

# **Greenhouse Gas Management Plan**

Hamersley Iron Pty. Limited

Greater Paraburdoo Iron Ore Hub Proposal

April 2022

RTIO-HSE-0345610

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## Executive Summary

Hamersley Iron Pty. Limited (the Proponent) operates the existing Greater Paraburdoo Operations (Greater Paraburdoo), located approximately six kilometres to the south of the Paraburdoo township in the Pilbara Region of Western Australia (Figure 1).

The Greater Paraburdoo Iron Ore Hub Proposal (the Proposal) includes the development of a new mine at Western Range including above and below water table deposits and the extension of existing operations at Paraburdoo and Eastern Range and associated infrastructure, including:

- mineral waste management, including in-pit storage of waste fines;
- dewatering and surplus water management including use in ore processing, on-site use and limited discharge to surface water systems and/or in-pit disposal; and
- other associated mine infrastructure and support facilities.

This Greenhouse Gas Management Plan (GHG MP) is intended to support the assessment, approval and implementation of the Proposal under Part IV of the *Environmental Protection Act 1986* (EP Act). The GHG MP has been prepared with due consideration to the Western Australian Government Greenhouse Gas Emissions Policy for Major Projects (State GHG Policy) and the Western Australian Environment Protection Authority (WA EPA) Greenhouse Gas Management Plan section of the *Environmental Factor Guideline: Greenhouse Gas Emissions 2020* (Guideline).

The scope of this GHG MP is the Proposal as defined in the Environmental Review Document (ERD, Rio Tinto, 2020). However, to provide context and where relevant, information is provided on the entire Greater Paraburdoo operation.

In recognition of the State GHG Policy, this GHG MP demonstrates the Proponent's contribution towards the State's aspiration of net zero emissions by 2050. The Proponent is making a commitment to implement initiatives that either avoid, reduce or offset Scope 1 GHG emissions. Following the assessment of current technology under development, identified efficiency improvement opportunities and forecast offset availability, the Proponent's long-term emissions reduction targets for the Proposal is to achieve net zero by 2050. The interim and long-term emission reduction targets for the Proposal are described in Section 4.1.2.

Reasonable and practicable emissions reduction and abatement initiatives, complimented by management provisions, have been proposed to achieve the emission reduction target. In line with the State GHG Policy and Guideline, the Proponent will report progress against targets every five years within the Ministerial Statement Annual Compliance Assessment Report. Section 6 provides further information on reporting.

Review and evaluation of the management actions outlined in this GHG MP will be conducted every five years (if not initiated prior to that time) to ensure the management actions are adequately addressing the key risks and meeting WA EPA objectives. When the five-yearly review cycle is triggered, or if a significant change to either the facility, activity, or risk is identified, a revised GHG MP will be submitted to the WA EPA. Section 7 outlines triggers for review and formal re-submission of the GHG MP.

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## Abbreviations and Definitions

Table 1 Abbreviations and Definitions

Abbreviation	Term
AWT	Above water table
BWT	Below water table
BESS	Battery Energy Storage System
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> -e	Carbon dioxide equivalent
Credible Offset Units	Offset units that meet offset integrity standards and principles outlined in ICROA's Technical Specification
DMAs	Decision-making authorities
EP Act	<i>Environmental Protection Act 1986</i>
GHG	Greenhouse gas
GHG MP	Greenhouse Gas Management Plan
Greater Paraburdoo	Refers to the entire Greater Paraburdoo operations and associated infrastructure, including Western Range, Paraburdoo, Eastern Range and Channar.
GWP	Global warming potential
Ha	Hectares
HME	Heavy Mobile Equipment
ICROA	International Carbon Reduction and Offset Alliance
IPCC	Intergovernmental Panel on Climate Change
Mtpa	Million tonnes per annum
NGER	National Greenhouse and Energy Reporting
NGER Determination	<i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i>
N <sub>2</sub> O	Nitrous oxide
Proponent	Hamersley Iron Pty. Limited
Proposal	The Greater Paraburdoo Iron Ore Hub Proposal, defined as an extension to existing operations at Paraburdoo and Eastern Range and development of a new mine at Western Range. Existing operations at Channar are excluded.
Safeguard Mechanism	<i>National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015</i>
Scope 1	Emissions released into the atmosphere as a direct result of an activity, or series of activities, at a facility
Scope 2	Indirect emissions released into the atmosphere from the consumption of purchased energy

Abbreviation	Term
<b>Scope 3</b>	All other indirect GHG emissions (not included in Scope 2) that occur in the Company's value chain
<b>SOP</b>	Saleable ore product
<b>State GHG Policy</b>	<i>Greenhouse Gas Emissions Policy for Major Projects</i>
<b>The Guideline</b>	<i>Environmental Factor Guideline Greenhouse Gas Emissions 2020</i>
<b>tCO<sub>2</sub>-e</b>	Tonnes of carbon dioxide equivalent
<b>WA EPA</b>	Western Australian Environment Protection Authority

# 1. Introduction

## 1.1. Background

Hamersley Iron Pty. Limited (the Proponent) operates the existing Paraburdoo and Eastern Range iron ore mines which are located approximately six kilometres south of the Paraburdoo township in the Pilbara Region of Western Australia (Figure 1).

The Greater Paraburdoo Iron Ore Hub Proposal (the Proposal) includes development of a new deposit at Western Range and extension of the existing operations at Paraburdoo and Eastern Range. This Proposal is an integral part of the Rio Tinto Group's (Rio Tinto) integrated network of iron ore mines in the Pilbara. Current indicative layout of the key components of the Proposal are depicted in Figure 2.

The Proposal includes:

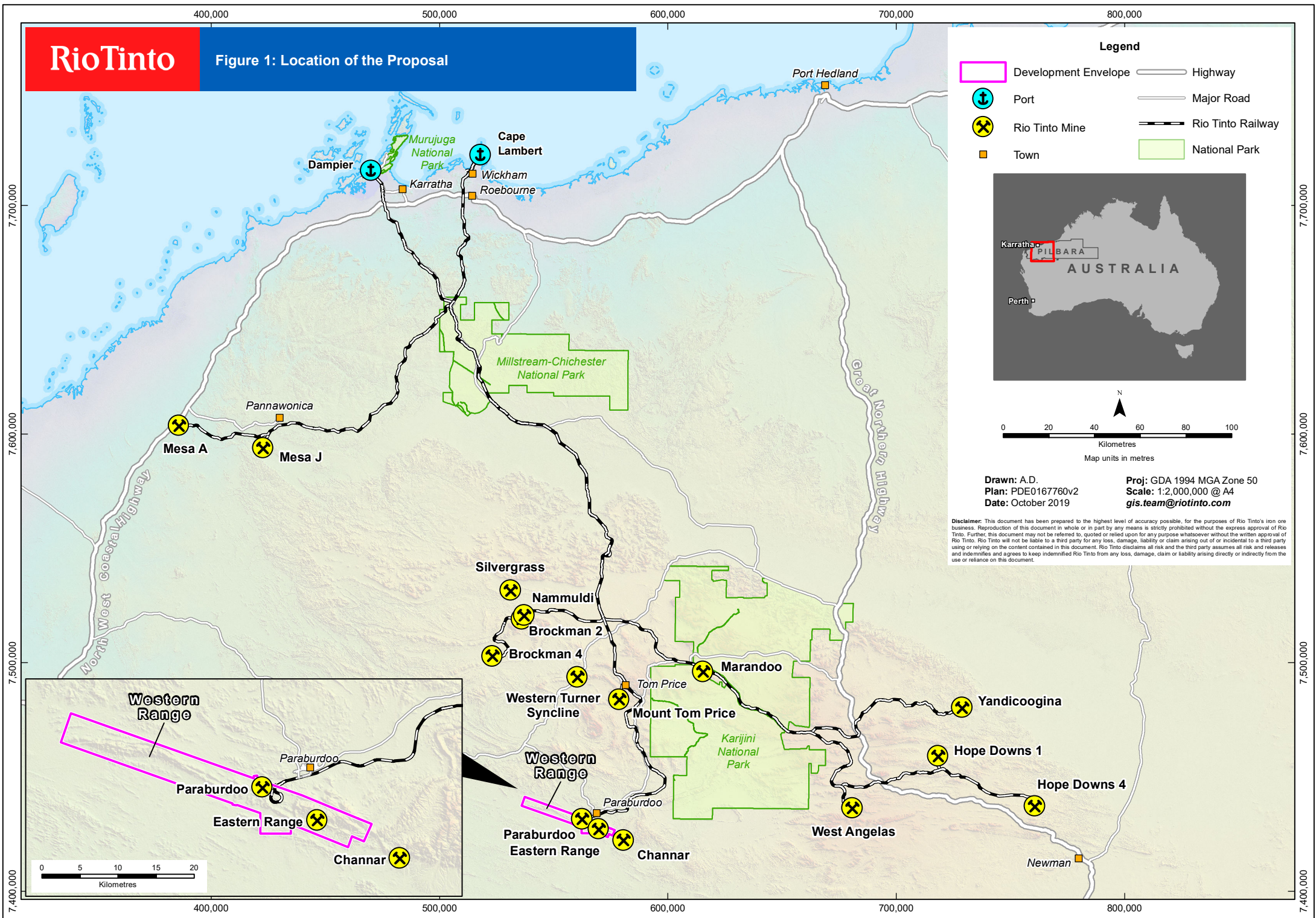
- New mine pits:
  - Development of above water table (AWT) and below water table (BWT) pits at Western Range;
  - Development of 4 East Extension (4EE) at Paraburdoo as an extension of the existing 4 East BWT pit, including new dewatering of the Wittenoom Formation;
  - Development of new AWT pits at Paraburdoo; and
  - Development of new AWT pits at Eastern Range.
- Activities required to facilitate the development of the new mine pits may include, but are not limited to:
  - Mineral waste management: including waste dumps, land bridges, low grade ore dumps, topsoil and subsoil stockpiles, waste fines storage;
  - Processing infrastructure at Western Range, and new and upgraded processing infrastructure at Paraburdoo;
  - Support facilities: including workshops, hydrocarbon storage, laydown areas, and offices;
  - Linear infrastructure: including heavy and light vehicle access roads, conveyors, pipelines and power (including sub-stations) and communications distribution networks;
  - Infrastructure for surface water management: including diversion drains, levees and culverts;
  - Groundwater abstraction and utilisation to meet operational demands, including associated infrastructure;
  - Dewatering to enable BWT mining, and associated infrastructure: including bores and pipelines; and
  - Surplus water management and associated infrastructure including options for discharge to surface water systems and discharge to disused mine pits.



The scope of the Proposal subject to assessment under Part IV of the EP Act excludes:

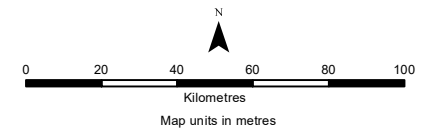
- Activities that are part of, or required for, continuation of the existing mining operations at Paraburdoo and Eastern Range. This includes but is not limited to:
  - Upgrades to existing facilities, including processing facilities and waste fines storage facility;
  - Upgrades to accommodation and facilities at the Paraburdoo townsite and airport, and associated activities;
  - Operation of dewatering and water supply borefields within the abstraction limits of current Section 5C groundwater licences issued under the *Rights in Water Irrigation Act 1914* (RIWI Act);
  - Low impact activities, including drilling and associated activities (such as upgrades to existing roads/tracks) for the purposes of resource evaluation, geotechnical assessment and hydrogeological investigation prior to Part IV approval of the Proposal (which are subject to relevant provisions under Part V of the EP Act and the RIWI Act);
  - Construction camp and associated activities (currently authorised under the Clearing Permits issued under Part V of the EP Act); and

Current operational activities are authorised via statutory environmental approvals under Part V of the EP Act and the RIWI Act. The Proponent notes that whilst the Proposal is under assessment, additional approvals or amendments to existing approvals may be required to support the continuation of existing operations that do not relate to the implementation of this Proposal. Therefore, the above exclusions are not limited to only those activities already approved. Environmental, heritage and other studies/investigations involving fieldwork.



### Legend

- Development Envelope
- ⚓ Port
- ⊗ Rio Tinto Mine
- Town
- Highway
- Major Road
- Rio Tinto Railway
- National Park

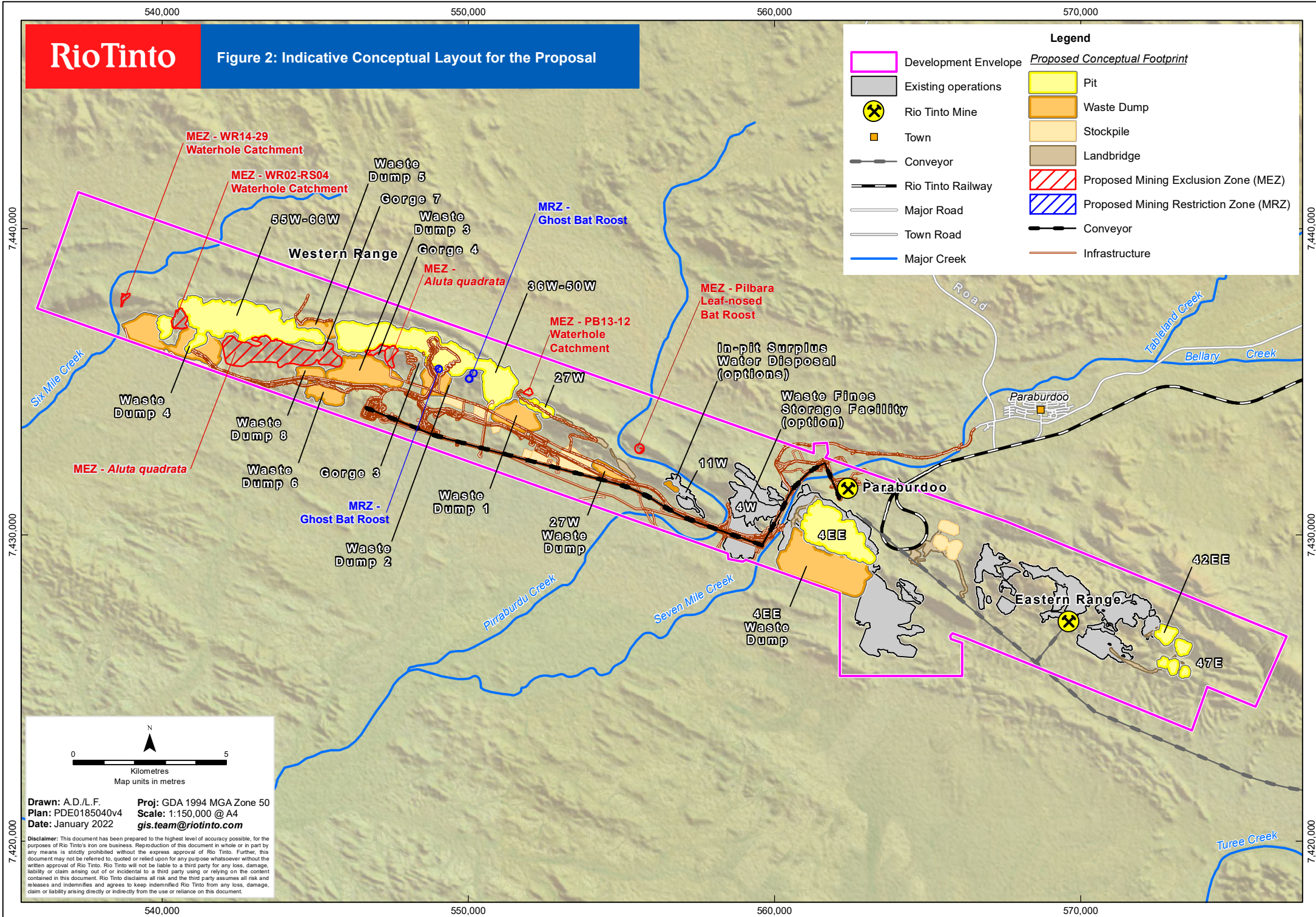


Drawn: A.D.  
Plan: PDE0167760v2  
Date: October 2019

Proj: GDA 1994 MGA Zone 50  
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## 1.2. Scope and Purpose

The scope of this GHG MP is the Proposal as defined in the Environmental Review Document (ERD. Rio Tinto, 2020). This GHG MP applies to Scope 1 emissions from activities associated with the Proposal that are within the operational control of the Proponent (as defined under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act)). However, to provide context and where relevant, information is provided on the entire Greater Paraburdoo.

The objectives of this GHG MP are to demonstrate:

- The Proponents' contribution towards the State's aspiration of net zero emissions by 2050, in relation to Scope 1 GHG emissions as outlined in the State GHG Policy and Guideline;
- The intended progressive reduction in Scope 1 emissions, via interim targets for the Proposal; and
- That all reasonable and practicable measures have been applied to avoid, reduce and offset the Scope 1 emissions from the Proposal.

### 1.2.1. Inclusions

The boundary for the Proposal emissions inventory has been defined using an operational control approach consistent with the NGER Act.

The following sources of emissions are considered within the boundaries of this GHG MP:

- Development and operation of the Proposal and associated infrastructure to sustain production from Greater Paraburdoo as outlined in Section 1.1; and
- Existing mining operations including overland conveyors, central processing plant, train load out facilities and mining operations support infrastructure to the extent utilised for the purpose of the proposed mining operations.

### 1.2.2. Exclusions

The following sources of emissions are excluded from the assessment:

- Rail and port export facilities: these facilities are approved under other ministerial statements, support several operations in the area and are outside the Proposal boundary;
- Switchyard and high voltage transformers: network services several sites (i.e. not exclusive to Greater Paraburdoo and the Proposal and therefore excluded);
- Transmission and distribution emissions of electricity imported to site, these are outside the Proposal boundary;
- Emissions associated with landfill waste and wastewater effluent from the wastewater treatment plants are excluded as they are not reportable under the NGER framework and not material; and
- Scope 3 emissions, including processing of produced iron ore to steel, transport of materials, fuels and personnel to and from site occur outside the Proposal boundary and are not reportable under the NGER framework<sup>1</sup>.

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<sup>1</sup> For completeness, Scope 3 emissions relating to processing of iron ore in respect of the Proposal are discussed in Section 3



### 1.3. Rationale and Approach

This GHG MP outlines how GHG emissions from the Proposal are monitored and managed to minimise the Greater Paraburdoo operation's (including the Proposal) contribution to global GHG emissions. This objective acknowledges that planned GHG emissions from the Proposal occur and that the impacts from these can be mitigated by implementing this GHG MP.

In accordance with Rio Tinto's commitment to implementing its Climate Change Approach and using existing management controls, GHG reduction initiatives and projects are driven at a corporate level with oversight of operational level processes (described in Section 2.3).

Given that GHG policy and approaches continue to evolve at State and Commonwealth levels, the interim targets established in this GHG MP have been developed to align with the State GHG Policy (described in Section 2.1).

A summary of key assumptions and uncertainties of the GHGMP is presented in Table 2.

**Table 2 Key Assumptions and Uncertainties of the GHG MP**

Key Assumption / Uncertainty	Justification / Explanation
Production and mine strategy may be amended in the future, resulting in a change to the GHG emissions.	Production and mine strategy are market driven and may result in changes. Pilbara facilities are operated as a vertically integrated system, potentially resulting in higher or lower GHG emissions from the Proposal.
Alternative and/or innovative sources of energy may become available in the future that can avoid or minimise GHG emissions from the Proposal.	Rio Tinto has robust study and development processes that ensure innovation and new technology developments are sought, assessed and developed where applicable. Rio Tinto will investigate relevant alternative and/or innovative energy sources when they become viable in the future.
GHG policy and approaches continue to evolve at State and Commonwealth levels	State and Commonwealth Government policies continue to evolve. Key uncertainties include: <ul style="list-style-type: none"><li>• Commonwealth interim targets;</li><li>• State's contribution to Commonwealth targets versus other states;</li><li>• Setting of sector specific targets for industry versus other sectors (e.g. power, transport, agriculture, buildings); and</li><li>• The WA EPA is proposing to release a revision of the Guideline in Q2 2022, the details of which are unknown.</li></ul>
Market price carbon emissions	There is no uniformly applied market price for carbon emissions within Australia. This may change in the future, given that there was a formal national price for carbon emissions (also known as a 'carbon tax') in the past, formerly repealed in 2014.  Rio Tinto will continue to assess opportunities for future capital expenditure to avoid and/or reduce GHG emissions. Internally, Rio Tinto uses a carbon price mechanism such that all capital projects are financially assessed for their carbon impacts.
Cost of technology for renewable energy	Cost of renewables has changed significantly over the last ten years, and market trends are regularly reviewed and assessed.

## 2. Management Frameworks

### 2.1. Western Australia State Regulation and Policy

In 2019, the Western Australian Government announced its State GHG Policy to guide Government decision making for major projects that are assessed by the Western Australian Environmental Protection Authority (WA EPA). The WA EPA released the Guideline in April 2020. Table 3 and Table 4 details how the contents of this GHG MP address both the State GHG Policy and the Guideline respectively.

**Table 3 Addressing State GHG Policy Requirements**

State GHG Policy Considerations on Contents of a GHG MP	Proponent Response
The policy supports the development of GHG MPs for proponents which: Outline strategies to avoid, reduce, mitigate and offset the project's direct (Scope 1) emissions contributing towards the State's aspiration of net zero by 2050	Rio Tinto is committed to contributing towards the State's aspiration of net zero by 2050 through achievement of interim and long-term targets. Strategies to avoid, reduce, mitigate and offset Scope 1 emissions from the Proposal are outlined in Section 4.
Are unique to a proposal's specific circumstances	The Proposal will construct new infrastructure for the Western Range mine, and also use existing infrastructure at Greater Paraburdoo. Existing and new HME fleet will be utilised. The emissions from the Proposal would account for approximately 0.24% of WA's annual emissions.
Allow proponents to take account of opportunities at either facility level or across national operations	In some cases, emission abatement projects may be implemented at alternative locations (Pilbara wide abatement approach), depending on the technical constraints of the network to ensure security, reliability and stability is upheld. The Pilbara Power Network is fully integrated across all of the Pilbara Mining assets, which are integrated for the purpose of the products produced in the Pilbara. Carbon abatement projects are treated holistically in their application across Rio Tinto's Pilbara operations providing net emissions reduction regardless of their physical location. Rio Tinto's GHG reduction projects in Western Australia are outlined in Section 5. Local, national or international credible offset units may be sourced to offset Proposal emissions where direct abatement cannot be achieved in order to meet targets set out in Section 4.1.2.

State GHG Policy Considerations on Contents of a GHG MP	Proponent Response
<p>Allow proponents to propose their own timeframes and targets;</p> <p>Include requirements for periodic public reporting against their targets; and</p> <p>Account for and align with Commonwealth requirements.</p>	<p>This GHG MP includes reduction targets aligned with the State's interim reduction targets (Section 4.1.2) and abatement initiatives that either avoid, minimise or offset emissions from Proposal (Table 14).</p> <p>Rio Tinto has set an ambition to reach net zero emissions by 2050 across all its operations (applicable to Iron Ore in the Pilbara). Further detail is included in Rio Tinto's 2020 "Our Approach to Climate Change" report and Section 4.1.1.</p> <p>Performance against the Proposal target will be reported in the Ministerial Statement Annual Compliance Assessment Report every five years, with the first review taking place in the 2025 report, as outlined in Section 4.1.2.</p> <p>Emissions from the Greater Paraburdoo (including the Proposal) will also be reported annually through NGER, in accordance with the NGER Act.</p>
<p>Consistent with the Government's focus on economic development and diversification, plans that include undertakings to develop Western Australian expertise, carry out research, pilot new initiatives and technologies, and support local communities are encouraged.</p>	<p>Rio Tinto is implementing and further developing a range of abatement initiatives in Western Australia, leveraging local expertise and ensuring benefits to local communities and industry participants. In addition, the ongoing activities of the Proponent, and more broadly Rio Tinto in the Pilbara, will continue to support social and economic development projects, including:</p> <ul style="list-style-type: none"> <li>• continued education, training, employment and business opportunities for local people, including local Aboriginal people; and</li> <li>• continued funding for a range of organisations in the region, including sporting and cultural groups.</li> </ul>

**Table 4 Addressing Guideline Requirements**

Guideline Considerations on contents of a GHG MP*	Proponent Response
Demonstration of the proponent's contribution towards the State's aspiration of net zero emissions by 2050	Details of how the Proposal will contribute towards the State's aspiration of net zero emissions by 2050 is outlined in Section 4.1.2.
Strategies which demonstrate that all reasonable and practicable measures have been applied to avoid, reduce and offset a proposal's Scope 1 emissions over the life of the proposal	Strategies to avoid, reduce, mitigate and offset Scope 1 emissions from the Proposal are outlined in Section 4.
Periodic public reporting against the Greenhouse Gas Management Plan including: Reporting against interim targets, with reporting ideally aligning with five-year milestones under the Paris Agreement	Performance against the Proposal target will be reported in the Ministerial Statement Annual Compliance Assessment Report every five years, with the first review taking place in the 2025 Report, as outlined in Section 6.

\*Greenhouse Gas Management Plan Requirements as outlined in the Guideline

## **2.2. Commonwealth Regulation and Policy**

### **2.2.1. National Greenhouse and Energy Reporting (NGER)**

The NGER Act is a single national framework for reporting GHG emissions, energy production and energy consumption. The objectives of the NGER scheme are to:

- Inform government policy and the Australian public;
- Help meet Australia's international reporting obligations;
- Assist Commonwealth, State and Territory government programs and activities; and
- Avoid duplicating reporting requirements in the states and territories.

The methods and criteria for calculating GHG emissions and energy data under the NGER Act are detailed in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (DoEE, 2008) (NGER Determination). Greater Paraburdoo (including the Proposal) emissions are reported annually under the NGER Act.

### **2.2.2. Safeguard Mechanism Baselines**

The *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Safeguard Mechanism) applies baselines to large GHG-emitting facilities, to ensure that net emissions are kept below a defined baseline in accordance with the Safeguard Mechanism administered by the Clean Energy Regulator. The Safeguard Mechanism applies to facilities with Scope 1 emissions (covered emissions) of more than 100,000 tCO<sub>2</sub>-e per year.

GHG emissions from the Proposal will contribute to the Greater Paraburdoo NGER report inventory and be accounted against its baseline under the Safeguard Mechanism. Results of monitoring and reporting against Safeguard Mechanism baselines are made available to the public on the Clean Energy Regulator website.

## **2.3. Rio Tinto Management Processes**

One of Rio Tinto's stated climate change goals is to ensure the business and supply chain continue to deliver economic and social benefits in the short, medium and long term, as we assist in the transition to a low-carbon future. Rio Tinto is a signatory to the Paris Pledge, which supported and endorsed the commitments and ambition outlined in the Paris Agreement.

Rio Tinto's Climate Change Approach is included in Rio Tinto's 2021 "Our Approach to Climate Change" report and summarised by four priorities that include a commitment to build the resilience of operations, investments, communities and ecosystems to the impacts of climate change. This multifaceted approach addresses emission across the business and aims to:

- Produce materials essential for a low-carbon future;
- Reduce the carbon footprint of our operations;
- Partner to reduce the carbon footprint across our value chain; and
- Enhance our resilience to physical climate risks.

### **2.3.1. Risk Mitigation Hierarchy**

Rio Tinto identifies and assesses climate-related risks that may occur over multiple time horizons. There is a short term (1 year), a medium term (2 – 10 year), and a long term (beyond 10 year) outlook.

Climate-related risks are monitored and managed on an ongoing basis via a range of mechanisms and at different levels within the organisation.



At a Rio Tinto Group level, the approach to corporate planning, investment decision-making and portfolio management provides a focus on the identification, assessment and management of climate change risks. Rio Tinto use a broad range of scenarios to consider how different policy, technology, market and societal outcomes could impact the portfolio, including shock events. The impacts of climate change are considered in Rio Tinto's group wide capital allocation framework. Rio Tinto's investment evaluation process includes an assessment of non-quantifiable risks such as impacts on people and the environment. The process has also incorporated market and sector-based carbon prices.

Rio Tinto has an enterprise-wide risk management information system where all material risks and actions, including those related to climate change, are documented and kept current for managing and reporting purposes. At an asset/site level, the Rio Tinto Risk Assessment process provides the framework for risk management relating to climate change such as wildfires, cyclones and floods.

### **2.3.2. Business Improvement Process**

In accordance with the Business Improvement Process, assets are required to develop optimised production improvements which identifies and implements opportunities to improve production and energy efficiency whilst minimising emissions.

The process outlines a framework for structured decision making, planning, governance and delivery approach to ensure opportunities are matured based on knowledge-based decisions, and account for uncertainty and residual risk.

### **2.3.3. Opportunity Management Process**

In 2019, Rio Tinto completed a review of mitigation options to inform the 2030 targets and long-term decarbonisation pathways. The Energy and Climate Change Centre of Excellence was established in September 2019 to work with Product Groups (including Iron Ore) to support and coordinate potential emissions reductions opportunities across each asset portfolio.

A marginal abatement cost curve was developed to assist in prioritising and allocating resources to progress high priority projects. Further detail is included in Rio Tinto's 2021 "Our Approach to Climate Change" report<sup>2</sup>.

Rio Tinto continues to invest in emissions reduction projects, research, development and enhancing the climate change resilience of our business. The business has identified a pipeline of GHG reduction projects that Rio Tinto expects to implement in order to achieve the targets.

### **2.3.4. Integrating GHG Considerations in Project Development Design**

In line with the Rio Tinto's ambition to reach net zero emissions by 2050 across all operations and carbon neutral growth, internal guidelines are in place to integrate GHG considerations into design and planning of development projects.

Strategic decisions are made throughout the development of projects to ensure energy efficient lower emission solutions are prioritised where practicable. Each project, in conjunction with the Rio Tinto Study Definition Guidelines, and aligned with the State GHG Policy and Guideline, considers throughout design, construction and operational phases:

- Application of a mitigation hierarchy to avoid, reduce and offset emissions;
- Contribution to emissions reduction targets;
- Adoption of best practice design, technology and management appropriate to the mitigation measures implemented; and

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<sup>2</sup> <https://www.riotinto.com/sustainability/climate-change>

- Continuous improvement to reduce emissions over the life of the project and across the Pilbara in a holistic, measured and consistent manner.

In consideration of the Guideline, the Proposal has been designed and will be operated to avoid, where possible, and minimise GHG emissions as far as practicable.

Reasonable and practicable measures to minimise Scope 1 emissions during the construction and operation of the Proposal are outlined in Section 4.2.

### 3. Projected GHG Emissions

The major emission types of GHG emissions from the Proposal are carbon dioxide (CO<sub>2</sub>), nitrogen oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>). The principal sources of GHG emissions include:

- Stationary and mobile diesel combustion (Scope 1); and
- Consumption of electricity from the Pilbara Power Generation Network (Scope 2).

It should be noted that no fugitive or transport emissions are expected for the Proposal.

Rio Tinto sell an iron ore blend and calculate Scope 3 emissions based on a portfolio of sales. Estimated Proposal Scope 3 are 32 MtCO<sub>2</sub>-e (annual average) and 575 Mt CO<sub>2</sub>-e (total life of proposal).

GHG emissions have been estimated for the Proposal using the methods and criteria in the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (DoEE, 2008) (NGER Determination). The emissions intensity has been estimated for the Proposal using the methodology in Section 27 of the Safeguard Mechanism. To provide context and where relevant, information is provided on the entire Greater Paraburdoo facility.

Emissions estimates for the GHG MP utilise the best available diesel, power and production data sourced from the Greater Paraburdoo Life of Mine Plan. This plan is the output of the most recent iteration of the official business planning process.

#### 3.1.1. Operational Phase GHG emissions

A summary of estimated peak, annual average<sup>3</sup> and total GHG emissions over the life of the Proposal by source and scope is presented in Table 5.

**Table 5 Proposal Operational Peak, Annual Average and Total GHG Emissions by Source and Scope**

Source	Scope 1 Emissions (t CO <sub>2</sub> -e pa)	Scope 2 Emissions (t CO <sub>2</sub> -e pa)
Diesel – Peak Annual	157,703	0
Land Clearing – Peak Annual	1,998	0
Electricity – Peak Annual	0	63,324
<b>Total (Scope 1 + Scope 2) – Peak Annual</b>	<b>223,025</b>	
Diesel – Annual Average Life of Proposal	127,432	0
Land clearing – Annual Average Life of Proposal	1,942	0
Electricity – Annual Average Life of Proposal	0	61,291
<b>Total (Scope 1 + Scope 2) – Annual Average Life of Proposal</b>	<b>190,665</b>	
Diesel – Total Life of Proposal	2,531,638	0

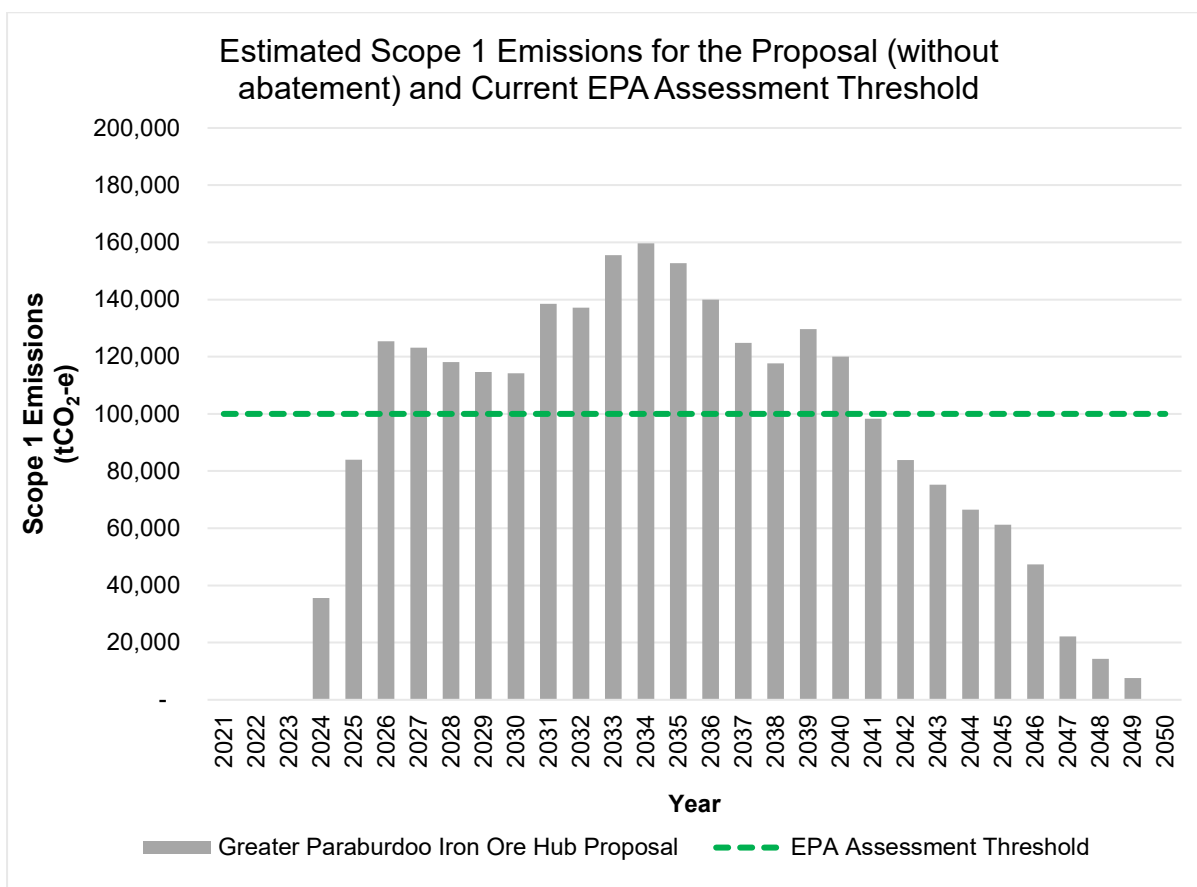
<sup>3</sup> Annual average life of Proposal diesel and electricity emissions are from 2025 to 2035, the period when production is sustained at ~25Mtpa predominantly by the Proposal

Source	Scope 1 Emissions (t CO <sub>2</sub> -e pa)	Scope 2 Emissions (t CO <sub>2</sub> -e pa)
Land clearing – Total Life of Proposal	35,790	0
Electricity – Total Life of Proposal	0	1,034,009
<b>Total (Scope 1 + Scope 2) – Life of Proposal</b>	<b>3,601,437</b>	

\*Diesel includes emissions from load and haul and drill and blast activities and electricity includes emissions from ore processing.

\*\*Estimates exclude emissions from Channar.

Estimated annual Scope 1 greenhouse gas emissions over life of the Proposal without abatement are presented in Figure 3. Production and mine strategy are market driven. Pilbara facilities are operated as a vertically integrated system, potentially resulting in changes to life of the Proposal. Variability of emissions occurs as production ramps up and then tapers off as production declines (Figure 3).



**Figure 3 Proposal Estimated Annual Scope 1 Emissions (without abatement)**

A summary of the estimated peak, annual average<sup>4</sup> and total GHG emissions from the Greater Paraburdoo (including the Proposal) is presented in Table 6.

<sup>4</sup> Annual average life of Proposal diesel and electricity emissions are from 2025 to 2035, the period when production is sustained at ~25Mtpa predominantly by the Proposal

**Table 6 Greater Paraburdoo (including the Proposal) Operational Peak, Annual Average and Total GHG Emissions**

Source	Scope 1 Emissions (tCO <sub>2</sub> -e pa)	Scope 2 Emissions (tCO <sub>2</sub> -e pa)
Diesel – Peak Annual	157,703	0
Land Clearing – Peak Annual	1,998	0
Electricity – Peak Annual	0	63,324
<b>Total (Scope 1 + Scope 2) – Peak Annual</b>	<b>223,025</b>	
Diesel – Annual Average Life of Greater Paraburdoo (including Proposal)	132,422	0
Land clearing – Annual Average Life of Proposal	1,942	0
Electricity – Annual Average Life of Greater Paraburdoo (including Proposal)	0	55,871
<b>Total (Scope 1 + Scope 2) – Annual Average Life of Greater Paraburdoo (including Proposal)</b>	<b>190,235</b>	
Diesel – Total Life Greater Paraburdoo (including Proposal)	2,950,095	0
Land Clearing – Total Life Greater Paraburdoo (including Proposal)	35,790	0
Electricity – Total Life of Greater Paraburdoo (including Proposal)	0	1,137,733
<b>Total (Scope 1 + Scope 2) – Total Life of Greater Paraburdoo (including Proposal)</b>	<b>4,123,618</b>	

*\*Diesel includes emissions from load and haul and drill and blast activities, and electricity includes emissions from ore processing*

### 3.1.2. Operational Phase GHG Emissions Intensity

At estimated peak annual production of 25,200 kilotonnes of Saleable Ore Product (SOP), the Proposal's emissions intensity is 7.2kgCO<sub>2</sub>-e/ per tonne of SOP produced (Table 7).

**Table 7 Proposal GHG Emissions Intensity**

Year Peak Annual Production	SOP (kt)	Peak annual emissions (tCO <sub>2</sub> -e pa)	Emissions intensity (kgCO <sub>2</sub> -e/tSOP)
2028	25,200	223,025	7.2

### 3.1.3. Benchmarking GHG Intensity with Other Comparable Projects

A GHG benchmarking assessment was undertaken to compare GHG emissions performance of the Proposal against other comparable open cut iron ore mining projects located in Western Australia's Pilbara region.

In order to compare mining operations of different sizes, emissions are normalised by a relevant measure of production. Saleable Ore Product (SOP) is a prescribed production variable and meets requirements for Iron Ore in Schedule 2 of the Safeguard Mechanism. SOP is also the key planning metric used throughout the business in relation to production. It is used when updating investors, financial markets and regulatory authorities. The emissions intensity is expressed in tonnes CO<sub>2</sub>-e per unit of SOP production, and therefore is a representative metric for benchmarking.

Default emissions intensity values for iron ore mining are set by the Clean Energy Regulator and defined in Schedule 2 of the Safeguard Mechanism. They represent the industry average emissions intensity of production over five years.

The data collated for comparative purposes has been sourced from publicly available documents. Although every effort has been made to provide a comprehensive and accurate comparison of open cut iron ore mining projects in located in the Pilbara region, Australia, the comparison does not include international iron ore mining projects as these were not considered comparable projects.

The operations considered for benchmarking are similar iron mines with above and below water table mining using conventional open pit methods. Rio Tinto' Tom Price Mine in West Pilbara was also included due to its comparable annual production.

Comparable benchmarking of emissions from individual mining operations is challenging, as it does not consider the site-specific circumstances which impact on GHG intensity. Waste to ore ratios, grade characteristics and topography have a significant influence on GHG intensity. Below water table mining requires dewatering infrastructure to be operated and a greater amount of waste material moved per tonne of SOP. The wet material requires advanced processing in wet plants, which are more electricity intensive than dry plants.

Boundary conditions present a further challenge to benchmarking across facilities. Some aspects of mining, processing and transport may be contracted to a third party that assumes operational control and hence ownership of a portion of a facility's GHG emissions. Rio Tinto has made every effort to present a comparable benchmarking assessment with consideration of the above challenges.

Benchmarking of the Proposal's forecast annual emissions and emissions intensity against the default emissions intensity for iron ore mining defined in Schedule 2 of the Safeguard Mechanism and comparable open cut iron ore mining operations in the Pilbara region is presented in Table 8.

The benchmarking shown in Figure 4 indicates that the performance of the Proposal is above the Iron Ore industries current average GHG intensity due to increase in total material movement.

**Table 8 Benchmarking Against Comparable Open Cut Iron Ore Mines in the Pilbara, WA**

Facility	Peak Annual Emissions (tCO <sub>2</sub> -e pa)	Emissions Intensity (kgCO <sub>2</sub> -e/tSOP)	Contribution to WA emissions <sup>5</sup> (%)
Rio Tinto – The Proposal	223,025	7.2	0.24
Rio Tinto – Tom Price <sup>6</sup>	193,230	6.8	
Default Emission Intensity Iron Ore Mining Safeguard Mechanism	-	4.76	-
BHP – Jimblebar	414,000 <sup>7</sup>	7.4 <sup>8</sup>	0.47
FMG – Eliwana <sup>9</sup>	272,315	7.0	0.31

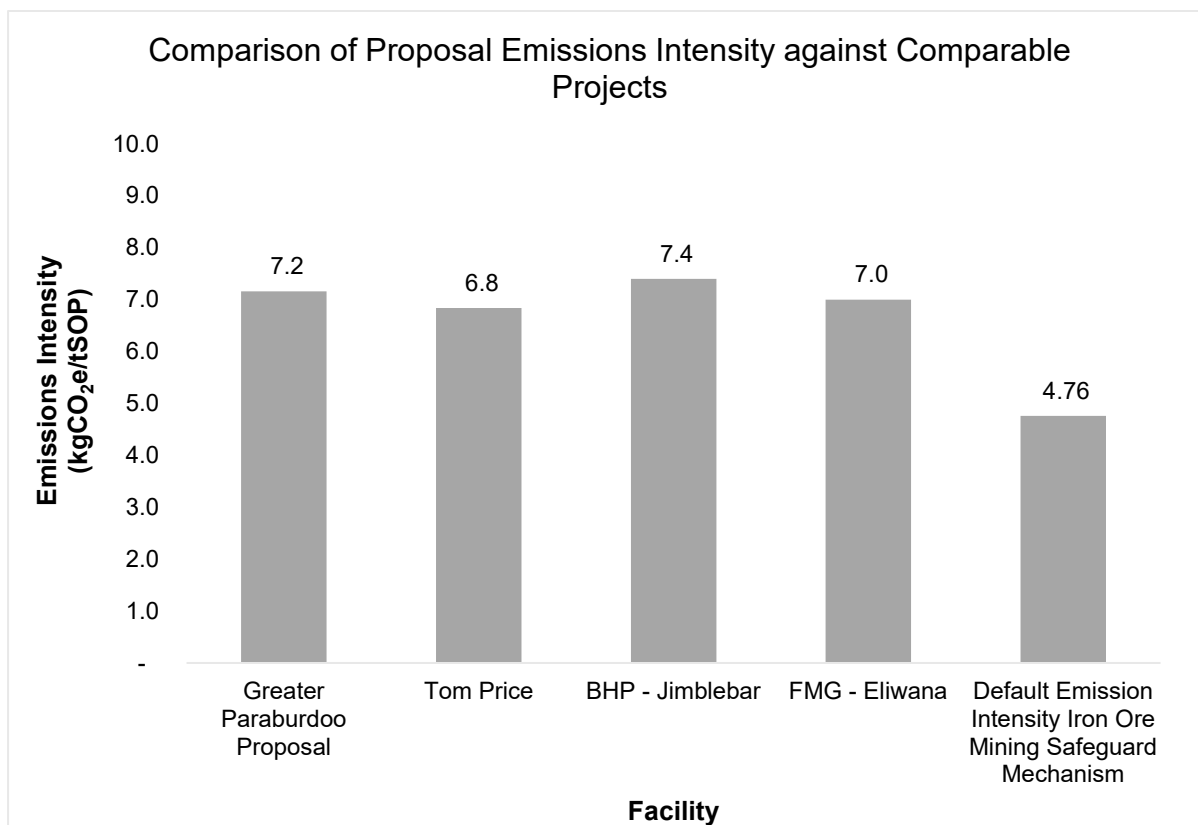
<sup>5</sup> Based on Western Australia total state emissions in 2019 Department of Industry, Science, Energy and Resources "State and Territory Greenhouse Gas Inventories 2019" April 2021 (Commonwealth of Australia 2021)

<sup>6</sup> Based on actual emissions and production in FY2020

<sup>7</sup> [https://www.epa.wa.gov.au/sites/default/files/Referral\\_Documentation/Environmental%20Review%20Document\\_0.pdf](https://www.epa.wa.gov.au/sites/default/files/Referral_Documentation/Environmental%20Review%20Document_0.pdf)

<sup>8</sup> Based on 55.8 Mtpa in FY2018 <https://www.bhp.com/our-businesses/minerals-australia/western-australia-iron-ore>

<sup>9</sup> FMG Fortescue Metals Group (2018), Eliwana Iron Ore Mine Project, Environmental Review Document, EW-RP-EN-0003-0. Table 57



**Figure 4 Comparison of Proposal GHG emissions intensity against other comparable projects**

### 3.1.4. Impact of the Proposal on State and National GHG Emissions

Estimated peak annual emissions for the Proposal have been compared to national and state GHG emissions totals.

Australia's national GHG emissions for December 2020 and state-based emissions inventory for 2019, by sector, are presented in Table 9. Total annual national emissions are 499 MtCO<sub>2</sub>-e and 91.9 MtCO<sub>2</sub>-e for Western Australia. Annual peak emissions from the Proposal, would account for approximately 0.04% of Australia's annual emissions and 0.24% of Western Australia's annual emissions (Table 10).

**Table 9 National and State GHG Inventory**

Emissions Source	December 2020 Australian Emissions (MtCO <sub>2</sub> -e) <sup>10</sup>	2019 Western Australia Emissions (MtCO <sub>2</sub> -e) <sup>11</sup>
Energy – Electricity	167.5	36.6
Energy – Stationary energy excluding electricity	101.7	20.1
Energy – Transport	87.8	14.9
Energy – Fugitive Emissions	49.7	12.8
Industrial processes and product use	30.7	4.3

<sup>10</sup> Department of Industry, Science, Energy and Resources "Quarterly Update of Australia's National Greenhouse Gas Inventory: December 2020". March 2021 (Commonwealth of Australia 2021).

<sup>11</sup> Department of Industry, Science, Energy and Resources "State and Territory Greenhouse Gas Inventories 2019" April 2021 (Commonwealth of Australia 2021).

Emissions Source	December 2020 Australian Emissions (MtCO <sub>2</sub> -e) <sup>10</sup>	2019 Western Australia Emissions (MtCO <sub>2</sub> -e) <sup>11</sup>
Agriculture	72.9	9.9
Waste	13.3	1.9
Land use, land use change and forestry	-24.5	-8.6
<b>Overall total</b>	<b>499</b>	<b>91.9</b>

**Table 10 Impact on Total National and State Annual GHG Emissions**

	National GHG Emissions (%)	WA GHG Emissions (%)
Proposal	0.04	0.24
Greater Paraburdoo (including the Proposal)	0.04	0.24

## 4. Targets and Management Measures

### 4.1. Emissions Reduction Targets

#### 4.1.1. Group Level

Rio Tinto has announced its ambition to reach net zero emissions by 2050 across all operations. To support this ambition, medium-term global targets<sup>12</sup> have been introduced for Scope 1 and 2 emissions, effective from 2021, to:

- Reduce absolute emissions by 15% by 2025 (approximately 4.9M tCO<sub>2</sub>-e equity basis)
- Reduce absolute emissions by 50% by 2030 (approximately 16.3M tCO<sub>2</sub>-e equity basis).
- No new purchase of diesel haul trucks and diesel locomotives beyond 2030

The target is measured against a 2018 global equity baseline, currently 32.6M tCO<sub>2</sub>e, which will be adjusted for divestments and acquisitions.

#### 4.1.2. Western Australia

##### Interim and Long-term Emissions Reduction Targets

Rio Tinto is committed to contributing towards the State's aspiration of net zero by 2050 through achievement of interim and long-term emissions reduction targets. The emitting assets subject to this proposal will and are included in the long-term emissions reduction pathways currently under investigation and will naturally see significant reductions over the longer timeframe as technologies develop and alternatives to firm power generation and mobile diesel become available.

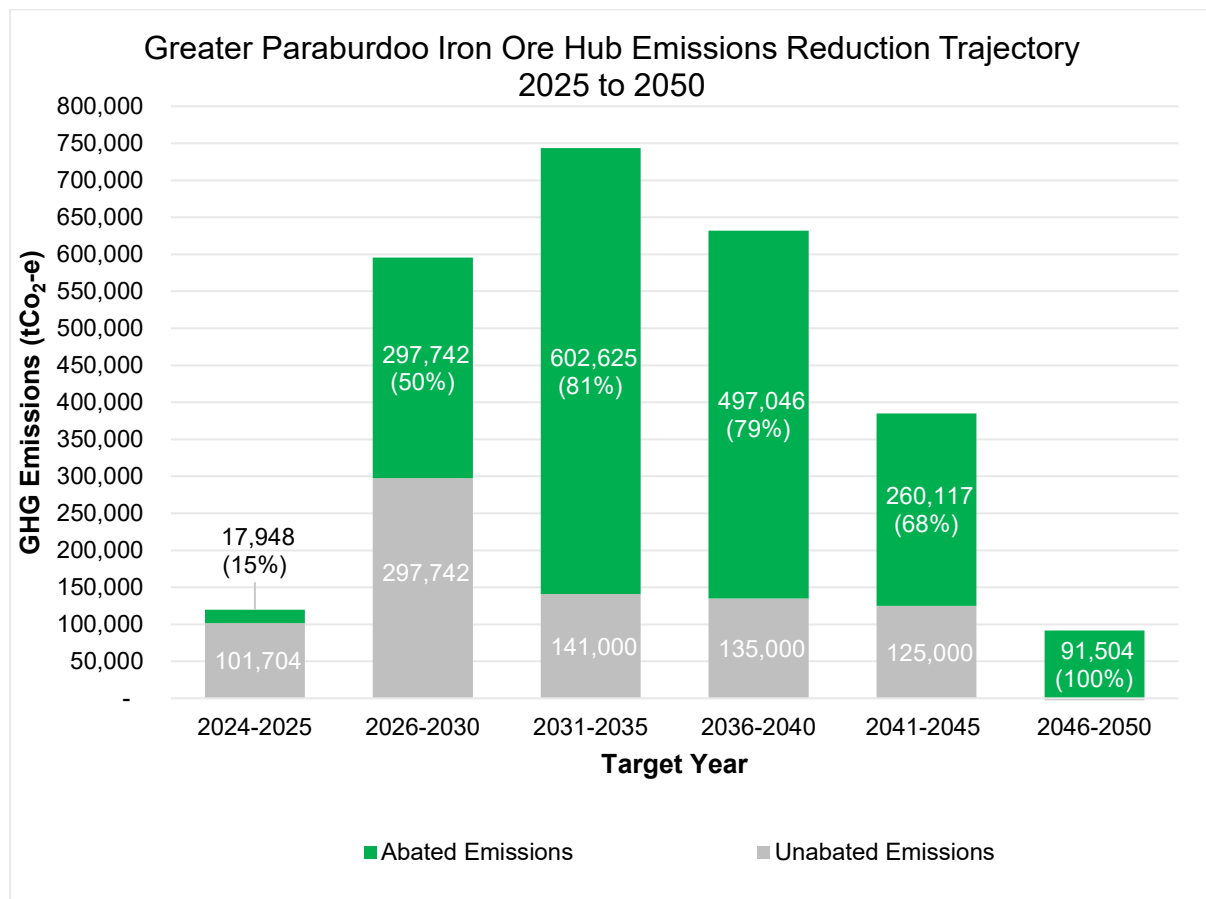
To support the State's ambition, the Proponents interim and long-term emissions reduction targets for the Proposal includes commitments to achieving targets in line with Rio Tinto global targets, specifically a 15% reduction by 2025 and 50% reduction by 2030 against the Proposal's 5 yearly cumulative emissions. Interim and long-term targets are to:

- Reduce or abate 17,948 tCO<sub>2</sub>-e emissions by 2025;

<sup>12</sup> Medium-term global targets are measured against a 2018 global equity baseline of 32.6M tCO<sub>2</sub>e.

- Reduce or abate 297,742 tCO<sub>2</sub>-e emissions by 2030;
- Reduce or abate 602,625 tCO<sub>2</sub>-e emissions by 2035;
- Reduce or abate 497,046 tCO<sub>2</sub>-e emissions by 2040;
- Reduce or abate 260,117 tCO<sub>2</sub>-e emissions by 2045; and
- Reduce or abate emissions 91,504 tCO<sub>2</sub>-e emissions by 2050.

The forecast emissions, interim and long-term emissions reduction targets for the Proposal is shown in Figure 5 and Table 11. The targets proposed are for cumulative 5-year periods, and consistent with the net zero emissions by 2050 trajectory. Targets are set in the periods ending 2025 and 2030 are based on internal targets compared to those in periods ending 2035, 2040, 2045 which are based on a linear reduction trajectory to net zero emissions by 2050. This reduction trajectory is supported by management-based provisions in Table 12.



**Figure 5 Proposal Interim and Long-Term Targets**



**Table 11 Interim and Long-Term Emissions Reductions Targets**

*Target Year	2025	2030	2035	2040	2045	2050
Total Scope 1 Emissions (tCO <sub>2</sub> -e)	119,652	595,484	743,625	632,046	385,117	91,504
*Emission Reduction Target (tCO <sub>2</sub> -e)	17,948	297,742	602,625	497,046	260,117	91,504
Percentage Reduction Emissions aligned to global targets (%)	15	50	81	79	68	100

*\*Emission Reduction Targets for 2035, 2040, 2045 derived as Scope 1 emissions above linear trajectory net zero 2050*

Performance against the interim and long-term targets will be reviewed on a five-yearly basis, with the first review taking place in the 2025 Ministerial Statement Annual Compliance Assessment Report. Actual GHG emissions for the Proposal will be compared against the target GHG emissions. In the event that the total actual emissions reductions for the Proposal are less than the target emission reduction in 2025, 2030, 2035, 2040, 2045 and 2050, local and national abatement projects that are reasonable and practicable will be applied against the total actual emissions from the Proposal.

Abatement will be measured and reported based on 5-yearly cumulative reductions made to align with the derivation of the interim and long-term targets in Table 11. In particular, Rio Tinto, applying a Pilbara wide (system) approach, has identified specific abatement initiatives (Table 14) which will be implemented in Rio Tinto's Pilbara Power Generation Network where the abatement from these projects will be applied to cover Scope 1 emissions from the Proposal's interim targets. The long-term emissions reduction target is anticipated to be achieved by the implementation of a range of existing or potential future GHG abatement opportunities.

Where the projects in Table 14 are insufficient to reduce Scope 1 emissions compared to the interim and long-term targets in 2025, 2030, 2035, 2040, 2045 and 2050, Rio Tinto may also source local, national or international credible offset units to offset the difference. Should National and/or West Australian climate policy be enacted that requires Rio Tinto to surrender or otherwise procure carbon credits under an emissions trading scheme or similar mechanism, or to pay a carbon tax in respect of some or all of the GHG emissions that are the subject of the interim and long-term targets, any offsetting requirement will be adjusted to recognise such a requirement.

There remains some uncertainty over the most effective means to reduce emissions for the Proposal. Emission reductions will continue to be subject to a number of factors, including the advances or availability of technology that is practicable for replacement of existing HME fleet and fixed plant and requirements under the Safeguard Mechanism (or other future Commonwealth legislation pertaining to GHG emissions). Despite the uncertainty of these technologies Rio Tinto is committed to advancing their development and deployment to reduce emissions and with the backstop of using credible offset units will set a long-term emissions reduction target for the Proposal to:

*Reduce or abate 100% of emissions to net zero by 2050 for the Proposal*

The long-term emissions reduction target is anticipated to be achieved by the implementation of a range of existing or potential future GHG abatement opportunities, some examples include:

- Energy efficiency projects;
- Renewable energy (solar pv, wind energy);
- Energy storage;
- Alternative fuels (lower emission fuels such as biofuels, renewable diesel);
- Zero-emission mobile fleet (e.g. haul trucks, locomotives, light vehicles);
- Hydrogen gas and or fuel cell technology; and
- Efficiency upgrades to gas turbines and mobile fleet.

Rio Tinto is committed to continue the ongoing evaluation of further opportunities to develop and implement practicable GHG abatement.

The Proponent's progress against proposed long-term emission reduction targets and current abatement technology under development will be reviewed and updated as part of the five-yearly review as outlined in Section 6.

#### **4.1.3. Eligible Offset Units**

The Proponent will offset where abatement is insufficient against the interim and long-term targets by retiring credible offset units in 2025, 2030, 2035, 2040, 2045 and 2050. Diversity in credible offset units is an important means of managing risks to source sufficient volumes, but it is also important to ensure the quality and credibility of offset units used.

Given developments in carbon offset markets and contemporary expectations in relation to the retirement of offset units, Rio Tinto will apply the integrity principles of the International Carbon Reduction and Offset Alliance (ICROA) in relation to the sourcing and use of credible offset units for carbon offsetting. As such, credible offset units sourced will be based on the principles outlined in ICROA's Technical Specification<sup>13</sup> being: real; measurable; permanent; additional; independently verified; and unique. Rio Tinto will only use credible offset units sourced from projects that are or will be validated, verified and registered, including but not limited to:

- Clean Development Mechanism;
- Climate Action Reserve;
- Gold Standard;
- Joint Implementation;
- Verified Carbon Standard;
- American Carbon Registry;
- Emissions Reduction Fund of the Australian Government; or
- UK Woodland Carbon Code.

The Proponent may also use other offset units that meet integrity principles and are based on clear, enforceable and accountable standards.

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<sup>13</sup> "Code of Best Practice for Carbon Management Services, Technical Specification", 2021, published by ICROA, downloaded from [https://www.icroa.org/resources/Documents/The%20Code/ICROA\\_cobp\\_tech\\_specs\\_2021.pdf](https://www.icroa.org/resources/Documents/The%20Code/ICROA_cobp_tech_specs_2021.pdf) on 9th August 2021

An ACCU may be retired for the purpose of meeting the Proposal interim target and also any Safeguard Mechanism obligations. It is noted that at present the Australian National Registry of Emissions Units, which is used for ACCUs, does not have a publicly available real-time retirement register.

#### **4.2. Management Measures**

Rio Tinto Iron Ore has incorporated management and mitigation measures (each included as Management Actions) to ensure ongoing minimisation of GHG emissions will be achieved. Table 12 lists the management-based provisions that will be implemented for the Proposal. These are based on the rationale and approach described in Section 1.3.

**Table 12 Management-based Provisions**

Objective Based Management - Provisions Greenhouse Gas Emissions				
<b>WA EPA Factor:</b> Greenhouse Gas Emissions <b>Key impacts and risks:</b> Emission of GHG emissions and subsequent contribution to climate change				
Management-based provisions				
<b>Objective:</b> To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change				
Management Actions	Management Targets	Monitoring	Timing / Frequency	Reporting
Achieve emissions reduction trajectory as defined in Figure 5 and Table 11.	<p><i>Interim and Long-term Targets</i></p> <p>Interim and long-term emissions reduction targets for the Proposal (as outlined in Section 4.1.2) are to:</p> <ul style="list-style-type: none"> <li>• Reduce or abate 17,948 tCO<sub>2</sub>-e emissions by 2025;</li> <li>• Reduce or abate 297,742 tCO<sub>2</sub>-e emissions by 2030;</li> <li>• Reduce or abate 602,625 tCO<sub>2</sub>-e emissions by 2035;</li> <li>• Reduce or abate 497,046 tCO<sub>2</sub>-e emissions by 2040;</li> <li>• Reduce or abate 260,117 tCO<sub>2</sub>-e emissions by 2045; and</li> <li>• Reduce or abate emissions 91,504 tCO<sub>2</sub>-e emissions by 2050.</li> </ul> <p>Implementation of the Pilbara emissions abatement projects in Table 14 as required to achieve interim and long-term targets described in Section 4.1.2.</p>	Monitoring of Proposal emissions and quantification of realised emissions reductions in accordance with NGER Act and NGER Determination.	Five yearly with the first report taking place in the 2025 Ministerial Annual Compliance Assessment Report. The Report will include previous five (financial years) data in alignment with NGER Act reporting periods.	<p>A summary report of performance against the Proposal interim and long-term emissions reduction targets in Section 4.1.2 will be reported in the Ministerial Statement Annual Compliance Assessment Report every five years, with the first report taking place in the 2025 Report. For details refer to Section 6.</p> <p>Retirement of Credible Offset Units in relation to the Proposal for 2025, 2030, 2035, 2040, 2045 and 2050 where the projects in Table 14 are insufficient to reduce Scope 1 emissions compared to the interim and long-term targets in Section 4.1.2.</p> <p>Summary of purchased and retired Credible Offset Units over the previous 5 years will be included in the Ministerial Statement Annual Compliance Assessment Report as described in Section 6.</p>

## Objective Based Management - Provisions Greenhouse Gas Emissions

**WA EPA Factor:** Greenhouse Gas Emissions

**Key impacts and risks:** Emission of GHG emissions and subsequent contribution to climate change

### Management-based provisions

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

Management Actions	Management Targets	Monitoring	Timing / Frequency	Reporting
Continuously work towards achieving net zero emissions by 2050 for the Proposal.	Implementation of reasonable and practicable measures to avoid, reduce and offset Proposal Scope 1 GHG emission described in Table 14 and Section 4.1.2.	Review of identified reasonable and practicable measures to avoid, reduce, mitigate and offset the Proposal's direct (Scope 1) emission completed.	Five-yearly, with the first review taking place in the 2025 Ministerial Annual Compliance Assessment Report.	A summary of delivered Pilbara abatement projects will be presented in the Ministerial Statement Annual Compliance Assessment Report every five years, as described in Section 6.
Management and ongoing implementation of Pilbara wide Net-zero Pathway	Ongoing of Pilbara Wide Net-zero Pathway Plan by end of 2022	Pilbara wide Net-zero Pathway revised regularly and uploaded to internal document management system	Presented and iterated twice yearly during business planning cycles	Summary presented internally during annual business planning process.
Implement GHG monitoring and reporting	Monitor and report all Scope 1 and Scope 2 (if applicable) emissions	Monitoring in accordance with NGER Measurement Determination.	Annually	Annual reporting of emissions is performed in accordance with the NGER Act. Summary of Scope 1 emissions published as part of annual Safeguard Mechanism data tables by the Clean Energy Regulator.
Operate under Safeguard Mechanism to maintain net emissions at or below Greater Paraburdoo Operations baselines	Greater Paraburdoo Operation (including the Proposal) operate under the Safeguard Mechanism baseline.	Monitoring of net emissions performed in accordance with Safeguard Mechanism. Purchase and surrender Australian Carbon Credit Units (if required) in accordance with Safeguard Mechanism.	Annually	Summary of any surrendered Australian Carbon Credit Units published as part of annual Safeguard Mechanism data tables by the Clean Energy Regulator.
Undertake review and re-submission of GHG MP	Update GHG MP every five years as a minimum or as required following significant changes as described in Section 7.	Review and re-submission of the GHG MP completed every five years as a minimum or as required following significant changes.	Five-yearly, with the first review taking place in 2025. Re-submission shall be completed by 31 March of the following year.	Submission of revised GHG MP for WA EPA approval.

## 5. Abatement Initiatives

Rio Tinto is exploring and implementing a range of short, medium- and long-term low-carbon initiatives. Currently an estimated 76% of the electricity consumption at our globally managed operations is from renewable sources. Specifically, in Western Australia, of our fossil fuel use, ~30% is gas consumption for power generation, the remaining ~70% diesel, predominantly powering our mobile equipment. The solutions to transition mobile fleet from diesel to low emission energy are not yet commercially and technically viable. Therefore, the short to medium term low-carbon transition strategy initiatives are focussed on displacement of gas in electricity generation with renewable energy sources.

In some cases, developments may be sought, with emissions abatement projects implemented at alternative locations, depending on the technical constraints of the network to ensure security, reliability and stability is upheld. Carbon abatement projects are treated holistically in their application across Rio Tinto's Pilbara operations providing net emissions reduction regardless of their physical location.

Rio Tinto is working towards the aspiration to be carbon-neutral for our operations in Western Australia by 2050, consistent with the State GHG Policy. Emissions reductions will be achieved via abatement projects at the Pilbara system level, as a Pilbara wide approach enables abatement projects to service multiple developments and is a more cost efficient / flexible approach.

Open cycle gas turbines provide firming of intermittent renewable energy and our existing Pilbara Power Generation network provides pathways for future potential fleet electrification. A number of alternative power solutions are being investigated as part of the planning for future potential opportunities to lower our carbon emissions in the Pilbara. The alternative options assessed included Battery Energy Storage System (BESS) and Solar PV (34MW).

- Funded, and currently being constructed, a BESS has the potential to provide back-up power capacity, known as spinning reserve. Batteries do not provide base load power that is required for stable operations. A BESS has the potential to act as this spinning reserve with the benefit that it reduces emissions through the direct displacement of gas.
- Also funded and in construction, a Solar PV (34MW) will consist of approximately 100,000 solar panels made up of photovoltaic cells to convert sunlight into electricity. Solar PV reduces emissions through displacement of gas in electricity generation with renewable energy sources.
- Further alternative energy projects are progressing across various stages of study to deliver substantial emissions abatement across all of our Pilbara assets, in many cases by 2030. Renewable energy studies focused on solar PV and wind energy are assessing deep renewable energy penetration (1GW) to support the transition of mobile fleet away from diesel.
- Partnered with Industry and Austmine for the 'Charge On Challenge', an industry wide partnership initiative where RTIO is collaborating to identify and develop innovative mobile fleet charging solutions.
- Partnered with Komatsu and Caterpillar to fast track development and implementation of battery electric haul solutions including haul trucks.

The Proponent has carefully considered GHG abatement measures having regard to the Proposal design and lifecycle. A summary of abatement measures under consideration to minimise Proposal emissions during construction and implementation is presented in Table 13. Proposed abatement initiatives for Pilbara Projects to 2030, to achieve the interim emissions target outlined in Section 4.1.2 are presented in Table 14.

Longer term work across the global business include:

- Rio Tinto Aluminium ELYSIS™ Joint Venture is developing inert anode technology, having completed a successful pilot, is currently progressing to larger scale development;

- Electric and lower carbon vehicles, requiring technical and economic developments in renewable energy, development of alternatively-fuelled mining vehicles and energy transfer systems; and
- Separate partnerships have commenced with BlueScope Steel, POSCO, Nippon Steel Corporation, Baowu Steel and Tsinghua University in China to develop and implement new methods to reduce carbon emissions and improve environmental performance across the value chain.

Rio Tinto is currently developing the business case for optimised decarbonisation scenarios (covering aspects such as capital and operational expenditure) over the life of Pilbara facilities. This includes optimisation of net zero pathways for each scenario, which identifies points in time where Rio Tinto will be required to make key decisions about investment and technology selection.

Future improvements in technology will be monitored and assessed for feasibility over the life of the Proposal. Such improvements will assist the Facility achieve the interim and long-term targets described in Section 4.1.2 and will be described in future revisions of this GHG MP once implemented.

**Table 13 Proposal Emissions Abatement Measures Under Consideration**

Abatement Measure
<b>Avoid</b>
<b>Construction of an Overland Conveyor</b> A key GHG abatement initiative incorporated within the Proposal is the construction of an overland conveyor to transport ore from the new Western Range mine back to the existing Paraburdoo processing plant. Using an overland conveyor to transport ore will reduce haul truck diesel consumption and deliver GHG abatement. Electrification through use of conveyors is a key measure for achieving reduction of Scope 1 emissions.
<b>Minimise</b>
<b>Fixed Plant</b> <ul style="list-style-type: none"> <li>• Use of variable speed drives where practicable to enable equipment to be efficiently modulated to meet changes in throughput.</li> <li>• Installation of high efficiency LED lighting across the plant infrastructure (where practical).</li> </ul>
<b>Overland Conveyor</b> <ul style="list-style-type: none"> <li>• Use of variable speed drive systems on the overland conveyor, to enable equipment to be efficiently modulated to meet changes in throughput.</li> <li>• Solar PV cell powered lighting along the overland conveyor route (where practical).</li> </ul>
<b>Non-Process Infrastructure</b> <ul style="list-style-type: none"> <li>• Control lighting using photoelectric cell, timer control and motion sensors when not occupied (where practical).</li> </ul>
<b>Mine Design</b> The ongoing design and mine plan optimisation process assesses the following opportunities: <ul style="list-style-type: none"> <li>• The location of crusher, mining area, pit exits and waste dumps are optimised to reduce haul distances.</li> <li>• Haul road layout design – designed to smooth the truck speeds to minimise stop/start and hence improve diesel use efficiency.</li> </ul>

**Table 14 Proposed Abatement Initiatives for Pilbara Projects to 2030**

Description	Mitigation Hierarchy	Indicative Implementation Timeframe	Estimated Emission Savings
<b>Implementation</b>			
Battery Energy Storage System Use of a Battery Energy Storage System (BESS) to operate as a standby spinning reserve in the Pilbara Power Generation Network	Reduce	2022	~37,000 tCO <sub>2</sub> -e per year
Solar PV (34MW) at Gudai Darri Mine	Reduce	2022	~52,000 tCO <sub>2</sub> -e per year
<b>Under assessment– timeline to be defined</b>			
Pilbara Renewable Energy Studies	Reduce	1 GW (Solar PV/Wind energy)	
Rail decarbonisation	Reduce	To be determined	
Zero emissions haul truck fleet	Reduce	To be determined	

## 6. Periodic Public Reporting Against Targets

A summary report of performance against the Proposal targets in Section 4.1.2 will be detailed in the Ministerial Statement Annual Compliance Assessment Report every five years, with the first report taking place in the 2025 Report. The summary report will include the following:

- The quantity of total GHG emissions from the facility;
- Performance against benchmarking for comparable facilities;
- Emissions intensity;
- GHG emission reduction measures that have been implemented to avoid and reduce GHG emissions;
- Statement whether interim targets have been achieved;
- Current abatement technology under development to achieve long term targets outlined in Section 4.1.2; and
- Outcomes of GHG MP five yearly review.

A technical review of the report required above, will be commissioned to review suitability of the methodology used to determine the matters set out in the report, whether the report is accurate and supported by credible evidence.



## **7. Review of the GHG MP**

This GHG MP will nominally be reviewed at least every five years, with the first review taking place in 2025, to ensure that it reflects the current situation with regards to GHG management and monitoring. Re-submission shall be completed by 31 March of the following year.

In line with the concept of adaptive management, the management actions presented in this GHG MP shall be monitored, reviewed, evaluated and updated as required considering:

- If new abatement technology is proposed to achieve interim and long-term targets in Section 4.1.2 that was not forecast as a part of the Pilbara Wide Net-zero Pathway Plan.
- If a new process or activity is proposed to be introduced that has the potential to significantly change the emissions from the Proposal, and that was not forecast as a part of the Pilbara Wide Net-zero Pathway Plan (and that is not in accordance with this GHG MP)
- Comments from the WA EPA and other decision-making authorities (DMAs) during the Public Environmental Review (PER) approval process;
- Significant changes in State or Commonwealth climate change legislation or policy; and
- Material change in risk (opportunities, processes and procedures) related to climate change identified by Rio Tinto.

Where either the five yearly review cycle is triggered, or if a significant change to either the facility, activity, or risk is identified, a revised GHGMP will be submitted to the WA EPA.

## 8. References

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Norgate and Haque (2010). Energy and Greenhouse Gas impacts of Mining and Minerals Processing operations. Journal of Cleaner Production 18: 266-274. retrieved October 2019, from [http://www.epa.wa.gov.au/sites/default/files/PER\\_documentation2/Eliwana%20Iron%20Ore%20Mine%20FINAL%20Environmental%20Review%20Document.pdf](http://www.epa.wa.gov.au/sites/default/files/PER_documentation2/Eliwana%20Iron%20Ore%20Mine%20FINAL%20Environmental%20Review%20Document.pdf)

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