact to riparian vegetation along drainage lines. Refer to Figure 2-3. |
| Ore production rate | 16 Mtpa |
| Pit | Single pit, Marra Mamba ore, mining below the water table |
| Waste rock disposal | Surface dumps; expansion of existing stockpiles and progressive backfilling of pits. |
| Dewatering | Peak dewatering of up to 36.5 GL per annum |
| Dewater disposal | <p>Dewater disposal through water use hierarchy including:</p> <ul style="list-style-type: none"> • use on site; • transfer to Tom Price; • re-injection at Southern Fortescue Borefield; and • discharge to the environment.² |

² Subsequent to the issue of MS 833, Hamersley Iron sought approval for the Hamersley Agriculture Project (HAP) as part of the water use hierarchy for the Marandoo BWT Project. This was approved via MS 883 and irrigated agriculture commenced in 2012.

| Element | Authorised Extent |
|-------------------|--|
| Processing | Wet processing of ore |
| Residue | Construction and operation of residue storage facility. |
| Greenhouse gases | Up to 190,000 tonnes of CO ₂ -e per year, plus one off emission of 50,000 tonnes CO ₂ -e resulting from clearing. Up to 15.3 tonnes CO ₂ -e/Kt of ore. |
| Water supply | All water requirements supplied from dewatering activities. |
| Product transport | By existing rail facilities to Dampier and Cape Lambert. |

2.3.1 Environmental factors relevant to the MMP2 Project

The key environmental factors considered by the EPA (EPA 2010) during the assessment of the MMP2 Project (Rio Tinto 2008) were:

- Flora and Vegetation;
- Groundwater; and
- Rehabilitation and Decommissioning.

The EPA concluded that the project could be managed to meet the EPA's objectives with several recommendations adopted as conditions in MS 833.

Rio Tinto considers that these key environmental factors remain relevant to the ongoing operation of the Revised Proposal, and can be managed via the rationalised conditions proposed in Appendix 4.

2.3.2 Status of the MMP2 Project

As of 31 December 2013, approximately 361 ha has been cleared to support construction and operation of the MMP2 Project under authorisation of MS 833.

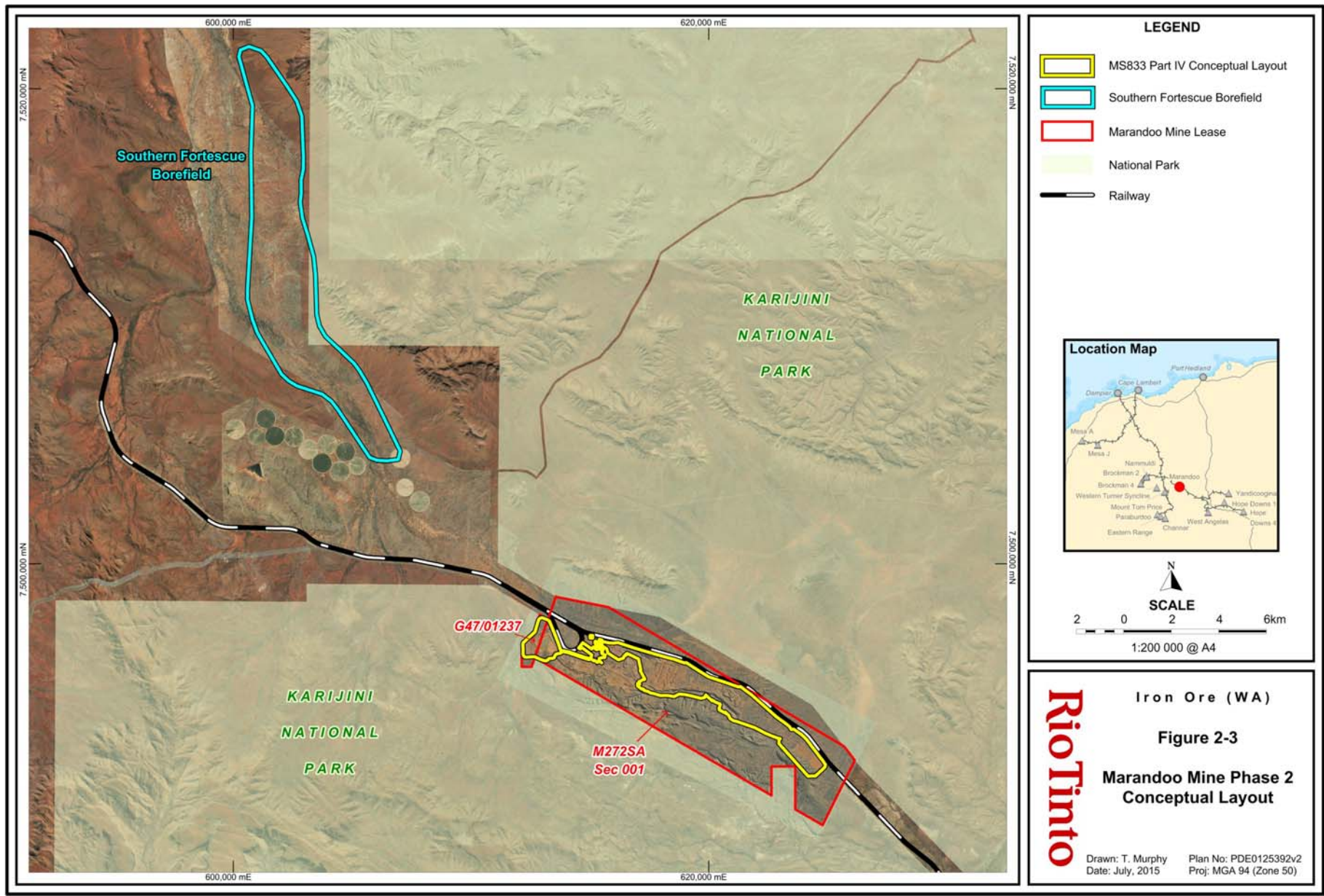


Figure 2-3: Marandoo Mine Phase 2 Conceptual Layout

2.4 CLEARING UNDER PART V OF THE EP ACT

As part of the rationalisation of the existing MSs associated with the Marandoo Project, Rio Tinto considers this an opportunity to rationalise all clearing approved within the Mine/Plant Development Envelope and to consolidate this into one overall new clearing limit for Marandoo.

Numerous NVCPs have been approved for the purposes of minor, preliminary or investigative works within the Marandoo Mine/Plant Development Envelope to support development of the MMP2 Project. The overall spatial footprint (~1,158 ha) associated with these NVCPs is presented in Figure 2-4 and the combined approved clearing limit is 450 ha (refer to Table 2-7).

In addition, an NVCP is currently under assessment (CPS 6014/1) with the Department of Mines and Petroleum (**DMP**) which includes a clearing limit of 6 ha. This Clearing Permit will be revised (CPS 6014/2) in early 2015 in order to increase the overall clearing limit to 18 ha. Therefore, the combined (approved and pending) clearing approved via NVCPs within the Mine/Plant Development Envelope is ~468 ha

Table 2-7: Clearing at Marandoo approved via Part V of the EP Act

| CPS Number | Clearing Limit (ha) |
|--|---------------------|
| Approved Clearing Permits | |
| 1658 | 45 |
| 2525/2 | 12 |
| 3200/1 | 1.7 |
| 3273/2 | 4.9 |
| 3344/1 | 1.6 |
| 3550/2 | 1.075 |
| 3734/3 | 110 |
| 3933/2 | 260 |
| 5039/2 | 4.98 |
| 5918 | 8.65 |
| Sub Total | 449.90 |
| Clearing Permits Currently Under Assessment | |
| 6014/1 | 6 |
| 6014/2 | 12 |
| Grand Total | 467.9 |

As of 31 December 2013, approximately 146 ha has been cleared under approved NVCPs within the Mine/Plant Development Envelope.

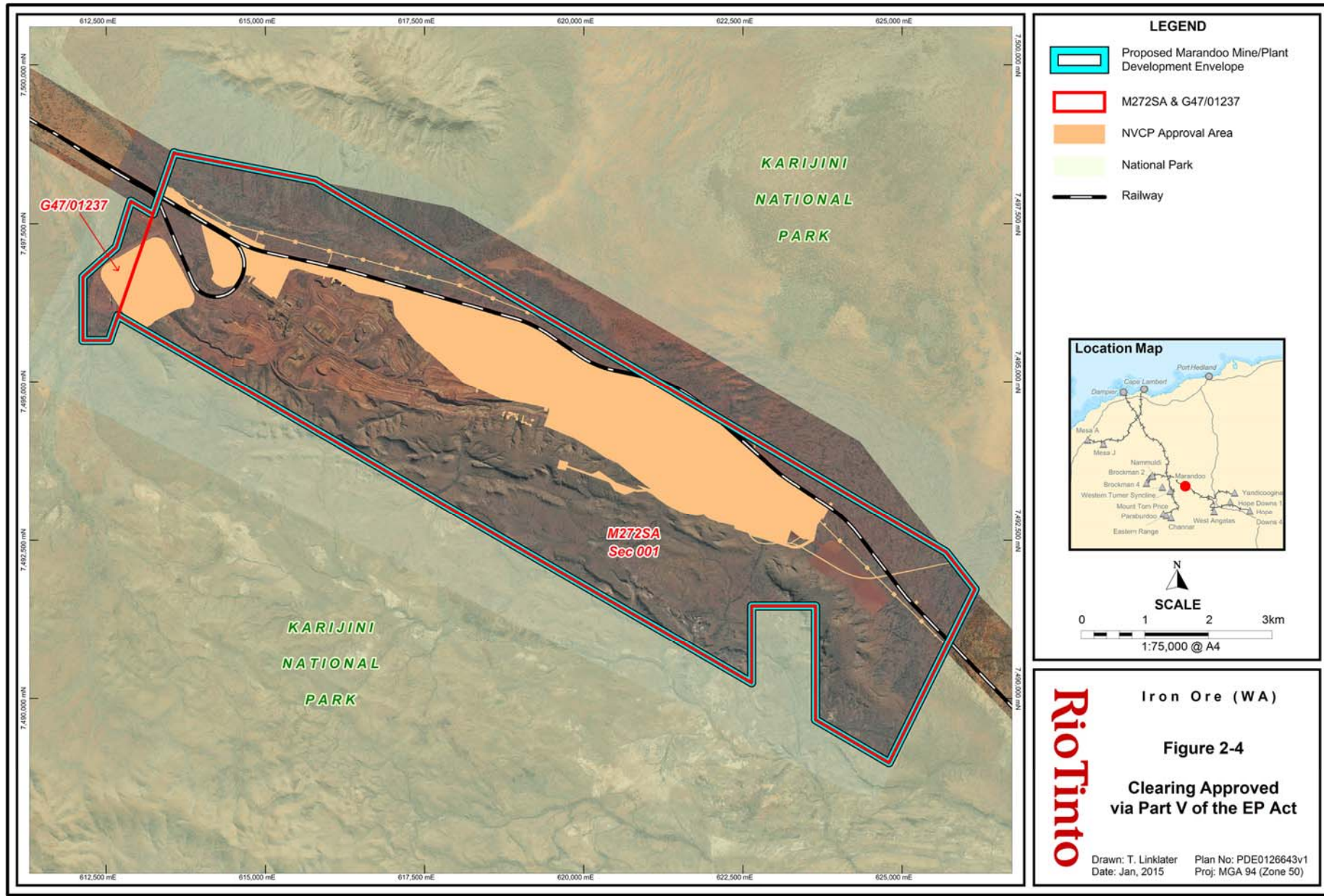


Figure 2-4: Clearing Approved via Part V of the EP Act

PART 2 – REVISED PROPOSAL

3. PROPOSAL DESCRIPTION

Part 2 of this Environmental Review document details the following proposed changes to the Marandoo Project:

- definition of Development Envelopes for the entire Marandoo Iron Ore Project;
- additional clearing within the proposed Marandoo Mine/Plant Development Envelope; and
- changes to Schedule 1 for the Revised Proposal.

3.1 DEVELOPMENT ENVELOPES

Rio Tinto proposes Development Envelopes for all relevant aspects of the Marandoo Project:

- Mine/Plant Development Envelope (of 4,657 ha) which includes all mine and plant elements approved under MS 286 and MS 833.
- Marandoo Operation Camp Development Envelope (221 ha) as operated under MS 833; and
- Linear Infrastructure Development Envelope (1,152 ha) which includes the Central Pilbara Railway (including three sidings), the fibre optic cable, and the pipeline and access road to the Borefield.

Figure 3-1 illustrates the spatial extent of the Development Envelopes for the Mine/Plant and Camp, and Figure 3-2 illustrates the extent of the Marandoo Linear Infrastructure Development Envelope.

Rio Tinto acknowledges the environmental constraints associated with the Marandoo Project's proximity to the Karijini National Park and the potential for long term impact to visual amenity. As such, the Mine/Plant Development Envelope has been designed to provide more flexibility than is currently possible under the 'conceptual footprints' approved under MS 286 and MS 833 (refer to Figure 2-1 and Figure 2-3 respectively) whilst upholding the environmental considerations by restricting the location of mining activities in certain areas. The actual location of the proposed activities may differ from the conceptual layout presented in Figure 3-1 to Figure 3-3. However, any disturbance will be undertaken within the various Development Envelopes and approved clearing limits.

This approach is consistent with the OEPA's position taken towards recent comparable proposals and is in line with the EPA's Environmental Assessment Guideline No. 1 (EAG 1) (EPA 2012) which allows for clearing of a proposal to be defined within a broader development envelope provided that appropriate biological surveys and an environmental impact assessment has been conducted for the entire area.

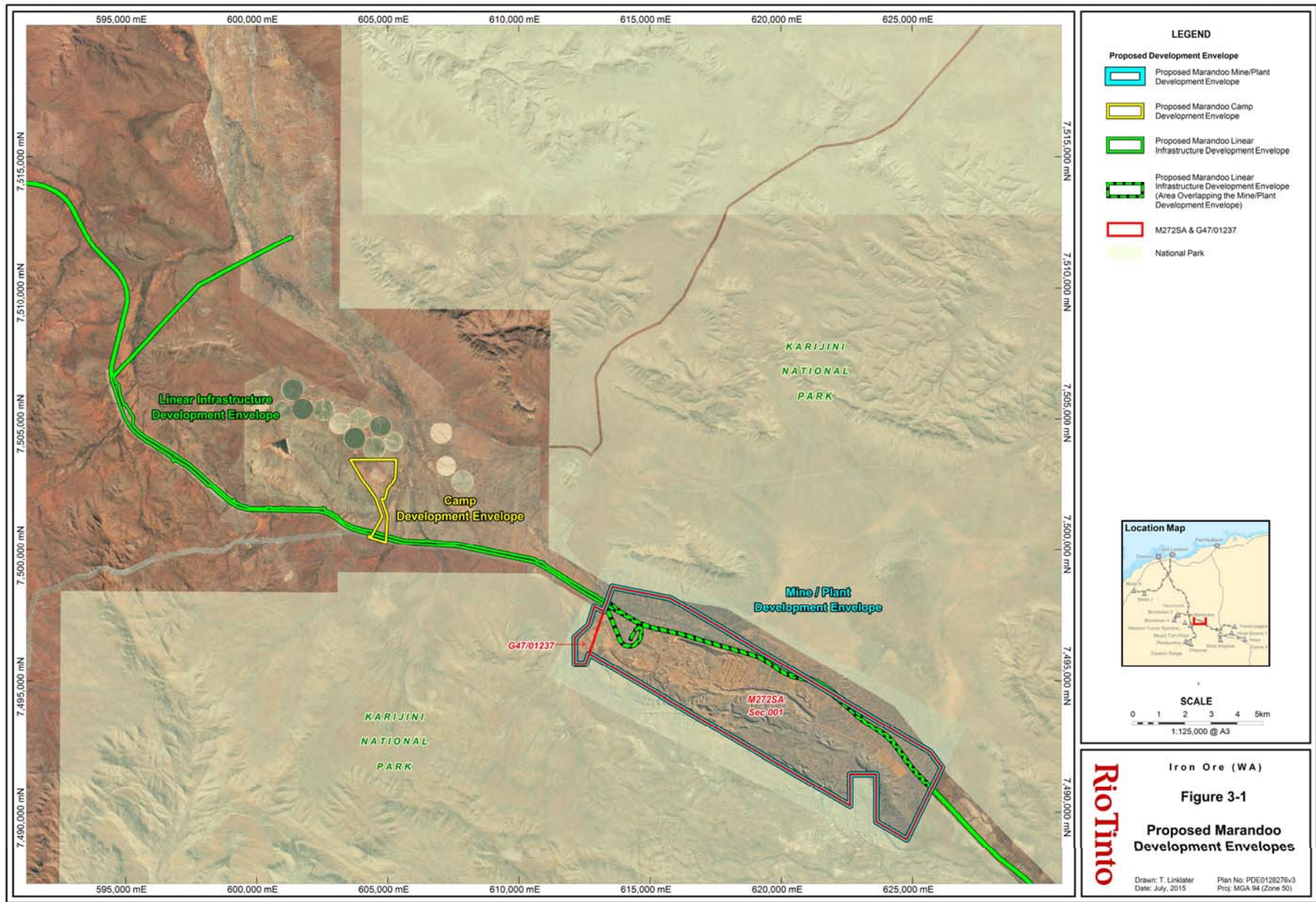


Figure 3-1: Proposed Marandoo Development Envelopes

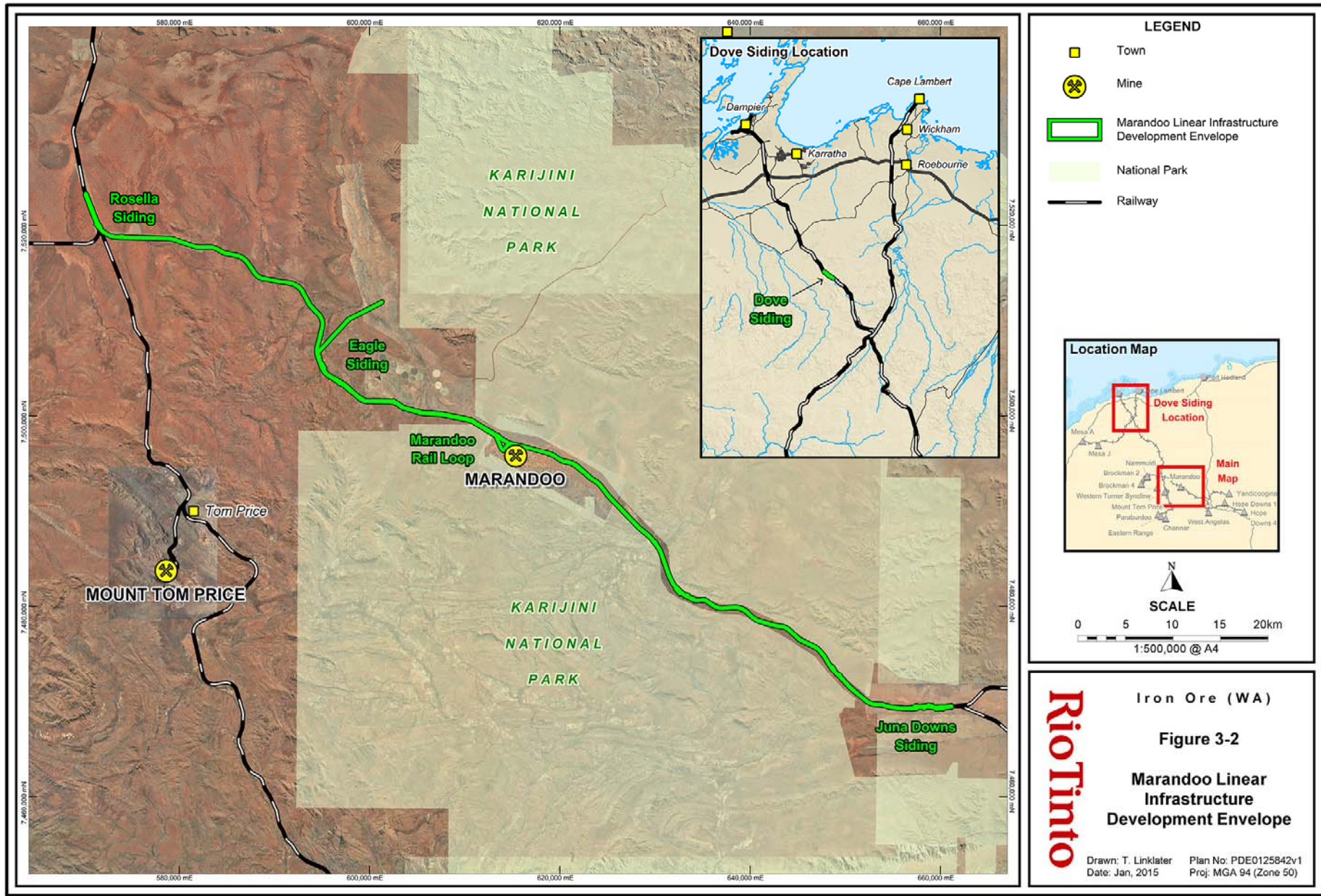


Figure 3-2: Marandoo Linear Infrastructure Development Envelope

3.2 APPROVED CLEARING FOR MARANDOO

Table 3-1 below summarises the clearing limits currently approved under MS 286, MS 833 and relevant NVCP's within the Marandoo Development Envelopes. The clearing completed under these approvals (up to ³31 December 2013) is also presented in Table 3-1. Figure 3-3 provides a spatial representation of this information.

All clearing done to support construction and operation of the rail loop and railway line, within the Mine/Plant Development Envelope, has been assigned to the AWT MS 286. This has enabled an easier clearing reconciliation process and ensured no double counting of clearing. Refer to Figure 3-1 for spatial representation of this.

Table 3-1: Estimate of total clearing approved and clearing completed as of 31 December 2013

| Element | Approved Limit/Conceptual Footprints | Clearing as of 31 Dec 2013 |
|--|---|--|
| Mine/Plant Development Envelope | | |
| MS 286 | Conceptual AWT footprint = 950 ha Linear Infrastructure = not stated | AWT = 932 ha Linear Infrastructure = not stated |
| MS 833 | BWT clearing limit = 1,000 ha Camp footprint = 95 ha | BWT = 361 ha Camp = 82.01 ha |
| NVCPs | 450 ha | 146 ha |
| | MS AWT/BWT combined boundary (less overlaps) – 1,829 ha NVCP (outside of MS combined boundary) – 273 ha | |
| TOTAL | <ul style="list-style-type: none"> Mine/Plant Development Envelope – 4,657 ha; current clearing limit - 2,102 ha Linear Infrastructure Development Envelope – 1,152 ha; clearing limit – 1,152 ha Camp Development Envelope – 221 ha; clearing limit – 95 ha | |

3.3 INCREASE IN CLEARING LIMIT FOR MINING AT MARANDOO

Rio Tinto, as a result of the recent review of the Marandoo Closure Plan, requires up to 400 ha of additional clearing for the ongoing management of subsoil (**SS**) and topsoil (**TS**) resources, surface water management, and operational requirements across the Marandoo mine (refer to Figure 3-4).

The Life of Mine (**LoM**) planning has confirmed that access to additional areas outside of the currently approved conceptual footprints of MS 286, MS 833 and the NVCPs (within the Mine/Plant Development Envelope), is required to support the long term storage of these additional resources until they are required for rehabilitation and closure. These additional areas will also support ongoing mining operations for the Revised Proposal.

Rio Tinto therefore seeks approval to increase the overall maximum clearing limit to **2,502 ha** within the Marandoo Mine/Plant Development Envelope. This increase in the clearing limit includes 400 ha of new disturbance; of which 383 ha is considered to be in Good to Excellent condition (Biota 2008a).

³ Rio Tinto completes commences the reconciliation of clearing against Ministerial Statements and NVCPs every December with reporting by April the following year. Therefore, for the purposes of this Proposal the 31 December 2013 reconciliation is being used.

Section 6 and 7 (in Part 4 of this document) addresses the potential environmental impacts associated with the proposed new clearing.

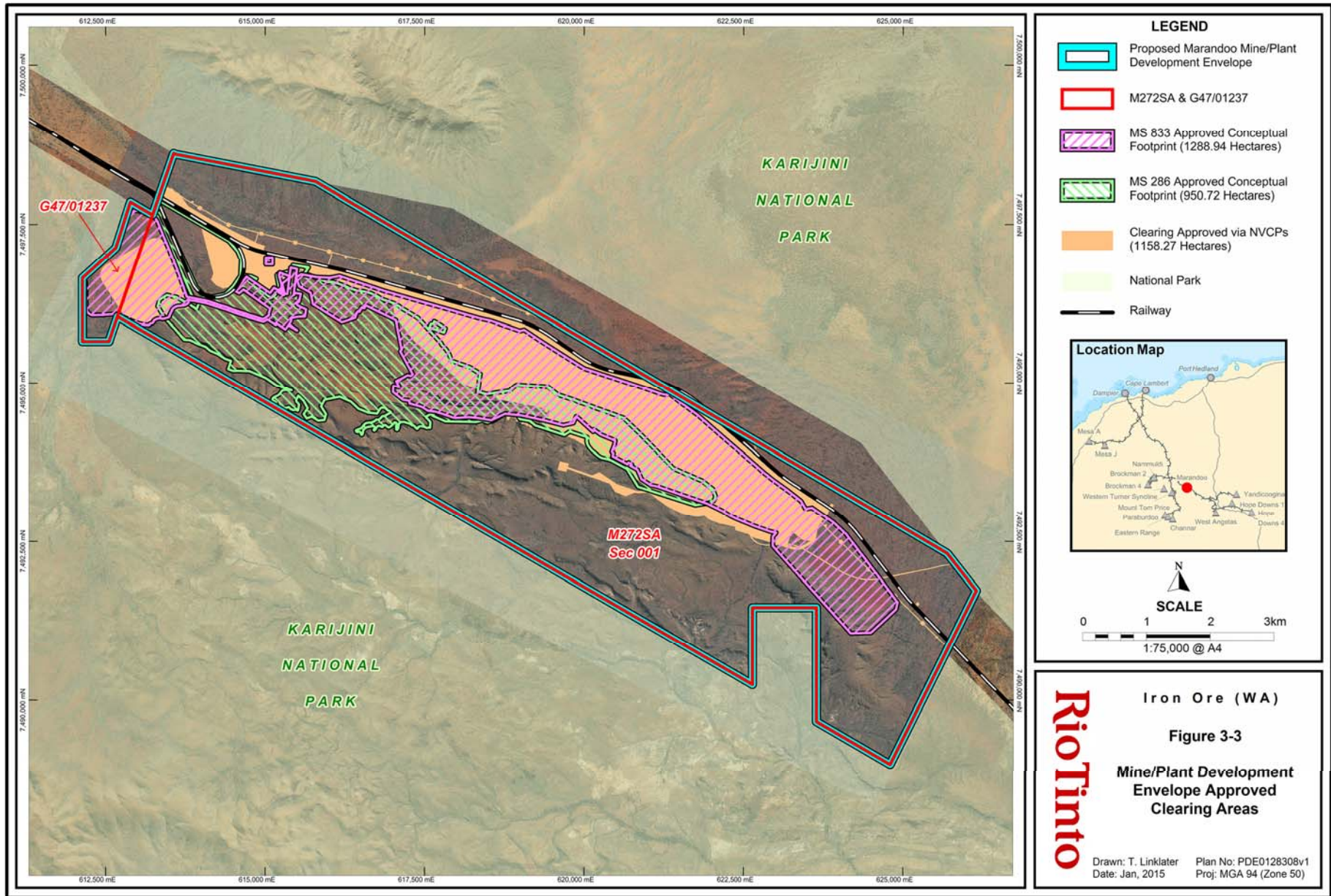


Figure 3-3: Mine/Plant Development Envelope Approved Clearing Areas

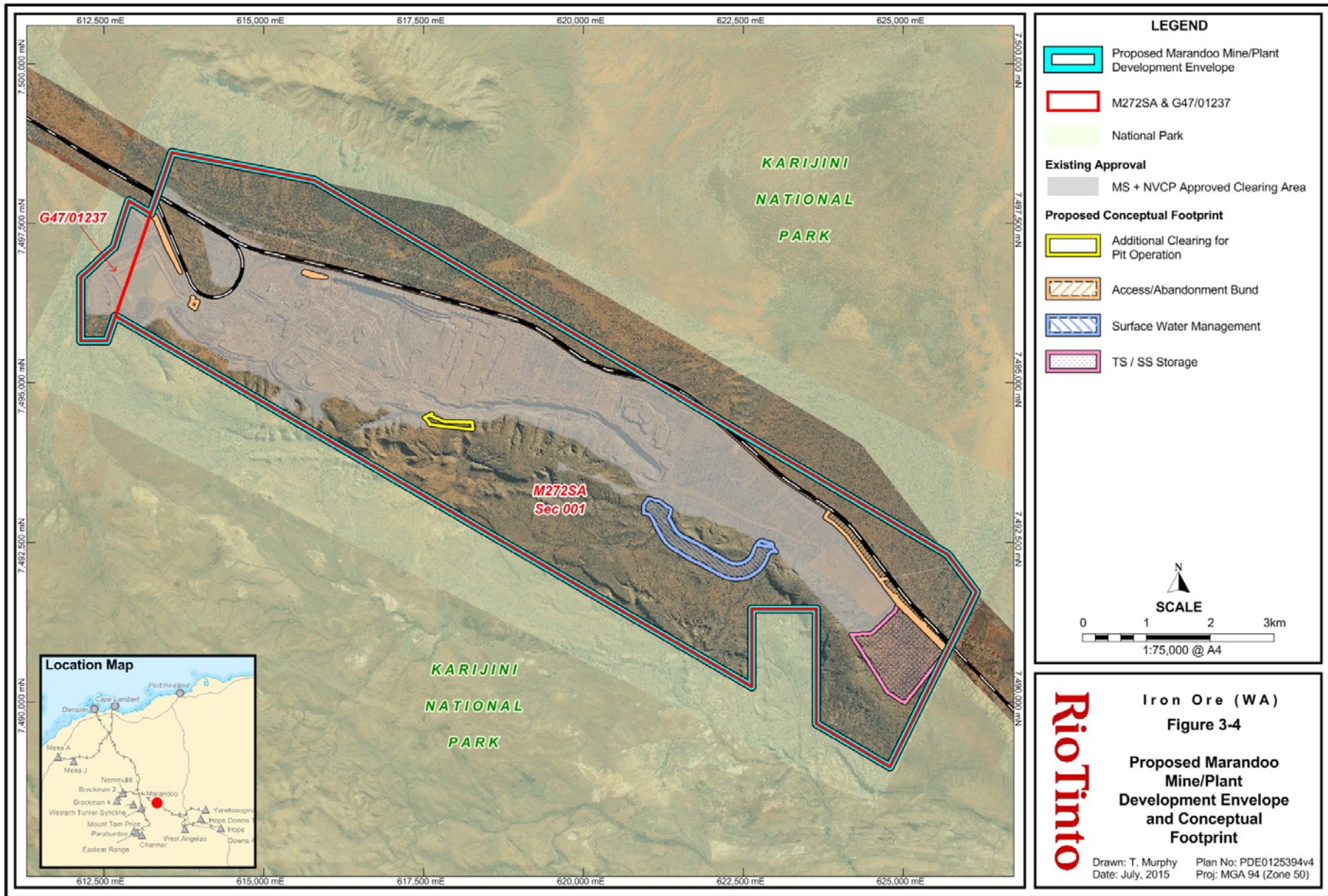


Figure 3-4: Proposed Marandoo Mine/Plant Development Envelope and Conceptual Footprint

3.4 ADMINISTRATIVE CHANGES TO SCHEDULE 1 OF THE MARANDOO PROJECT

Rio Tinto requires several changes to key characteristics of the Marandoo Project as provided for in Schedule 1. The following administrative changes are proposed (refer to Table 3-2).

- Elements that provide contextual information about the MMP2 Project are not key characteristics as defined in the EPA Guidance for Defining the Key Characteristics of a Proposal (EPA 2012). Rio Tinto understands the need for broader contextual information about the MMP2 Project however this type of information differs from the “key elements of the proposal for which the proponent is seeking approval that are likely to have a significant impact on the environment” (EPA 2012).

Rio Tinto considers that the key characteristics which remain relevant to MS 833 are: clearing; dewatering; and waste dump management. Therefore these aspects should be retained in Schedule 1 of MS 833 and all other elements are requested to be removed.

- Removal of elements that are adequately managed under other processes. For example:
 - Water supply is managed under the *Rights in Water and Irrigation Act 1914 (RiWi Act)* so this element is requested to be removed.
 - Greenhouse Gas Emissions are managed under the *National Greenhouse and Energy Reporting Act 2007 (NGER Act)* so this element is requested to be removed.
- Inclusion of irrigated agriculture to the dewater disposal water use options. Irrigated agriculture for the HAP was approved and is implemented under MS 883. Rio Tinto proposes that the HAP be included as a water management option in Schedule 1 of the MMP2 Project.

These proposed changes are provided in a consolidated Schedule 1 of the proposed MS for the Revised Proposal (Appendix 4).

Rio Tinto submits that the above proposed changes are administrative and that the intent of, and commitments within, the original environmental impact assessment and approval for MMP2 remains unchanged and still relevant to the Revised Proposal.

Table 3-2: Changes (*italicised*) to the Key Characteristics of the Marandoo Project

| Proposal Characteristic | Description (MS 286 – as implemented) | Description (MS 833 – as implemented) | Revised Description (Revised Proposal) |
|--------------------------------|---|---|---|
| Proposal life | - | 15 – 20 years | <i>Remove project life</i> |
| Conceptual Footprint | Within a 4km by 2km area. | - | <i>Remove</i> |
| Development Envelopes | - | - | <p><i>Marandoo Development Envelopes:</i></p> <ul style="list-style-type: none"> • <i>Mine/Plant (4,657 ha)</i> • <i>Marandoo Operation Camp (221 ha)</i> • <i>Linear Infrastructure (1,152 ha).</i> |
| Clearing limits | Not stated | Up to 1,000 ha, localised impact riparian vegetation along drainage lines | Up to 2,502 ha direct disturbance <i>including</i> localised impact to riparian vegetation along drainage lines within the Mine/Plant Development Envelope. |
| | - | - | Up to 95 ha direct disturbance within the Marandoo Operation Camp Development Envelope. |
| Central Pilbara Railway | <p>115 km railway from Rosella Siding to Homestead Junction with spur loop at Marandoo. Average width of disturbance of 14 metres.</p> <p>Inclusive of the following sidings:</p> <ul style="list-style-type: none"> • <i>Eagle Siding</i> • <i>Juna Downs Siding</i> • <i>Dove Siding</i> | | <p><i>Up to 1,152 ha direct disturbance for the following existing infrastructure within the Linear Infrastructure Development Envelope:</i></p> <ul style="list-style-type: none"> • <i>115 km railway from Rosella Siding to Homestead Junction with spur loop at Marandoo</i> • <i>Eagle Siding 284.8 km to 287.5 km mark (Rosella to Yandi line).</i> • <i>Juna Downs Siding 359.7km to 363.1 km mark (Rosella to Yandi line).</i> • <i>Dove Siding 50.6 km to 53.6 km mark (Dampier to Tom Price line).</i> • <i>Fibre optic cable from Rosella Siding to Juna Downs Siding.</i> • <i>Pipeline and vehicle access to Borefield</i> |
| Mining rate | 15 Mtpa | 16 Mtpa | <i>Remove mining rate.</i> |
| Maximum pit depth | AWT | BWT | <i>AWT and BWT.</i> |

| Proposal Characteristic | Description (MS 286 – as implemented) | Description (MS 833 – as implemented) | Revised Description (Revised Proposal) |
|---------------------------------|---|---|--|
| Waste rock disposal | - | Surface dumps; expansion of existing stockpiles and progressive backfilling of pits. | Surface dumps; expansion of existing stockpiles and progressive backfilling of pits. |
| Processing | - | Wet processing of ore | <i>Wet and dry processing of ore</i> |
| Residue | - | Construction and operation of residue storage facility. | <i>Operation of residue storage facilities and associated infrastructure.</i> |
| Dewatering | - | Peak dewatering of up to 36.5GL/a | Peak dewatering of up to 36.5GL/a. |
| Water supply | - | Dewatering | <i>Remove water supply</i> |
| Surplus water management | - | Dewater disposal through water use hierarchy including: <ul style="list-style-type: none"> • use on site; • transfer to Tom Price; • re-injection at SFB; and • discharge to the environment. | <i>Management of surplus dewater through water use options including:</i> <ul style="list-style-type: none"> • use on site including <i>Marandoo Camp</i>; • transfer to Tom Price for water supply; • re-injection at SFB; • <i>irrigated agriculture</i>; and • discharge to the environment. |
| Hydrological Research programme | - | - | <ul style="list-style-type: none"> • Infrastructure and track to be retained post trial (until Marandoo is decommissioned). • Rehabilitation. |
| Fibre optic cable | Located on the existing Rosella to Yandi line: <ul style="list-style-type: none"> • From 284.8km to 287.5km mark • From 359.7km to 363.1km mark | | <i>Remove</i> Included within Linear Infrastructure Development Envelope |
| Greenhouse Gas Emissions | - | Up to 190,000 tonnes of CO ₂ -e per year, plus one off emission of 50,000 tonnes CO ₂ -e resulting from clearing. Up to 15.3 tonnes CO ₂ -e/Kt of ore. | <i>Remove GHG limit</i> |

Subject to approval of this Proposal, Rio Tinto proposes the following summary for the Revised Proposal:

Table 3-3: Summary of the Revised Proposal

| | |
|--------------------------|--|
| Proposal Title | Marandoo Iron Ore Project |
| Proponent Name | Hamersley Iron Pty Limited |
| Short Description | <p>Development and operation of an open cut above and below water table iron ore mine and associated infrastructure at the Marandoo iron Ore Mine, 37 km east of Tom Price in the Pilbara region. Mine pits will be backfilled to at least 1 m above the pre-mining watertable level.</p> <p>Surplus dewater management options include use on site and camp, transfer to Tom Price town, re-injection to Southern Fortescue Borefield; irrigated agriculture, and discharge to the environment.</p> <p>115 km Railway and associated infrastructure from Rosella Siding to Homestead Junction with spur loop at Marandoo and three sidings (Eagle, Juna Downs, and Dove).</p> |

Table 3-4: Location and authorised extent of physical and operational elements

| Column 1 | Column 2 | Column 3 |
|-----------------------|------------|---|
| Element | Location | Authorised Extent |
| Mine/Plant | Figure 3-1 | Clearing of up to 2,502 ha of localised impact including riparian vegetation along drainage lines within the Marandoo Mine/Plant Development Envelope (4,657 ha). |
| Marandoo Camp | Figure 3-1 | Clearing of up to 95 ha within the Camp Development Envelope (221 ha). |
| Linear Infrastructure | Figure 3-1 | <p>Clearing of up to 1,152 ha within the Linear Infrastructure Development Envelope (1,152 ha).</p> <ul style="list-style-type: none"> • 115 km railway from Rosella Siding to Homestead Junction with spur loop at Marandoo • Eagle Siding 284.8 km to 287.5 km mark (Rosella to Yandi line). • Juna Downs Siding 359.7km to 363.1 km mark (Rosella to Yandi line). • Dove Siding 50.6 km to 53.6 km mark (Dampier to Tom Price line). • Fibre optic cable from Rosella Siding to Juna Downs Siding. • Pipeline and vehicular access to Borefield. |
| Dewatering | Figure 3-1 | Peak dewatering of up to 36.5GL |

4. STAKEHOLDER CONSULTATION

Consultation with relevant stakeholders has been ongoing since Marandoo operations commenced and has included the following government agencies and non-government organisations:

- Government agencies:
 - Office of the Environmental Protection Authority (**OEPA**);
 - Department of Parks and Wildlife (**Parks and Wildlife**);
 - Department of Environment and Regulation (**DER**);
 - Department of Water (**DoW**);
 - Department of Mines and Petroleum (**DMP**);
 - Department of State Development (**DSD**);
 - Department of Aboriginal Affairs (**DAA**); and
 - Shire of Ashburton
- Community:
 - Eastern Guruma people;
 - Yinhawangka Bunjima People;
 - Banjima People; and
 - Tom Price and Paraburdoo communities.

Consultation specific to this Revised Proposal has been undertaken with the following relevant Decision Making Authorities (**DMAs**): OEPA, Parks and Wildlife, DER, DoW and DMP. Details of this consultation are provided below in Table 4-1.

Table 4-1: Stakeholder Consultation Table

| Stakeholder | Date | Topics/issued raised | Proponent response/outcome |
|--------------------|--|--|--|
| OEPA | August 2014 Rio Tinto / OEPA Managers Monthly meeting | Rio Tinto discussed the proposed request and expected timing for referral to the OEPA. | OEPA noted this. |
| Parks and Wildlife | 2 September 2014 Rio Tinto / Parks and Wildlife Quarterly meeting | Rio Tinto explained the requirement for additional area to manage subsoil and topsoil resources and the proposal to submit a s45c application to the OEPA. | Parks and Wildlife did not raise any significant concerns with the proposed works or approvals pathway. A copy of this Revised Proposal has been submitted to Parks and Wildlife and comments will be addressed in subsequent versions during the assessment process. |
| OEPA | September 2014 Rio Tinto / OEPA Managers Monthly meeting | Rio Tinto discussed the proposed request and sought advice from the OEPA regarding an appropriate approvals application (referral via s45c or s38 of the EP Act). The OEPA requested a letter from RTIO explaining the proposed scope of works. | Rio Tinto provided further details regarding the scope of works to the OEPA (on 2 September 2014) and proposed submission of a s45c application. |
| OEPA | 17 September 2014 | OEPA considered that the new clearing would more than likely require an offset which is a new factor for the MMP2 Project. Therefore Rio Tinto was requested to refer the proposal via s38 of the EP Act instead of s45c. | This was noted. Rio Tinto withdrew the s45c application. |
| OEPA | 30 October 2014 | Rio Tinto met with OEPA to discuss the scope of the s38 referral and proposed that it form a Revised Proposal to MS 833 and an opportunity to rationalise the existing Ministerial Statements associated with the Marandoo Project. | The OEPA accepted this proposed approach and sort clarity from Rio Tinto regarding timing of referral. |
| Parks and Wildlife | 30 October 2014 | Rio Tinto provided an update on the scope of the proposed works and the revised approvals pathway to Parks and Wildlife. | Parks and Wildlife noted this and will review the Revised Proposal once referred to the OEPA. |

| Stakeholder | Date | Topics/issued raised | Proponent response/outcome |
|--|---|---|--|
| OEPA | 17 December 2014 Rio Tinto/OEPA Managers | OEPA discussed high level queries regarding the Referral Document and requested additional information regarding approved and actual clearing, fauna surveys, and stakeholder consultation. This was requested in writing dated 18 December 2014 with a request for this additional information to be provided by the 9 January 2015. | Rio Tinto met with the OEPA on 6 January 2015 to clarify the request for additional information in the referral. Rio Tinto addressed the queries and submitted a revised referral on 9 January 2015. |
| Parks and Wildlife | 6 January 2015 | Rio Tinto provided an update on the referral document and sought Parks and Wildlife advice regarding management measures for fauna and potential impacts to fauna habitats. | Rio Tinto amended the referral document to minimise impacts to fauna habitats. The referral document was provided to Parks and Wildlife on 9 January 2015. Parks and Wildlife contacted Rio Tinto to confirm that impacts to gorges and gullies was not a concern for the project and that their review of the proposal would be on the rationalisation of the Conditions in a new MS. |
| Department of Environmental Regulation | 7 January 2015 | Rio Tinto provided a brief summary of the scope of the referral document and approvals pathway to the DER. | The referral document was provided to DER on 9 January 2015. |
| Department of Water | 7 January 2015 | Rio Tinto provided a brief summary of the scope of the referral document and approvals pathway to the DoW. | The referral document was provided to DoW on 9 January 2015. |
| Department of Mines and Petroleum | 8 January 2015 | Rio Tinto provided a brief summary of the scope of the referral document and approvals pathway over the phone to Matt Boardman from the Operations, Environment at the DMP. On receiving a copy of the referral the DMP will review and provide comment to the OEPA. | The referral document was provided to DMP on 9 January 2015. Rio Tinto offered to meet with DMP to discuss any queries regarding the referral document. |
| OEPA | 16 January 2015 | RTIO met with the OEPA to discuss further clarity required regarding definition of Development Envelopes and clearing limits. | The environmental review document has been amended to provide this clarity. |

PART 3 – ENVIRONMENTAL MANAGEMENT

5. ENVIRONMENTAL APPROVALS PROCESS

This Proposal is a revision to the existing Marandoo Project. This Environmental Review document has been provided to the OEPA to support the referral of the Revised Proposal and has been prepared in accordance with the EPA’s Environmental Assessment Guidelines (EAGs): specifically Defining the Key Characteristics of a Proposal *Environmental Protection Act 1986* (**EAG 1**) (EPA 2012b), EAG for Environmental factors and objectives (**EAG 8**) (EPA 2013a) and EAG for Application of a significance framework in the environmental impact assessment process (**EAG 9**) (EPA 2013b).

The referral form for this Revised Proposal has been prepared in accordance with Section 38(1) of the EP Act and is provided in Appendix 2.

Subject to approval of this Revised Proposal it is proposed that a new Ministerial Statement be issued for the Revised Proposal which will supersede MS 286, MS 598, and MS 833. It is intended that the Revised Proposal will be managed in accordance with the existing legislative requirements and the existing Marandoo OEMP.

5.1 ASSESSMENT OF ENVIRONMENTAL FACTORS

The environmental factors and objectives adopted by the EPA are listed EAG 8. Rio Tinto has identified and assessed the key environmental factors that are relevant to this Revised Proposal, based on EAG 8 and EAG 9. The outcome of the assessment is illustrated below in Figure 5-1.

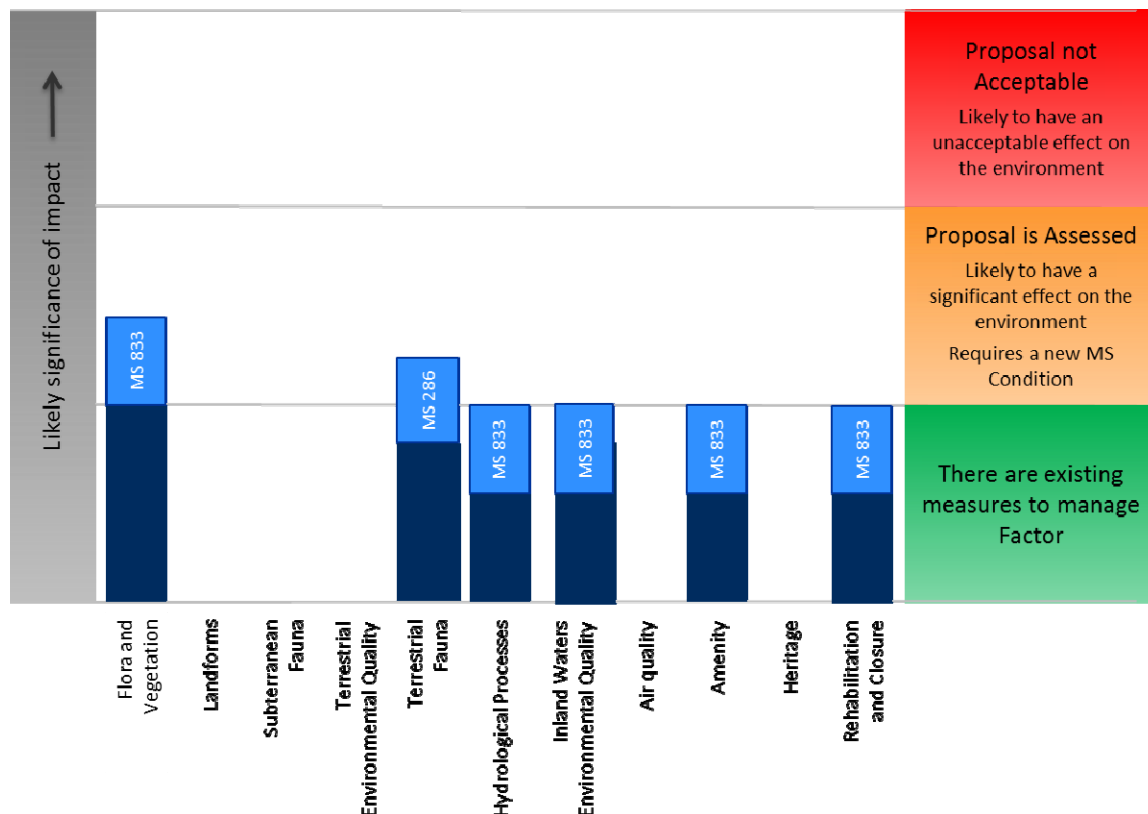


Figure 5-1: Environmental Factors for the Revised Proposal (EAG 8/EAG 9)

The key environmental factors relevant to this Revised Proposal are flora and vegetation and terrestrial fauna.

The above assessment included consideration of existing legislative controls for each identified environmental factor (shown in Figure 5-1) which determined that flora and vegetation and terrestrial fauna are the key environmental factors for this Revised Proposal.

Rio Tinto considers that the remaining environmental factors the Revised Proposal will not result in any significant change in addition to, or different from, that originally assessed and approved under MS 286, MS 598, and MS 833. These factors are addressed in Section 9.

As such, Rio Tinto believes that the Revised Proposal meets the EPA's Objectives and should be assessed at an Assessment on Proponent Information (**API**) - A level of assessment where the existing conditions of MS 286, MS 598, and MS 833 are appropriate to continue managing the Revised Proposal to meet the EPA's objectives.

5.2 ENVIRONMENTAL MANAGEMENT OVERVIEW

Rio Tinto has developed and refined environmental management objectives, systems and procedures over decades of operational mining experience in the Pilbara region that are successfully applied at multiple iron ore mine sites.

The key components of the environmental management approach that will continue to be implemented for the Revised Proposal include:

1. The Rio Tinto Iron Ore Group Health, Safety, Environment, Communities and Quality (**HSECQ**) Policy which is the guiding document for environmental management and provides context and direction for continuous improvement.
2. The Rio Tinto Iron Ore (WA) Environmental Management System (**EMS**) contained within the HSEQ Management System which is a continuous improvement model covering:
 - systematic assessment of environmental risk and legal requirements; systems for training, operational control, communication, emergency response and corrective actions;
 - the development of objectives and targets for improvements; and
 - audits and review.
3. MS 833 includes the following conditions relevant to the Flora and Vegetation:
 - Condition 6 MS 833 for the Coolibah Woodlands;
 - Condition 7 MS 833 for Springs, Pools and Creeklines of Karijini National Park;
 - Condition 8 of MS 833 for Dewater Discharge;
 - Condition 10 MS 833 for Rehabilitation; and
 - Condition 11 and 12 MS 833 for Closure.

4. The Marandoo OEMP was prepared for the MMP1 Project, and will be updated to only include management plans for the following:
 - Coolibah Woodland
 - Minthicoondunna Spring
 - Dewatering MP
5. Two existing licences issued under Part V of the EP Act:
 - Operating Licence L6869/1992/11 for processing, dewatering, screening, sewage treatment facility and landfill.
 - Operating Licence L8507/2010/1 for the Marandoo Camp sewage treatment facility.

Note that these two licences will be amalgamated by February 2015, resulting in:

 - Operating Licence L6869/1992/12 for processing, dewatering, screening, sewage treatment facility and landfill.
6. Four existing licences⁴ issued under the *Rights in Water Irrigation Act 1914 (RIWI Act)*:
 - i. RiWI Act Groundwater Licence GWL107420(14) for abstraction of 36,500,000 kL/annum for dewatering, dust suppression for earthworks and construction, general campsite use, recovery of water for environmental purposes, water use for industrial processing, *mineral exploration activities*, earthwork and construction use, water requirements to maintain pool and lake levels and general water supply purposes.
 - ii. RiWI Act Groundwater Licence GWL163229(3) for abstraction of 12,000 kL/annum for exploration related activities, namely dust suppression for earthwork and construction purposes, exploratory drilling operations, geotechnical investigation, potable water supply and general campsite purposes. The mineral exploration activities have subsequently been added to GWL107420(14) with plans to relinquish GWL163229(3) in 2015.
 - iii. RiWI Act Groundwater Licence GWL167317(3) for abstraction of 300,000 kL/annum for dust suppression for earthwork and construction *purposes, earthworks and construction of the Marandoo camp*, and potable water supply.
 - iv. RiWI Act Groundwater Licence GWL158662(2) for abstraction of 400 kL/annum for exploratory drilling operations purposes.
7. The Rio Tinto closure approach will continue to guide closure planning for the Revised Proposal. This approach governs:
 - commencement of planning for closure prior to project commencement;

⁴ GWL163229(3), GWL167317(3) and GWL158662(2) were applied and approved for water use required for the Marandoo Camp whilst in Construction Phase and for resource evaluation and exploration works in the broader Marandoo area. GWL163229(3) is now captured under GWL107420(14), and will therefore be relinquished in 2015.

The remaining abstraction limit of 300,400 kL/annum is therefore in addition to the 36.5 GL/a limit approved for the dewatering and operating activities of the Marandoo mine, but is required for exploration activities and camp purposes.

- stakeholder consultation regarding closure;
- financial provisioning for closure;
- the review of closure plans; and
- the development of Decommissioning Plans five years prior to scheduled closure.

Consideration of existing legislative controls for Flora and Vegetation is illustrated in Figure 5-1.

5.3 PRINCIPALS OF ENVIRONMENTAL PROTECTION AND EIA

This section describes how the objectives of the EP Act and the principles of Environmental Impact Assessment (**EIA**) have been addressed and how the Revised Proposal meets the criteria for an Assessment of Proponent Information (**API**) (Category A) assessment as described in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012 (2012 Administrative Procedures)* (EPA 2012b).

5.3.1 Principles of Environmental Protection

The concept of sustainable development came to prominence at the World Commission on Environment and Development (1987), in the report entitled *Our Common Future*, which defined sustainable development as; *development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

In recognition of the importance of sustainable development, the Commonwealth Government developed a National Strategy for Ecologically Sustainable Development (Commonwealth of Australia 1992) that defines Ecologically Sustainable Development (**ESD**) as “...using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased”.

The principles of ESD are incorporated into the EP Act and the EPA’s Position Statement No. 7 - Principles of Environmental Protection (EPA 2004c). These principles are:

- the Precautionary Principle;
- the Principle of Intergenerational Equity;
- the Principle of the Conservation of Biological Diversity and Ecological Integrity;
- principles in relation to Improved Valuation, Pricing and Incentive Mechanisms; and
- the Principle of Waste Minimisation.

These Principles have been considered for the Revised Proposal and are summarised in Table 5-1.

Table 5-1: Principles of Environmental Protection

| Principle | Consideration Given in Revised 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> <ul style="list-style-type: none"> • Careful evaluation to avoid, where practicable, serious or irreversible damage to the environment. • An assessment of the risk-weighted consequences of various options. | <p>Rio Tinto has undertaken comprehensive baseline studies and modelling of aspects of the Revised Proposal that may affect the environment.</p> <p>Where significant potential environmental impacts were identified, management and mitigation measures have been, and will continue to be, implemented in design and operation of the Revised Proposal in order to avoid or minimise these potential environmental impacts.</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 Rio Tinto Iron Ore HSECQ Policy incorporates the principle of sustainable development and includes the following commitments:</p> <ul style="list-style-type: none"> • Prioritising research and implementation programs through technology to reduce impacts to land, enhancing our contribution to biodiversity and improving our efficiency in water and energy use. • Identifying climate change improvement solutions through dedicated optimisation work programs. • Contributing to the health and well-being of local communities. |
| <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>Biological investigations are undertaken by the Proponent during the Proposal planning process to identify aspects of the environment that are of conservation significance. Where significant potential environmental impacts are identified, measures have been, and will continue to be, incorporated into Proposal design and management to avoid or minimise these impacts where practical.</p> <p>The Rio Tinto HSEQ Management System has well established rehabilitation procedures for restoring disturbed environments.</p> |

| Principle | Consideration Given in Revised Proposal |
|---|---|
| <p>4. Improved valuation, pricing and incentive mechanisms</p> <ul style="list-style-type: none"> • Environmental factors should be included in the valuation of assets and services. • The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement. • 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. • 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>Environmental factors have been considered during the design phase of the Revised Proposal, and will continue to be considered during the operational and closure phases of the Proposal.</p> <p>Proposal design and operational management will continue to investigate and implement opportunities to reduce impact to land, and improve efficiency in water and energy use, in accordance with the Rio Tinto Iron Ore Group HSECQ Policy.</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>All reasonable and practicable measures are taken to minimise the generation of waste and its discharge into the environment through the existing EMP and procedures.</p> |

5.4 PRINCIPLES OF EIA FOR THE PROPONENT

Table 5-2 outlines the principles of EIA as described in clause 5 of the 2012 Administrative Procedures.

Table 5-2: Principles of EIA for the Proponent

| The principles of EIA for the Proponent | Discussed in the Document |
|--|---|
| <p>1. Consult with all stakeholders, including the EPA, DMAs, other relevant government agencies and the local community as early as possible in the planning of their proposal, during the environmental review and assessment of their proposal, and where necessary during the life of the project.</p> | <p>Rio Tinto will continue to consult with relevant stakeholders throughout the environmental approval process and implementation of the Revised Proposal.</p> |
| <p>2. Ensure the public is provided with sufficient information relevant to the EIA of a proposal to be able to make informed comment, prior to the EPA completing the assessment report.</p> | <p>This EIA has been prepared to provide sufficient information about the Revised Proposal, its potential environmental impacts and proposed management measures.</p> |

| The principles of EIA for the Proponent | | Discussed in the Document |
|---|---|---|
| 3. | Use best practicable measures and genuine evaluation of options or alternatives in locating, planning and designing their proposal to mitigate detrimental environmental impacts and to facilitate positive environmental outcomes and a continuous improvement approach to environmental management. | Avoiding and minimising impacts to the environment where practical is a key management commitment for the Revised Proposal, and has been implemented during design and operation. As detailed in Section 5, continuous improvement is a key aspect of the Rio Tinto Iron Ore (WA) HSEQ Management System. |
| 4. | Identify the environmental factors likely to be impacted and the aspects likely to cause impacts in the early stages of planning for their proposal. The onus is on the proponent through the EIA process to demonstrate that the unavoidable impacts will meet the EPA objectives for environmental factors and therefore their proposal is environmentally acceptable. | Figure 5-1 identifies the key environmental factor relevant to the Revised Proposal, potential environmental impacts, proposed management measures, and how the EPA objective relevant to this environmental factor can be met. Table 9-1 to Table 9-6 provide a brief EIA of the Revised Proposal for other environmental factors. |
| 5. | Consider the following, during project planning and discussions with the EPA, regarding the form, content and timing of their environmental review: <ul style="list-style-type: none"> a. The activities, investigations (and consequent authorisations) required to undertake the environmental review. b. The efficacy of the investigations to produce sound scientific baseline data about the receiving environment. c. The documentation and reporting of investigations. d. The likely timeframes in which to complete the environmental review; e. Use best endeavours to meet assessment timelines. | Rio Tinto plans to discuss any concerns once the OEPA have had an opportunity to review the Revised Proposal. The content of this environmental review will incorporate advice provided by the OEPA. Comprehensive studies have been undertaken to support the environmental review, and are provided as appendices. Project design has considered the expected timeframes for completion of supporting studies, environmental review preparation and assessment, and timings for key milestones are regularly discussed with the OEPA. |
| 6. | Identify in their environmental review, subject to EPA guidance: <ul style="list-style-type: none"> a. Best practicable measures to avoid, where possible, and otherwise minimise, rectify, reduce, monitor and manage impacts on the environment. b. Responsible corporate environmental policies, strategies and management practices, which demonstrate how the proposal can be implemented to meet the EPA environmental objectives for environmental factors. | Table 6-5 and Table 7-3 identify the key management measures to avoid where possible, and otherwise minimise impacts on the environment. These tables also provide an assessment of how the Revised Proposal meets the EPA environmental objective for the key environmental factor, based on implementation of key management measures, and corporate environmental policies. |

5.5 CRITERIA FOR API CATEGORY A

Clause 10.1.1 in the 2012 Administrative Procedures states that the OEPA applies an API-A level of assessment where the proponent has provided sufficient information about the proposal, its environmental impacts, proposed management, and it appears that the proposal is consistent with Category A criteria. Consistency of the Proposal with these criteria is addressed in Table 5-3.

Table 5-3: Criteria for API Category A

| Category A Criteria | Discussion |
|---|--|
| <p>The proposal raises a limited number of key environmental factors that can be readily managed and for which there is an established condition-setting framework.</p> | <p>The Revised Proposal raises two key environmental factors:</p> <ul style="list-style-type: none"> • flora and vegetation; and • terrestrial fauna. <p>These are assessed in Table 6-3 and Table 7-3.</p> <p>These factors are typical of iron ore mining in the Pilbara and can be readily managed under the existing conditions of the MS 286 and MS 833. However a new Condition is required for the significant residual impact of clearing.</p> |
| <p>The proposal is consistent with established environmental policies, guidelines and standards.</p> | <p>The Revised Proposal is consistent with established environmental policies, guidelines and standards.</p> |
| <p>The proponent can demonstrate that it has conducted appropriate and effective stakeholder consultation, in particular with DMAs.</p> | <p>Stakeholder consultation has been, and will continue to be undertaken throughout the approvals process and implementation of the Revised Proposal.</p> <p>Section 4 details the stakeholder consultation that has been undertaken to date, issues raised, and Proponent response to issues raised.</p> |
| <p>There is limited or local concern only about the likely effect of the proposal, if implemented, on the environment.</p> | <p>The location of the Proposal is very remote, with no neighbouring mining. The Revised Proposal is adjacent to the Karijini National Park but will not result in direct impact to the Park.</p> |

5.6 PROPOSED ENVIRONMENTAL CONDITIONS

Rio Tinto proposes to maintain and adhere to the existing environmental conditions (where still relevant) of MS 286 and MS 833 to address the environmental aspect of the Revised Proposal. It is proposed that these environmental conditions be applied to the Revised Proposal.

These environmental conditions do not duplicate other regulatory controls that are, or will be, applied under other existing legislation. A condition has not been proposed if the environmental factor is already adequately addressed by other environmental control instruments.

PART 4 – ENVIRONMENTAL IMPACT ASSESSMENT OF THE REVISED PROPOSAL

This section has been prepared in accordance with the EPA's Environmental Assessment Guidelines (EAGs), specifically *Defining the Key Characteristics of a Proposal* (**EAG 1**) (EPA 2012b) and EAG for *Environmental Factors and Objectives* (**EAG 8**) (EPA 2013a).

Rio Tinto considers that key environmental factors relevant to the Revised Proposal are flora and vegetation and terrestrial fauna. The Revised Proposal is not expected to affect any other environmental factors different to, or in addition to, that as assessed and approved under the existing MS 286 and MS 833.

6. FLORA AND VEGETATION

This Section describes the flora and vegetation that occurs within the Marandoo Mine/Plant Development Envelope and provides details regarding the potential impacts to conservation significant vegetation communities and flora species as a result of this Revised Proposal. The EPA applies the following objective from EAG 8 in its assessment of proposals that may affect vegetation and flora:

To maintain representation, diversity, viability and ecological function at the species, population and community level.

6.1 FLORA AND VEGETATION STUDIES

Flora and vegetation studies have been undertaken across the Marandoo Mine/Plant Development Envelope since the 1970s, covering an area in excess of 6,000 ha. The combined coverage of these surveys, with a number of targeted searches for Declared Rare Flora (**DRF**) and Priority Flora in the area, provides a comprehensive understanding of the existing vegetation and flora in the Marandoo Mine/Plant Development Envelope.

Studies relevant to this Proposal are summarised in Table 6-1.

Table 6-1: Summary of Relevant Flora and Vegetation Studies

| Author | Survey name | Study area, type and timing | Study standard/guidance and limitations |
|---------------|--|---|---|
| Mattiske 1992 | <i>Flora and vegetation: Marandoo Project Area</i> | Development Envelope and surrounds (20,000 ha). Desktop review, reconnaissance and field surveys. May, June, August and September 1991. | Consultation with the Environmental Protection Authority. Limitation: access to some areas constrained due to lack of tracks and rainfall events during June and July 1991. |
| Biota 2008a | <i>MMP2 Project Vegetation and Flora Survey,</i> | Development Envelope and surrounds (6,253 ha). Desktop review and baseline field survey. March and May 2007 and April 2008. | EPA Guidance Statement No. 51. Level 2 survey. Consultation with Parks and Wildlife ⁵ (EM Branch and Pilbara Region). Limitations: vegetation sampled within some quadrats was found not to correlate with the mapping unit presented in earlier studies. |
| Biota 2008c | <i>A Vegetation and Flora Survey of the Rio Tinto Rail Duplication – Bellbird Siding to Juna Downs</i> | Rail Duplication – Bellbird Siding to Juna Downs (120km in length). 23 May to 1 June 2008. | EPA Guidance Statement No. 51. Level 2 survey. Consultation with Parks and Wildlife (EM Branch and Pilbara Region). Limitations: dry conditions, not optimal for collection of ephemeral flora or cryptic perennial species. |

⁵ Conservation and Land Management at the time

6.2 IBRA BIOREGIONS AND SUBREGIONS

The Revised Proposal is located in the Pilbara Bioregion as defined in the Interim Biogeographic Regionalisation of Australia (**IBRA**) Report (Australian Government 2012). The Pilbara bioregion has been divided into 4 sub regions: Chichester (PIL1); Fortescue Plains (PIL2); Hamersley (PIL3); and Roebourne (PIL4). The Marandoo Mine/Plant Development Envelope falls within the Hamersley (PIL3) sub-region which is described as:

'Mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite). Mulga low woodland over bunch grasses on fine textured soils in valley floors, and Eucalyptus leucophloia over Triodia brizoides on skeletal soils of the ranges. The climate is Semi-desert tropical, average 300 mm rainfall, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon. Drainage is into either the Fortescue (to the north), the Ashburton to the south, or the Robe to the west.'

6.3 BEARDS VEGETATION MAPPING

The Marandoo Mine/Plant Development Envelope lies entirely within the Fortescue Botanical District of the Eremaean Botanical Province as defined by Beard (1975). The vegetation of this Province is typically open and frequently dominated by spinifex, wattles and occasional eucalypts. Beard (1975) mapped the vegetation of the Marandoo Mine/Plant Development Envelope as four main vegetation units:

- Mulga (*Acacia aneura*) continuous low woodland;
- Mulga (*Acacia aneura*) sparse low woodland;
- Scattered Snappy Gums (*Eucalyptus leucophloia*) over a Hard Spinifex (*Triodia wiseana*) hummock grassland; and
- Scattered shrubs of Mulga (*Acacia aneura*) and *Acacia pyrifolia* over a *Triodia pungens*, *T basedowii* hummock grassland.

Beard (1975) mapped these units at 1:1,000,000 therefore these mapping units correlate only broadly with the vegetation mapping that has been conducted specifically for the Marandoo operation and surrounds.

6.4 LAND SYSTEMS

Land Systems (Rangelands) mapping covering the Marandoo Mine/Plant Development Envelope has been prepared by the Western Australian Department of Agriculture (van Vreeswyk *et al.* 2004). Land systems comprise a series of 'land units' that occur on characteristic physiographic types within the land system. Of the 107 Land Systems that have been identified in the Pilbara, six occur within the Marandoo Mine/Plant Development Envelope as described in Table 6-2 and illustrated in Figure 6-1.

Table 6-2: Land Systems in the Marandoo Mine/Plant Development Envelope

| Land System | Description |
|--------------|---|
| Boolgeeda | <p>Stony lower slopes and plains found below hill systems supporting hard and soft spinifex grasslands and mulga shrublands.</p> <p>Occurs on the stony plains on the northern side of the Marandoo Ridge.</p> |
| Jurrawarrina | <p>Hardpan plains and alluvial tracts supporting mulga shrublands with tussock and spinifex grasses.</p> <p>Occurs on the western boundary of the proposed Mine/Plant Development Envelope.</p> |
| McKay | <p>Hills, ridges, plateau remnants and breakaways of meta-sedimentary and sedimentary rocks supporting hard spinifex grasslands.</p> <p>Located on the southern side of the Marandoo Ridge, in the southern part of the proposed Mine/Plant Development Envelope.</p> |
| Newman | <p>Rugged jaspelite plateaux, ridges and mountains supporting hard spinifex grasslands.</p> <p>Dominates the hills of the Marandoo Ridge.</p> |
| Platform | <p>Dissected slopes and raised plains supporting hard spinifex grasslands.</p> <p>Occurs on the south-eastern corner of the proposed Mine/Plant Development Envelope.</p> |
| Wannamunna | <p>Hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasionally eucalypt woodlands).</p> <p>Occurs on the northern boundary of the proposed Mine/Plant Development Envelope.</p> |

Most of the Land Systems occurring within the Marandoo Mine/Plant Development Envelope are widespread throughout the Hamersley subregion and well represented within the adjacent Karijini National Park.

However, the Jurrawarrina and Wannamunna Land Systems have a smaller area of representation than the other units and the Jurrawarrina Land System occurs only in small areas along the western boundary of Karijini National Park.

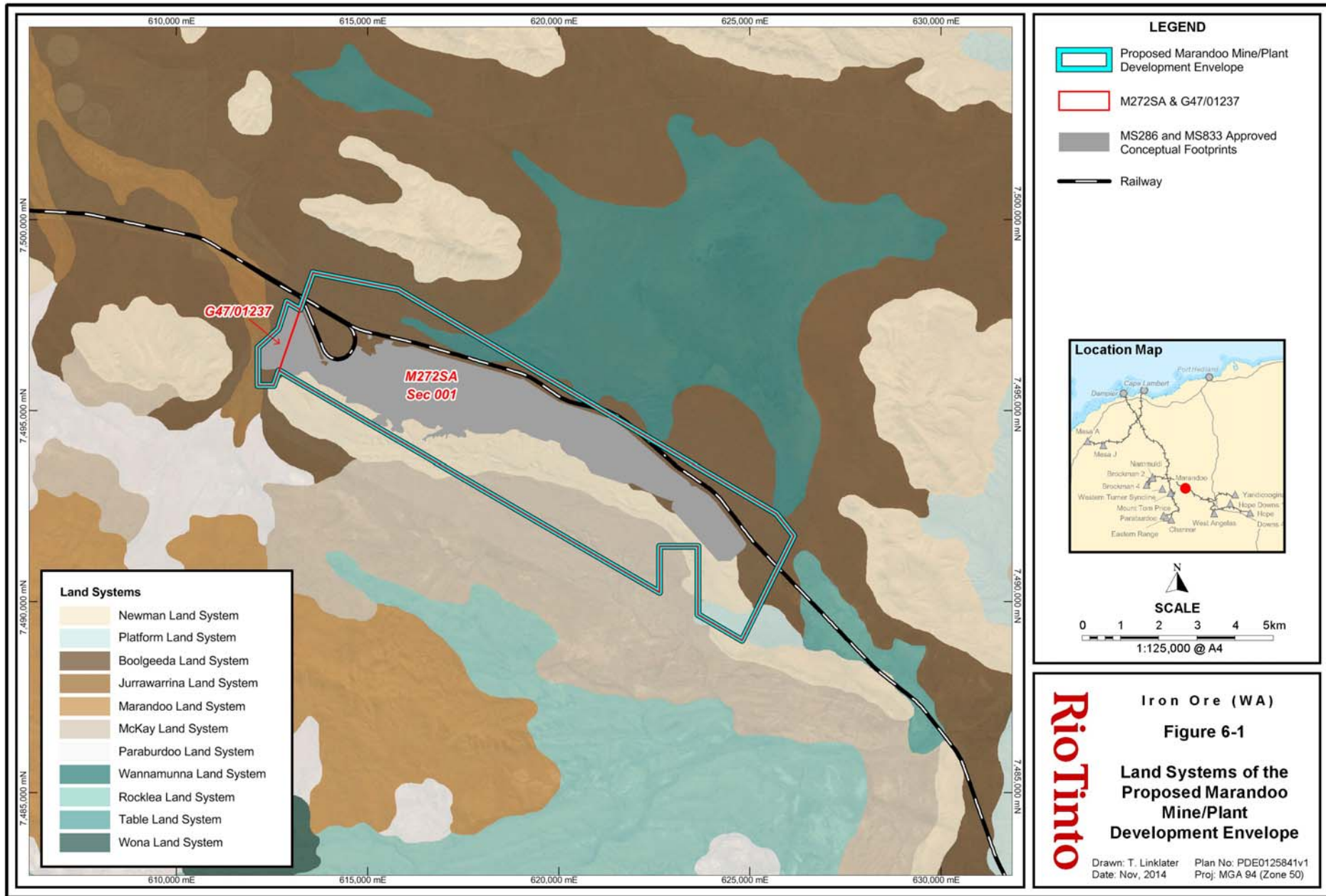


Figure 6-1: Land Systems of the Proposed Marandoo Mine/Plant Development Envelope

6.5 VEGETATION

Twenty-seven vegetation types were recorded (Biota 2008a, Mattiske 1992) study areas of the Marandoo Mine/Plant Development Envelope, infrastructure corridor and surrounds. Twenty-six of these vegetation types are relevant to this Revised Proposal as summarised in Table 6-3 and illustrated in Figure 6-2.

Table 6-3: Vegetation Types within the Marandoo Mine/Plant Development Envelope

| Vegetation Mapping Code | Vegetation Description |
|--|---|
| Broad Drainage Areas and Basins | |
| 1a | <i>Acacia aneura</i> woodland on broad flat alluvial and colluvial areas |
| 1b | Open grassland |
| 1c | <i>Triodia melvillei</i> hummock grassland |
| Major Flowlines and Creeks | |
| 2a | <i>Acacia aneura</i> – <i>A. pruinocarpa</i> woodland in major flowlines |
| 2b | <i>Eucalyptus xerothermica</i> – <i>Acacia aneura</i> woodland in major flowlines |
| 3c | <i>Eucalyptus xerothermica</i> – <i>Acacia aneura</i> woodland over <i>Acacia citrinoviridis</i> tall shrubland in major flowlines |
| 2e | <i>Eucalyptus victrix</i> woodland in secondary creeklines |
| Minor Creeks | |
| 3a | <i>Acacia</i> species shrubland in minor flowlines |
| Flats | |
| 4a | <i>Acacia aneura</i> – <i>A. pruinocarpa</i> woodland |
| 4b | <i>Acacia synchronicia</i> – <i>*Vachellia farnesiana</i> tall shrubland |
| 4c | <i>Acacia aneura</i> scattered low trees over open grassland |
| 4d | <i>Acacia xiphophylla</i> low woodland |
| 4e | <i>Triodia wiseana</i> , <i>T. pungens</i> hummock grassland |
| 4f | <i>Triodia wiseana</i> , <i>T. sp.</i> Shovelanna Hill, <i>T. angusta</i> hummock grassland |
| Ridges and Erosional Spurs | |
| 5a | <i>Eucalyptus leucophloia</i> scattered low trees over <i>Acacia</i> spp. scattered shrubs over <i>Triodia brizoides</i> , <i>T. wiseana</i> hummock grassland |
| 5b | <i>Eucalyptus leucophloia</i> scattered low trees over <i>Acacia</i> spp. scattered shrubs over <i>Triodia wiseana</i> (<i>T. brizoides</i> , <i>T. sp.</i> Shovelanna Hill) hummock grassland |
| 5c | <i>Eucalyptus leucophloia</i> scattered low trees over <i>Acacia</i> spp. scattered shrubs over <i>Triodia sp.</i> Shovelanna Hill (<i>T. wiseana</i>) hummock grassland |

| Vegetation Mapping Code | Vegetation Description |
|--------------------------------------|---|
| 5d | <i>Eucalyptus gamophylla</i> scattered low mallees over <i>Acacia</i> spp. scattered tall shrubs over <i>Triodia</i> sp. Shovelanna Hill (<i>T. wiseana</i>) hummock grassland |
| 5e | Mixed community supporting a range of structural formations from <i>Acacia aneura</i> low woodlands to sheer rock faces with <i>Astrotricha hamptonii</i> scattered shrubs to <i>Eriachne mucronata</i> open grasslands |
| 5f | <i>Acacia aneura</i> low woodland to woodland on rocky ledges and upper slopes of ranges |
| 5g | <i>Eucalyptus gamophylla</i> scattered low mallees over <i>Triodia wiseana</i> hummock grassland |
| 5h | <i>Triodia wiseana</i> hummock grassland with mixed <i>Acacia</i> spp. emergent shrubs |
| Low Foothills and Escarpments | |
| 6a | Mixed <i>Triodia</i> spp. hummock grassland on upper slopes and ridges of small foothills and escarpments |
| 6b | Mixed <i>Acacia aneura</i> , <i>Acacia</i> spp. low woodland to woodland on upper slopes of low foothills |
| 6c | <i>Acacia aneura</i> low woodland to woodland on breakaways of low foothills |
| 6d | <i>Eucalyptus trivalva</i> , <i>E. socialis</i> low mallee woodland with pockets of <i>Triodia angusta</i> , <i>T. wiseana</i> hummock grassland on shallow calcrete soils |

Based on the vegetation condition scale developed by Trudgen (1988) as cited in Biota (2008a, 2008c), the vegetation of the Marandoo Mine/Plant Development Envelope is considered to generally be in Very Good to Excellent condition. The exceptions to this are: sections of Mulga vegetation on the clayey flats that show signs of repeated burns and were considered to be in Good condition; and areas in close proximity to the existing mine and associated infrastructure that were considered to be typically in Poor to Good condition (Biota 2008a, 2008c). Approximately 383 ha of the Proposal area is considered to be in Good to Excellent condition.

Twenty weed species were recorded by Biota (2008a). None of the species recorded are Declared Plants under the *Agriculture and Related Resources Protection Act 1976*, however *Cenchrus* species and **Acetosa vesicaria* are considered to be serious environmental weeds. Where present, weeds typically occurred as scattered individuals with occasional dense infestations (Biota 2008a).

6.6 CONSERVATION SIGNIFICANT VEGETATION

No Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs) or vegetation types of high conservation significance were recorded in the Marandoo Mine/Plant Development Envelope.

All of the vegetation types (Table 6-3) recorded in the Marandoo Mine/Plant Development Envelope occur more broadly in the Marandoo locality and none are expected to be restricted to the locality, given the landforms and dominant species (Biota 2008a, Mattiske 1992).

Vegetation types considered to be of moderate conservation significance comprise (Biota 2008a, Mattiske 1992):

- Vegetation units 1a, 2a, 2b, 2c, 2e and 4a are species rich and support some restricted taxa, including some Priority Flora species.

- Vegetation units 4f and 6d comprise vegetation of calcretes; this substrate has a small area of representation and potentially supports restricted taxa.
- Vegetation units 5e, 5f and 6c comprise vegetation of breakaways and cliff habitats; these landforms have a small area of representation and support habitat restricted taxa.

The remainder of the vegetation types are considered to be of low conservation significance.

6.7 CONSERVATION SIGNIFICANT FLORA

Three Threatened Flora species (*Thryptomene wittweri*, *Lepidium catapycnon* and *Aluta quadrata*) are known from the Pilbara bioregion. *Thryptomene wittweri* and Hamersley *Lepidium catapycnon* are listed as Threatened flora under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* as well as the *WA Wildlife Conservation Act 1950 (WC Act)*. *Aluta quadrata* is listed as a Threatened species in WA and is recognised as such under the WC Act. None of these species has been recorded within the Marandoo Mine/Plant Development Envelope (Biota 2008a).

T. wittweri occurs in the Hamersley subregion on hilltops at high altitude. *T. wittweri* is not expected to occur in the Marandoo Mine/Plant Development Envelope due to a lack of suitable habitat (Biota 2008a).

L. catapycnon occurs in hummock grasslands on low stony hills and occasionally stony plains in the Hamersley subregion. It is thought to be short-lived and is generally found on recently disturbed ground. Suitable habitat for *L. catapycnon* occurs throughout the Marandoo Mine/Plant Development Envelope; however, this species has not been recorded from the Marandoo locality despite relatively intensive sampling both at Marandoo and in the surrounding Karijini National Park (Biota 2008a).

A. quadrata occurs mainly in rocky gullies and sometimes also along the creeklines downstream or on adjacent ridge slopes and crests. Recorded only at Paraburdoo (approximately 80 km south-west of Marandoo), this species has not been recorded in the Marandoo Mine/Plant Development Envelope.

Five Priority (P) flora species were recorded in the Marandoo Mine/Plant Development Envelope (Biota 2008a) as shown in Table 6-4 and Figure 6-2. These species occur relatively broadly throughout the Pilbara and are not restricted to the Marandoo locality (Maier 2008, Parks and Wildlife 2014).⁶

⁶ Michi Maier (Biota Environmental Science) 2008 pers. comm., 19 August

Table 6-4: Priority flora recorded within the Marandoo Mine/Plant Development Envelope

| Species | Priority | Regional Distribution |
|---|----------|--|
| <i>Indigofera ixocarpa</i> | 2 | This species extends over a range of >250 km across the Pilbara bioregion, including locations within both the Hamersley and Chichester sub-regions (Maier 2008). |
| <i>Goodenia lyrata</i> | 3 | This species extends over a range of >250 km within the Hamersley sub-region of the Pilbara and also occurs >400 km east in the Gibson Desert bioregion and 600 km in the Murchison bioregion (Maier 2008). |
| <i>Rhagodia</i> sp. Hamersley (M.E. Trudgen 17794) | 3 | This species has a relatively broad distribution through the Pilbara and is not uncommon in Mulga and <i>Acacia xiphophylla</i> vegetation; it has been recorded numerous times in the vicinity of Tom Price to Newman (Maier 2008). |
| <i>Goodenia nuda</i> | 4 | This species has a widespread distribution of approximately 720 km across the Pilbara and inland desert regions, including populations in Karijini and Millstream-Chichester National Parks (Parks and Wildlife 2014). |
| <i>Eremophila magnifica</i> subsp. <i>magnifica</i> | 4 | This species extends over a range >150 km within the Hamersley sub-region of the Pilbara, including numerous records from the Tom Price locality (Maier 2008). |

An assessment of the potential impacts to Flora and vegetation as a result of this Revised Proposal is presented in Table 6-5. Any potential impacts as a result from implementation of this Proposal will not result in impacts additional to, or different from, those assessed and approved under MS 286 and MS 833.

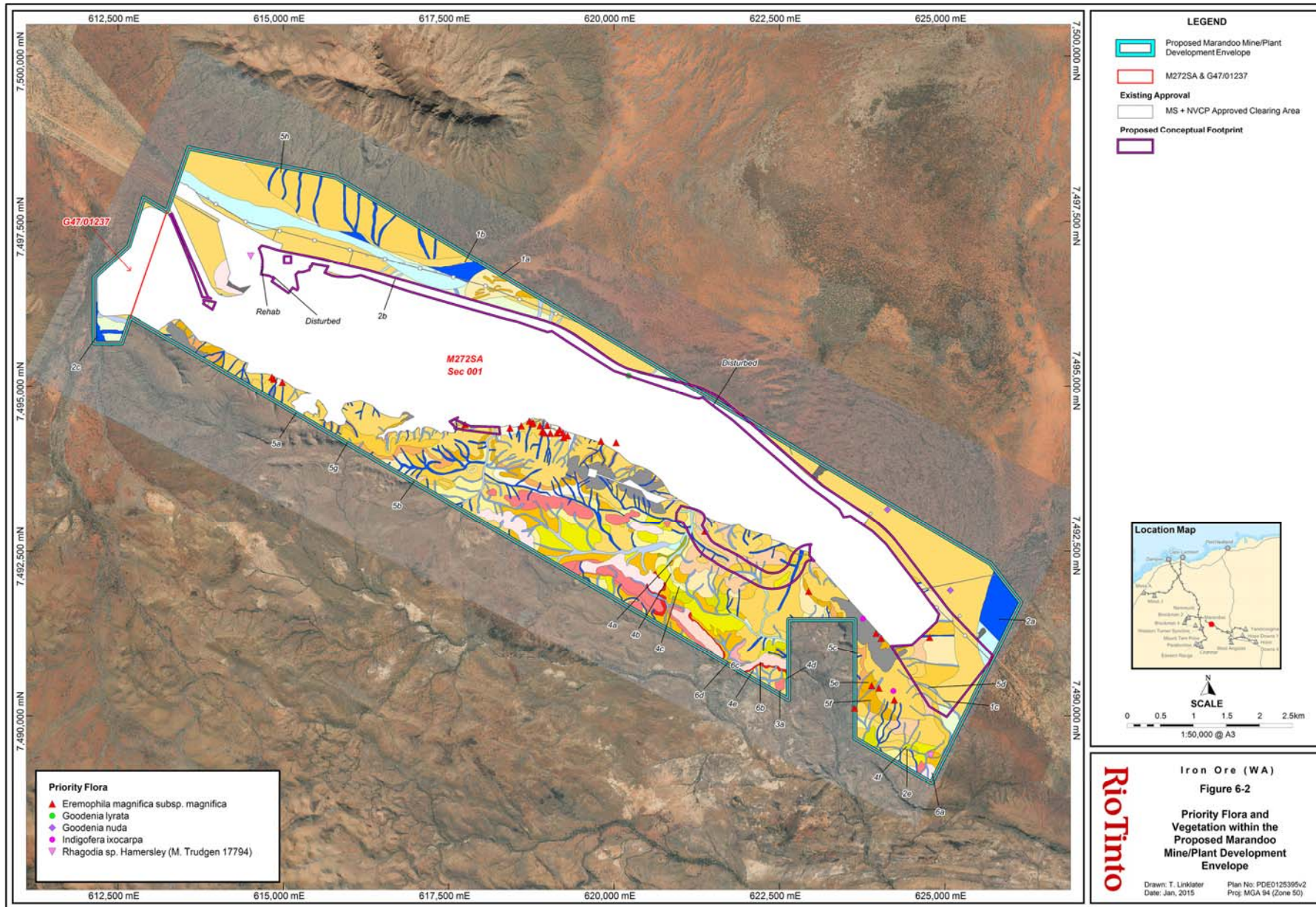


Figure 6-2: Priority Flora and Vegetation within the Proposed Mine/Plant Development Envelope

-  5c
Eucalyptus leucophloia scattered low trees over Acacia spp. scattered shrubs over Triodia sp. Shovelanna Hill, (T. wiseana) hummock grassland
-  5d
Eucalyptus gamophylla scattered low mallees over Acacia spp. scattered tall shrubs over Triodia sp. Shovelanna Hill (T. wiseana) hummock grassland
-  3a
Acacia species shrubland in minor flowlines
-  1c
Hummock Grassland of Plectrachne metvillei
-  6a
Mixed Triodia spp. hummock grassland on upper slopes and ridges of small foothills and escarpments
-  4f
Hummock grassland of Triodia wiseana, Triodia basedowii and Triodia angusta on shallow calcrete soils
-  4d
Acacia xiphophylla low woodland
-  4e
Triodia wiseana, T. pungens hummock grassland
-  5b
Hummock Grassland of Triodia wiseana, with occasional mixtures of T. brizoides, T. basedowii and emergent shrubs of mixed Acacias and Eucalyptus leucophloia
-  5f
Acacia aneura low woodland to woodland on rocky ledges and upper slopes of ranges
-  5e
Mixed community supporting a range of structural formations from low woodlands of Acacia aneura to sheer rock faces with Astrotricha hamptonii to open herbfields of Eriachne mucronata
-  2e
Woodland of Eucalyptus coolabah on the secondary flow and creek lines
-  5a
Hummock Grassland of Triodia brizoides - Triodia wiseana, with emergent shrubs of mixed Acacias and Eucalyptus leucophloia
-  2a
Acacia aneura - A. pruinocarpa woodland in major flowlines
-  2c
Woodland of Eucalyptus patellaris - Acacia aneura - Acacia citrinoviridis on the major flow lines
-  5h
Hummock grassland of Triodia wiseana with emergent shrubs of mixed Acacias
-  2b
Eucalyptus xerothermica - Acacia aneura woodland
-  6c
aneura low woodland to woodland on breakaways of low foothills
-  6d
Low Woodland of mixed mallee species with pockets of Triodia angusta and Triodia wiseana on shallow calcrete soils
-  4c
Acacia aneura scattered low trees over open grassland
-  4b
Low shrubland of Acacia victoriae - Acacia farnesiana on fine silty alluvial soils
-  6b
Mixed Acacia aneura, Acacia spp. low woodland to woodland on upper slopes of low foothills
-  4a
Woodland of Acacia aneura - Acacia pruinocarpa on the flatter silty alluvial areas
-  Disturbed
-  1a
Acacia aneura woodland on broad flat alluvial and colluvial areas
-  5g
Hummock grassland of Triodia wiseana to low woodland of Eucalyptus gamophylla, on shallow gravelly soils
-  1b
Open grassland
-  Disturbed
-  Highly disturbed Acacia shrubland
-  Rehab
-  Planted wetland

RioTinto

Iron Ore (WA)

**Vegetation
Legend**

Drawn: T. Linklater Plan No: PDE0125395v1
Date: Nov, 2014

Table 6-5: Flora and Vegetation: Description of Factor, Impact Assessment and Management

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---|---|---|--|--|---|---|
| <p>To maintain representation, diversity, viability and ecological function at the species, population and community level.</p> | <ul style="list-style-type: none"> No TECs or PECs present. No vegetation of high conservation significance present. Vegetation generally in Good to Excellent condition. Exceptions are sections of Mulga on the clayey flats that are in Good condition and areas in close proximity to the existing operations that are in Poor to Good condition. No DRF or plant species listed under the EPBC Act present. <i>Indigofera ixocarpa</i> (P2), <i>Goodenia lyrata</i> (P3), <i>Rhagodia</i> sp. Hamersley (M.E. Trudgen 17794) (P3), <i>Goodenia nuda</i> (P4) and <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) present. Weeds are present typically as scattered individuals. | <p><u>Impact 1</u></p> <p>Up to 400 ha of additional clearing of vegetation of low and moderate conservation significance, which supports one P2, two P3 and two P4 species. Of the 400 ha, 383 ha is generally in Good to Excellent condition.</p> | <p><u>Aspect 1</u></p> <p>Additional clearing required for long term management of topsoil and subsoil and to support ongoing mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. An internal Permit will be obtained for all areas to be cleared in accordance with Rio Tinto's internal approvals system. Known locations of DRF and Priority flora will be avoided as far as practicable. Disturbed areas will be progressively rehabilitated with native flora species where possible. | <p><u>Regulation of Aspect 1</u></p> <p>Existing MS 286 and MS 833 and new MS for Revised Proposal - with specified clearing limit, defined Mine/Plant Development Envelope and a Condition relating to Rehabilitation.</p> | <p>The Revised Proposal can be managed to meet the EPA objective for this factor, in summary:</p> <ul style="list-style-type: none"> No TECs, PECs, vegetation of high conservation significance or DRF have been recorded. Flora and vegetation potentially affected by the Proposal is well represented outside the Mine/Plant Development Envelope. Any potential impacts as a result from implementation of this Proposal will not result in impacts additional to, or different from, those assessed and approved under MS 286 and MS 833. Appropriate, and existing, management measures to avoid, minimise and mitigate potential impacts of the Revised Proposal will continue to be implemented. |

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---------------|---------|--|---|--|---|----------------------|
| | | <p><u>Impact 2</u></p> <p>Spread of existing weeds and/or introduction of new weeds that compete with native vegetation.</p> | <p><u>Aspect 2</u></p> <p>Vehicle and earth movements.</p> | <p><u>Management of Aspect 2</u></p> <ul style="list-style-type: none"> • The distribution of target weed species within and adjacent to the Mine/Plant Development Envelope will continue to be mapped and controlled. • Weed hygiene procedures for mining machinery entering and leaving the Mine/Plant Development Envelope will continue to be implemented. | <p>Existing MS 286 and MS 833 and new MS for the Revised Proposal - includes Conditions relating to Rehabilitation and Weeds.</p> | |
| | | <p><u>Impact 3</u></p> <p>Increase in fire frequency which may favour establishment of weeds and prevent re-generation of native species</p> | <p><u>Aspect 3</u></p> <p>Vehicle and personnel movements and hot work.</p> | <p><u>Management of Aspect 3</u></p> <ul style="list-style-type: none"> • Basic fire awareness and firefighting training will continue to be provided to all personnel prior to commencing work on site. • Fire breaks will continue to be maintained across the mine site and around working areas where required. | <p>Bush Fires Act, FESA Act and LG Act.</p> | |

7. TERRESTRIAL FAUNA

This Section describes the terrestrial fauna and fauna habitats that occur within the Marandoo Mine/Plant Development Envelope and provides details regarding the potential impacts to conservation significant fauna and fauna habitats as a result of this Revised Proposal. The EPA applies the following objective from EAG 8 in its assessment of proposals that may affect terrestrial fauna:

To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.

7.1 TERRESTRIAL FAUNA STUDIES

Fauna studies have been undertaken across the Marandoo Mine/Plant Development Envelope since the 1970s, covering an area in excess of 4,500 ha. The combined coverage of these surveys provides a comprehensive understanding of the existing terrestrial fauna in the Marandoo Mine/Plant Development Envelope. Table 7-1 provides a summary of these studies.

Table 7-1: Summary of Key Terrestrial Fauna Studies

| Consultant | Survey name | Study area, type and timing | Study standard/guidance and limitations |
|-------------|---|--|---|
| Ninox 1992 | <i>Marandoo Project Area Vertebrate Fauna Assessments (1975-1991)</i> | Development Envelope and surrounds (>4,500 ha). Desktop review, site reconnaissance and field surveys. September 1990, June and August 1991. | Consultation with the Department of Conservation and Land Management |
| Biota 2008b | <i>MMP2: Seasonal Fauna Survey</i> | Large proportion of the Development Envelope (5,000 ha). Desktop review and two phase field survey. April and November 2007. | EPA Guidance Statement No. 56. Level 2 survey. Consultation with WA Museum and the Parks and Wildlife (EM Branch and Pilbara region). Limitation: funnel traps not deployed due to high temperatures; sampling for bats carried out using harp traps, restriction on night work on the mine site. |

Four primary habitat types, largely based on vegetation structure and landforms, have been identified in the Marandoo Mine/Plant Development Envelope (Biota 2008b) (Figure 7-1):

- *Flowlines* - Small drainage lines vegetated with *Acacia aneura* over tussock grasses on loamy substrates;
- *Hills* - Stony hill slopes vegetated with *Acacia* shrubs over *Triodia* on stony loam substrates;
- *Plains* - Flat outwash plains vegetated with *Acacia* shrubs on loamy substrates; and
- *Gorges/Gullies* - Rocky gorges vegetated with scattered *Acacia* shrubs and spinifex.

These fauna habitats are typical of the area surrounding the Marandoo Mine Plant Development Envelope and are well represented across the Pilbara (Biota 2008b).

A total of 125 vertebrate species were recorded in the survey area (Biota 2008a), comprising 54 avifauna species, 20 mammal species and 51 herpetofauna species. Fauna assemblages recorded are comparable to those recorded during earlier work and are typical of assemblages occurring where similar habitats are found elsewhere in the Pilbara (Biota 2008b).

Three groups of invertebrate fauna were also recorded during the Biota (2008b) survey.

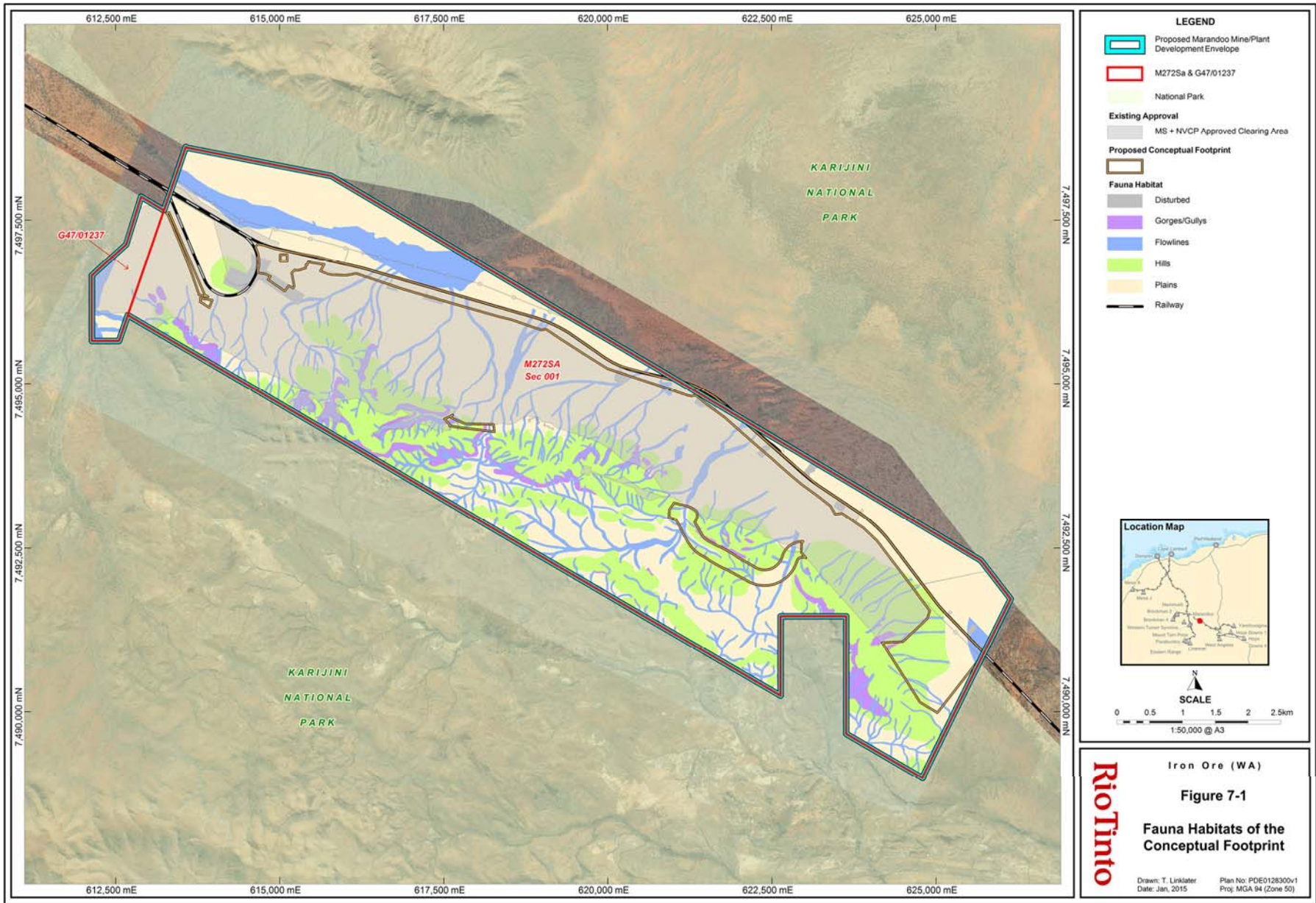


Figure 7-1: Fauna Habitats of the Conceptual Footprint

7.2 FAUNA OF CONSERVATION SIGNIFICANCE

7.2.1 Vertebrate Fauna

Six species of State conservation significance were recorded by Ninox (1992) and/or Biota (2008b) in the Marandoo locality. One additional species, the orange leaf-nosed bat, whilst not recorded in the surveys is considered to potentially occur in the Marandoo area on the basis of the known distribution and available habitat. The little north-western mastiff Bat (*Mormopterus loriae cobourgiana*) (Priority 1) was reportedly recorded at Marandoo by Ninox (1992), however, it is considered that records of this species at Marandoo represent misidentification as this species is restricted to mangrove forest and adjacent areas (Biota 2008b).

Table 7-2 provides a summary of fauna species of State conservation significance recorded or with potential to occur in the Marandoo locality. Other species of conservation significance identified from database searches as potentially occurring in the survey area are considered unlikely to inhabit the area due to a lack of suitable habitat (Biota 2008b).

Table 7-2: Fauna species of conservation significance recorded (or potentially occurring) in the Marandoo Mine/Plant Development Envelope

| Species | State level | Recorded | Habitat and likelihood of occurrence in the Marandoo Mine/Plant Development Envelope |
|---|--------------------------|-------------------------------|---|
| Northern quoll <i>Dasyurus hallucatus</i> | Schedule 1 Endangered | Biota (2008b) Ninox (1992) | Recorded in the rocky gorges habitat type on Marandoo ridge (survey site MARE02, Figure 7-2). Typical habitat comprises gorges and gullies (Figure 7-1) – however this is limited in the Marandoo Mine/Plant Development Envelope. |
| Orange leaf-nosed bat <i>Rhinonictes aurantius</i> | Schedule 1 Vulnerable | Not recorded | Due to its poor ability to thermoregulate, the orange leaf-nosed bat requires deep caves or mine adits (horizontal shafts) that have stable, warm and humid microclimates for permanent roost sites (DotE 2014). No suitable roosts have been recorded in the Marandoo Mine/Plant Development Envelope. However, it is possible that individuals may occur periodically in the area (Biota 2008b). |
| Pilbara olive python <i>Liasis olivaceus barroni</i> | Schedule 1 Vulnerable | Ninox (1992) | Recorded opportunistically in the Marandoo mining tenement during the Ninox (1992) survey. Occurs in rocky areas in the Pilbara, showing a preference for rocky habitats near water. No core habitat was recorded in the Marandoo Mine/Plant Development Envelope (Biota 2008a). |

| Species | State level | Recorded | Habitat and likelihood of occurrence in the Marandoo Mine/Plant Development Envelope |
|---|-------------|-------------------------------|--|
| Peregrine falcon <i>Falco peregrinus</i> | Schedule 4 | Ninox (1992) | Recorded on a ridge in the south-western section of the Marandoo mining tenement by Ninox (1992). The peregrine falcon inhabits a wide range of habitats including forest, woodlands, wetlands and open country (Pizzey and Knight 1997, cited in Biota (2008b)). Prey is almost exclusively birds such as pigeons, parrots and passerines which are captured in flight (Johnson and Storr 1998, cited in Biota (2008b)). The availability of prey appears to be more important than habitat in determining the distribution of the Peregrine Falcon (Biota 2008b). |
| Western pebble-mound mouse <i>Pseudomys chapmani</i> | Priority 4 | Biota (2008a) Ninox (1992) | Recorded in the stony hill slopes habitat type (survey site MAR06, Figure 7-2). Mounds from this species were also recorded scattered throughout the lease. The western pebble-mound mouse is found on stony hillsides with hummock grassland. In suitable habitats, pebble mounds of this species can be found in large numbers although not all of these mounds are active and occupied. This species is common to very common in suitable habitat within the Hamersley and Chichester subregions of the Pilbara bioregion (Biota 2008b). |
| Ghost bat <i>Macroderma gigas</i> | Priority 4 | Biota (2008a) Ninox (1992) | Recorded in the rocky gorges habitat type (survey site MARE03, Figure 7-2). The rocky gorge where this species was recorded contained no deep caves that might represent permanent roosts; likely that the gorge contains only temporary roosts (Biota 2008b). The ghost bat occurs in a broad range of habitats, with its distribution being influenced by the availability of suitable caves and mines for roost sites (Churchill 1998, cited in Biota 2008b). |
| Australian bustard <i>Ardeotis australis</i> | Priority 4 | Ninox (1992) | Recorded on a plain to the north of the Marandoo Ridge by Ninox (1992). The Australian bustard occurs in a relatively broad range of habitats with a preference to open or lightly wooded grassland (Biota 2008b). This species is nomadic and has a large home range (Marchant and Higgins 1993, cited in Biota 2008b). |

An assessment of the potential impacts to Terrestrial Fauna as a result of this Revised Proposal is presented in Table 7-3. Any potential impacts as a result of implementation of this Proposal will not result in impacts additional to, or different from, those assessed and approved under MS 286 and MS 833.

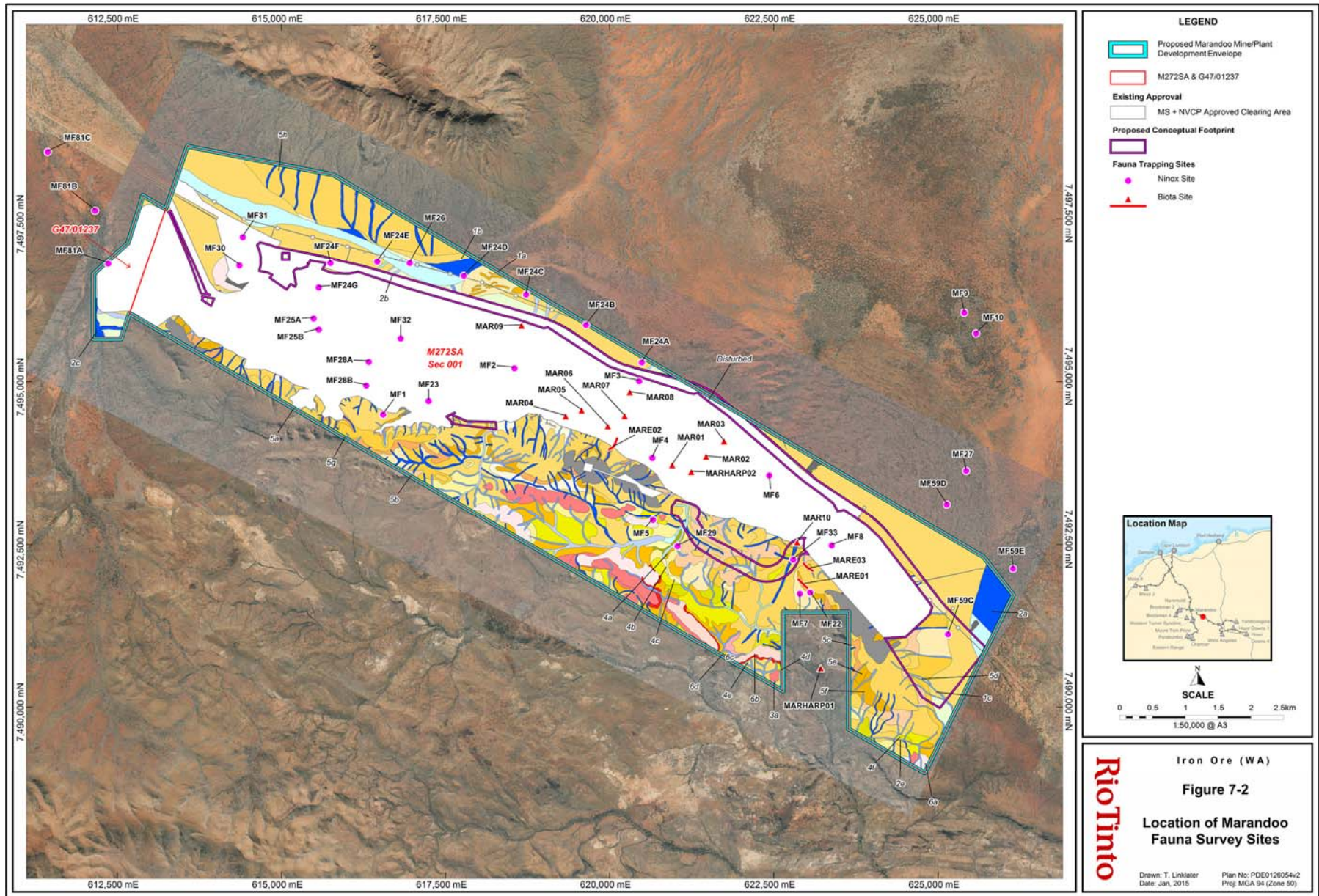


Figure 7-2: Location of Marandoo Fauna Survey Sites

Table 7-3: Terrestrial Fauna: Description of Factor, Impact Assessment and Management

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|--|---|---|--|---|---|--|
| <p>To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.</p> | <ul style="list-style-type: none"> Four primary habitat types have been identified in the Development Envelope. These are typical of the surrounding area and are well represented in the Pilbara. Fauna assemblages are typical of assemblages occurring where similar habitats are found elsewhere in the Pilbara. Eight vertebrate fauna species of conservation significance were recorded or may occur in the Development Envelope. Suitable habitat for all species of conservation significance exists outside the Development Envelope. Most of the species of conservation significance are highly mobile. Typical habitat for the | <p><u>Impact 1</u></p> <p>Up to 400 ha of clearing (in addition to that approved under MS 286, MS 833 and NVCPs) potentially resulting in fauna habitat loss and/or fragmentation.</p> <p>The additional clearing will not affect regional population levels or the conservation status of any fauna species.</p> | <p><u>Aspect 1</u></p> <p>Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. An internal Approvals Permit will be obtained for all areas to be cleared in accordance with Rio Tinto's Approvals Request System. Disturbed areas will be progressively rehabilitated with native flora species to restore fauna values where possible. | <p><u>Regulation of Aspect 1</u></p> <p>Existing MS 286 and new MS for Revised Proposal - with specified clearing limit, defined Development Envelope and a Condition relating to Closure and Rehabilitation.</p> | <p>The Revised Proposal can be managed to meet the EPA objective for this factor, in summary:</p> <ul style="list-style-type: none"> Fauna habitats potentially impacted by the Revised Proposal are well represented outside the Development Envelope on a local and regional scale. Fauna assemblages present in the Development Envelope are typical of assemblages found elsewhere in the Pilbara. Any potential impacts as a result of implementation of this Proposal will not result in impacts additional to, or different from, those assessed and approved under MS 286 and MS 833. The conservation status of species of conservation significance is unlikely to be altered either at the local or regional level. Appropriate management measures to avoid, minimise and mitigate potential impacts of the |

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---------------|--|---|---|---|--|--|
| | <p>Northern Quoll is limited in the Development Envelope.</p> <ul style="list-style-type: none"> No caves have been located that would represent suitable roosts for the Orange Leaf-nosed Bat or permanent roosts for the Ghost Bat. No core habitat suitable for the Pilbara Olive Python has been recorded in the Development Envelope. Invertebrate fauna are not considered a key factor for this Revised Proposal and are therefore addressed in Section 9 (Table 9-1). | <p><u>Impact 2</u></p> <p>Loss of individual fauna through interactions with vehicles and personnel</p> | <p><u>Aspect 2</u></p> <p>Vehicle and personnel movements associated with mining operations</p> | <p><u>Management of Aspect 2</u></p> <ul style="list-style-type: none"> The requirements of the Wildlife Interaction Policy will continue to be communicated to, and implemented by, all personnel. Native animals encountered on-site will be given the opportunity to move on if there is no threat to personnel safety in doing so. Snakes will be relocated from work areas by appropriately trained snake-handlers. | <p><u>Regulation of Aspect 2</u></p> <p><i>Wildlife Conservation Act 1950.</i></p> | <p>Revised Proposal will continue to be implemented.</p> |

8. RESIDUAL IMPACTS: IMPACT ASSESSMENT AND MANAGEMENT

8.1 DETERMINATION OF SIGNIFICANT RESIDUAL IMPACT

The WA Environmental Offsets Policy (Government of Western Australia 2011) and WA Environmental Offsets Guidelines (Government of Western Australia 2014) provide guidance to proponents on the approach needed to determine offset requirements for proposals.

The WA Environmental Offsets Guidelines (2014) state that:

“In general, significant residual impacts include those that affect rare and endangered plants and animals (such as declared rare flora and threatened species that are protected by statute), areas within the formal conservation reserve system, important environmental systems and species that are protected under international agreements (such as Ramsar listed wetlands) and areas that are already defined as being critically impacted in a cumulative context. Impacts may also be significant if, for example, they could cause plants or animals to become rare or endangered, or they affect vegetation which provides important ecological functions”.

Environmental aspects of the Revised Proposal were assessed for potential significant residual impacts.

The Revised Proposal does not lie within a reserve or protected area. Vegetation mapping has been completed across the entire Marandoo Development Envelope and does not indicate the presence of any vegetation types that qualify for specific legislative protection (i.e. TECs). None of the vegetation types identified were considered to be sufficiently rare or restricted to warrant designating them as being of high conservation significance and are considered likely to be widely distributed and relatively well represented in the region.

The majority of the vegetation communities were generally found to be in Good to Excellent condition despite evidence of weed invasion and nearby mining activities from the existing Marandoo operation.

Whilst some occurrences of Priority listed species (flora and fauna) have been recorded, none of these were found to be restricted to the Marandoo development Envelope.

8.2 OFFSET REQUIRED FOR THE REVISED PROPOSAL

The EPA considers that the increased amount of clearing of native vegetation in the Pilbara Bioregion, combined with the predicted future activities requiring clearing and other impacts from pastoralism and fires, is likely to result in a significant impact on environmental values. Subsequently the EPA has determined that a proactive approach to limiting these impacts is required and that a possible solution is the establishment of a strategic regional conservation initiative for pooling of offset funds the Pilbara.

As a result, offsets for clearing of native vegetation considered in Good to Excellent condition have recently been consistently applied in the Pilbara Bioregion. Where there is an additional level of environmental value, a higher offset has been applied to account for this greater value. This

approach has been applied to all mining proposals in the Fortescue, Hamersley and Chichester sub-regions since mid-2011.

An assessment of potential impacts of the Revised Proposal following the mitigation process was undertaken in accordance with the WA Environmental Offsets Guidelines (Government of Western Australia 2014). It is expected that an offset will be required for clearing of native vegetation in Good to Excellent condition.

The Hamersley subregion is fairly well represented (12.6%) within the conservation reserve system. Lower offset rates for clearing of native vegetation in Good to Excellent condition have therefore been applied in recognition of this fair representation (i.e. this is below the target of 17%). It is therefore expected that this lower offset rate is applicable to this Revised Proposal.

Additionally, given that MS 286 and MS 833 do not specify the need for an offset, Rio Tinto considers that it is reasonable that the offset should only apply to the proposed additional clearing (considered to be in Good to Excellent condition) that forms part of this Revised Proposal. This approach is consistent with other recent Ministerial Statements.

The Residual Impact Table is included in Table 8-1.

Table 8-1: Environmental Offsets Reporting Table

| Existing environment / Impact | Mitigation | | | Significant Residual Impact | Offset Calculation Methodology | | | | |
|---|--|---|---|--|--|------|-----------------------|----------|--|
| | Avoid and minimise | Rehab Type | Likely Rehab Success | | Type | Risk | Likely offset success | Time Lag | Offset Quantification |
| 400 ha of clearing of native vegetation considered to be in Good to Excellent condition | <p>Avoid:</p> <p>The backfill strategy has been adopted to prevent the formation of permanent pit lakes which could affect local or regional groundwater quality.</p> <p>The project design has also minimised additional clearing areas. The extensive biological and heritage surveys completed within the Marandoo Development Envelope ensure that any areas identified as significant can be avoided.</p> <p>Minimise:</p> <p>Use of existing infrastructure and plant facilities will minimise clearing of undisturbed native vegetation.</p> <p>Additional clearing will be minimised as far as practicable and will avoid areas of</p> | Areas will be progressively rehabilitated with local native vegetation. | <p><u>Can the environmental values be rehabilitated/Evidence? Operator experience in undertaking rehabilitation?</u></p> <p>Yes – Rio Tinto has completed several areas of successful rehabilitation including examples within the Marandoo operation.</p> <p><u>What is the type of vegetation being rehabilitated?</u></p> <p>Assorted vegetation assemblages associated with plains, hills, flow lines and terminal basin habitat types.</p> <p><u>Time lag?</u></p> <p>Progressive rehabilitation where practicable.</p> <p><u>Credibility of the rehabilitation proposed (evidence of demonstrated success)</u></p> <p>See previous rehabilitation from Rio Tinto.</p> | <p><u>Extent:</u> 400 ha</p> <p><u>Quality:</u> Good to Excellent condition</p> <p><u>Conservation Significance:</u> N/A</p> <p><u>Land Tenure:</u> N/A</p> <p><u>Time Scale:</u> N/A</p> <p>According to the agreed significance framework, residual impact from clearing of native vegetation is considered to be significant in the context of cumulative impacts in the Pilbara.</p> | Provision of funds to a Pilbara Strategic Conservation Initiative. | N/A | N/A | N/A | In accordance with the EPA's established offset rates for the Pilbara, \$750/ha of clearing of good to excellent condition native vegetation |

| Existing environment / Impact | Mitigation | | | Significant Residual Impact | Offset Calculation Methodology | | | | |
|-------------------------------|--|------------|----------------------|-----------------------------|--------------------------------|------|-----------------------|----------|-----------------------|
| | Avoid and minimise | Rehab Type | Likely Rehab Success | | Type | Risk | Likely offset success | Time Lag | Offset Quantification |
| | <p>elevated conservation significance as far as practicable.</p> <p>Rehabilitation:</p> <p>Where clearing is unavoidable, areas will be progressively rehabilitated with local native vegetation.</p> <p>The Closure Plan will be implemented to ensure that the Revised Proposal can be closed in an ecologically sustainable manner, consistent with agreed outcomes and land uses.</p> | | | | | | | | |

9. OTHER ENVIRONMENTAL FACTORS

As discussed previously the key environmental factors of this Revised Proposal are Flora and Vegetation and Terrestrial Fauna (refer to Sections 6 and 7 respectively).

The following factors, although not considered key, are relevant to this Revised Proposal due to the proposed additional clearing of vegetation:

- Invertebrate fauna
- Hydrological Processes - Groundwater
- Visual amenity
- Air quality
- Heritage
- Rehabilitation and Closure

However Rio Tinto considers that the Revised Proposal will not result in any change different from those originally assessed and approved under MS 833 (refer to Table 9-1 to Table 9-6 which outline consideration of these environmental factors).

The remaining environmental factors (Hydrological Processes – Groundwater and Surface Water, Subterranean Fauna, and Terrestrial Environmental Quality) have not been considered in this Revised Proposal as the additional clearing will not result in any environmental impact different to that assessed, and approved, under MS 286 and MS 833.

Part 5 of this document details the rationalisation of these existing MSs relevant to this Revised Proposal and the proposed Ministerial Statement is provided in Appendix 4.

Table 9-1: Invertebrate Fauna: Not a Key Environmental Factor to this Revised Proposal

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|--|---|--|---|---|---|--|
| <p>To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.</p> | <p>Three groups of invertebrate fauna potentially containing SRE species were recorded during the Biota (2008b) survey. These groups were <i>Pulmonata</i> (terrestrial snails), <i>Scorpionida</i> (scorpions) and <i>Pseudoscorpionida</i> (pseudoscorpions). Invertebrate groups recorded are considered unlikely to harbour SRE taxa due to the extensive distributions of their preferred habitats across the Pilbara Bioregion (Biota 2008b).</p> | <p><u>The additional clearing is not expected to result in an impact that is significantly different from that of the existing Marandoo operation.</u></p> | <p><u>Aspect 1</u> Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> • The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. • Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. • An internal Approvals Permit will be obtained for all areas to be cleared in accordance with Rio Tinto's Approvals Request System. • Disturbed areas will be progressively rehabilitated with native flora species to restore fauna values where possible. | <p>Existing MS 286 and the new MS for the Revised Proposal - with specified clearing limit, defined Development Envelope and a Condition relating to Rehabilitation and Closure</p> | <p>The Revised Proposal can be managed to meet the EPA objective for this factor, in summary:</p> <ul style="list-style-type: none"> • Fauna habitats potentially impacted by the Revised Proposal are well represented outside the Development Envelope on a local and regional scale. • Fauna assemblages present in the Development Envelope are typical of assemblages found elsewhere in the Pilbara. • The conservation status of species of conservation significance is unlikely to be altered either at the local or regional level. <p>Appropriate management measures to avoid, minimise and mitigate potential impacts of the Revised Proposal will continue to be implemented.</p> |

Table 9-2: Hydrological Processes and Inland Waters Environmental Quality – Groundwater

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---|---|---|--|---|---|--|
| <p>To maintain hydrological regimes of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.</p> | <p>Water reserves are proposed for the Southern Fortescue and Marandoo borefields for the purpose of protecting the public drinking water sources from potential contamination. Whilst these water reserves have not yet been proclaimed under the <i>Country Areas Water Supply Act 1947 (WA)</i>, they will be managed for Priority 1 source protection with 500m wellhead protection zones established around all production bores and in accordance with the DoW approved <i>Southern Fortescue and Marandoo Water Reserves drinking water source protection plan (2011)</i>, to help protect the sources from contamination. In a letter dated 14 Feb 2013, the DoW undertook to ensure the Water Reserve was proclaimed in accordance with a priority list. The Plan is part of the accepted multi-barrier approach to drinking water protection that is consistent</p> | <p>The main contamination risk to the proposed Marandoo Water Reserve is conduct of mining activities that are contrary to the requirements under the water source protection plan and associated documentation and guidance (e.g. storage of ANFO within the Water Reserve). However, potential for contamination of the target aquifer is extremely low due to a 40-60m thick layer of Upper Tertiary Lacustrine Clay, with a median vertical permeability of 1.5 x 10⁻¹¹ m/s, which is equivalent to 0.5mm/year. The main risks to the proposed Southern Fortescue Water Reserve are problems introduced into the aquifer by failure of the</p> | <p>Water quality impacted by Marandoo mining activities or Southern Fortescue Borefield reinjection.</p> | <p>The DoW approved Southern Fortescue and Marandoo Water Reserves drinking water source protection plan in 2011, and includes the following management measures:</p> <ul style="list-style-type: none"> • Adherence to the Water Quality Protection Guidelines: Mining and mineral processing. • Storage of greases, oils and other hydrocarbons in appropriately bunded areas. • Establishment of an ongoing working arrangement with the DoW that sets in place suitable communications protocols to ensure effective ongoing protection of the water source. | <ul style="list-style-type: none"> • <i>Country Areas Water Supply Act 1947 (WA)</i>. • <i>Water Services Act (2012)</i>. | <p>The Revised Proposal meets the EPA's objective for this factor given the existing regulatory regime for drinking water source protection administered by the DoW, the existing regulatory regime for water services provision administered by the Economic Regulation Authority and existing management measures associated with the <i>Southern Fortescue and Marandoo Water Reserves drinking water source protection plan</i> and associated documents, the water services licence (no 33), and the requirement for an MoU with the Department for Health under this licence.</p> <p>Impacts to water reserves are, therefore, not considered to be a key environmental factor for the Revised Proposal and will be in consultation with the DoW as the lead agency on this issue.</p> |

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---------------|--|---|----------------------|---------------------------------|------------|----------------------|
| | <p>with all water service providers (such as HI), licensed and regulated under the <i>Water Services Act 2012</i>. In addition, the water services licence requires a memorandum of Understanding (MOU) with the Department of Health with regards to drinking water quality and public health. The Department of Health retain strong powers of intervention if there are public health issues at risk.</p> | <p>re injection scheme, including the introduction of contaminants and changes to the how the aquifer operates.</p> | | | | |

Table 9-3: Amenity (Visual): Not a Key Environmental Factor to this Revised Proposal

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|--|--|--|---|--|---|--|
| <p>To ensure that impacts to amenity are reduced as low as reasonably practicable.</p> | <ul style="list-style-type: none"> Impacts to visual amenity at the Marandoo operation were assessed as a minor environmental factor during assessment of the MMP2 proposal (EPA 2010). The existing Marandoo operation is a highly modified landscape. Visitors to Mount Bruce experience significant impacts to visual amenity. | <p><u>The additional clearing is not expected to result in a visual impact that is significantly different from that of the existing Marandoo operation.</u></p> | <p><u>Aspect 1</u> Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. Disturbed areas will be progressively rehabilitated to come as close as possible to local landscape values and surrounding environment. Continuing to select colour schemes for buildings and infrastructure that blend in with the surrounding environment. Continuing to locate infrastructure in or near previously disturbed areas where possible. | <p>Existing MS 833 and the new MS for Revised Proposal - with specified clearing limit, defined Development Envelope and a Condition relating to Rehabilitation and Closure</p> | <p>The Revised Proposal meets the EPA's objective for this factor given existing impacts on visual amenity and the existing management measures.</p> <p>Visual amenity is, therefore, not considered to be a key environmental factor for the Revised Proposal and where relevant will be addressed through the Marandoo Rehabilitation and Closure Plan in consultation with key stakeholders (Parks and Wildlife).</p> |

Table 9-4: Air Quality (Dust): Not a Key Environmental Factor to this Revised Proposal

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|--|--|--|--|--|---|---|
| <p>To maintain air quality for the protection of the environment and human health and amenity.</p> | <ul style="list-style-type: none"> Impacts to air quality due to dust emissions at the Marandoo operation were assessed as a minor environmental factor during assessment of the Marandoo Phase 2 proposal (EPA 2010). Dust is generated during mining mainly by mechanical disturbances such as blasting, earthmoving and road traffic on unsealed surfaces. In dry, windy conditions dust particles can be lifted from open or disturbed areas. Due to the remote location of the mine there is unlikely to be any significant impact to health or amenity arising from dust associated from the Revised Proposal. | <p><u>The additional clearing is not expected to result in a significant change to dust emissions from the Marandoo operation.</u></p> | <p><u>Aspect 1</u></p> <p>Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. Disturbed areas will be progressively rehabilitated to minimise total exposed area. Dust control measures will continue to be implemented on haul roads, working surfaces and stockpiles as required. | <p>Existing MS 833 and new MS for Revised Proposal - with specified clearing limit, defined Development Envelope and a Condition relating to Rehabilitation and Closure.</p> <p>Dust control Condition on Operating Licence issued under Part V of the EP Act</p> | <p>The Revised Proposal meets the EPA's objective for this factor given existing regulation, management measures and the remote location of the Marandoo operation.</p> <p>Air quality is, therefore, not considered to be a key environmental factor for the Revised Proposal.</p> |

Table 9-5: Heritage: Not a Key Environmental Factor to this Revised Proposal

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---|--|--|--|--|---|--|
| <p>To ensure that historical and cultural associations are not adversely affected</p> | <p>This Marandoo Project is located within the traditional lands of the Eastern Guruma people.</p> <p>Archaeological and ethnographic surveys carried out in and around the Marandoo mine lease indicate that there are rock shelters, stone artefact scatters, scarred trees and a quarry within the Marandoo mine lease.</p> <p>Minthicoondunna Spring is located 10km east of the Project and is a registered Aboriginal site and protected by law.</p> | <p><u>The additional clearing is not expected to result in a significant change to heritage from the Marandoo operation.</u></p> | <p><u>Aspect 1</u></p> <p>Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <ul style="list-style-type: none"> • The Revised Proposal design has minimised planned clearing to areas necessary for safe construction and operation. • If sites cannot be avoided, the impacts will be managed in accordance with the AHA Section 18, and through on-going consultation with Traditional Owners via existing agreements. • Additional clearing will only occur within approval boundaries up to a maximum of 400 ha. • Disturbed areas will be progressively rehabilitated to minimise total exposed area. | <p>Existing MS 833 and new MS for Revised Proposal - with specified clearing limit, defined Development Envelope and a Condition relating to Rehabilitation.</p> <p>Heritage is managed under the <i>Heritage Act 1972</i> and Rio Tinto's Indigenous Land use Agreements with the relevant Traditional Owners.</p> | <p>The Revised Proposal meets the EPA's objective for this factor and it is therefore not considered a key environmental factor.</p> <p>It is not expected that Aboriginal Heritage values will be impacted by this Revised Proposal.</p> <p>Ongoing engagement with Traditional Owners is managed and maintained through engagement frameworks established through existing agreements. This ensures all activities occur with ongoing engagement with both groups.</p> |

Table 9-6: Rehabilitation and Closure

| EPA Objective | Context | Potential Impact (without mitigation) | Environmental Aspect | Management Actions (Mitigation) | Regulation | Meets EPA Objective? |
|---|---|--|--|---|--|--|
| <p>To ensure that premises can be closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State.</p> | <p>The Marandoo Closure Plan has been developed to address closure of the AWT and BWT phases of the Project and associated infrastructure.</p> <p>Based on the current plan, the post closure land use option is to be consistent with Karijini National Park objectives.</p> <p>Key risks related to closure of Marandoo include:</p> <ul style="list-style-type: none"> • Visual impact; • re-establishment of surface water flows; • impacts to groundwater; • future land use; and • rehabilitation. | <p><u>The additional clearing is not expected to result in a significant change to rehabilitation and closure of the Marandoo operation.</u></p> | <p><u>Aspect 1</u></p> <p>Additional clearing required for long term management of surplus topsoil and subsoil and to support ongoing other mining related activities.</p> | <p><u>Management of Aspect 1</u></p> <p>Marandoo is subject to conditions 10, 11 and 12 of MS 833 which requires the preparation and implementation of a Closure Plan.</p> <p>The Closure Plan documents the current closure knowledge base for Marandoo and it outlines the objectives that need to be met at closure, the strategies and plans to be employed to achieve them, and provides an indication of the criteria that will be used to assess closure success.</p> <p>The Closure Plan is not a static document and it will be reviewed throughout the life of the project to ensure that the objectives to which it is working towards remain relevant and aligned to stakeholder expectations, and to revise its strategies and plans where appropriate to achieve improved closure outcomes.</p> | <p>Existing MS 833 and new MS for the Revised Proposal includes a specified clearing limit, defined Development Envelope and a Condition relating to Rehabilitation and Closure.</p> | <p>The Revised Proposal meets the EPA’s objective for this factor given existing regulation, management measures and the remote location of the Marandoo operation.</p> <p>Rehabilitation and Closure is therefore not considered to be a key environmental factor for the Revised Proposal.</p> |

10. CUMULATIVE IMPACTS

Cumulative impacts can arise where operation level impacts act synergistically, cause indirect impacts or combine to exacerbate impacts spatially and/or through time. In the case of Pilbara mining projects, a principal concern is the potential for multiple mining projects to incrementally diminish and degrade environmental values that would otherwise not be significantly affected by each project in isolation.

Given its distance from existing operations in the Pilbara and the relatively small scale of clearing proposed, Rio Tinto does not consider that the Revised Proposal will contribute to significant cumulative impacts. An assessment of the potential for cumulative impacts in relation to the Revised Proposal is summarised in Table 10-1.

Table 10-1: Assessment of Potential for Cumulative Impacts

| Possible cumulative impact | Description and assessment of significance |
|--|---|
| Disturbance to landforms | The Revised Proposal does not intersect landforms with elevated conservation significance or other special interest. Whilst existing and potential future operations may affect the same land systems, all of the land systems mapped are widely distributed across the Pilbara. Therefore no significant cumulative impacts are predicted. |
| Disturbance to vegetation and flora | The Revised Proposal is an extension to existing Marandoo operations. The location is very remote with no neighbouring mining or pastoral activities. The Revised Proposal does not intersect vegetation of high conservation significance. All vegetation units and Priority Flora species that may potentially be disturbed by this Revised Proposal are well represented in the Pilbara bioregion. Therefore no significant cumulative impacts are predicted. |
| Disturbance to habitat for fauna species | The Revised Proposal does not intersect habitats of regional significance for rare and endangered fauna species. All of the habitat types that will be disturbed by this Revised Proposal are well represented in the Pilbara bioregion. Therefore no significant cumulative impacts are predicted. |
| Disturbance to hydrological processes | There is no new or additional dewatering or surface discharge as a result of this Revised Proposal, therefore no net increase in cumulative impacts to hydrological processes is predicted. |

PART 5 – MARANDOO MINISTERIAL STATEMENT RATIONALISATION

The Revised Proposal provides the opportunity to rationalise the Marandoo Project description, implementation conditions and commitments from three Ministerial Statements into one modernised Statement, pursuant to section 46 of the EP Act.

The intent of this rationalisation is as follows:

- To reflect the proposed changes to the various Marandoo related projects that have been assessed and approved (refer to Part 2 of this document).
- To facilitate integrated management under a single set of conditions.
- To reflect contemporary presentation.

11. MODERNISATION OF PROJECT CHARACTERISTICS

Rio Tinto is seeking approval for a new Project description within Schedule 1 of a consolidated Statement (**the Statement**) for the Revised Proposal (the Marandoo Project).

The following proposed changes are summarised:

- The description of the Marandoo Project (in Schedule 1 of the Statement) is updated in line with the changes proposed in Part 2 of this document.
- The description of the Marandoo Project (in Schedule 1 of the Statement) is updated in line with more recent and contemporary presentation.
- The description of the Marandoo Project (in Schedule 1 of the Statement) to reflect consolidation of the three Marandoo related Ministerial Statements (286, 598, and 833).
- Those Project components that have been implemented to be deleted from Schedule 1 of the Statement.
- The Statement will supersede MS 286, MS 598, and MS 833.

The proposed administrative changes and consolidation of the Key Characteristics of MS 286, MS 598 and MS 833 are summarised in Table 3-2.

The contemporised Project Description and Key Characteristics for the Revised Proposal are provided in Appendix 4.

12. RATIONALISATION OF MINISTERIAL CONDITIONS AND COMMITMENTS

Rio Tinto has undertaken a review of the current conditions and commitments of MS 286, MS 598, and MS 833. This Section is for the purpose of rationalising the implementation conditions and commitments for the new Statement of the Revised Proposal.

The intention of the rationalisation of conditions of is as follows:

- Conditions relating to compliance auditing should be updated to reflect contemporary presentation and to align the Revised Proposal reporting with reporting required under other Ministerial Statements for Rio Tinto's Pilbara iron ore operations.
- Removal of redundant conditions where this can be justified.
- Development of outcomes-based conditions where requirements have been developed and approved by the CEO of the OEPA. These conditions should be consolidated into outcomes based conditions, consistent with EPA guidance (Environmental Assessment Guideline, Towards Outcome-based Conditions, EAG4, Draft 2009). The updated conditions should address key environmental factors, consistent with the EP Act, EPA guidance (Environmental Assessment Guideline for Environmental factors and objectives, EAG8, 2013) and the EPA Significance Framework (Environmental Assessment Guideline, Application of a significance framework in the EIA process, EAG9, 2013).
- Removal of conditions that are managed under other processes and as such, do not require regulation under Part IV of the EP Act. This will also avoid unnecessary duplication with other regulatory agencies.

The rationale for updating the conditions and commitments in each of the existing Ministerial Statements is described in Appendix 1. Compliance status for each auditable element has been reviewed based on actions completed to date as 'Compliant - Complete'; 'Compliant - Ongoing'; 'Not yet required'; or 'Non-compliant'.

The proposed new conditions for the Revised Proposal cover the following aspects:

1. Proposal Implementation
2. Contact Details
3. Compliance Reporting
4. Public Availability of Data
5. Environmental Management Program
6. Coolibah Woodlands
7. Minthicoondunna Spring
8. Dewater Discharge

9. Sinkhole Formation
10. Rehabilitation and Closure
11. Residual Impacts and Risk Management Measures

These proposed conditions do not differ from the intent of MS 286, MS 598 or MS 833 and will not affect the overall level of protection of environmental values or management of key environmental factors by Rio Tinto. They present a contemporary and outcome based approach to managing and protecting the key environmental factors relevant to the Revised Proposal. The proposed new conditions for the revised Proposal will there continue to meet the EPAs objectives for each environmental factor.

Rio Tinto proposes that these conditions be adopted for the Revised Proposal's Statement which will supersede MS 286, MS 598, and MS 833. The proposed new Statement for the Revised Proposal is presented in Appendix 4.

13. CONCLUSION

In summary, the proposed changes in this document are not considered to have significant, detrimental environmental effects, in addition to or different from the effects of the initial Proposals as assessed, approved, and implemented under MS 286, MS 598 and MS 833.

A draft Statement that reflects the proposed changes to Schedule 1 of MS 286, MS 598, and MS 833, as described in the Part 2, in conjunction with changes to implementation conditions, is included as Appendix 4 for consideration.

Rio Tinto proposes that this is a revision to MS 833 and that the new Ministerial Statement for the Marandoo Project (Revised Proposal) supersedes MS 286, MS 598, and MS 833.

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APPENDICES

- Appendix 1: Existing Ministerial Statements for the Project (MS 286, MS 598, and MS 833)**
- Appendix 2: Referral Form for Revised Proposal**
- Appendix 3: Justification for Rationalisation of Conditions of MS 286, MS 598 and MS 833**
- Appendix 4: Proposed Ministerial Statement for the Revised Proposal (Marandoo Project)**