**Avonbank Mineral Sands Project**

**Environment Effects Statement**

**Chapter 24 – Environmental Management**

**Graphical user interface, website

Description automatically generated**

**TABLE OF CONTENTS**

[24 Environmental Management 24-1](#_Toc127262666)

[24.1 Introduction 24-1](#_Toc127262667)

[24.2 Context 24-1](#_Toc127262668)

[24.2.1 Key Approvals and Regulation 24-1](#_Toc127262669)

[24.2.2 Environmental Management System 24-2](#_Toc127262670)

[24.3 Scope 24-2](#_Toc127262671)

[24.4 Environmental Policy and Leadership 24-3](#_Toc127262672)

[24.4.1 Leadership 24-3](#_Toc127262673)

[24.4.2 Environmental Policy 24-3](#_Toc127262674)

[24.5 Risk Assessment and Planning 24-3](#_Toc127262675)

[24.5.1 Environmental Aspects 24-3](#_Toc127262676)

[24.5.2 Compliance Obligations 24-3](#_Toc127262677)

[24.5.3 Risks and Opportunity 24-4](#_Toc127262678)

[24.5.4 Environmental Objectives 24-5](#_Toc127262679)

[24.5.5 Business Planning 24-5](#_Toc127262680)

[24.6 Resources, Training and Communication 24-5](#_Toc127262681)

[24.7 Operational Control 24-6](#_Toc127262682)

[24.7.1 Operational Planning and Control 24-6](#_Toc127262683)

[24.7.2 Emergency Preparedness and Response 24-7](#_Toc127262684)

[24.8 Monitoring and Performance Evaluation 24-7](#_Toc127262685)

[24.8.1 Monitoring, Measurement, Analysis and Evaluation 24-7](#_Toc127262686)

[24.8.2 Audit Requirements 24-7](#_Toc127262687)

[24.8.3 Management Review 24-8](#_Toc127262688)

[24.8.4 Documentation 24-8](#_Toc127262689)

[24.9 Improvement 24-8](#_Toc127262690)

[24.9.1 Community Engagement and Complaints Management 24-8](#_Toc127262691)

[24.9.2 Non-conformity and Corrective Action 24-9](#_Toc127262692)

[24.9.3 Continual Improvement 24-9](#_Toc127262693)

[24.10 Supporting Detail 24-9](#_Toc127262694)

**TABLES**

[Table 24‑1: Key Project approvals 24-1](#_Toc127262695)

[Table 24‑2: Key avoidance and mitigation measures 24-10](#_Toc127262696)

[Table 24‑3: Key monitoring requirements 24-14](#_Toc127262697)

# Environmental Management

## Introduction

This Chapter provides an overview of the environmental management framework for the Avonbank Mineral Sands Project (the Project). It has been prepared to address the Environment Effects Statement (EES) Scoping Requirements (DELWP, 2020) and reflects the requirements set out in the AS/NZS ISO 14001:2016 Standard ‘Environmental management systems – Requirements with guidance for use’.

The Scoping Requirements state that a framework must be developed to articulate how the Project will achieve its predicted environmental outcomes, meet statutory requirements and maintain stakeholder relations. The specific Scoping Requirements relevant to this Chapter are detailed in Appendix A of the EES.

It is intended that an environmental management system (EMS) will be developed and maintained across the Project, the scope of which will cover the mine site, secondary processing plant, road transport and activities at the Port of Portland (PoP). The EMS will provide a consistent management approach across the Project, and will be integrated with other relevant business elements.

The overarching requirements of the AS/NZS ISO 14001:2016 Standard, as they apply to the Project, are summarised in this Chapter. This Chapter communicates the framework that will be established and maintained for the life of the Project. It is intended to clearly articulate an auditable set of requirements associated with the proposed management system.

## Context

### Key Approvals and Regulation

The relevant Project approvals that will be required prior to commencement are set out in Chapter 4 (Regulatory Framework). For context in this Chapter, the key approvals and regulatory instruments associated with each work area are summarised below in Table 24‑1.

Table 24‑1: Key Project approvals

| Work Area | Key Legislation | Key Requirements and Regulatory Instruments |
| --- | --- | --- |
| Mining licence (MIN) | *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) | Work Plan including a Risk Management Plan, Rehabilitation Plan and Community Engagement Plan. Various other requirements must be met prior to work commencing (refer Chapter 4, Section 4.4.1). |
| WIM Base Area (WBA) | Horsham Planning Scheme, Specific Control Overlay (SCO) | Relevant management plans in line with the incorporated document as detailed in the draft Planning Scheme Amendment (refer Chapter 4, Section 4.4.2). |
| Minor Utilities (Power and water) | Horsham Planning Scheme (HPS) | In line with planning permissions/requirements in the HPS as they relate to minor utilities installation. |
| Port of Portland (PoP) | *Port Management Act 1995*  Glenelg Planning Scheme (GPS) | Environmental Management Plan (including decommissioning commitments) in line with the Port licence conditions. |

In addition to the above approvals and associated regulatory instruments, the Project must comply with the relevant permissions granted under the *Environmental Protection Act 2017* (EP Act) and comply with the requirements of the General Environmental Duty (GED) (refer Chapter 4, Section 4.5).

The GED applies to all entities engaging in activities that may give rise to risks of harm to human health or the environment from pollution or waste. The GED requires that a person who is engaging in an activity that may give rise to risks of harm minimise those risks so far as reasonably practicable. The GED will apply to all phases of the Project, from construction through to closure and is a legislative requirement that applies concurrently with all other legal obligations.

### Environmental Management System

An AS/NZS ISO 14001:2016 EMS is an interrelated set of business elements established to avoid and minimise effects on the environment, to fulfil regulatory compliance obligations, enhance environmental performance and to maintain a process of continual improvement.

The underlying concept is based on a Plan-Do-Check-Act (PDCA) principle comprising the following elements:

* Plan: establish environmental objectives and processes necessary to deliver results in accordance with the organisation’s environmental policy.
* Do: implement the processes as planned.
* Check: monitor and measure performance against the organisation’s environmental policy and environmental objectives.
* Act: take action to meet environmental objectives and to continually improve performance.

The AS/NZS ISO14001:2016 Standard provides a clear set of requirements against which an organisation can be audited over the life of the Project. The intent of the Standard is reflected in this Chapter to ensure the commitments made are clear, concise, auditable and relevant for the life of the Project.

Several elements of the EMS have been developed as part of EES and associated Scoping Requirements. Where relevant cross-references are provided to sections of this EES. Key related sections of this EES include Attachment 5 (Aspects and Risks), Chapter 4 (Regulatory Framework) and Chapter 5 (Community Engagement).

## Scope

The scope of the Avonbank EMS will include all activities, related conditions and products that the Project has influence over. It will include the following key Project elements:

* Mining, primary processing and associated activities within the mining licence area.
* Secondary processing, ancillary infrastructure, production of Heavy Mineral Concentrate (HMC) and loading for transport at the WIM Base Area (WBA).
* Transport of Heavy Mineral Concentrate from the WBA to the PoP.
* Storage of HMC and loading at the PoP.

These Project elements are further described in Chapter 2 (Project Description). Shipping from the PoP to overseas markets will be excluded from the EMS as a third party will be primarily responsible for these activities, as described in Chapter 4 (Regulatory Framework, Section 4.5).

The scope of the EMS will cover all phases of the Project, from construction, operations, and decommissioning/closure.

The EMS scope will be refined prior to the commencement of the Project and will consider the outcome of the EES assessment and subsequent approvals.

## Environmental Policy and Leadership

### Leadership

The Management team will be responsible for the establishment of an environmental policy that is compatible with the strategic direction and context of the Project. The Management team will take accountability for the effectiveness of the EMS to ensure it achieves its intended outcomes.

### Environmental Policy

The environmental policy will be developed and endorsed by the Management team to provide the framework upon which the environmental objectives will be set.

The environmental policy will include commitments to:

* Comply with regulatory requirements.
* Avoid or minimise emissions to land, water and air.
* Protect sites of cultural heritage.
* Protect flora and fauna.
* Conserve resources and minimise waste.
* Undertake targeted research to improve environmental performance.
* Progressively rehabilitate disturbed areas.
* Respond quickly and effectively to stakeholder concerns.
* Communicate openly with employees, the community and regulators.

The environmental policy will be reviewed, updated on a periodic basis and communicated to all staff and contractors.

## Risk Assessment and Planning

### Environmental Aspects

A register of environmental aspects will be maintained to identify the Project related activities, conditions and products that can interact with the environment. In determining the relevant environmental aspects, consideration will be given to:

* the Project description in this EES and detailed operating plans;
* any planned changes, including new or modified infrastructure, activities or products, conditions; and
* any reasonably foreseeable emergency or unplanned situation.

The aspects register will include a description of the potential impacts and will form the basis of the risk assessment described in Section 24.5.3.

A preliminary register of environmental aspects is included as Attachment 5 (Aspects and Risks). This register will be further developed prior to commencement with consideration to the Minister’s assessment of the EES and the detailed mine operating plans.

### Compliance Obligations

A register of compliance obligations associated with the Projects environmental aspects will be developed and maintained as part of the EMS. Compliance obligations will include key legislative requirements, conditions related to Project approvals, orders or guidance from regulatory bodies and commitments made to stakeholders.

The documentation describing the compliance obligations will provide context as to how each obligation applies to the Project such that it can be readily communicated through the organisation. A periodic review will be undertaken to ensure the compliance obligations remain current and in line with the relevant legislative requirements. Required approvals for the Project prior to commencement are described in Chapter 4 (Regulatory Framework).

### Risks and Opportunity

The EMS will require that an assessment of the risks and opportunities associated with the Project related environmental aspects, potential impacts and compliance obligations be periodically undertaken. The assessment will be conducted in accordance with documented procedures that reflect the requirements of the AS/NZS ISO 14001:2016, ‘Standard for Environmental Management Systems’ and with consideration to the AS ISO 31000:2018, ‘Standard for Risk Management’. This will include processes for:

* identifying hazards, potential impacts or opportunities associated with the Project;
* assessing the risks or opportunities in terms of likelihood and consequence; and
* identifying the controls to avoid or minimise the risks so far as reasonably practicable.

The assessment will be scheduled to occur periodically and in response to significant non-conformities associated with results from monitoring, inspections, audits and community complaints. A change management process will be established whereby any material change to the operating conditions or environmental setting will require an assessment of the risks and opportunities.

The scope of the periodic assessment will consider:

* the relevant environmental aspects, including any new or proposed operational changes, changed environmental conditions, changes to technology and/or changes to the state of knowledge;
* current compliance obligations, including any new or changed legislative or Project specific obligations;
* emerging organisational issues or opportunities;
* reported non-conformities, stakeholder issues, incidents and outcomes from monitoring programs, inspections and audits;
* outcomes from community/stakeholder engagement; and
* emergency or unplanned situations and contingencies.

The EMS will identify and establish controls to avoid or minimise residual risk to human health and the environment so far as reasonably practicable. A hierarchy of controls will be applied to:

* avoid or eliminate the hazard; or
* minimise the risk associated with the hazard through:
* engineering controls to minimise the risk;
* substituting higher-risk activities with lower-risk ones;
* isolating the hazard/source or receptor; or
* implementing administrative controls.

The controls will consider all avoidance and mitigation measures communicated in this EES and any additional controls that may be required to ensure the risks are avoided or minimised during operations.

In identifying and selecting appropriate controls, consideration will be given to:

* the availability and suitability of ways to avoid or minimise the hazards and risks;
* the likelihood of the risks eventuating;
* the degree of harm (consequence) that would result if the risks eventuated;
* the cost of avoiding or minimising the risks;
* current technology and state of knowledge regarding the hazard or risk; and
* leading practice controls applied within the mineral sands industry.

The risk and opportunity assessment will address certain requirements under both the *Environmental Protection Act 2017* and the *Mineral Resources Sustainable Development Act 1990* with regard to avoiding or minimising risks to human health and the environment so far as reasonably practicable.

A preliminary Aspects and Risk register is included as Attachment 5 (Aspects and Risks). This provides an overview of the environmental aspects and risks associated with the Project and will be further developed prior to commencement with consideration to the Minister’s assessment of the EES and detailed operating plans.

### Environmental Objectives

Environmental objectives will be established and maintained that aim to fulfil the commitments in the environmental policy and meet the required compliance obligations. The environmental objectives associated with this EES are provided in Chapters 8 to 23.

Performance standards will be developed and maintained to provide a measurable benchmark against which an associated environmental objective can be assessed. The performance standards will be specific, measurable, achievable, realistic and time-bound. Each performance standard will have an associated monitoring, inspection or auditing program.

The relevant environmental objectives and performance standards will be incorporated into the mining work plan and other relevant Project approvals. Objectives and standards will be appropriately communicated, regularly reviewed and updated as required in line with the organisation’s commitment to continuous improvement. A summary of the environmental objectives defined are provided in Attachment 5 (Aspects and Risks).

### Business Planning

An integrated business plan will be maintained to describe how the Project aims to achieve its operational and environmental objectives. The planning process will occur periodically to establish the forward work plan for the Project. It will define specific actions and will detail how they are to be resourced, the timeframes for completion and the associated measures of success.

## Resources, Training and Communication

The Project will be appropriately resourced with competent personnel to maintain the EMS and associated environmental policy commitments.

The Project Management team will report to the Chief Executive Officer and indirectly to board members. The Management team will take accountability for the implementation of the EMS and will be supported by line managers and operational staff based in Horsham.

Procedures will be established to:

* determine the competencies required to undertake work and fulfil the Projects policy commitments and compliance obligations;
* ensure personnel are competent on the basis of appropriate experience, training or education; and
* assess the training needs for the Project.

Programs will be established to ensure all personnel are made aware of the Project’s environmental policy commitments as well as:

* the significant environmental aspects and the potential impacts and risks associated with their work;
* their contribution to the effectiveness of the EMS, including the benefits of enhanced environmental performance; and
* the implications of not conforming with the EMS requirements, including not fulfilling the Project’s compliance obligations.

Internal communication processes will be established between various levels of the organisation to ensure changes to the EMS and associated procedures are effectively communicated.

External communication procedures will be established to ensure the triggers for reporting to regulatory bodies or other stakeholders are documented and communicated. A community engagement strategy is included in Chapter 5 (Community Engagement).

## Operational Control

### Operational Planning and Control

A range of environmental management plans will be developed and maintained through all phases of the Project as described in this EES and updated as required to address emerging issues, risks or regulatory requirements. Each management plan will:

* Summarise the baseline data and existing environment.
* Explain the relevant statutory requirements and context (including any relevant approvals).
* Describe the controls to be implemented to minimise residual risks/impacts so far as reasonably practicable.
* Identify specific environmental objectives and performance standards to be achieved with controls in place.
* Detail monitoring to be undertaken to verify the effectiveness of the controls.
* Describe mechanisms to determine when/if corrective actions and contingency measures are required.
* Detail a program to investigate and implement ways to improve the environmental performance of the Project over time.
* Detail appropriate review periods and/or triggers to ensure the plan remains fit for purpose.
* Establish procedures to manage:
* incidents and any non-conformity.
* stakeholder and community complaints.
* failure to comply with statutory requirements and/or environmental performance standards.
* roles and responsibilities for implementing the plan.
* a protocol for periodic review of the plan.
* Include a community engagement strategy which will include a complaints handling system.

The avoidance and mitigation measures/controls and monitoring commitments described in this EES will be incorporated into the relevant management plans. The key management plans that will be required prior to commencement are summarised in Section 24.10 and elaborated upon in each EES Chapter.

Procedures will be developed and maintained to provide further task specific detail where required. Operational procedures will provide work instructions and detail the criteria or operating parameters within which work will be undertaken.

### Emergency Preparedness and Response

The Project will implement and maintain procedures and processes to prepare for and respond to potential emergency situations. The procedures and plans will:

* aim to prevent or mitigate adverse environmental impacts from emergency situations;
* define response actions to prevent or mitigate the consequences of emergency situations appropriate to the magnitude of the emergency and the potential environmental impact;
* include a periodic testing regime for the planned response actions, where practicable;
* have requirements to review procedures and processes periodically, particularly after the occurrence of an emergency situation; and
* provide relevant information and training related to emergency preparedness and response, as appropriate, to relevant parties.

Plans, procedures and processes will be reviewed and maintained to ensure they remain current and fit for purpose.

## Monitoring and Performance Evaluation

### Monitoring, Measurement, Analysis and Evaluation

Programs will be established to proactively monitor, measure, analyse and evaluate the Project’s environmental performance. A monitoring program will be maintained over the life of the Project that outlines:

* what needs to be monitored and measured;
* the methods for monitoring, measurement, analysis and evaluation, as applicable, to ensure valid results;
* the standards against which the Project will evaluate its environmental performance; and
* a schedule to identify when monitoring will be undertaken, analysed and evaluated.

The monitoring program will address the commitments in this EES, relevant compliance obligations and will consider any emerging risks and opportunities associated with the Project’s environmental aspects. The key Project monitoring requirements are described in Chapters 8 to 23 and are summarised in Section 24.10 and in Attachment 5 (Aspects and Risks).

Periodic assessment of the monitoring outcomes against the performance standards and compliance obligations will be undertaken. Monitoring outcomes and associated environmental performance will be communicated both internally and externally, as identified in the Project’s communications procedures and in line with the identified compliance obligations.

### Audit Requirements

Internal audits will be undertaken at planned intervals to assess whether the EMS conforms to the requirement of AS/NZS ISO 14001:2016 and is effectively implemented and maintained.

An internal and external audit program will be maintained detailing the frequency, methods, responsibilities, planning requirements and reporting requirements. The frequency and scope of the audit program will be determined with consideration to risks and issues pertinent at any point in time over the life of the Project, in line with the AS ISO 9011:2018, ‘Guideline for Auditing Management Systems’.

It is anticipated that regulators will establish their own audit programs independent to the EMS requirements. Relevant documentation associated with the audit program will be retained.

### Management Review

The Management team will review the EMS at planned intervals to ensure its continuing suitability, adequacy and effectiveness.

The management review will include consideration of:

* Changes in:
* external and internal issues that are relevant to the EMS;
* the needs and expectations of interested parties, including compliance obligations;
* significant environmental aspects; and
* risks and opportunities.
* The extent to which environmental objectives have been achieved.
* Information on the Projects environmental performance, including trends in:
* non-conformities and corrective actions;
* monitoring and measurement results;
* fulfilment of its compliance obligations; and
* audit results.
* Relevant communications from interested parties, including complaints.
* Opportunities for continual improvement.

The relevant documentation and outputs from the management review meetings will be retained.

### Documentation

Documented information and records required by the EMS will be controlled to ensure:

* they are available and suitable for use, where and when required; and
* are adequately protected (e.g. from loss of confidentiality, improper use, or loss of integrity).

For the control of documented information and records, appropriate processes will be put in place for document storage and preservation, including preservation of legibility, control of changes (e.g. version control), retention and disposition.

Key records will include, but not limited to monitoring data, stakeholder correspondence, baseline environmental information, minutes from management meetings and regulator correspondence.

## Improvement

### Community Engagement and Complaints Management

A community engagement strategy will be maintained to ensure:

* Contact options are established such that all community members can provide feedback on the Project or lodge a complaint.
* A complaints mechanism is established so that community issues can be resolved so far as reasonably practicable.
* Material community complaints are raised as a non-conformity and investigated.
* Outcomes from investigations are incorporated into decision-making processes related to the avoidance and mitigation of impacts and general improvement of environmental performance.

The complaints or grievances will be documented in a register and the complainants will be kept informed during the consideration of the issue and notified of any corrective actions that occur as a result of the complaint or incident investigation.

Feedback will be documented and acknowledged as soon as practical. Where required, progress updates and/or a formal response will be provided to address the feedback received.

A community engagement framework is provided in Chapter 5 (Community Engagement). This framework outlines the consultation activities that will be undertaken through the life of the Project, including direct engagement activities, sources of Project information and ways in which the Project will contribute to the local community and wider region.

### Non-conformity and Corrective Action

Material deviations from the plans, processes and procedures that comprise the EMS will be identified as non-conformities and reported as incidents. Incidents will be investigated to determine the root cause and to develop corrective actions with the aim of preventing reoccurrence and addressing any associated consequences, including mitigating adverse environmental impacts. Documentation will be retained to show the nature of the incidents and any immediate contingencies applied or subsequent actions taken.

### Continual Improvement

A process of continual improvement will be established to enhance environmental performance over the life of the Project. This will be primarily achieved through the successful implementation of the EMS described in this Chapter.

Over the life of the Project, it is recognised technologies will advance and leading practice standards across the industry will evolve. Processes will be established to identify, evaluate and implement such improvements over the life of the Project.

A research and development program will be maintained and funded to further develop and improve environmental performance. Aspects of this program are further described in Attachment 3 (Rehabilitation Plan).

## Supporting Detail

Sections 24.1 to 24.9 of this Chapter set out the EMS requirements in line with AS/NZS ISO 14001:2016 standard. This describes the adaptive management strategy that is designed to respond to emerging issues or risks, new technologies, community feedback and to ensure compliance with policy commitments and regulatory requirements.

The measures to avoid and minimise the impacts and risks to the environment, so far as reasonably practicable are set out in Chapters 8 to 23 and have been summarised below in Table 24‑2 and Table 24‑3.

In line with the intent of the EMS, it is acknowledged that these requirements will evolve over time to ensure the Project related risks are minimised so far as reasonably practicable in line with the intent of the EMS and the requirements of the GED.

The GED is a concurrent regulatory obligation in relation to the proposed avoidance and mitigation measures. Additional measures may be required to minimise the risk of harm to human health or the environment so far as reasonably practicable under the GED. These additional measures may develop over time as the ‘state of knowledge’ evolves.

Table 24‑2: Key avoidance and mitigation measures

| Environmental Element | Code | Measure |
| --- | --- | --- |
| Land Use and Planning  (Chapter 8) | LP-01 | The WBA secondary processing facility is situated within the Wimmera Intermodal Freight Terminal (WIFT) Precinct, which is a Special Use Zone (SUZ9) established for industrial purposes, including the processing, storage and handling of mineral sands. The placement of the facility within the WIFT Precinct will avoid the loss of land parcels currently zoned for farming. |
| LP-02 | Land will be purchased prior to the commencement of works or Land Access and Compensation Agreements will be negotiated such that landholders are reasonably compensated. |
| LP-03 | A Rehabilitation Plan will be established for the Project that will address matters relating to progressive rehabilitation and closure. |
| Traffic and Transport (Chapter 9) | TM-01 | The proposed haulage route is designed to rely on higher-order roads and/or routes gazetted as appropriate to cater for the types of traffic generated by the Project. |
| TM-02 | A Traffic Management Plan will be maintained to manage Project traffic movements and mitigate specific short and long-term traffic impacts. |
| TM-03 | A Green Travel Plan will be maintained to encourage sustainable travel and to minimise Project traffic generation. |
| TM-04 | Road maintenance and management agreements will be established with Horsham Rural City Council for local roads that are relied upon by the Project. |
| TM-05 | Road infrastructure improvements will be undertaken at the Wimmera Highway/WBA intersection so that it complies with Austroads and Department of Transport design requirements. |
| TM-06 | A Community Engagement Plan will be established to identify and consult affected and interested stakeholders. |
| TM-07 | Local roads will be progressively rehabilitated and reinstated over the life of mine. |
| Historic Heritage  (Chapter 10) | HH-01 | Exclusion zones will be established to avoid impacts several sites within the development extent. |
| HH-02 | The shed at Site 1 may be relocated in consultation with the landholder if impacts are unavoidable and relocation is deemed to be practicable. |
| HH-03 | A Chance Finds Procedure will be maintained to manage unexpected discoveries of archaeological sites, which includes a provision to stop work in the vicinity of the discovery. |
| HH-04 | A Heritage Management Plan will be developed, which will include relevant requirements under the *Heritage Act 2017* and other means to avoid and minimise residual impacts so far as reasonably practicable. |
| HH-05 | A Rehabilitation Plan will be established for the Project that will address matters relating to progressive rehabilitation and closure. |
| Landscape and Visual Amenity  (Chapter 11) | LV-01 | Project plant will be situated in a planning zone designated for industrial activity (WIFT Precinct). |
| LV-02 | The form and placement of Mine Block B overburden stockpile will be set back from road edges and designed to minimise the footprint, avoid visual impacts and disturbance to the surrounding agricultural land. |
| LV-03 | Progressive rehabilitation will be undertaken to minimise the disturbed area on average to less than 300 ha at any point in time over the life of mine. |
| LV-04 | Landscape screening vegetation will be established to filter and screen views of the mine Block B overburden stockpile and Wet Concentrator Plant (WCP), from public viewpoints along the Henty and Wimmera Highways. |
| LV-05 | Project lighting at the WBA location within the WIFT Precinct will be diverted away from roads and farming areas, so far as reasonably practicable. |
| LV-06 | A Rehabilitation Plan will be established for the Project that will address matters relating to progressive rehabilitation and closure. |
| Noise and Vibration  (Chapter 12) | NV-01 | Equipment fleet size will be optimised to reduce the number of circuits associated with the mining operations. |
| NV-02 | The proposed haulage route will comprise arterial roads, which are gazetted to cater for the types of traffic generated by the Project, and as such, impacts to lower-order local roads will be avoided. |
| NV-03 | High noise level generating construction activities will be limited to the Environment Protection Authority (EPA) recommended normal working hours, where reasonably practicable. |
| NV-04 | Earthen bunds and stockpiles will be established to abate noise emissions and mitigate impacts to sensitive receptors. |
| NV-05 | Noise abatement kits will be fitted on all equipment and vehicles where practicable to do so. |
| NV-06 | A Noise and Vibration Management Plan will be established and implemented to manage and mitigate impacts associated with Project construction, operations and rehabilitation/closure. |
| NV-07 | A Traffic Management Plan will be established to manage and mitigate impacts associated with all phases of the Project. |
| Air Quality  (Chapter 13) | AQ-01 | Transport of HMC will be undertaken on sealed roads to avoid wheel generated dust and the HMC will be stored and loaded onto the ship via a closed system. |
| AQ-02 | Active mining areas, including topsoil stripping, will be minimised so far as reasonably practicable. |
| AQ-03 | Gravel and low silt content material will be used for internal haulage routes. |
| AQ-04 | Open areas and unsealed roads will be routinely watered, and schedules will be adapted as required in response to forecast weather conditions, monitoring and community feedback. |
| AQ-05 | HMC will be stockpiled wet, and sprinklers will be established to maintain moisture content and minimise surface creep during extremely dry conditions. |
| AQ-06 | Topsoil stripping and placement will be avoided during extreme weather conditions. |
| AQ-07 | Appropriately sized vehicles will be used to maximise the efficiency of material carting and minimise the number of haulage circuits. |
| AQ-08 | An Air Quality Management Plan will be established to provide a framework for the management of residual impacts and risks. |
| AQ-09 | A Community Engagement Plan will be implemented to provide a framework for consultation over the life of the Project. |
| AQ-10 | Mined areas will be progressively rehabilitated and stabilised with a crop cover 1.5 to 4 years after disturbance. |
| Radiation  (Chapter 14) | RD-01 | Site security measures and signage will be applied to restrict unauthorised access by members of the public to operational areas. |
| RD-02 | HMC haulage trucks will be fully contained. |
| RD-03 | Roads for light and heavy vehicles will be constructed with appropriate materials comprising low silt content to minimise dust emissions. |
| RD-04 | Road watering will be undertaken on light vehicle roads and heavy vehicle routes to keep the surface moist and to minimise wheel generated dust. |
| RD-05 | HMC will be stockpiled wet, and sprinklers will be established to maintain moisture content and minimise surface creep during extremely dry conditions |
| RD-06 | Vehicle washdown facilities will be provided within the WBA to ensure vehicles and equipment can be washed down as required. |
| RD-07 | The Project will implement and maintain procedures and processes to prepare for and respond to potential emergency situations. |
| RD-08 | A Radiation Management Plan will be established to provide a framework for the management of radiation related risks. |
| RD-09 | A Rehabilitation Plan will be developed to achieve the rehabilitation objectives as soon as reasonably practicable. |
| Soils and Landform  (Chapter 15) | SL-01 | Potential acid sulfate soil (PASS) material (Geera Clay) will be avoided during all mining, excavation and dewatering activities with a buffer of at least 1.5 m to avoid exposing/oxidising PASS. |
| SL-02 | A pre-mine soil survey protocol will be maintained to characterise soils prior to stripping. |
| SL-03 | The effective rooting zone will be stripped and stockpiled to ensure the upper soil horizons are stockpiled separately from the lower soil horizons. |
| SL-04 | Rehabilitated soils will be ameliorated with gypsum. |
| SL-05 | Rehabilitation machinery with low bearing pressure will be used and subsurface soil units will be ripped as required. |
| SL-06 | Potentially contaminated sites will be assessed and managed in accordance with the National Environment Protection Measures (NEPM) prior to mining. |
| SL-07 | An integrated mine planning process will be implemented to progressively develop site drainage plans. |
| SL-08 | Hydrocarbons and other chemicals will be managed in line with industry leading practice and material safety datasheets. |
| SL-09 | A risk-based weed management protocol will be implemented to minimise the risk of spreading weeds or pathogens. |
| SL-10 | A Rehabilitation Operations Management Plan (ROMP) will be maintained to avoid and minimise operational risks/impacts. |
| SL-11 | A Rehabilitation Plan will be developed to achieve the rehabilitation objectives as soon as reasonably practicable. |
| SL-12 | The agricultural productivity of landholdings will be assessed prior to mining to inform the relevant performance standards for landholder specific rehabilitation plans. |
| Surface Water  (Chapter 16) | SW-01 | Slimes and sand tailings will be co-disposed to the mining cell to avoid the construction of solar drying cells. |
| SW-02 | Process water storage capacity will be established and maintained to contain a 1% Annual Exceedance Probability (AEP) storm event. |
| SW-03 | Progressive rehabilitation of mined areas will be undertaken to minimise the disturbed area on average to less than 300 ha at any point in time over the life of mine. |
| SW-04 | An integrated mine planning process will be maintained to manage site drainage. |
| SW-05 | A water efficiency program will be developed and implemented to minimise water use so far as reasonably practicable. |
| SW-06 | A Surface Water Management Plan will be maintained to avoid and minimise risks/impacts so far as reasonably practicable. |
| SW-07 | A Rehabilitation Plan will be developed to achieve the rehabilitation objectives as soon as reasonably practicable. |
| Groundwater  (Chapter 17) | GW-01 | PASS material (Geera Clay) will be avoided during all mining, excavation and dewatering activities with a buffer of at least 1.5 m to avoid exposing/oxidising PASS. |
| GW-02 | Process water from tailings will be recovered and reused using flocculants and decant sumps. |
| GW-03 | Sand tailings will be placed in the mine void to a depth greater than 3 m from the final rehabilitated ground surface and surrounding natural ground. |
| GW-04 | Groundwater bore network will be monitored and augmented over the life of mine to adequately characterise the potential risks and impacts to groundwater resources. |
| GW-05 | If Project related drawdown/mounding or adverse changes to groundwater quality are recorded, targeted studies and monitoring will be undertaken to avoid or minimise the risks so far as reasonably practicable. |
| GW-06 | Potentially contaminated sites will be assessed and managed in accordance with the NEPM prior to mining. |
| GW-07 | Chemicals will be stored and managed in line with relevant guidelines and industry best practice. |
| GW-08 | A Groundwater Management Plan will be implemented to avoid and minimise risks/impacts so far as reasonably practicable. |
| GW-09 | A PASS Management Plan will be implemented to avoid and minimise risks/impacts so far as reasonably practicable. |
| GW-10 | Chemicals will be stored and managed in line with relevant guidelines and industry best practice. |
| GW-11 | A Rehabilitation Plan will be developed and implemented to avoid and minimise planning and operational risks/impacts. |
| Wastes and Emissions  (Chapter 19) | WE-01 | Process water storage, transfer areas and sumps will be designed with a capacity to contain a significant rainfall event of at least 1 % AEP such that there is no discharge of contact water from operational areas. |
| WE-02 | Process water will be recovered and reused to minimise discharge. |
| WE-03 | A drainage plan will be prepared prior to disturbance of each new mining cell with consideration to the existing topography, detailed mine design and surrounding infrastructure. |
| WE-04 | Potentially contaminated materials and sites will be assessed in accordance with the NEPM prior to mining. |
| WE-05 | An energy efficiency program will be established to minimise greenhouse gas emissions over the life of the Project. |
| WE-06 | A Waste Management Plan will be maintained to avoid and minimise waste and emissions so far as reasonably practicable. |
| WE-07 | A Rehabilitation Plan will be developed and implemented to avoid and minimise planning and operational risks/impacts. |
| Socioeconomics  (Chapter 20) | SE-01 | The development extent has been designed to avoid direct impacts on dwellings, historic sites, patches of vegetation and key public infrastructure. |
| SE-02 | An EMS will be established and maintained to monitor and respond to emerging issues and to avoid and minimise impacts to the community so far as reasonably practicable. |
| SE-03 | A Workforce Accommodation Strategy will be developed in consultation with key stakeholders. |
| SE-04 | Targeted community programs will be funded to support the local community. |
| SE-05 | Land Access and Compensation Agreements will be negotiated such that landholders are reasonably compensated. |
| SE-06 | A Rehabilitation Plan will be developed and implemented to return mined land to the landholder with objectives met as soon as possible after mining. |
| Flora and Fauna  (Chapter 21) | FF-01 | Areas of native vegetation will be avoided via exclusion zones to protect local ecological values. |
| FF-02 | Tree protection zones will be established around selected scattered trees that are not otherwise protected within an exclusion zone (FF-01). |
| FF-03 | Periodic flora surveys will be undertaken over the life of the Project across the proposed disturbance area to characterise previously unsurveyed areas. |
| FF-04 | Fauna egress will be incorporated into the design of open mine voids, sumps, trenches and dam infrastructure which could pose a risk to native fauna due to entrapment. |
| FF-05 | If Project related drawdown/mounding or adverse changes to groundwater quality are recorded, targeted studies will be undertaken and corrective actions applied to avoid or minimise the risks so far as reasonably practicable. |
| FF-06 | A Flora and Fauna Management Plan will be maintained to minimise the risk of direct and indirect impacts on flora and fauna. |
| FF-07 | A Rehabilitation Plan will be developed to achieve the rehabilitation objectives as soon as reasonably practicable. |
| FF-08 | Offsets will be applied to compensate for residual impacts on native vegetation, threatened species and habitat for threatened species. |
| Land Rehabilitation  (Chapter 22) | RH-01 | A Rehabilitation Plan will be developed to achieve the rehabilitation objectives as soon as reasonably practicable after mining. The rehabilitation strategy is detailed in Attachment 3 (Rehabilitation Plan). |
| Aboriginal Cultural Heritage  (Chapter 23) | AH-01 | A Cultural Heritage Management Plan, as agreed with the Registered Aboriginal Party (RAP), will be implemented to protect Aboriginal cultural heritage. |

**Table 24‑3: Key monitoring requirements**

| Environmental Element | Code | Key Monitoring Requirements  (Requirements are for all phases of the Project unless otherwise stated) |
| --- | --- | --- |
| Traffic and Transport  (Chapter 9) | TM-0A | Assessments will be undertaken to confirm if reinstated roads meet the necessary regulatory standards and the agreed pre-condition benchmark. |
| TM-0B | Local roads relied upon by the Project will be periodically inspected for signs of deterioration resulting from the Project. |
| Historic Heritage  (Chapter 10) | HH-0A | Heritage exclusion zones will be periodically inspected to ensure no damage to heritage sites has occurred as a result of Project activities. |
| Landscape and Visual Amenity  (Chapter 11) | LV-0A | Visual amenity inspections will be periodically conducted from selected viewpoints over the life of mine to qualitatively assess the effects of lighting and other matters relating to visual amenity. |
| LV-0B | Tree screen establishment will be periodically inspected and monitored to assess the condition of vegetation. |
| Noise and Vibration  (Chapter 12) | NV-0A | Operator attenuated noise measurements will be undertaken over the life of mine at sensitive receptors according to a schedule approved in the Noise and Vibration Management Plan. The monitoring program will be developed by a suitably qualified person such that it is aligned with the requirements of EPA Publication 1834 and 1826.4 and will fully characterise the relevant risks and impacts associated with the Project. |
| Air Quality  (Chapter 13) | AQ-0A | Real-time continuous air quality monitoring of particulate matter will be undertaken at sensitive receptors according to a schedule approved in the Air Quality Management Plan. The monitoring will be developed by a suitably qualified person such that it is aligned with the requirements of EPA Publication 1961 and will fully characterise the relevant risks and impacts associated with the Project. |
| AQ-0B | Visual inspections for nuisance dust will be undertaken. |
| Radiation  (Chapter 14) | RD-0A | Personal radiation dose monitoring (workers) and work area monitoring will be undertaken over the life of mine at sensitive receptors according to a schedule approved in the Radiation Management Plan. The monitoring program will be developed by a suitably qualified person such that it is aligned with the regulatory requirements and will fully characterise relevant risks and impacts associated with the Project. |
| RD-0B | Periodic sampling of airborne particulate matter will be analysed for radionuclides. |
| RD-0C | Surface water and groundwater samples will be analysed for radionuclides according to a schedule approved in the Radiation Management Plan. The monitoring program will be developed by a suitably qualified person such that it is aligned with the regulatory requirements and will fully characterise the relevant risks and impacts associated with the Project. |
| Soils and Landform  (Chapter 15) | SL-0A | Field surveys and inspections will be undertaken during supervised soil stripping and stockpiling activities. |
| SL-0B | Pre-mine soil sampling will be undertaken over the life of mine according to the protocol in the Rehabilitation Operations Management Plan. The monitoring program will be developed to adequately characterise the resources to be recovered for rehabilitation. |
| SL-0C | Contaminated land assessments will be undertaken in line with the NEPM once land access is granted and prior to soil disturbance. |
| SL-0D | Stormwater drains and sumps will be inspected and monitored over the life of the Project. |
| Surface Water  (Chapter 16) | SW-0A | Surface water samples and water levels will be undertaken according to a schedule approved in the Surface Water Management Plan. The surface water sampling analytical suite will be developed by a suitably qualified person such that it is aligned with the requirements of the EPA Environment Reference Standard (ERS) and will fully characterise the relevant risks and impacts associated with the Project. |
| SW-0B | Process water dam levels will be routinely monitored to confirm freeboard levels are maintained. |
| Groundwater  (Chapter 17) | GW-0A | Groundwater samples and water levels will be undertaken according to a schedule approved in the Groundwater Management Plan. The groundwater sampling analytical suite will be developed by a suitably qualified person such that it is aligned with the requirements of the ERS and will fully characterise the relevant risks and impacts associated with the Project. |
| GW-0B | Targeted monitoring of groundwater dependent ecosystems (GDEs) will be undertaken over the course of the Project if adverse groundwater effects (flux or hydrochemistry) are observed in bores associated with the relevant GDE sensitive receptors. |
| GW-0C | Process water monitoring will be undertaken at the WCP prior to groundwater discharge according to a schedule to be approved in the Groundwater Management Plan. |
| GW-0D | Soil sampling will be undertaken to validate the geological conceptual model in line with the requirements to be approved in the PASS Management Plan. |
| Wastes and Emissions  (Chapter 19) | WE-0A | The volume and characteristics of all waste streams removed from site will be recorded and routine site inspections will be undertaken to ensure site procedures are effectively implemented. |
| WE-0B | Energy use and greenhouse gas emissions will be monitored in line with the GHG and Project Energy and GHG Efficiency Program. |
| Socioeconomic  (Chapter 20) | SE-0A | Periodic community surveys will be conducted over the life of the Project to objectively gauge views on the Project. |
| Flora and Fauna  (Chapter 21) | FF-0A | Periodic reconciliation of survey data collected for vegetation clearing and topsoil disturbance against planned and approved areas. |
| FF-0B | Periodic inspections of avoidance areas to ensure there are no impacts from Project activities. |
| FF-0C | Weed inspections and monitoring will be undertaken according to the schedule in the Flora and Fauna Management Plan. |
| Rehabilitation  (Chapter 22) | RH-0A | Rehabilitation monitoring will be conducted against the agreed completion criteria as outlined in the Rehabilitation Plan. Aspects to be monitored include but not limited to soil stability/erosion, vegetation establishment and soil physical and chemical parameters. |
| Aboriginal Heritage  (Chapter 23) | AH-0A | Monitoring and inspections will be undertaken as agreed in the Cultural Heritage Management Plan. |