**Avonbank Mineral Sands Project**

**Environment Effects Statement**

**Chapter 6 – Impact Assessment Framework**

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# Impact Assessment Framework

## Introduction

This Chapter provides an overview of the environmental impact assessment framework applied during the development of the Avonbank Mineral Sands Project (the Project) Environment Effects Statement (EES). The framework has been prepared to meet the intent of the:

* ‘Ministerial Guidelines for the Assessment of Environmental Effects under the *Environment Effects Act* *1978*’ (DSE, 2006) (the Ministerial Guidelines).
* ‘Scoping Requirements for the Avonbank Environment Effects Statement’ (DELWP, 2020) (the Scoping Requirements).
* ‘Department of Environment, Land, Water and Planning Impact Assessment Guidance, Use of Impact Assessment and Risk Assessment in Environment Effects Statements’ (DELWP, 2021) (the Advisory Note).

In line with the Scoping Requirements, the EES impact assessment framework has been developed ‘to provide a clear, objective and well-integrated analysis of the potential effects of the proposed Project, including proposed avoidance, mitigation and management measures, as well as feasible alternatives.’ (DELWP, 2020).

The impact assessment framework described in this Chapter has been applied to all matters being assessed under the *Environment Effects Act 1978* (EE Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)*,* in line with the Bilateral Agreement between the State of Victoria and Commonwealth (dated 27 October 2014) (DAWE, 2014).

## Scoping Requirements

The Scoping Requirements, issued by the Victorian Minister for Planning in July 2020, set out the matters to be investigated and the way they are to be presented in the EES.

The Scoping Requirements detail the:

* assessment process and required approvals;
* matters to be addressed in the EES;
* evaluation objectives against which the Project are to be assessed;
* specific requirements to be investigated; and
* the manner in which the EES could document its assessment of environmental effects.

The evaluation objectives listed in the Scoping Requirements set out the desired Project outcomes in the context of key legislative and statutory policies, as well as the principles and objectives of ecologically sustainable development and environmental protection. The evaluation objectives and specific scoping requirements are presented in Appendix A (Scoping Requirements) of this EES.

The Scoping Requirements set out a structure detailing how the EES could document the assessment of environmental effects for each evaluation objective. This structure requires that the EES include an assessment of the likely residual impacts with avoidance and mitigation measures in place.

It is noted that while the Scoping Requirements are intended to cover all relevant matters, the EES has addressed other issues that emerged during the EES investigations and associated stakeholder consultation.

## Framework

The Avonbank EES impact assessment framework adopts the suggested approach detailed in the Scoping Requirements. In accordance with this structure, the Avonbank EES has addressed the following requirements:

* Project description with consideration to alternative design options.
* Consultation with stakeholders and the broader community to understand their key issues and concerns.
* Characterisation of the existing environment to underpin the impact assessment.
* Identification of potential impacts that require further assessment.
* Development of measures to avoid and mitigate the environmental impacts so far as reasonably practicable in line with the hierarchy set out below:
* Avoidance: measures taken to avoid adverse impacts on the environment from the outset, such as careful spatial or temporal placement of infrastructure or disturbance.
* Minimisation: measures taken to reduce the duration, intensity and extent of impacts that cannot be avoided.
* Rehabilitation/restoration: measures taken to improve a degraded environment following exposure to impacts that cannot be avoided or minimised.
* Offsets: measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the hierarchy.
* Assessment of the likely residual impacts of the Project on the existing environment with avoidance and mitigation measures in place.
* Development of environmental objectives and an associated management framework to ensure the Project’s impacts are maintained within permissible levels.

The interrelationship between the above elements is summarised in Figure 6‑1 and further described in Section 6.4.

Figure 6‑1: Impact assessment framework

Project Definition and Alternatives

Existing Conditions

Identification of Potential Impacts

Avoidance and Mitigation Hierarchy AppliedMeasures

Impacts avoided or minimised

Residual Impact Assessment and Performance Objectives

Amend Project Description

Stakeholder Engagement

No

Yes

## Impact Assessment

This Section describes the approach adopted in this EES to assess the environmental impacts in line with the framework described in Section 6.3.

### Project Description

Chapter 2 (Project Description) provides an overview of the proposed Project, including the key elements associated with mining, secondary processing, and product transport. It was developed and refined over the course of the EES preparation period to incorporate and optimise the Project design with consideration to the Definitive Feasibility Study and the environmental impact assessments.

The key objectives considered during the preparation of the Project design were to:

* optimise recovery of the resource and feasibility of the Project;
* avoid and minimise environmental impacts so far as reasonably practicable; and
* enhance socioeconomic benefits for the State.

Various design alternatives were considered during the preparation of the Project Description, as summarised in Chapter 3 (Project Alternatives). In assessing the feasibility of each alternative, a range of matters were considered, including:

* Environmental risks.
* Workplace health and safety.
* Operational constraints and opportunities.
* Leading practice mineral sands mining and processing techniques.
* Project cost implications and limitations.
* Standards and legislative guidance.
* Stakeholder views and feedback.

A pilot mining and rehabilitation trial was conducted from 2019 through 2022 to demonstrate the feasibility of mining and processing the Avonbank deposit and to inform the EES with regard to matters relating to environmental management. Where appropriate, the findings of the trial were incorporated into the relevant impact assessments.

### Stakeholder and Community Consultation

Stakeholder and community consultation was undertaken during the EES preparation period to seek feedback on the Project and to communicate the outcomes from key impact assessments and feasibility studies. Engagement activities were undertaken in line with the EES Stakeholder Engagement Plan, which detailed a strategy to inform, consult, involve or collaborate with interested stakeholders.

Key stakeholder and community consultation engagement activities undertaken during the EES period are detailed in Attachment 1 (Stakeholder Engagement Report). The Project design and environmental impact assessments considered stakeholder feedback with the aim of directly addressing or providing further context for matters raised. Each impact assessment includes a summary of the stakeholder engagement undertaken for each environmental discipline.

### Existing Conditions

Baseline environmental studies were undertaken to characterise the existing conditions and inform the various impact assessments and feasibility studies. Each existing condition report was submitted to the Technical Reference Group (TRG) for review prior to commencing the detailed impact assessment study.

The existing studies, in most instances, involved directly monitoring conditions within and surrounding the Project area. Baseline information was also sourced from existing literature and via consultation with stakeholders.

The impact assessment reports and associated Chapters summarise the existing conditions relevant to each discipline. This provides context and relevant baseline information for the residual impact assessment studies. Chapters 8 to 23 summarise the relevant existing baseline conditions for each environmental discipline.

### Potential Impacts

In this EES, an impact was defined as any change to the environment which results in a complete linkage between the Project related source activity or condition and a sensitive receptor. A change to the environment can be either adverse or beneficial.

The Project related potential impacts associated with each environmental discipline were identified by technical specialist(s) with consideration to:

* findings from the baseline studies;
* risks and issues identified in the EES referral document and Scoping Requirements;
* stakeholder concerns and feedback;
* the existing knowledge base; and
* legislative requirements or guidelines.

The potential impacts identified for detailed assessment were those that:

* may result in a material environmental impact; and/or
* were scientifically complex and further information was required.

In line with the Ministerial Guidelines, the level of investigation or assessment undertaken was proportional to the risk of adverse impacts. Potential impacts which were well understood and represented a relatively low level of risk with standard effective controls in place were not described in the detailed impact assessment. Where appropriate, these were captured in the Project risk assessment included as Attachment 5 (Aspects and Risks).

### Avoidance and Mitigation Measures

Avoidance and mitigation measures were developed for each environmental discipline to minimise the residual impacts so far as reasonably practicable. Each Chapter incorporates the Project design commitments and recommendations from the technical specialist(s) as a consolidated set of proponent commitments.

The hierarchy of avoidance and mitigation measures described in Chapters 8 to 23 include:

* avoidance measures taken to avoid adverse impacts on the environment from the outset, such as careful spatial or temporal placement of infrastructure or disturbance;
* minimisation measures taken to reduce the duration, intensity and extent of impacts that cannot be avoided;
* rehabilitation/restoration measures taken to improve a degraded environment following exposure to impacts that cannot be avoided or minimised; and
* offset measures taken to compensate for any residual, adverse impacts after full implementation of the previous steps of the mitigation hierarchy.

To ensure the residual impacts were reduced so far as reasonably practicable with avoidance and mitigation measures in place, the technical specialists and mineral sands Project team considered the:

* available leading practice design and mitigation measures applied at other successfully operating mineral sands projects (current state of knowledge);
* the significance of the residual impacts or associated risk; and
* the relative cost-benefit of alternative avoidance and mitigation measures.

It is acknowledged that avoidance and mitigation measures will evolve over the life of the Project, in line with the process of continual improvement outlined in the environmental management system described in Chapter 24 (Environmental Management).

### Residual Impacts

#### Impact assessment approach

Following the identification of potential impacts and the application of avoidance and mitigation measures, the technical specialists undertook a detailed residual impact assessment. Each residual impact assessment was undertaken using the methodology best suited to the issue being investigated, and in line with the relevant guidance material where available. The key types of assessments applied in this EES include:

* quantitative modelling of existing conditions and predicted impacts;
* site-specific field trials within the Project area;
* qualitative assessments with consideration to existing literature and/or guidelines; and
* benchmarking with other successfully operating mineral sands sites.

The likely residual impacts were assessed for activities that were broadly considered to be plausible worst-case scenarios. Where appropriate, each impact assessment details the level of uncertainty associated with the assessment and/or mitigation measures. A precautionary approach was taken such that plausible conservative assumptions were incorporated into the assessments to ensure the impacts were not under or overstated.

#### Significance of residual impacts

The significance of the residual impacts were assessed in a manner consistent with the Ministerial Guidelines and Scoping Requirements. Each discipline-specific impact assessment characterised the significance of the residual impact with reference where appropriate to the:

* magnitude, spatial extent and duration of the impacts on affected sensitive receptors;
* the likely effectiveness of avoidance or mitigation measures;
* consistency with statutory benchmarks, where relevant;
* the level of uncertainty associated with the residual impact assessment; and
* the interrelationship between different impacts, where they exist.

In addition to the above detailed characterisation, the relative significance of each residual impact was summarised on a scale ranging from negligible to severe. In this regard, each impact assessment includes discipline-specific definitions which broadly align with those provided in Table 6‑1. While this is recognised as a limited tool to broadly summarise complex matters, it provides a useful means of communicating residual impacts succinctly.

Table 6‑1: Significance of residual impacts

| Rating | Description |
| --- | --- |
| Negligible | No detectable/material impact on identified receptor/s, environmental value, or use. |
| Minor | Impact on identified receptor/s within natural variability and/or no tangible change to environmental values or use. |
| Moderate | Impacts on identified receptor/s with a tangible change to environmental values or use. Impacts may persist over the medium to long-term. |
| Major | Impacts on identified receptor/s with a significant change to environmental values or use. The impacts may extend regionally and persist over the medium to long-term. Receptors of State significance may be permanently impacted. |
| Severe | Impacts on identified receptor/s with a significant change to environmental values or use. Impacts may extend locally, regionally, or State-wide and may persist over the long-term or be irreversible. Receptors of State and Commonwealth significance may be permanently impacted. |

Cumulative impacts are the incremental, combined direct or indirect impacts of project development. They arise from compounding additional activities of a project or other non-related projects. A cumulative impact assessment was undertaken for each discipline with consideration of one or more other proposed projects or existing activities in the region. These cumulative assessments were generally qualitative, unless there was considered to be a plausible material cumulative impact. In these instances, a quantitative assessment was conducted where practicable, and the significance was assessed.

#### Matters of national environmental significance

The Project was determined by the Commonwealth to be a controlled action requiring assessment and approval under the EPBC Act before it can proceed. The bilateral agreement between the Commonwealth and the State of Victoria allows the Minister for the Environment and Water to rely on specified environmental impact assessment processes established in Victoria to assess actions under the EPBC Act.

Matters of national environmental significance were assessed in line with this impact assessment framework and in line with the assessment requirements listed in Section 6 of the Bilateral Agreement. Chapter 25 (Matters of National Environmental Significance), details the residual impact assessment as it relates to the relevant EPBC Act controlling provisions.

In line with the bilateral agreement, Chapter 25 describes:

* the controlled action;
* the places affected by the action;
* any matters of national environmental significance that are likely to be affected by the action; and
* all relevant impacts on matters of national environmental significance and the extent of the likely impacts.

It is expected that the EES will provide all relevant information for the Commonwealth Minister to make an informed decision on the Project under the EPBC Act.

#### Environmental impacts and risk

The EES Advisory Note states that the purpose of an EES is to identify, assess and clearly characterise the likely environmental impacts rather than the environmental risks. The impact assessments in this EES sought to clearly identify the likely residual impacts in line with this advice.

The Advisory Note also states it may be appropriate to discuss some issues that are unlikely to occur in terms of environmental risk. In this context, environmental assessments relating to radiation (Chapter 14) and human health (Chapter 18) were undertaken as risk assessments rather than impact assessments. These assessments were undertaken in line with the relevant guidance material available for each discipline.

Additionally, the Scoping Requirements state that a register of environmental risks must be included as part of the EES. As such, a Project risk assessment is included as Attachment 5 (Aspects and Risks) and includes the hazards and potential impacts associated with each environmental aspect.

### Environmental Objectives and Management

Environmental objectives were defined for each environmental discipline to articulate the predicted and achievable environmental outcomes for the Project. A monitoring and management framework was described for each discipline in line with the proposed environmental management system to be established for the Project, as described in Chapter 24 (Environmental Management).

The overarching environmental management system will be established in line with the AS/NZS ISO 14001:2016 standard. This will ensure an auditable system of interrelated business elements will be established to achieve environmental objectives, compliance obligations and policy commitments.

## Review and Quality Control

### Specialist Input

Technical specialists for each discipline were engaged to carry out the impact assessments and to assess the significance of the residual impacts. The specialists also advised the mineral sands Project team on potential avoidance and mitigation measures that could be applied. The TRG and stakeholders were provided opportunities over the EES preparation period to engage directly with each technical specialist.

A mineral sands Project team was involved in the preparation of the definitive feasibility and EES studies to provide input, based on experience drawn from successfully operating mineral sands operations across Australia. This facilitated the incorporation of leading practice operational and environmental management aspects associated with successful mineral sands mining.

### Technical Reference Group

The TRG was specifically appointed for the Project to advise on the preparation of the Avonbank EES. The TRG’s membership was drawn from bodies, including Government agencies, authorities and the municipal council that have a statutory or policy interest in the Project.

In line with the Ministerial Guidelines, the TRG provided advice on:

* Required statutory approvals and coordination of procedures.
* Relevant policy provisions and related information requirements.
* Study briefs and methodologies for key studies.
* Availability of relevant data sets and research.
* Conformity of the proposal and EES studies with policy and statutory requirements.
* Design and implementation of the proponent’s consultation plan.
* Adequacy of EES specialist study reports.

Agencies and authorities participating in the TRG had an obligation under the Ministerial Guidelines to provide accurate and timely advice regarding matters for which their organisations had specific responsibility.

### Independent Peer Review

The Ministerial Guidelines note that it may be prudent for a proponent to initiate expert peer reviews of EES studies that are technically or scientifically complex and where there may be a range of scientific views. As such, Independent Peer Reviews were undertaken for several technically complex matters, including:

* Groundwater modelling.
* Radiation impact assessment

The independent peer reviews primarily examined the assessment reports ensuring each was technically sound. Other impact assessments relied on quality control mechanisms provided by the technical specialist.

### Community Feedback

Acknowledging that the EES must be prepared to inform the general public as well as the TRG and the Minister, feedback was sought from the community on the key impact assessments. A presentation was provided to the Community Reference Group and at publicly available webinars. Specific chapters and topics were reviewed by the Project team’s community engagement specialists to provide advice on the form, structure, and content of the EES to ensure it remained accessible and comprehendible to the general public. Where differing views on the form and content of the EES were provided by the TRG and community, a reasonable balance was sought by the Project team.