



# GREENHOUSE GAS ASSESSMENT REPORT



# **Big Vein South Gold Project - Greenhouse Gas Assessment**

**Prepared for:**

**Strategic Minerals Corporation**

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**FINAL**

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## Contents

|            |                                                                         |    |
|------------|-------------------------------------------------------------------------|----|
| 1.         | Introduction .....                                                      | 1  |
| 1.1        | Project description .....                                               | 1  |
| 2.         | Regulatory Environment .....                                            | 3  |
| 2.1        | Global Agreement .....                                                  | 3  |
| 2.1.1      | Paris Agreement on Climate Change .....                                 | 3  |
| 2.2        | Legislation and Regulation .....                                        | 3  |
| 2.2.1      | Climate Change Act 2022 (Cth) .....                                     | 3  |
| 2.2.2      | National Greenhouse and Energy Reporting Act 2007 (Cth) .....           | 3  |
| 2.2.3      | Environmental Protection Act 1994 (Qld) .....                           | 4  |
| 2.2.4      | Clean Economy Jobs Act 2024 (Qld) .....                                 | 4  |
| 2.3        | Policy and Guidelines .....                                             | 4  |
| 2.3.1      | DESI Guideline Greenhouse gas emissions .....                           | 4  |
| 2.3.2      | Corporate Value Chain (Scope 3) Accounting and Reporting Standard ..... | 5  |
| 3.         | Method .....                                                            | 6  |
| 3.1        | Emissions assessment boundary .....                                     | 6  |
| 3.1.1      | Reporting boundaries .....                                              | 6  |
| 3.2        | Scope 1, Scope 2, and Scope 3 emissions .....                           | 6  |
| 3.3        | Project activities that produce GHG emissions .....                     | 7  |
| 3.4        | Calculation of Scope 1 emissions .....                                  | 7  |
| 3.4.1      | Emissions from construction, operations and decommissioning .....       | 7  |
| 3.4.2      | Emissions from vegetation clearance .....                               | 8  |
| 3.4.3      | Emissions from wastewater treatment .....                               | 9  |
| 3.5        | Calculation of Scope 3 emissions .....                                  | 9  |
| 3.5.1      | Emissions from procured construction materials and reagents .....       | 9  |
| 3.5.2      | Emissions from incoming freight .....                                   | 10 |
| 3.5.3      | Emissions from transport of gold doré bars .....                        | 10 |
| 3.5.4      | Emissions from upstream processing of purchased diesel .....            | 10 |
| 4.         | Greenhouse Gas Inventory .....                                          | 11 |
| 4.1        | Summary EA emissions .....                                              | 11 |
| 4.2        | Energy consumption and emissions .....                                  | 11 |
| 4.3        | NGER obligations .....                                                  | 13 |
| 4.3.1      | Safeguard mechanism .....                                               | 13 |
| 4.4        | Emissions from vegetation clearance .....                               | 13 |
| 4.5        | Emissions from wastewater handling .....                                | 13 |
| 4.6        | Scope 3 emissions .....                                                 | 14 |
| 5.         | Greenhouse Gas Abatement Plan .....                                     | 15 |
| 5.1        | GHG emissions reference point .....                                     | 16 |
| 5.2        | Targets, management controls and timing .....                           | 16 |
| 5.3        | Management controls .....                                               | 17 |
| 5.3.1      | Avoid .....                                                             | 17 |
| 5.3.2      | Reduce .....                                                            | 17 |
| 5.3.3      | Substitute .....                                                        | 17 |
| 5.4        | Assessment of proposed GHG abatement measures .....                     | 18 |
| 5.5        | Advancing technologies and opportunities .....                          | 23 |
| 5.6        | Monitoring and reporting .....                                          | 23 |
| 6.         | Risks and Likely Magnitude of Impacts on Environmental Values .....     | 24 |
| 7.         | Summary and Conclusions .....                                           | 25 |
| 8.         | References .....                                                        | 26 |
| Appendix A | Expanded Emissions Inventory .....                                      | 27 |

## Tables

|          |                                                                                                                                                                                                 |    |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Table 1  | Sections of the Greenhouse Gas Assessment addressing requirements of the GHG Guideline .....                                                                                                    | 2  |
| Table 2  | Project activities that cause GHG emissions .....                                                                                                                                               | 7  |
| Table 3  | Summary of energy content and emissions factors for Scope 1 components of the Project .....                                                                                                     | 8  |
| Table 4  | Summary of Scope 3 emissions factors for components of the Project .....                                                                                                                        | 9  |
| Table 5  | Summary of LOM and average annual unabated GHG emissions (t CO <sub>2</sub> -e) .....                                                                                                           | 11 |
| Table 6  | Summary of unabated NGER reportable energy use, electricity generation, and associated GHG emissions for the Project .....                                                                      | 12 |
| Table 7  | Vegetation clearance areas and resulting emissions for the Project .....                                                                                                                        | 13 |
| Table 8  | Emissions from Project's sewage treatment plants .....                                                                                                                                          | 13 |
| Table 9  | Summary of unabated Scope 3 GHG emissions produced during the operation, construction, and decommissioning phases of the Project by category .....                                              | 14 |
| Table 10 | Summary of LOM and average annual unabated and abated GHG emissions (t CO <sub>2</sub> -e) .....                                                                                                | 15 |
| Table 11 | GHG abatement plan requirements reference table .....                                                                                                                                           | 15 |
| Table 12 | Base case and abated case sources and quantities of GHG emissions (t CO <sub>2</sub> -e) by activity .....                                                                                      | 18 |
| Table 13 | Targets, management controls and timing .....                                                                                                                                                   | 19 |
| Table 14 | Assessment of proposed GHG abatement measures .....                                                                                                                                             | 21 |
| Table 15 | Queensland, Australia, and global carbon budgets (Gt CO <sub>2</sub> -e) remaining to achieve Paris agreement goals and the relative Project LOM Scope 1 emissions proportion (%) of the budget | 24 |
| Table A1 | Diesel consumption and GHG emissions by category .....                                                                                                                                          | 27 |
| Table A2 | Summary of GHG emissions (t CO <sub>2</sub> -e) and emissions intensity (t CO <sub>2</sub> -e/t.km) from truck freight during the construction phase of the Project .....                       | 29 |
| Table A3 | Summary of GHG emissions (t CO <sub>2</sub> -e) and emissions intensity (t CO <sub>2</sub> -e/t.km) from truck freight during the operations phase of the Project .....                         | 30 |
| Table A4 | Summary of GHG emissions (t CO <sub>2</sub> -e) produced by the transport of gold doré bars from the Project site to the Perth Mint .....                                                       | 31 |
| Table A5 | Comparison of annual and LOM GHG emissions (t CO <sub>2</sub> -e) associated with the manufacturing of construction materials and reagents for the Project .....                                | 31 |
| Table A6 | Summary of annual and LOM GHG emissions (t CO <sub>2</sub> -e) associated with the manufacturing of construction materials purchased during the construction phase of the Project .....         | 32 |
| Table A7 | Summary of annual and LOM GHG emissions (t CO <sub>2</sub> -e) associated with manufacturing of reagents purchased during the operation phase of the Project .....                              | 32 |
| Table A8 | Summary of LOM GHG emissions (t CO <sub>2</sub> -e) produced by the upstream diesel processing during the construction and operation phases of the Project .....                                | 33 |

## Glossary

| Term                  | Definition                                                                       |
|-----------------------|----------------------------------------------------------------------------------|
| GJ                    | Gigajoule                                                                        |
| kL                    | Kilolitres                                                                       |
| kt CO <sub>2</sub> -e | Kilotonnes of carbon dioxide equivalent                                          |
| Mt CO <sub>2</sub> -e | Million tonnes of carbon dioxide equivalent                                      |
| kWh                   | Kilowatt hour                                                                    |
| MW                    | Megawatt                                                                         |
| t                     | Tonnes                                                                           |
| t CO <sub>2</sub> -e  | Tonnes of carbon dioxide equivalent                                              |
| Nomenclature          | Definition                                                                       |
| CH <sub>4</sub>       | Methane                                                                          |
| CO <sub>2</sub>       | carbon dioxide                                                                   |
| CO <sub>2</sub> -e    | carbon dioxide equivalents                                                       |
| Abbreviation          | Definition                                                                       |
| ATAP                  | Australian Transport Assessment and Planning                                     |
| BNE                   | Brisbane Airport                                                                 |
| BVS                   | Big Vein South                                                                   |
| CC Act                | <i>Climate Change Act 2022</i>                                                   |
| CCCA Act              | <i>Climate Change (Consequential Amendments) Act 2022</i>                        |
| CEJ Act               | <i>Clean Economy and Jobs Act 2024</i>                                           |
| CER                   | Clean Energy Regulator                                                           |
| CFI                   | Carbon Farming Initiative                                                        |
| CIL                   | Carbon In-Leach                                                                  |
| CRL                   | Commercial Readiness Level                                                       |
| Cth                   | Commonwealth                                                                     |
| DETSI                 | Department of Environment, Tourism, Science and Innovation                       |
| EA                    | Environmental Authority                                                          |
| EAR                   | Environmental Assessment Report                                                  |
| EF                    | Emission factor                                                                  |
| EP                    | Equivalent Person                                                                |
| EP Act                | <i>Environmental Protection Act 1994</i>                                         |
| FullCAM               | Full Carbon Accounting Model                                                     |
| GHG                   | Greenhouse gas(es)                                                               |
| GHG Guideline         | <i>Guideline Greenhouse gas emissions ESR/2024/6819</i>                          |
| ICAO                  | International Civil Aviation Organisation                                        |
| ICEC                  | ICAO Carbon Emissions Calculator                                                 |
| LOM                   | Life of mine                                                                     |
| LULUCF                | Land use, land use change, and forestry                                          |
| NEM                   | National Electricity Market                                                      |
| NGER                  | National Greenhouse and Energy Reporting                                         |
| NGER Act              | <i>National Greenhouse and Energy Reporting Act 2007</i>                         |
| NGER Determination    | <i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i> |
| NHVR                  | National Heavy Vehicle Regulator                                                 |
| PER                   | Perth Airport                                                                    |
| PV                    | photovoltaic                                                                     |
| QLD                   | Queensland                                                                       |
| RCM                   | Richmond Airport                                                                 |
| SMC                   | Strategic Minerals Corporation                                                   |
| SOP                   | Standard Operating Procedures                                                    |
| STP                   | Sewage Treatment Plant                                                           |

|        |                                                       |
|--------|-------------------------------------------------------|
| TGT    | Target(s)                                             |
| TRL    | Technical Readiness Level                             |
| TVL    | Townsville Airport                                    |
| UNFCCC | United Nations Framework Convention on Climate Change |

# 1. INTRODUCTION

## 1.1 Project description

Katestone Environmental Pty Ltd was commissioned by Strategic Minerals Corporation (SMC) to complete a Greenhouse Gas (GHG) Assessment for the Big Vein South Gold Project (the Project) addressing the requirements of the Department of Environment, Science, Tourism and Innovation (DETSI) *Greenhouse Gas Emissions Guideline ESR/2024/6819* (GHG Guideline) (section 2.3.1). Table 1 identifies the sections of this report that address each of the specific requirements of the GHG Guideline.

The Project involves the construction and operation of an open cut gold mine on a greenfield site in North Queensland. The Project site covers an area of approximately 2,281 ha and is located approximately 100 km north of Richmond and 380 km west of Townsville.

Open cut mining will be conducted using excavators and trucks. Gold ore will be processed on site to produce gold doré (solid bars containing gold alloy). The mine's peak production rate will be up to 1.95 million tonnes per annum of run of mine (ROM) gold ore, yielding up to approximately 100,000 ounces of gold doré per annum. The mine life will be approximately 11 years.

The following mining and ore processing activities will be undertaken as part of the Project:

- Developing three open cut pits, as follows:
  - The main Big Vein South Pit (BVS Pit) located in the centre of the Project site. Waste rock from this pit will be hauled by truck and stored in the Central and Southern Waste Rock Dumps (WRDs).
  - Two small satellite pits, BV1 Pit and BV2 Pit, located in the northern part of the Project site. Waste rock from these pits will be stored in the Northern WRD.
- Ore will be transported in haul trucks from the open cut pits to the ROM stockpiles located near the mine processing facilities at the southern end of the Project site.
- Ore will be processed from the BV1 and BV2 pits in the first 2 years of mining using gold cyanidation in heap leach pads for gold elution. Processing of ore mined from the BVS Pit will occur in an on-site Carbon In-Leach (CIL) Plant from Year 3 onwards. The heap leaching process will generate spent heap leach residues. These residues will be reprocessed in the CIL Plant over the life of the mine. The CIL Plant will generate wet tailings and dewatered tailings. Wet tailings will be pumped to a Tailings Storage Cell. Dewatered tailings will be stored with waste rock in the Central and Southern WRDs.
- Doré bars will be transported from the site via plane to a refinery.

The majority of the mine infrastructure will be located at the southern end of the Project site. Key mine infrastructure will include ore processing facilities, workshop, warehouse, administration buildings, haul and access roads, vehicle servicing, refuelling and wash down facilities, fuel storage facilities, diesel and solar power station, water supply and water management infrastructure. Workforce accommodation and a private airstrip will also be located at the southern end of the Project site.

**Table 1      Sections of the Greenhouse Gas Assessment addressing requirements of the GHG Guideline**

| <b>Application requirements</b>                                                                                                                    | <b>Section</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>a.</b> Method for estimating GHG emissions                                                                                                      | Section 3      |
| <b>b.</b> GHG emissions inventory (including Scope 1, 2 and 3)                                                                                     | Section 4      |
| <b>c.</b> GHG emission mitigation and management practices<br>(including Scope 3 where possible)                                                   | Section 5      |
| <b>d.</b> GHG abatement plan                                                                                                                       | Section 5      |
| <b>e.</b> A risk assessment that outlines the Project's relative<br>contribution to climate change impacts on Queensland's<br>environmental values | Section 6      |

## 2. REGULATORY ENVIRONMENT

### 2.1 Global Agreement

#### 2.1.1 Paris Agreement on Climate Change

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 195 Parties, including Australia, at the UN Climate Change Conference (COP21) on 12 December 2015 and entered into force on 4 November 2016.

The overarching goal is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and to pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.”

### 2.2 Legislation and Regulation

#### 2.2.1 Climate Change Act 2022 (Cth)

The *Climate Change Act 2022* (CC Act) provides the legislative framework to implement Australia’s net-zero commitments and codifies Australia’s 2030, 2035 and 2050 net GHG emissions reductions targets under the Paris Agreement. The legislated targets are to reduce net GHG emissions to 43% below 2005 levels by 2030, and 62 - 70% by 2035, and to reduce net GHG emissions to zero by 2050. The CC Act establishes that 2030 GHG emissions reduction target as a national point target and an emissions budget. The CC Act does not impose obligations directly on companies, but it does signal sector-based reforms to achieve the GHG emissions reduction targets.

#### 2.2.2 National Greenhouse and Energy Reporting Act 2007 (Cth)

##### 2.2.2.1 Emissions and Energy Reporting

The *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act) and related legislative and regulatory instruments, establishes the NGER Scheme, a national framework for corporations to report GHG emissions as well as energy production and consumption.

NGER registration and emissions reporting are mandatory for facilities that have energy production or consumption in excess of 100 terajoules (TJ) or specified GHG emissions<sup>1</sup> that exceed 25,000 t CO<sub>2</sub>-e in a financial year. The reporting thresholds for corporate groups are energy production or consumption in excess of 200 TJ or GHG emissions that exceed 50,000 t CO<sub>2</sub>-e in a financial year. These entities are required to report on their Scope 1 and Scope 2 emissions. Scope 3 emissions are not included in NGER reporting due to the potential for double counting.

The *NGER (Measurement) Determination 2008* (Cth) provides methods, criteria, and measurement standards for calculating greenhouse gas emissions and energy data under the NGER Act. It covers Scope 1 and Scope 2 emissions and energy production and consumption.

---

<sup>1</sup> Relevant to this Project, GHG emissions related to land clearing and explosives are excluded.

### 2.2.2.2 Safeguard Mechanism

The Safeguard Mechanism requires large facilities, whose net emissions exceed the safeguard threshold of 100,000 tonnes of CO<sub>2</sub> equivalent per year, to keep their emissions at or below a progressively declining production-adjusted baseline.

The legislative framework for the Safeguard Mechanism is set out in the NGER Act with details defined in the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (the Safeguard Rules).

Following the reforms underpinned by the *Safeguard Mechanism (Crediting) Amendment Act 2023* (Cth), baselines will decline in a predictable and gradual way. The decline rate applying to all Safeguard facilities is set at 4.9% each year to 2030. After 2030, decline rates will be set in predictable five-year blocks, consistent with updates to Australia's Nationally Determined Contribution under the Paris Agreement. Total emissions from all Safeguard facilities are also required to reduce over time, measured on a five-year rolling average.

### 2.2.3 Environmental Protection Act 1994 (Qld)

The *Environmental Protection Act 1994* (EP Act) seeks to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The EP Act does not explicitly regulate the emission of GHG. However:

- Regarding air emissions, a contaminant can be a gas (11(a))
- GHG emissions may constitute an environmental harm (14(1)(2)), i.e., "... any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value ..." "whether the harm is a direct or indirect result of the activity; or whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors".

### 2.2.4 Clean Economy Jobs Act 2024 (Qld)

The purpose of the *Clean Economy Jobs Act 2024* (CEJ Act) is to reduce GHG emissions in Queensland by legislating emissions reduction targets. The CEJ Act sets a target of net zero emissions by 2050, with an interim emissions reduction target of 75% below 2005 emissions by 2035. The initial target of a reduction by 30% of 2005 levels by 2030 has already been achieved.

Queensland's emissions in 2005 were 197.3 Mt CO<sub>2</sub>-e meaning that annual emissions will need to be reduced to 49.3 MTCO<sub>2</sub>-e or below by 2035.

## 2.3 Policy and Guidelines

### 2.3.1 DETSI Guideline Greenhouse gas emissions

The DETSI *Guideline Greenhouse gas emissions ESR/2024/6819* (GHG Guideline) describes requirements under the EP Act and provides information about how to meet these requirements in relation to GHG emissions for new and amended environmental authority (EA) applications.

The GHG Guideline sets out the minimum expectations for GHG emissions information to be provided with applications and supports rigorous, defensible, and transparent decision making in relation to GHG emissions. The required information described by the GHG Guideline includes:

- An inventory of expected GHG emissions resulting from the Project including the stage at which the emissions will occur and a breakdown by source
- An estimate of Projected Scope 1 and Scope 2 CO<sub>2</sub>-e emissions over the life of the Project, including an unabated and abated emissions scenario
- An estimate of annual Scope 3 emissions and total Scope 3 emissions over the life of the Project
- A description of the methodology used for estimating GHG emissions
- A GHG abatement (decarbonisation) plan in alignment with recommendations made in Appendix A of the GHG Guideline
- A description of risks and the likely magnitude of impacts on environmental values resulting from the Project, including qualitatively describing the impacts of climate change on environmental values and the likely magnitude of such impacts based on the relative scale of the Project's net GHG emissions.

### **2.3.2 Corporate Value Chain (Scope 3) Accounting and Reporting Standard**

The Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Scope 3 Standard) (GHG Protocol, 2011) is the only internationally accepted method for Scope 3 emissions accounting.

Scope 3 emissions refer to all indirect emissions occurring in the value chain of a reporting company, including upstream and downstream emissions, that are not included in the reporting company's Scope 1 and 2 inventory.

## 3. METHOD

### 3.1 Emissions assessment boundary

The GHG emissions assessment boundary includes:

- Construction activities of the Project under the operational control of SMC (Scope 1).
- Operational activities of the Project under the operational control of SMC (Scope 1).
- Decommissioning activities of the Project under the operational control of SMC (Scope 1)
- Transportation of incoming freight (Scope 3).
- Transportation of gold doré bars to Perth Mint (Scope 3), and
- Construction materials and processing reagents purchased by SMC for the Project (Scope 3).

#### 3.1.1 Reporting boundaries

##### 3.1.1.1 Environmental Authority (QLD)

The Environmental Authority (EA) boundary includes all Scope 1, Scope 2 and relevant Scope 3 emissions from activities authorised by the EA. In addition to the NGER and Safeguard boundaries, it explicitly includes land-clearing emissions (for state and national LULUCF inventory purposes) and emissions from explosives, which are treated as the activity of fuel combustion.

##### 3.1.1.2 National Greenhouse and Energy Reporting Scheme (Cth)

The NGER reporting boundary covers reportable Scope 1 and Scope 2 emissions and associated energy production and consumption, in accordance with the NGER Act and NGER Determination. Vegetation clearing and explosives emissions are not reported to NGER; however, the energy content of fuels added to explosives (e.g. diesel in ANFO) is required to be reported as energy consumed.

##### 3.1.1.3 Safeguard Mechanism (Cth)

The Safeguard Mechanism reporting boundary covers all reportable Scope 1 and Scope 2 NGER emissions at the facility.

### 3.2 Scope 1, Scope 2, and Scope 3 emissions

GHG emissions are classified into three Scopes for monitoring, reporting, and management purposes. In Australia, these are defined in the NGER Act as:

- Scope 1. GHG emissions released to the atmosphere as a direct result of an activity or series of activities that are controlled by a company, and which are reported at a facility level. This would include emissions from combustion of diesel during construction or operation of the Project. These direct emissions are reported annually if the emissions exceed a legislated threshold (section 2.2.2).
- Scope 2. GHG emissions released to the atmosphere because of the generation of electricity that has been purchased by a company for use at a facility such as the Project. These are considered indirect emissions and are reported annually if the facility exceeds a legislated threshold (section 2.2.2).
- Scope 3. GHG emissions released to the atmosphere upstream or downstream in an organisation's supply or value chain. These indirect emissions are not reported under the NGER Act as they are another

company or organisation's Scope 1 or Scope 2 emissions (Section 3.1.). The Scope 3 emissions categories relevant to the Project include:

- Category 2: Capital goods
- Category 3: Fuel and energy related emissions
- Category 4: Upstream transportation and distribution

### 3.3 Project activities that produce GHG emissions

Project activities that will lead to GHG emissions are presented in Table 2. These are differentiated by their scope and the Project phase in which they occur. It is anticipated that diesel combustion will be the primary source of Scope 1 emissions at all stages of the Project. There are no Scope 2 emissions resulting from the Project as no electricity will be purchased from the National Electricity Market (NEM). Embedded emissions are anticipated to be the largest source of Scope 3 emissions.

A small fraction of calcite is associated with the ore; however the refinement process is unlikely to convert this to CO<sub>2</sub>, so this has been excluded from the assessment.

**Table 2 Project activities that cause GHG emissions**

| Phase                  | Scope 1                                                                                                                                                    | Scope 3                                                                                                                                                                                             |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Construction</b>    | <ul style="list-style-type: none"> <li>• Diesel combustion by stationary plant</li> <li>• Vegetation clearance</li> <li>• Wastewater handling</li> </ul>   | <ul style="list-style-type: none"> <li>• Materials fabrication or manufacture</li> <li>• Diesel combustion for transport of materials</li> <li>• Upstream fuel extraction and processing</li> </ul> |
| <b>Operation</b>       | <ul style="list-style-type: none"> <li>• Diesel combustion by stationary plant</li> <li>• Diesel for explosives</li> <li>• Wastewater treatment</li> </ul> | <ul style="list-style-type: none"> <li>• Diesel combustion for transport of materials</li> <li>• Upstream fuel extraction and processing</li> </ul>                                                 |
| <b>Decommissioning</b> | <ul style="list-style-type: none"> <li>• Diesel combustion by stationary plant</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>• Upstream fuel extraction and processing</li> </ul>                                                                                                         |

### 3.4 Calculation of Scope 1 emissions

#### 3.4.1 Emissions from construction, operations and decommissioning

Projected Scope 1 and Scope 3 construction, operation, and decommissioning emissions are calculated from activity data provided by SMC, applying the methods and emissions factors described in the following resources:

- NGER Measurement Determination
- The National Greenhouse Accounts Factors (to date)
- The Australian Life Cycle Inventory Database Initiative
- The Greenhouse Gas Protocol (WRI/WBCSD, 2004)

- Australian Transport Assessment and Planning (ATAP) Guidelines
- International Civil Aviation Organisation (ICAO) Carbon Emissions Calculator (ICEC).

Method 1 of the NGER Measurement Determination is used to calculate Scope 1 emissions. The formula is:

$$t\ CO2_e = \frac{Q \times ECF \times EF}{1000}$$

where Q is the quantity of the emission source (e.g., with units kL or kWh), ECF is the energy content factor of the emission source (with units GJ/kL), EF is the emission factor that describes the total amount of equivalent CO<sub>2</sub> emissions associated with the emission source (i.e., with units kgCO<sub>2</sub>-e/GJ) (Table 3), and the 1000 returns the correct units for the emissions (t CO<sub>2</sub>-e).

**Table 3 Summary of energy content and emissions factors for Scope 1 components of the Project**

| Emission source                   | Energy content | Units  | Emission factor | Units                   |
|-----------------------------------|----------------|--------|-----------------|-------------------------|
|                                   |                |        | Scope 1         |                         |
| Diesel (transport) <sup>1</sup>   | 38.6           | GJ/kL  | 70.41           | kgCO <sub>2</sub> -e/GJ |
| Diesel (stationary) <sup>1</sup>  | 38.6           | GJ/kL  | 70.20           | kgCO <sub>2</sub> -e/GJ |
| Gasoline (transport) <sup>1</sup> | 34.2           | GJ/kL  | 67.62           | kgCO <sub>2</sub> -e/GJ |
| LPG (transport) <sup>1</sup>      | 26.2           | GJ/kL  | 61.60           | kgCO <sub>2</sub> -e/GJ |
| <i>Eucalyptus</i> open woodland   | 22.05          | t C/ha | 80.85           | t CO <sub>2</sub> -e/ha |
| <sup>1</sup> (DCCEEW, 2025)       |                |        |                 |                         |

### 3.4.2 Emissions from vegetation clearance

The Full Carbon Accounting Model (FullCAM) (Richards 2001) is used to assess the carbon stock (tonnes carbon per hectare, tC/ha) of vegetation within the proposed clearing areas (Table 3, Table 7). FullCAM is the standard method for measuring change in carbon stocks due to land use change and is used to assess the effects of land use, land use change, and forestry (LULUCF) in Australia's National Greenhouse Gas Accounts. It estimates the carbon stock change at a grid scale of 25 m x 25 m including:

- Above and belowground biomass
- Standing and decomposing debris
- Soil carbon

Vegetation to be cleared is classified and modelled as *Eucalyptus* open woodland and results are presented as if all carbon is converted to CO<sub>2</sub>-e in the year that it is cleared. The formula is:

$$t\ CO2_e = t\ C_{total} \times \left(\frac{44}{12}\right) \times ha_{total\ cleared}$$

### 3.4.3 Emissions from wastewater treatment

Emissions from the proposed sewage treatment plants (STPs) are calculated with Method 1 in the NGER wastewater domestic and commercial calculator<sup>2</sup>, and are conservatively estimated based on the peak design capacity of each STP.

## 3.5 Calculation of Scope 3 emissions

### 3.5.1 Emissions from procured construction materials and reagents

A variation of Method 1 of the NGER Measurement Determination is used to calculate Scope 3 emissions of procured construction materials and reagents:

$$t\ CO2_e = \frac{Q \times EF}{1000}$$

where Q is the volume (m<sup>3</sup>) or mass (t) of the materials and EF is the published emissions factor given in Table 4.

**Table 4 Summary of Scope 3 emissions factors for components of the Project**

| Emission source                                                              | Scope 3 emission factor | Units                               |
|------------------------------------------------------------------------------|-------------------------|-------------------------------------|
| Diesel (transport) <sup>1</sup>                                              | 17.3                    | kgCO <sub>2</sub> -e/GJ             |
| Concrete (32 MPa) <sup>2</sup>                                               | 392.91                  | kgCO <sub>2</sub> -e/m <sup>3</sup> |
| Concrete (50 MPa) <sup>2</sup>                                               | 599.96                  | kgCO <sub>2</sub> -e/m <sup>3</sup> |
| Structural steel <sup>2</sup>                                                | 1,770                   | kg/CO <sub>2</sub> -e/t             |
| High-strength steel <sup>2</sup>                                             | 4,550                   | kg/CO <sub>2</sub> -e/t             |
| Stainless steel <sup>2</sup>                                                 | 4,550                   | kg/CO <sub>2</sub> -e/t             |
| Steel for grinding media <sup>2</sup>                                        | 1,770                   | kg/CO <sub>2</sub> -e/t             |
| Rebar for concrete <sup>2</sup>                                              | 1,500                   | kg/CO <sub>2</sub> -e/t             |
| Aggregate <sup>3</sup>                                                       | 7.75                    | kg/CO <sub>2</sub> -e/t             |
| Quicklime <sup>4</sup>                                                       | 1,218                   | kg/CO <sub>2</sub> -e/t             |
| Sodium Cyanide <sup>5</sup>                                                  | 899                     | kg/CO <sub>2</sub> -e/t             |
| Hydrogen Peroxide <sup>6</sup>                                               | 442                     | kg/CO <sub>2</sub> -e/t             |
| <sup>1</sup> (DCCEEW, 2023)                                                  |                         |                                     |
| <sup>2</sup> (The Australian Life Cycle Inventory Database Initiative, 2023) |                         |                                     |

<sup>2</sup> Clean Energy Regulator. (2025). *Estimating emissions and energy: Wastewater handling—domestic, commercial and industrial guideline*. <https://cer.gov.au/document/estimating-emissions-and-energy-wastewater-handling-domestic-and-commercial-and-industrial-guideline>

<sup>3</sup> (Climatiq, 2022)

<sup>4</sup> (vdz, 2023)

<sup>5</sup> (Australian Gold Reagents Pty Ltd, 2022)

<sup>6</sup> (Yuke, et al., 2022)

### 3.5.2 Emissions from incoming freight

Emissions resulting from incoming freight are estimated by multiplying the industry published fuel consumption of each vehicle type (four, five or six axle articulated etc.) and vehicle class, and the Projected transport distances (km) for each vehicle. The fuel consumption (L/100 km) of each vehicle type was calculated according to the *Australian Transport Assessment and Planning Guidelines* (ATAP, 2020) using maximum vehicle weight limits designated by the *Australian Heavy Vehicle Regulator* (NHVR, 2016). Emissions factors in Schedule 1, NGER Determination (Table 3) were applied to evaluate total GHG emissions resulting from fuel consumption.

### 3.5.3 Emissions from transport of gold doré bars

Emissions created by the transport of gold on the regular commercial flights was calculated using the *International Civil Aviation Organisation (ICAO) Carbon Emissions Calculator*. Unit emission rates were calculated by determining the emissions rate per passenger from Richmond to Townsville, Townsville to Brisbane and Brisbane to Perth and multiplying this value by 5.5 passenger equivalents for the seats occupied by the security team members and gold Doré bars.

It is expected that 10 gold doré bars weighing 25kg each will be transported from the Project site at the end of each week. Once the on-site airstrip is constructed, the gold doré bars will be transported by plane directly from the site to Townsville. Prior to the commissioning of the on-site airstrip, the transportation of gold doré bars will involve the following stages and is assumed to occur under escort of three (3) security team members:

- Road travel via coaster bus from the Project site to Richmond Airport (RCM)
- Air travel via the regularly scheduled ATR-72 to Townsville Airport (TVL)
- Air travel via commercial airline carrier from TVL to Brisbane Airport (BNE)
- Air travel via commercial airline carrier from BNE to Perth airport (PER)
- Road travel from PER to the Perth Mint<sup>3</sup>.

This transport sequence has been used, conservatively, as the basis of the emissions calculations.

### 3.5.4 Emissions from upstream processing of purchased diesel

Method 1 of the NGER Measurement Determination (section 3.4.1) was used to evaluate total Scope 3 GHG emissions from the upstream extraction and processing of diesel, applying the EF in the National Greenhouse Accounts Factors (Table 4) and diesel consumption data provided by SMC.

<sup>3</sup> Road travel from PER to the Perth Mint is considered immaterial for the purposes of this GHG assessment due to the low distance and frequency of trips

## 4. GREENHOUSE GAS INVENTORY

This GHG emissions inventory presents forecast unabated Scope 1 and Scope 3 emissions over the life of the mine (LOM).

### 4.1 Summary EA emissions

The estimated unabated LOM GHG emissions are as follows:

- LOM Scope 1 emissions, including construction and decommissioning, are estimated to be 931,073 t CO<sub>2</sub>-e, with an annual average value of 71,621 t CO<sub>2</sub>-e
- LOM Scope 3 emissions are estimated at 670,365 t CO<sub>2</sub>-e, with an annual average value of 51,567 t CO<sub>2</sub>-e

**Table 5** Summary of LOM and average annual unabated GHG emissions (t CO<sub>2</sub>-e)

| Scope   | Metric         | Unabated | Unit                 |
|---------|----------------|----------|----------------------|
| Scope 1 | Average annual | 71,621   | t CO <sub>2</sub> -e |
|         | Total          | 931,073  | t CO <sub>2</sub> -e |
| Scope 3 | Average annual | 51,567   | t CO <sub>2</sub> -e |
|         | Total          | 670,365  | t CO <sub>2</sub> -e |

The estimated Project annual Scope 1 and Scope 2 emissions are greater than 25,000 t CO<sub>2</sub>-e and the Project is therefore a medium to high emitter under the GHG Guidelines, requiring an inventory of Scope 3 emissions (section 4.6) and the development of a GHG Abatement Plan (section 5).

### 4.2 Energy consumption and emissions

Total LOM energy consumption is projected at 11,923,262 GJ with diesel used for electricity generation being the largest consumer of energy (6,671,077 GJ), followed by diesel used in other stationary plant (4,775,914 GJ), and diesel consumed by explosives mixed onsite (225,721 GJ) (Table 6). Energy consumed for electricity generation is estimated to produce 648,576,923 kilowatt hours (kWh) of electricity at an assumed generation efficiency of 35 percent.

NGER reportable Scope 1 emissions are proportional to energy consumption, with diesel combusted for electricity generation the largest source at 468,310 t CO<sub>2</sub>-e over the LOM, followed by diesel combusted for stationary purposes, at 335,269 t CO<sub>2</sub>-e (Table 6). Total emissions for the LOM to be reported to NGER are estimated at 806,722 t CO<sub>2</sub>-e. A detailed breakdown of diesel combustion line items is provided in Appendix A, A1.1.

**Table 6 Summary of unabated NGER reportable energy use, electricity generation, and associated GHG emissions for the Project**

| Year           | Energy            |                      |                   |         |         |                   |                        | Emissions (t CO <sub>2</sub> -e) |                    |       |         |                |
|----------------|-------------------|----------------------|-------------------|---------|---------|-------------------|------------------------|----------------------------------|--------------------|-------|---------|----------------|
|                | Consumed (GJ)     |                      |                   |         |         |                   | Produced (kWh)         |                                  |                    |       |         |                |
|                | Diesel stationary | Diesel - Electricity | Diesel Explosives | Oils    | Greases | Total             | Electricity Generation | Diesel stationary                | Diesel Electricity | Oils  | Greases | Total          |
| <b>1</b>       | 651,451           | 188,003              | 24,414            | 15,762  | 2,364   | <b>881,994</b>    | 18,278,077             | 45,732                           | 13,198             | 219   | 8       | <b>59,157</b>  |
| <b>2</b>       | 706,935           | 303,231              | 33,444            | 19,194  | 2,879   | <b>1,065,682</b>  | 29,480,769             | 49,627                           | 21,287             | 267   | 10      | <b>71,190</b>  |
| <b>3</b>       | 463,869           | 626,677              | 25,494            | 20,810  | 3,121   | <b>1,139,971</b>  | 60,926,923             | 32,564                           | 43,993             | 289   | 11      | <b>76,856</b>  |
| <b>4</b>       | 463,869           | 784,357              | 25,494            | 23,980  | 3,597   | <b>1,301,296</b>  | 76,256,923             | 32,564                           | 55,062             | 333   | 13      | <b>87,971</b>  |
| <b>5</b>       | 463,869           | 788,400              | 25,494            | 24,061  | 3,609   | <b>1,305,433</b>  | 76,650,000             | 32,564                           | 55,346             | 334   | 13      | <b>88,256</b>  |
| <b>6</b>       | 463,869           | 776,271              | 25,494            | 23,817  | 3,573   | <b>1,293,023</b>  | 75,470,769             | 32,564                           | 54,494             | 331   | 13      | <b>87,401</b>  |
| <b>7</b>       | 334,449           | 776,271              | 17,311            | 21,215  | 3,182   | <b>1,152,428</b>  | 75,470,769             | 23,478                           | 54,494             | 295   | 11      | <b>78,279</b>  |
| <b>8</b>       | 315,909           | 776,271              | 14,085            | 20,842  | 3,126   | <b>1,130,234</b>  | 75,470,769             | 22,177                           | 54,494             | 290   | 11      | <b>76,972</b>  |
| <b>9</b>       | 300,359           | 776,271              | 17,873            | 20,530  | 3,079   | <b>1,118,112</b>  | 75,470,769             | 21,085                           | 54,494             | 285   | 11      | <b>75,876</b>  |
| <b>10</b>      | 283,406           | 784,357              | 14,937            | 20,352  | 3,053   | <b>1,106,105</b>  | 76,256,923             | 19,895                           | 55,062             | 283   | 11      | <b>75,251</b>  |
| <b>11</b>      | 44,959            | 90,969               | 1,681             | 1,618   | 243     | <b>139,470</b>    | 8,844,231              | 3,156                            | 6,386              | 22    | 1       | <b>9,565</b>   |
| <b>12</b>      | 141,486           | -                    | -                 | 2,844   | 427     | <b>144,757</b>    | -                      | 9,932                            | -                  | 40    | 1       | <b>9,973</b>   |
| <b>13</b>      | 141,486           | -                    | -                 | 2,844   | 427     | <b>144,757</b>    | -                      | 9,932                            | -                  | 40    | 1       | <b>9,973</b>   |
| <b>Total</b>   | 4,775,914         | 6,671,077            | 225,721           | 217,869 | 32,680  | <b>11,923,262</b> | 648,576,923            | 335,269                          | 468,310            | 3,028 | 114     | <b>806,722</b> |
| <b>Average</b> | 367,378           | 513,160              | 17,363            | 15,762  | 2,364   | <b>917,174</b>    | 49,890,533             | 25,790                           | 36,024             | 233   | 9       | <b>62,056</b>  |

### 4.3 NGER obligations

Scope 1 and 2 GHG emissions and energy use/production associated with the Project will need to be accounted for in annual NGER scheme reporting as the energy consumption threshold of 100 GJ is exceeded in all years and the emissions threshold of 25,000 t CO<sub>2</sub>-e is exceeded in all Project years except for the final year of operations.

#### 4.3.1 Safeguard mechanism

The maximum annual Scope 1 GHG emissions for the Project covered under Safeguard is estimated at 88,256 t CO<sub>2</sub>-e (see table 6) which does not exceed the Safeguard Mechanism facility threshold of 100,000 t CO<sub>2</sub>-e/yr. The Project would therefore not be subject to the requirements of the Safeguard Mechanism.

### 4.4 Emissions from vegetation clearance

Vegetation clearing is proposed to occur from Project Year 1 to Project Year 7. All carbon stock losses from land clearing are accounted for in the year in which the clearing occurs. The highest emissions are estimated to be 36,383 t CO<sub>2</sub>-e in Project Year 1 (Table 7), associated with the clearing of approximately 450 hectares of woodland. The area to be cleared, and the associated emissions, progressively reduce each year until Project Year 8, when no further clearing is required. Carbon resequenced through rehabilitation has not been considered in this assessment as any areas of woodland revegetation are not likely to have established until after mine closure.

**Table 7** Vegetation clearance areas and resulting emissions for the Project

| Project Year                     | 1      | 2      | 3      | 4     | 5     | 6     | 7     | 8 -13 | Total   |
|----------------------------------|--------|--------|--------|-------|-------|-------|-------|-------|---------|
| Cleared vegetation Areas (ha)    | 450    | 300    | 250    | 100   | 100   | 100   | 41    | 0     | 1,341   |
| Emissions (t CO <sub>2</sub> -e) | 36,383 | 24,255 | 20,213 | 8,085 | 8,085 | 8,085 | 3,315 | 0     | 108,420 |

### 4.5 Emissions from wastewater handling

Emissions from wastewater handling were determined for three STPs: the northern mining industrial area STP with a design capacity of 50 equivalent person (EP)), the main mining industrial area STP with a design capacity of 200 EPs, and the accommodation camps STP with a design capacity of 300 EP. There are no methane emissions because of managed aerobic treatment (0 t CO<sub>2</sub>-e), while emissions from nitrogen are estimated at 6.6 t CO<sub>2</sub>-e per year, or 86 t CO<sub>2</sub>-e for the LOM (Table 8).

**Table 8** Emissions from Project's sewage treatment plants

| Design Capacity (Equivalent Persons) | Emissions (t CO <sub>2</sub> -e) |     |
|--------------------------------------|----------------------------------|-----|
|                                      | Annually                         | LOM |
| 550                                  | 6.6                              | 86  |

## 4.6 Scope 3 emissions

Total Scope 3 emissions for the LOM are estimated to be 670,365 t CO<sub>2</sub>-e (Table 9). Scope 3 emissions for the construction phase are estimated as 377,005 t CO<sub>2</sub>-e or 56.2% of total LOM emissions, while emissions for the operations phase are estimated as 293,360 t CO<sub>2</sub>-e or 43.8% of total LOM emissions.

The highest emissions contributors during the construction and decommissioning phase are the upstream processing of construction materials and liquid fuels (diesel, oils, and greases), with estimated emissions of 308,597 t CO<sub>2</sub>-e (81.9% of total) and 39,237 t CO<sub>2</sub>-e (10.4% of total), respectively.

The highest emissions contributors during the operation phase are related to upstream processing of liquid fuels and operation reagents, with estimated emissions of 168,106 t CO<sub>2</sub>-e (57.3 % of total) and 96,456 t CO<sub>2</sub>-e (32.9% of total), respectively. Further detail on the Scope 3 calculations, including category level breakdowns and input data, is provided in Appendix A2.

**Table 9 Summary of unabated Scope 3 GHG emissions produced during the operation, construction, and decommissioning phases of the Project by category**

| Category                                            | Construction and decommissioning phases |                                      |                              | Operation phase                         |                                      |                              |
|-----------------------------------------------------|-----------------------------------------|--------------------------------------|------------------------------|-----------------------------------------|--------------------------------------|------------------------------|
|                                                     | Annual Emissions (t CO <sub>2</sub> -e) | LOM emissions (t CO <sub>2</sub> -e) | Phase emissions contribution | Annual Emissions (t CO <sub>2</sub> -e) | LOM emissions (t CO <sub>2</sub> -e) | Phase emissions contribution |
| Transport of gold Doré bars                         | -                                       | -                                    | -                            | 96                                      | 1,059                                | 0.4%                         |
| Truck freight                                       | 2,652                                   | 29,171                               | 7.7%                         | 2,522                                   | 27,738                               | 9.5%                         |
| Diesel and PBOGs (upstream processing) <sup>1</sup> | 9,809                                   | 39,237                               | 10.4%                        | 18,678                                  | 168,106                              | 57.3%                        |
| Materials (construction)                            | 154,299                                 | 308,597                              | 81.9%                        | -                                       | -                                    |                              |
| Reagents (operations)                               | -                                       | -                                    | -                            | 8,769                                   | 96,456                               | 32.9%                        |
| Total                                               | 166,760                                 | 377,005                              | 100%                         | 30,065                                  | 293,360                              | 100%                         |
| Phase LOM contribution                              | 56.2%                                   |                                      |                              | 43.8%                                   |                                      |                              |
| Total LOM                                           | 670,365                                 |                                      |                              |                                         |                                      |                              |

<sup>1</sup> Construction and decommissioning are considered to include all diesel usage for Project Year 1 and 2 and Year 12 and 13

## 5. GREENHOUSE GAS ABATEMENT PLAN

This abatement plan will result in a reduction of 42,880 t CO<sub>2</sub>-e (4.6%) total LOM Scope 1 emissions and 11,443 t CO<sub>2</sub>-e (1.7%) total LOM Scope 3 emissions (Table 10) and annual average Scope 1 reduction of 3,292 t CO<sub>2</sub>-e. The primary abatement measure is the installation of a 2.5 MW solar PV array (solar array) for electricity generation at the commencement of the Project. This abatement measure will also be supported by energy efficiency in operations to reduce the amount of diesel combusted over the LOM.

**Table 10** Summary of LOM and average annual unabated and abated GHG emissions (t CO<sub>2</sub>-e)

| Scope   | Metric         | Unabated (t CO <sub>2</sub> -e) | Abated (t CO <sub>2</sub> -e) |
|---------|----------------|---------------------------------|-------------------------------|
| Scope 1 | Average annual | 71,621                          | 68,329                        |
|         | Total          | 931,073                         | 888,193                       |
| Scope 3 | Average annual | 51,567                          | 50,686                        |
|         | Total          | 670,365                         | 658,922                       |

Table 10 provides a reference to the sections of this report that address each of the abatement plan requirements as specified in Appendix A of the GHG guideline.

**Table 11** GHG abatement plan requirements reference table

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                   | Section                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>a. Project details</b>                                                                                                                                                                                                                                                                                                                                                                                     | Section 1                          |
| <b>b. Emissions Projections and commencing abatement measures:</b> <ul style="list-style-type: none"> <li>i. Emission inventory and estimates as developed in section 3.1 of the GHG Guideline</li> <li>ii. Management practices proposed to be implemented at commencement to reduce GHG emissions as per section 3.3 of the GHG Guideline</li> </ul>                                                        | Section 4, Section 5, Table 13     |
| <b>c. GHG emissions reference point:</b> <ul style="list-style-type: none"> <li>i. Outline the level of emissions against which ongoing reduction of GHG emissions will be assessed throughout the life of the Project (reference point) (based on Projected GHG emissions prior to implementation of the GHG abatement plan)</li> <li>ii. Provide justification for the reference points proposed</li> </ul> | Section 5.1                        |
| <b>d. Emission reduction targets:</b>                                                                                                                                                                                                                                                                                                                                                                         | Table 13, Section 5.2, Section 5.3 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>i. Identify interim Scope 1 and Scope 2 GHG emission reduction targets to be applied throughout the life of the Project</li> <li>ii. Identify long-term overall Scope 1 and Scope 2 GHG emission reduction targets.</li> <li>iii. Provide justification for the emission reduction trajectory and targets proposed and how they support the Queensland Government's GHG emission reduction targets</li> </ul>                                                                                                                                                                                                                                                                                                                       |                                                                      |
| <p><b>e. GHG emission reduction program (as detailed in section 3.3 and Appendix A (Part B) of the GHG guideline), including:</b></p> <ul style="list-style-type: none"> <li>i. Implementation details including timeframes for implementation and estimated reduction of emissions expected</li> <li>ii. Risk assessment details including cost, practicality, effectiveness and risks of each measure</li> <li>iii. Justification for each measure including a comparison of each proposed measure with relevant best practice environmental management standards</li> <li>iv. Estimates of emissions expected to be abated by each measure</li> <li>v. Any ongoing monitoring proposed to be undertaken to ensure the success of emission reduction measures</li> </ul> | Section 5, Table 13, Table 14, Section 5.4, Section 5.5, Section 5.6 |
| <p><b>f. Advancing technologies and opportunities:</b></p> <ul style="list-style-type: none"> <li>i. Include provisions for regularly reviewing new technologies to identify opportunities to further reduce emissions and energy efficiency</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Section 5.5                                                          |
| <p><b>g. Monitoring and auditing program</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Section 5.6                                                          |
| <p><b>h. Reporting:</b></p> <ul style="list-style-type: none"> <li>i. A program for periodic public reporting on progress towards the GHG emission reduction targets outlined in the GHG abatement plan, including details about how public reporting will be undertaken</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Section 5.6                                                          |

## 5.1 GHG emissions reference point

The projected total unabated LOM Scope 1 emissions (Table 5) and the unabated maximum annual Scope 1 emissions (Table 6) are the Project's GHG emissions reference points against which abatement will be measured. These reference points include all Projected Scope 1 emissions, i.e., NGER system reportable emissions and non-reportable emissions.

## 5.2 Targets, management controls and timing

Details of the Abatement Plan for the base case and residual (abated) emissions are provided in the following sections. The Abatement Plan focuses on Scope 1 emissions for the Project although there will be flow on effects on Scope 3 emissions (section 5.3.3.1).

The targets, their timing and management practises proposed for the Project's GHG Abatement Plan are summarised in Table 13.

For timing, *Immediate* applies to management controls that will be implemented from Project commencement. *Progressive long term* applies to initiatives that require further investigation, design, and business case assessment. These measures will be scoped and refined over the LOM and will be implemented where they are demonstrated to be technically feasible and cost effective.

## 5.3 Management controls

The GHG management measures in the Project Abatement Plan are framed on the GHG Guidelines abatement hierarchy.

### 5.3.1 Avoid

The Project is unable to feasibly avoid GHG emissions from its primary mining activities, except by ceasing or significantly reducing production. Avoidance would forgo development of the mineral deposit and its contribution to Queensland's economy.

### 5.3.2 Reduce

Combustion of diesel for mine plant is estimated to result in 351,114 t CO<sub>2</sub>-e for the LOM (Table A1). SMC will apply best practice and design loading, transit, and unloading areas to minimise unnecessary slowing or stopping of machinery and optimise operational efficiency (Crittenden et al., 2016) (TGT 1). This will include:

- Optimising layout such as waste rock emplacement areas in close proximity to the mine pits.
- Mine planning and scheduling to minimise travel distances, material handling and double handling.
- Optimising payload.
- Minimising the slope of haul roads.
- Minimising rolling resistance
- Effective mine site communication to reduce downtime.

SMC will be required to report emissions from the activities of contractors under its operational control as its own through NGER and will therefore require these contractors to adhere to the energy efficiency measures.

SMC is committed to workforce training that emphasises the importance of energy efficiency and emissions reduction to the success of the business and will implement key performance indicators at the appropriate levels of management and training of staff to ensure that management controls are effective and monitored (TGT 2). SMC will incorporate energy efficiency in standard operating procedures and will promote a process of continuous improvement.

### 5.3.3 Substitute

Complete electrification of the Project is not possible as it cannot be connected to the National Electricity Market (NEM) grid.

The Project on-site power station will be required to have capacity to supply an average nominal load of 8.75 MW. The unabated case is for the total Project power demand to be supplied using diesel generators. This unabated scenario is estimated to emit 468,310 t CO<sub>2</sub>-e for the LOM and represents the highest component source of emissions for the Project (57.2%).

SMC is proposing to install a 2.5 MW solar PV array (solar array) at the commencement of the Project, thereby reducing GHG emissions resulting from the use of diesel generators (TGT 3). The emissions reductions associated with installation of the solar array are estimated to be 42,801 t CO<sub>2</sub>-e for the LOM (Table 12).

**Table 12 Base case and abated case sources and quantities of GHG emissions (t CO<sub>2</sub>-e) by activity**

| Activity                                     | Base Case Maximum Annual Emissions (t CO <sub>2</sub> -e) | Base Case Maximum Life of Mine Emissions (t CO <sub>2</sub> -e) | Abated Maximum Annual Emissions (t CO <sub>2</sub> -e) | Abated Maximum Life of Mine Emissions (t CO <sub>2</sub> -e) |
|----------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| Diesel combustion for electricity generation | 55,346                                                    | 468,310                                                         | 51,455                                                 | 425,509                                                      |

SMC recognises early investment in renewable energy is crucial for maximising cost-effectiveness and will periodically review the potential for further development of the initial solar PV system including appropriate storage systems, where feasible and cost effective. Renewable energy generation on-site represents an ideal emissions reduction opportunity for the Project, offering several benefits including:

- Commercially mature technologies available with case study examples of implementation to mining operations
- Indicative levelised cost of energy for electricity generation of 44–65 AUD/MWh for solar photovoltaic compared with 269–384 AUD/MWh for liquid fuel (diesel) gen-sets (MRIWA, 2022):
- Reduction in operational expenditure for diesel

### 5.3.3.1 Scope 3 emissions mitigation measures

The Project's LOM Scope 3 emissions (Table 10) will be reduced by > 11,000 t CO<sub>2</sub>-e over the LOM as a consequence of the installation of the solar PV system and the associated reduction in diesel consumption for electricity generation

## 5.4 Assessment of proposed GHG abatement measures

An assessment of the proposed GHG abatement measures for the Project is provided in Table 14 and considers the timeframe for implementation, key risks, opportunities, comparison with relevant best practice environmental management standards, an estimate of emissions reductions resulting from the abatement measure, and consideration of whether the inclusion of an ongoing monitoring program for the abatement measure is necessary.

The timeframes for implementation are presented as immediate and progressive - long-term.

**Table 13**      **Targets, management controls and timing**

| Priority          | Target (TGT)                                                                                                                             | Timing                                                                  | Management Controls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reduce</b>     | TGT 1: Reduce mobile and stationary plant emissions from the reference point where practical and cost effective                          | Progressive<br>- long term                                              | <ul style="list-style-type: none"> <li>• Procure or contract for heavy vehicles with high diesel use efficiency rating.</li> <li>• Selection of energy efficient motors and pumps based on throughput and processing requirements, including use of variable speed motors where load variability is a factor.</li> <li>• Investigate alternative fuel compositions for improved diesel combustion efficiency.</li> <li>• Continued optimisation of mine layout to drive an efficient mining operation. Monitor and control the use of diesel.</li> </ul>                        |
|                   | TGT 2: Project staff are engaged in energy efficiency and emissions reduction                                                            | Immediate                                                               | <ul style="list-style-type: none"> <li>• Energy efficiency and emissions reduction are tied to corporate targets.</li> <li>• National Greenhouse and Energy Reporting (NGER) assessments and audits are linked to corporate efficiency/emissions programs.</li> <li>• Incorporate energy efficiency in standard operating procedures (where relevant) and promote a process of continuous improvement.</li> <li>• Embed energy efficiency and emissions reduction requirements in supplier and support contracts to influence relevant Scope 1 and Scope 3 emissions</li> </ul> |
| <b>Substitute</b> | TGT 3: Substitute a proportion of diesel generator output with onsite solar PV to reduce associated Scope 1 emissions from the base case | Immediate<br><br>Progressive – long term<br><br>Progressive – long term | <ul style="list-style-type: none"> <li>• Installation of 2.5 MW solar farm on Project site.</li> <li>• Investigation and cost benefit analysis of increased renewable electricity generation capacity on Project site is undertaken.</li> <li>• Investigation and cost benefit analysis of battery energy storage systems on the Project site is undertaken.</li> </ul>                                                                                                                                                                                                         |

| Priority | Target (TGT)                                                                                                                       | Timing                    | Management Controls                                                                                                                                                                                                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | TGT 4: Substitute fuels used in mobile and stationary plant emissions with lower emission fuels where practical and cost effective | Progressive<br>-Long term | <ul style="list-style-type: none"> <li>• Include efficiency and emissions factors in procurement assessments when sourcing diesel for mobile and stationary plant.</li> <li>• Embed energy efficiency and emissions reduction requirements in supplier and support contracts to influence relevant Scope 1 and Scope 3 emissions.</li> </ul> |

**Table 14 Assessment of proposed GHG abatement measures**

| Mitigation measure                                                                          | Timeframe   | Risks                                                                                                                                                                                                                                                                                                                                                                                                                      | Opportunities                                                                                                                                                                                                                                                                                                              | Industry Standard | Emissions reduction estimate for the LOM (t CO <sub>2</sub> -e) |
|---------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------|
| <b>Mobile and stationary plant emissions are reduced where practical and cost effective</b> | Progressive | <ul style="list-style-type: none"> <li>High investment costs for high efficiency plant equipment</li> <li>Longer lead times for mine planning and procuring higher efficiency technologies leading to disrupted production and economics</li> </ul>                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Reduced operating costs and lower exposure to volatile diesel markets</li> <li>Productivity and reliability gains from optimised layout and technologies</li> </ul>                                                                                                                 | Best              | TBD – measured through NGER                                     |
| <b>Project staff are engaged in energy efficiency and emissions reduction</b>               | Immediate   | <ul style="list-style-type: none"> <li>Training and engagement compete with production priorities, reducing short term productivity</li> <li>Disempowered staff could drive efficient operation</li> <li>Inability or resistance to new practices, leading to inconsistent implementation</li> </ul> <p>Operational risks if efficiency methods are pursued without fully considering workplace health or safety risks</p> | <ul style="list-style-type: none"> <li>Improved performance and cost savings when staff identify efficiency improvements, often leading to reduced fuel use, lowering operating costs and avoiding emissions</li> <li>Demonstrating staff engagement supports sustainability reporting and regulatory alignment</li> </ul> | Best              | TBD – measured through NGER                                     |

|                                                                                                                                          |                |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                         |                 |                             |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------|
| <b>Substitute a proportion of diesel generator output with onsite solar PV to reduce associated Scope 1 emissions from the base case</b> | Immediate      | <ul style="list-style-type: none"> <li>• Cost overruns and Installation delays</li> <li>• Intermittent weather dependent generation</li> <li>• Susceptible to weather and climate related damages</li> </ul>                           | <ul style="list-style-type: none"> <li>• Establishes renewable electricity generation on the Project site</li> <li>• Lower exposure to volatile energy and fuel markets</li> </ul>                                                                                                      | Best            | 42,801                      |
| <b>Substitute fuels used in mobile and stationary plant emissions with lower emission fuels where practical and cost effective</b>       | Progressive    | <ul style="list-style-type: none"> <li>• Supply constraints and price volatility for lower emission fuels, increasing operating costs</li> <li>• Technical compatibility and reliability risks for existing plant equipment</li> </ul> | <ul style="list-style-type: none"> <li>• Cleaner combustion increasing air quality and broader sustainable reputation</li> <li>• Lower exposure to future diesel and carbon price increases</li> </ul>                                                                                  | Best            | TBD – measured through NGER |
| <b>Regularly scope for new technologies</b>                                                                                              | As practicable | <ul style="list-style-type: none"> <li>• Capital cost of new technology delays uptake or implementation leading to inefficient, non-viable, or stranded asset</li> </ul>                                                               | <ul style="list-style-type: none"> <li>• Innovation and competitive advantage</li> <li>• Efficiency gains, new technologies can boost productivity, improve safety alongside emissions reduction</li> <li>• Energy transition leads to new business models and opportunities</li> </ul> | Emerging – Best | TBD                         |

## 5.5 Advancing technologies and opportunities

Emerging technologies in the mining sector, such as efficient conveyors, electric/hybrid vehicles, and variable speed drive (VSD) systems on ball mills, are providing options to deliver savings in operational expenditure and GHG abatement. SMC will review its highest emitting equipment, i.e., haul trucks and excavators (Table A1) and will investigate the business case for investing in energy efficient heavy vehicles and equipment.

SMC will undertake periodic reviews of the technical readiness level (TRL) and commercial readiness level (CRL) of technology and process options that can reduce the emission intensity of production, including:

- increased development of solar PV and ancillary infrastructure on Project site.
- energy efficiency measures for highest emitting mine plant equipment.

## 5.6 Monitoring and reporting

SMC will be required to report its BVS Scope 1 emissions annually through the NGER scheme.

SMC will report on emissions reduction and minimisation of risks associated with operations through its Sustainability and ESG reports.

SMC will report on the success of the following emissions reduction targets through its Sustainability report, informed by its annual NGER reporting:

- a reduction in GHG emissions resulting from the use of diesel generators due to the installation of a 2.5 MW solar PV array
- improved processes and reporting of GHG emissions and management controls detailed in this Greenhouse Gas Assessment report.

## 6. RISKS AND LIKELY MAGNITUDE OF IMPACTS ON ENVIRONMENTAL VALUES

The Project is located in North Queensland and projected climate change and resulting hazards for this region include:

- Increased frequency of hot days (>35°C) and very hot days (>40°C)
- Increased likelihood of bushfire weather
- Increased likelihood of short duration high intensity rainfall
- Increased pan evaporation rates
- Increased frequency and severity of drought
- Less frequent but more intense tropical cyclones

Queensland and Australia have legally committed to achieving a net zero GHG emissions economy by 2050 as their contribution to the Paris agreement goal to preferably limit warming to 1.5°C or at least well below 2°C (section 2.1.1). The relative carbon budgets (Gt CO<sub>2</sub>-e) remaining between 2025 and 2050 (Friedlingstein, 2025) to achieve these goals and the relative proportion of these budgets occupied by the Project's abated LOM Scope 1 emissions are presented in Table 15.

**Table 15** Queensland, Australia, and global carbon budgets (Gt CO<sub>2</sub>-e) remaining to achieve Paris agreement goals and the relative Project LOM Scope 1 emissions proportion (%) of the budget

| Limit degree of warming | Queensland                     |                          | Australia                      |                          | Global                         |                          |
|-------------------------|--------------------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|--------------------------|
|                         | Budget (Gt CO <sub>2</sub> -e) | Project contribution (%) | Budget (Gt CO <sub>2</sub> -e) | Project contribution (%) | Budget (Gt CO <sub>2</sub> -e) | Project contribution (%) |
| 1.5°C                   | 1.68                           | 0.05                     | 7.25                           | 0.012                    | 531                            | 0.00017                  |
| 2.0°C                   | 2.781                          | 0.03                     | 11.91                          | 0.007                    | 869                            | 0.00010                  |

The Project will contribute an insignificant fraction to the drawdown on Queensland's remaining carbon budget to achieve a net zero emissions economy by 2050 (Table 15) and the Project will have been completed and the site rehabilitated and decommissioned before this time. The individual contribution of the Project to global warming is therefore also considered minimal.

SMC is aware and supportive of the drive towards a net zero economy and Queensland's interim targets and has committed to an energy efficient and low emissions intensity operation where practicable, and the implementation of renewable energy generation to support its operation.

## 7. SUMMARY AND CONCLUSIONS

Unabated Scope 1 GHG emissions for the Project are estimated as 931,073 tonnes of carbon dioxide equivalent (t CO<sub>2</sub>-e) for the LOM with an annual average emissions rate of 71,621 t CO<sub>2</sub>-e, primarily from the combustion of diesel. This makes the Project a medium to high emitter under the Guideline Greenhouse Gas Emissions (ESR/2024/6819), requiring an inventory of Scope 1, Scope 2, and Scope 3 emissions, details of GHG emissions mitigation and management practices, a GHG abatement plan, and a GHG emissions risk assessment.

There are no Scope 2 emissions associated with the Project and all electricity will be generated on site. LOM Scope 3 GHG emissions for the Project are estimated as 670,365 t CO<sub>2</sub>-e, with the purchase of construction materials and reagents, upstream processing of purchased diesel, and emissions associated with road truck freight, contributing the majority of the Scope 3 inventory.

The abatement plan identifies that the Scope 1 emissions inventory will be reduced by approximately 40,000 t CO<sub>2</sub>-e over the LOM, primarily through installation of a 2.5MW solar array on site to produce electricity and reduce the amount of diesel combusted. The plan also identifies that SMC will run an energy efficient operation that will contribute to further emissions reduction where practicable. Scope 3 emissions will be reduced by approximately 11,000 t CO<sub>2</sub>-e over the LOM also as a consequence of the installation of the solar array and associated reduced diesel consumption.

The Project will be required to report its emissions annually through the National Greenhouse and Energy reporting (NGER) system but does not trigger the Safeguard Mechanism threshold that would require progressive emissions reduction over the LOM. SMC will report on the success of its emissions abatement through its Sustainability report, informed by the annual NGER reporting.

SMC understand that GHG emissions contribute to global warming and climate change, and that Queensland, Australia, and the globe have an allowable emissions budget that will limit warming to 1.5°C or under 2.0°C. The Project will draw down less than 0.5% on Queensland's 2025 – 2050 emissions budget for both goals and approximately 0.01% of Australia's emissions budget. The Project contribution to global warming and climate change, and the associated environmental risk, is therefore considered immaterial.

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## APPENDIX A EXPANDED EMISSIONS INVENTORY

### A1 Scope 1 Emissions

#### A1.1 Diesel

GHG emissions resulting from the combustion of diesel by category for the LOM of the Project are shown in Table A1. The highest contributing sources of GHG emissions due to the combustion of diesel are generators (57.2%), trucks (20.2%), and excavators (6.1%).

**Table A1 Diesel consumption and GHG emissions by category**

| <b>Machinery</b>                 | <b>Total consumption (kL)</b> | <b>LOM emissions (t CO<sub>2</sub>-e)</b> | <b>Unabated LOM contribution</b> |
|----------------------------------|-------------------------------|-------------------------------------------|----------------------------------|
| Generators                       | 172,826                       | 468,310                                   | 57.2%                            |
| Construction                     | 17,892                        | 48,483                                    | 5.9%                             |
| Trucks                           | 61,235                        | 165,929                                   | 20.2%                            |
| Excavators                       | 18,472                        | 50,053                                    | 6.1%                             |
| Drills                           | 2,789                         | 7,558                                     | 0.9%                             |
| Pit Dozers                       | 4,037                         | 10,940                                    | 1.3%                             |
| Dump Dozers                      | 5,621                         | 15,230                                    | 1.9%                             |
| Graders                          | 2,683                         | 7,269                                     | 0.9%                             |
| Water Carts                      | 5,473                         | 14,830                                    | 1.8%                             |
| Lighting Towers                  | 487                           | 1,320                                     | 0.2%                             |
| Ancillary equipment              | 5,040                         | 13,656                                    | 1.7%                             |
| Explosives <sup>1</sup>          | 5,848                         | 15,846                                    | 1.9%                             |
| <b>Total (unabated)</b>          | <b>302,420</b>                | <b>819,424</b>                            | <b>100%</b>                      |
| <sup>1</sup> Not NGER reportable |                               |                                           |                                  |

## A2 Scope 3 Emissions

### A2.1 Truck freight

The total GHG emissions created by road freight during the construction phase of the Project is estimated to be 2,652 t CO<sub>2</sub>-e per year (Table A2). The highest contributor to these emissions is the transport of construction equipment (969 t CO<sub>2</sub>-e per year), followed by the transport of fuel by B double vehicles (659 t CO<sub>2</sub>-e per year).

Transporting construction materials results in total emissions of 2,156 t CO<sub>2</sub>-e per year while transporting wastes results in total emissions of 2,652 t CO<sub>2</sub>-e per year. The emissions intensity (tonnes of carbon dioxide equivalent per tonne kilometre, t CO<sub>2</sub>-e/tkm) of B double vehicles is the lowest of all vehicle types, indicating the lowest carbon footprint for transportation of incoming freight for the Project per tonne kilometre (t.km).

Table A3 shows that the total GHG emissions created by road freight during the operations phase is 2,522 t CO<sub>2</sub>-e per year. The highest contributor to these emissions is the delivery of fuel using B double vehicles with emissions of 1,176 t CO<sub>2</sub>-e per year, followed by the transport of maintenance spares and consumables using six axle articulated vehicles which will emit 284 t CO<sub>2</sub>e per year. Operation inputs generate total emissions of 2,117 t CO<sub>2</sub>-e per year, while operation outputs generate total emissions of 405 t CO<sub>2</sub>-e per year.

**Table A2 Summary of GHG emissions (t CO<sub>2</sub>-e) and emissions intensity (t CO<sub>2</sub>-e/t.km) from truck freight during the construction phase of the Project**

| Material                            | Return trips | Vehicle type          | Total vehicle kms | Fuel consumption (l/100 km) | Total diesel consumed (kL) | Total Energy content (GJ) | Total emissions (t CO <sub>2</sub> -e/y) | Emission intensity (t CO <sub>2</sub> -e/tkm) |
|-------------------------------------|--------------|-----------------------|-------------------|-----------------------------|----------------------------|---------------------------|------------------------------------------|-----------------------------------------------|
| <b>Construction Materials</b>       |              |                       |                   |                             |                            |                           |                                          |                                               |
| Construction equipment              | 532          | Six axle articulated  | 532,000           | 67.0                        | 356.5                      | 13,762                    | 969                                      | 42.9                                          |
| Infrastructure                      | 38           | Six axle articulated  | 38,000            | 67.0                        | 25.5                       | 983                       | 69                                       | 42.9                                          |
| Reagents                            | 7            | Four axle truck       | 7,000             | 67.0                        | 4.7                        | 181                       | 13                                       | 42.8                                          |
|                                     | 72           | Six axle articulated  | 72,000            | 67.0                        | 48.3                       | 1,863                     | 131                                      | 42.9                                          |
|                                     | 46           | B double              | 46,000            | 81.9                        | 37.7                       | 1,455                     | 102                                      | 35.6                                          |
| Fuel                                | 296          | B double              | 296,000           | 81.9                        | 242.5                      | 9,359                     | 659                                      | 35.6                                          |
| Miscellaneous materials             | 23           | Five axle articulated | 23,000            | 62.8                        | 14.4                       | 558                       | 39                                       | 43.8                                          |
|                                     | 2            | Six axle articulated  | 2,000             | 67.0                        | 1.3                        | 52                        | 4                                        | 42.9                                          |
| Maintenance spares & consumables    | 93           | Six axle articulated  | 93,000            | 67.0                        | 62.3                       | 2,406                     | 169                                      | 42.9                                          |
| <b>Construction material totals</b> | <b>1,109</b> |                       | <b>1,109,000</b>  |                             | <b>793.2</b>               | <b>30,618</b>             | <b>2,156</b>                             |                                               |
| <b>Wastes</b>                       |              |                       |                   |                             |                            |                           |                                          |                                               |
| General waste                       | 104          | Five axle articulated | 104,000           | 62.8                        | 65.3                       | 2,522                     | 178                                      | 43.8                                          |
| Sewage sludge/solids                | 130          | Four axle truck       | 130,000           | 67.0                        | 87.1                       | 3,360                     | 237                                      | 42.8                                          |
| Scrap metal                         | 24           | Five axle articulated | 24,000            | 62.8                        | 15.1                       | 582                       | 41                                       | 43.8                                          |
| Oil Waste                           | 24           | Five axle articulated | 24,000            | 62.8                        | 15.1                       | 582                       | 41                                       | 43.8                                          |
| <b>Waste totals</b>                 | <b>282</b>   |                       | <b>282,000</b>    |                             | <b>182.5</b>               | <b>7,046</b>              | <b>496</b>                               |                                               |
| <b>Construction totals</b>          | <b>1,391</b> |                       | <b>1,391,000</b>  |                             | <b>975.7</b>               | <b>37,664</b>             | <b>2,652</b>                             |                                               |

**Table A3 Summary of GHG emissions (t CO<sub>2</sub>-e) and emissions intensity (t CO<sub>2</sub>-e/t.km) from truck freight during the operations phase of the Project**

| Material                           | Return trips (#) | Vehicle type          | Total vehicle kms | Fuel consumption (l/100 km) | Total diesel consumed (kL) | Total Energy content (GJ) | Total emissions (t CO <sub>2</sub> -e/year) | Emission intensity (t CO <sub>2</sub> -e/tkm) |
|------------------------------------|------------------|-----------------------|-------------------|-----------------------------|----------------------------|---------------------------|---------------------------------------------|-----------------------------------------------|
| <b>Project inputs</b>              |                  |                       |                   |                             |                            |                           |                                             |                                               |
| Reagent delivery                   | 12               | Four axle truck       | 12,000            | 67.0                        | 8.0                        | 310                       | 22                                          | 42.8                                          |
|                                    | 132              | Six axle articulated  | 132,000           | 67.0                        | 88.5                       | 3,415                     | 240                                         | 42.9                                          |
|                                    | 84               | B double              | 84,000            | 81.9                        | 68.8                       | 2,656                     | 187                                         | 35.6                                          |
| Fuel delivery                      | 528              | B double              | 528,000           | 81.9                        | 432.5                      | 16,695                    | 1,176                                       | 35.6                                          |
| Media materials                    | 96               | Five axle articulated | 96,000            | 62.8                        | 60.3                       | 2,328                     | 164                                         | 43.8                                          |
|                                    | 24               | Six axle articulated  | 24,000            | 67.0                        | 16.1                       | 621                       | 44                                          | 42.9                                          |
| Maintenance spares and consumables | 156              | Six axle articulated  | 156,000           | 67.0                        | 104.5                      | 4,036                     | 284                                         | 42.9                                          |
| <b>Operations totals</b>           | <b>1,032</b>     |                       | <b>1,032,000</b>  |                             | <b>778.8</b>               | <b>30,060</b>             | <b>2,117</b>                                |                                               |
| <b>Wastes</b>                      |                  |                       |                   |                             |                            |                           |                                             |                                               |
| General waste                      | 104              | Five axle articulated | 104,000           | 62.8                        | 65.3                       | 2,522                     | 178                                         | 43.8                                          |
| Sewage sludge/solids               | 80               | Four axle truck       | 80,000            | 67.0                        | 53.6                       | 2,068                     | 146                                         | 42.8                                          |
| Scrap metals                       | 24               | Five axle articulated | 24,000            | 62.8                        | 15.1                       | 582                       | 41                                          | 43.8                                          |
| Oil wastes                         | 24               | Five axle articulated | 24,000            | 62.8                        | 15.1                       | 582                       | 41                                          | 43.8                                          |
| <b>Waste totals</b>                | <b>232</b>       |                       | <b>232,000</b>    | <b>255.4</b>                | <b>149.1</b>               | <b>5,753</b>              | <b>405</b>                                  |                                               |
| <b>Operations totals</b>           | <b>1,264</b>     |                       | <b>1,264,000</b>  |                             | <b>927.8</b>               | <b>35,814</b>             | <b>2,522.2</b>                              |                                               |

## A2.2 Transport of gold doré bars

GHG emissions arising from the transport of gold doré bars for the LOM are estimated as 1,059 t CO<sub>2</sub>-e (Table A4), with the highest contribution resulting due to the regular flights from Brisbane airport (BNE) to Perth airport (PER) (679.9 t CO<sub>2</sub>-e (64.2% of total)). This is followed by the TVL to BNE flights with 338.5 t CO<sub>2</sub>-e (32%), and lastly by RCM to TVL flights with 40.9 t CO<sub>2</sub>-e (3.9%). The difference in emissions between the flights is primarily due to the flight distance.

**Table A4 Summary of GHG emissions (t CO<sub>2</sub>-e) produced by the transport of gold doré bars from the Project site to the Perth Mint**

| Parameter                                       | Flight                          |                        |                   |
|-------------------------------------------------|---------------------------------|------------------------|-------------------|
|                                                 | Richmond to Townsville          | Townsville to Brisbane | Brisbane to Perth |
| Flight distance (km)                            | 415                             | 1,112                  | 3,605             |
| Emission factor source                          | ATR-72 technical specifications | ICAO                   |                   |
| Emission factor (kg CO <sub>2</sub> -e/seat/km) | 0.069                           | -                      |                   |
| Emissions per flight (kg CO <sub>2</sub> /seat) | -                               | 108                    | 216               |
| <b>Annual emissions (t CO<sub>2</sub>-e)</b>    | <b>4</b>                        | <b>31</b>              | <b>62</b>         |
| <b>LOM emissions (t CO<sub>2</sub>-e)</b>       | <b>41</b>                       | <b>339</b>             | <b>680</b>        |
| <b>Contribution</b>                             | <b>3.9%</b>                     | <b>32.0%</b>           | <b>64.2%</b>      |
| <b>Total LOM emissions (t CO<sub>2</sub>-e)</b> | <b>1,059</b>                    |                        |                   |

## A2.3 Construction materials and reagents

GHG emissions associated with the manufacturing of purchased construction materials and reagents for the LOM of the Project are estimated as 405,053 t CO<sub>2</sub>-e (Table A5). The construction phase is expected to emit a total of 308,597 t CO<sub>2</sub>-e (76.2%) while the operation phase is expected to emit a total of 96,456 t CO<sub>2</sub>-e (23.8%).

**Table A5 Comparison of annual and LOM GHG emissions (t CO<sub>2</sub>-e) associated with the manufacturing of construction materials and reagents for the Project**

| Parameter                                       | Construction Phase | Operation Phase |
|-------------------------------------------------|--------------------|-----------------|
| Annual emissions (t CO <sub>2</sub> -e)         | 154,299            | 8,769           |
| LOM emissions (t CO <sub>2</sub> -e)            | 308,597            | 96,456          |
| LOM emissions contribution                      | 76.2%              | 23.8%           |
| <b>LOM total emissions (t CO<sub>2</sub>-e)</b> | <b>405,053</b>     |                 |

Detailed emissions associated with the manufacturing of construction materials purchased during the construction phase of the Project are shown in Table A6. Total LOM emissions are expected to be 308,597 t CO<sub>2</sub>-e with the vast majority of that related to concrete production. Specifically, the production of 30 MPa and 50 MPa concrete is expected to produce 165,022 t CO<sub>2</sub>-e and 107,993 t CO<sub>2</sub>-e respectively, which makes up 53.5% and 35% of all supply chain Scope 3 emissions from the construction phase.

**Table A6 Summary of annual and LOM GHG emissions (t CO<sub>2</sub>-e) associated with the manufacturing of construction materials purchased during the construction phase of the Project**

| Construction Phase       |                   |                                          |                                         |                                      |                            |
|--------------------------|-------------------|------------------------------------------|-----------------------------------------|--------------------------------------|----------------------------|
| Material                 | Annual amount (t) | Emission factor (t CO <sub>2</sub> -e/t) | Annual emissions (t CO <sub>2</sub> -e) | LOM Emissions (t CO <sub>2</sub> -e) | LOM emissions contribution |
| 50 MPa concrete          | 37,500            | 1.44                                     | 53,996                                  | 107,993                              | 35.0%                      |
| 30 MPa concrete          | 87,500            | 0.94                                     | 82,511                                  | 165,022                              | 53.5%                      |
| structural steel         | 2,400             | 1.77                                     | 4,248                                   | 8,496                                | 2.8%                       |
| high-strength steel      | 400               | 4.55                                     | 1,820                                   | 3,640                                | 1.2%                       |
| stainless steel          | 1,400             | 4.55                                     | 6,370                                   | 12,740                               | 4.1%                       |
| steel for grinding media | 1,400             | 1.77                                     | 2,478                                   | 4,956                                | 1.6%                       |
| rebar for concrete       | 1,400             | 1.50                                     | 2,100                                   | 4,200                                | 1.4%                       |
| Aggregate                | 100,000           | 0.01                                     | 775                                     | 1,550                                | 0.5%                       |
| <b>Total</b>             | <b>232,000</b>    |                                          | <b>154,299</b>                          | <b>308,597</b>                       | <b>100%</b>                |

Detailed emissions associated with the manufacturing of reagents purchased during the operation phase of the Project are shown in Table A7. Total LOM emissions are expected to be 96,456 t CO<sub>2</sub>-e with the vast majority of these related to the Semi-Autogenous Grinding (SAG) mill media production. SAG mill media production is expected to produce 54,516 t CO<sub>2</sub>-e (56.5% of total LOM emissions during the operation phase). The second highest contributor is quicklime production with estimated emissions of 29,475.6 t CO<sub>2</sub>-e (30.6% of total LOM emissions during the operation phase).

**Table A7 Summary of annual and LOM GHG emissions (t CO<sub>2</sub>-e) associated with manufacturing of reagents purchased during the operation phase of the Project**

| Operation Phase   |              |                                          |                                         |                                      |                            |
|-------------------|--------------|------------------------------------------|-----------------------------------------|--------------------------------------|----------------------------|
| Material          | Amount (t/y) | Emission factor (t CO <sub>2</sub> -e/t) | Annual emissions (t CO <sub>2</sub> -e) | LOM Emissions (t CO <sub>2</sub> -e) | LOM emissions contribution |
| Quicklime         | 2,200        | 1.22                                     | 2,680                                   | 29,476                               | 30.6%                      |
| Cyanide           | 1,100        | 0.90                                     | 989                                     | 10,878                               | 11.3%                      |
| Hydrogen Peroxide | 326          | 0.44                                     | 144                                     | 1,586                                | 1.6%                       |
| SAG Mill Media    | 2,800        | 1.77                                     | 4,956                                   | 54,516                               | 56.5%                      |
| <b>Total</b>      | <b>6,426</b> |                                          | <b>8,769</b>                            | <b>96,456</b>                        | <b>100%</b>                |

## A3 Liquid Fuels

Table A8 summarises the estimated Scope 3 emissions related to upstream liquid fuel processing. Expected LOM emissions from diesel, oils and greases are estimated at 202,833 t CO<sub>2</sub>-e, 3,922 t CO<sub>2</sub>-e and 588 t CO<sub>2</sub>-e respectively.

**Table A8 Summary of LOM GHG emissions (t CO<sub>2</sub>-e) produced by the upstream diesel processing during the construction and operation phases of the Project**

| Fuel                                            | Consumption (kL)   |                 | Emissions t CO <sub>2</sub> -e |                 |         |
|-------------------------------------------------|--------------------|-----------------|--------------------------------|-----------------|---------|
|                                                 | Construction phase | Operation phase | Construction phase             | Operation phase | Total   |
| Diesel                                          | 57,497             | 246,245         | 38,396                         | 164,438         | 202,833 |
| Oils                                            | 1048               | 4568            | 732                            | 3190            | 3,922   |
| Greases                                         | 157                | 685             | 110                            | 479             | 588     |
| <b>Total LOM emissions (t CO<sub>2</sub>-e)</b> |                    |                 | <b>207,343</b>                 |                 |         |