

Submission Cover Sheet

Fingerboards Mineral Sands Project Inquiry and Advisory
Committee - EES

716B

Request to be heard?: Yes

Full Name: Darren Wong

Organisation: East Gippsland Shire Council

Affected property:

Attachment 1:

Attachment 2:

Attachment 3:

Comments: Please see attached submission

11 December 2020

By Email

To

Amy Selvaraj
Senior Project Officer
Planning Panels Victoria
Fingerboards.IAC@delwp.vic.gov.au

Dear Amy

**Inquiry and Advisory Committee (IAC)
Fingerboards Mineral Sands Project**

We continue to act for East Gippsland Shire Council (**Council**).

We refer to your letter dated 16 November 2020 advising the IAC would accept an endorsed submission from Council by 10am on 11 December 2020.

Council thanks the IAC for the indulgence to submit its submission for consideration.

Council considered its proposed submission at its meeting on 1 December 2020. We are instructed that Council passed the following resolution:

THAT COUNCIL:

1. RECEIVES AND NOTES THE REPORT AND THE FINGERBOARDS MINERAL SANDS PROJECT TECHNICAL REVIEW PREPARED BY SLR CONSULTING PTY LTD AS AT ATTACHMENT 1;
2. ON THE BASIS OF CLAUSE 1 ABOVE, OPPOSES THE PROPOSED FINGERBOARDS MINERAL SANDS MINE AS PROPOSED BY KALBAR OPERATIONS OR ANY OTHER PROPONENT ON THE BASIS OF THE EVIDENCE BEFORE COUNCIL;
3. ENDORSES THE FINGERBOARDS MINERAL SANDS PROJECT TECHNICAL REVIEW, AS AT ATTACHMENT 1, AND THE KEY MATTERS FOR EAST GIPPSLAND SHIRE COUNCIL, AT ATTACHMENT 2, AS COUNCIL'S SUBMISSION;
4. REQUIRES THE CHIEF EXECUTIVE OFFICER, OR DELEGATE, TO PREPARE AN ADDENDUM TO THE SUBMISSION THAT INCLUDES, BUT IS NOT LIMITED TO, ISSUES RELATING TO HUMAN HEALTH AND CLIMATE CHANGE, AS THE SCOPE FOR THE TECHNICAL REVIEW DID NOT INCLUDE DETAILED REVIEW;

5. AUTHORISES THE CHIEF EXECUTIVE OFFICER TO LODGE THE AMENDED COUNCIL SUBMISSION AND COUNCIL OBJECTION TO THE PROPOSED MINE WITH THE MINISTER FOR PLANNING FOR CONSIDERATION AS PART OF THE ENVIRONMENTAL EFFECTS STATEMENT, DRAFT PLANNING SCHEME AND DRAFT WORKS APPROVAL PROCESSES;
6. AUTHORISES THE CHIEF EXECUTIVE OFFICER OR THEIR DELEGATE TO PRESENT AT THE INQUIRY ADVISORY COMMITTEE PANEL HEARING BEFORE THE MINISTERIAL ADVISORY COMMITTEE IN RELATION TO THE FINGERBOARDS MINERAL SANDS PROJECT;
7. AUTHORISES THE CHIEF EXECUTIVE OFFICER TO ENGAGE APPROPRIATE LEGAL REPRESENTATION FOR PREPARATION AND REPRESENTATION AT THE INQUIRY ADVISORY COMMITTEE PANEL HEARING; AND
8. OBJECTS TO THE DRAFT PLANNING SCHEME AMENDMENT SPECIAL CONTROLS OVERLAY PROVISIONS WHICH EFFECTIVELY REMOVE THE EAST GIPPSLAND SHIRE COUNCIL AS THE RESPONSIBLE AUTHORITY FOR LAND USE PLANNING AND IMPLEMENTATION STRATEGIES FOR THE PRIVATELY OWNED LAND OUTSIDE THE MINE FOOTPRINT THAT THE MINE PROPOSES FOR ITS OWN PURPOSES.

We now attach as forming part of Council's submission the EES Targeted Technical Review dated November 2020, Attachment 2 to the Council Report and letter dated 9 December 2020 – Addendum 1 – Human Health Risk Assessment Technical Review (**SLR Report**).

Further, in accordance with Council's Resolution 4, we are instructed to outline following concerns relating to climate change which are to be taken as forming part of Council's submission to the IAC:

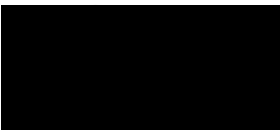
1. Council considers that the technical reports and EES documents have not adequately taken into account the impacts of climatic changes and more extreme weather events when assessing the potential impacts of the proposal on the environment particularly given the highly significant agricultural land to the east and the Gippsland Lakes.
2. Without carefully identifying potential environment impacts as a result of climate change, there cannot be any acceptable level of certainty that any material impacts can be effectively managed.

Council will expand on the concerns raised in this letter and the SLR Report as part of its presentation to the IAC.

We understand that Council has indicated to the IAC that 3 hours would be required to present its case. Based on our understanding of Council's position following the Council Meeting on 1 December 2020, we expect that Council might need 3-4 days. We will be considering this issue further in preparation for the directions hearing on Monday.

If you have any questions, please contact me.

Yours sincerely



Darren Wong
Principal



FINGERBOARDS MINERAL SANDS PROJECT

Kalbar Operations Pty Ltd
EES Targeted Technical Review
East Gippsland Shire Council

Prepared for:
East Gippsland Shire Council

SLR Ref: 640.30078.00000-R01
Version No: -v2.0
November 2020

SLR 

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with East Gippsland Shire Council (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
640.30078.00000-R01 v2.0	13 November 2020	████████	████████	████████
640.30078.00000-R01-v1.0 (Draft)	5 November 2020	████████	████████	████████

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East Gippsland Shire Council has engaged SLR Consulting supported by several additional technical specialist consultancies (Tardis- Cultural heritage, Ethos Urban- Economics, JHRC- Radiation and KDC Planning- Planning) to provide a targeted review of numerous technical reports and supporting documentation (including Draft Work Plan, Draft Works Approval Application, Planning Scheme Amendment and Land use and Planning Impact Assessment) contained within the Environment Effects Statement (EES) Package released for public comment on the 3rd September 2020. The review was undertaken with reference to the final Scoping Requirements for the Fingerboards Mineral Sands Project Environment Effects Statement (EES) released by DELWP in March 2018 (Appendix A), applicable Best Practice Standards and legislative requirements in Victoria and on a Commonwealth basis.

In accordance with an extension in response time granted by the Minister in a letter dated 20 September 2020 ref MIN078122 to East Gippsland Shire Council an initial holding response was provided to the Minister/DELWP on the 29 October 2020 prior to the close of public submissions. The following sets out key issues identified during the technical review of the EES and its associated technical reports. Further, the following sections also set out key issues identified in a technical review of the Planning Scheme Amendment, Draft EPA Works Approval and Draft Work Plan and should also be considered a response to the simultaneous public exhibition of these documents with the EES.

Significant key issues were identified in the following technical Areas as follows:

Planning Scheme Amendment

- Overall, the Planning Scheme Amendment (PSA) adequately addresses the technical requirements and sufficiently describes the need for the Specific Control Overlay (SCO) to simplify the approvals process. However, the PSA will need to provide further detail relating to specific land which applies to the SCO, provide discussion around the Public Acquisition Overlay including authority consultation and indicate the approach to be undertaken with private landowners to signify the purpose and impacts on private land.
- Further infrastructure details are required to be addressed in the incorporated document as well as the staging of the proposal.
- Provide clarity in the explanatory report as to who has been notified of the proposal.
- The predominate use surrounding the site is Farming zone. The explanatory report or incorporated document does not provide detail of land outside of the mining lease area in broader context of the works associated with the mine. The proposed mineral sands project and SCO constrains the surrounding Farming zone, putting onus on the Responsible Authority or individual applicant to prepare PSA's to facilitate currently prohibited uses for the associated mining personnel and mining life cycle. Current prohibited uses under the farming zone such as commercial and accommodation uses are deemed necessary for the future operation of the mine. Thus, as discussed, the burden is left to the RA/future applicant to strategize how to provide relevant commercial/accommodation uses for the expected increase in workers associated with the mine. The explanatory report needs to provide comment around this matter and the potential land use impacts that are associated.
- SLR understands Council are unsupportive of commercial/accommodation uses in the surrounding area.
- Mapping sheets are required to include pump stations north of site, otherwise will need to undergo planning permit process or another PSA as the proposed use(s) are prohibited.

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- Discuss further how the proposal gives effect to any relevant state policy, many of these SPPF's are only briefly touched on.
- The PSA is to provide further comment on how it aligns with the local planning policy framework which encourages mining but also provide a clearer and more contemporary strategic direction on matters included in the MSS such as;
 - Future agricultural land use
 - Goods and services to facilitate personnel – Economic development and business facilitation
 - Housing to facilitate personnel

Land Use and Planning Impact Assessment

- Overall, the land use and planning impact assessment adequately addresses the matters of change of land use, land use impacts and mitigation. The Planning Scheme Amendment which supports the Land Use and Planning Impact Assessment has addressed the technical requirements of the ministerial directions and has addressed the scoping requirements sufficiently.
- The predominate use surrounding the site is Farming zone. The Land Use and Planning Impact Assessment report needs to provide further detail of how private land is affected by the PSA relating to land use compatibility.
- The agglomeration impact section of the report puts responsibility on Council to deal with an unfavorable process. Further discussion is required for how the proposed Fingerboards project constrains the surrounding Farming zone and the need for land uses which may be prohibited in such a zone, but necessary to facilitate the expected mine personnel. The land use and planning impact assessment needs to provide an indication or solution to Council of how this is managed. It is seen unfavorable that a PSA is required to be undertaken by each individual applicant to include an additional permitted use in surrounding land zones, when the need for uses discussed in the agglomeration impacts section at 6.4 is directly impacted by the mining project.
- Existing State and local planning policy favours new industry and commercial activities, however, further comment is required as the MSS has many components to be addressed.

Surface water

- It is not clear how the Mitchell River 3% AEP design criteria was determined and whether this an acceptable level of risk. It is noted that the water balance predicted 3 overflow events during a 117-simulation period which corresponds to a 2.5% AEP event and a 37.5% probability that a mine water discharge event will occur during the 15-year project life. The probability of discharge could be higher when water balance modelling sensitivity is considered.

Clarification / justification is required for the 3% AEP Mitchell River spillway discharge design criteria and why this is different to the Perry River design criteria of 1% AEP which is a more widely adopted industry design criteria for mine water runoff.

- The EES attempts to characterise the water quality of mine runoff. This characterisation includes sediment, nutrients and heavy metals but makes no mention of salinity, pH or radionuclides.

SLR suggests an assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life. Given

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the potential sensitivity of the receiving environment to salt, the assessment should also include review of the potential for accumulation of salt in mine water storages over the design life of the project.

- Treatment with Dissolved Air Flotation (DAF) has not however been shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment.

It is of serious concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. As a dilution strategy is proposed to overcome the DAF system shortcomings a robust assessment of increased contaminant loads (kg per annum) to the downstream receiving waters is required.

- The EES surface water impact assessments rely heavily on the site water balance investigation. Although comprehensive, the GoldSim model is based on a number of assumptions and limitations which are detailed within Section 10 of the water balance report. These assumptions and limitations bring with them uncertainty and risk which SLR believes has not been adequately assessed within the EES and water balance and are further explored in Table 4. This concern was also raised during the Peer Review undertaken by AECOM in August 2020. SLR shares the concern regarding the potential for the project to be shut down safely if the economics or water resources are reduced or not able to be met in any one year.

The project should incorporate mechanism for adaptive management incorporating periodic review and risk assessment to ensure effective management of 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. A defined specific set of operating rules for the proposed dams (with accountability) is required to provide assurance that the general rules detailed in the site water plan will be adhered to during operation.

- The potential environmental consequences associated with failure of the temporary TSF would be extreme, with destruction of downstream aquatic habitats and scour and/or sedimentation of the fine tailings in the receiving creeks and rivers, largely in the Perry River catchment. A failure such as this is a rare event in the mining sector. The Perry River catchment and Gippsland Lakes Ramsar site are highly unlikely to be impacted (as the event is not expected to occur) given the standards required for design and operation of such a facility, and short period (five years) proposed for operation. The temporary TSF will be designed, constructed and operated in accordance with the relevant ANCOLD Guidelines on the Consequence Categories for Dams. A Moderate residual risk is the lowest possible ranking for a scenario with an inherent Significant consequence rating.

The risk management plan should be revised to include contingency planning for failure event in the tailings storage system.

- Due to the lack of surface water flow, the baseline monitoring program did not achieve a sufficient quantity of results to effectively characterise the water quality in the local environment. These data gaps are considered to be unavoidable and acknowledged within the EES with a recommendation to continue the event monitoring of the drainage lines to define a robust baseline, as opposed to comparison with the ANZECC aquatic ecosystem trigger values.

The baseline monitoring program should be continued as stated in the EES. An assessment of risk associated with the existing uncertainty is also recommended. SLR notes that the ANZECC guidelines typically require 2 years of monthly sampling to effectively characterise the baseline water quality.

- Table 8-6 of appendix 6 states that "If required, flocculant treatment (i.e., alum, gypsum or hydrated lime) will be used to drop suspended sediment levels in the stormwater". However, testing of these flocculants described in Section 6.6 of the 'Surface Water Assessment Site Study' identified that alum and hydrated lime were not recommended due to the site-specific characteristics. Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment

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systems. MSDS information in Appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota.

Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.

Groundwater

With regard to the proposed groundwater borefield to support mine operational water demand SLR has identified the following concerns:

- Drawdown at the bore field is significantly greater than modelled with implications for groundwater availability, and quality
- The bore field is unable to provide the required supply volume and/or a 3 GL/year groundwater license for Latrobe Group cannot be sourced through trade
- Groundwater extraction from shallow aquifer(s) is required to augment supply
- Impact of groundwater extraction on the geothermal properties beneficial use, at depths shallower than 2500 m Beneficial Uses (p.63 refers to 2500 m to 4000m depth)
- Saline intrusion to the Latrobe Group aquifer due to decline in groundwater pressure at coast
- Seepage from TSF and/or mine void tailings impacts the beneficial uses of Balook Formation / Latrobe Valley Group groundwater

With regard to the proposed filling of voids and mounding SLR has identified the following concerns

- Layering in the Coongulmerang Formation impedes the downward drainage from filled voids
- The use of groundwater for processing and implications for mine void seepage water chemistry
- Increased discharged to GDE and Mitchell River of groundwater with natural concentrations above criteria
- Shallow water table activates discharge to drainage lines on-site, land salinisation, impact on site structures and adjoining pit(s)
- The hydraulic connection between sediments under site, the Mitchell River flats and the Latrobe Valley Group at Woodglen is greater than indicated by the groundwater model.
- Implication for bore field drawdown if tailings seepage is less than modelled

Traffic and transport

- Insufficient geometric details have been provided to independently verify that the proposed road realignments which EGSC would assume control of will readily conform with relevant design requirements. This information is needed to fully address the ESS Scoping Requirements. Whilst basic cross-sectional details have been provided the practicality of the proposed alignments should be substantiated through the provision of more advanced engineering drawings including for instance long-sections. The proposed alignment of Fernbank Glenaladale Road would for instance result in the need to negotiate challenging topography which may in turn limit in practice the ability to meet various design requirements such as sight distance requirements.

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- The proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is inconsistent with EGSC's planning intent for the road network. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road however EGSC's subsequent planning (i.e. Bairnsdale Southern Alternative Freight Route) establishes that the intent is for freight movement to be facilitated by Collins Street/Bosworth Road, not Racecourse Road.
- Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options considered. It is therefore not possible to confirm based on the material contained within the Technical Report for instance if the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service as is required by the EES Scoping Requirements.
- It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available. Adoption of the Post-Avon River Bridge - Option 1 routing scenario would be preferable (from a traffic and transport perspective) given that it minimises impacts to the EGSC road network.
- Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm indication of the specific mechanism to manage these impacts is however identified beyond broadly describing a "make-good" type mechanism. Such a mechanism is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration to haulage activity that occurs remote from the project.

Whilst SLR has focused its assessment on the use and mitigation of impacts on the EGSC's controlled road network, it is noted that amenity impacts to residents of EGSC may arise as a result of the use of Declared Roads. For instance, the use of Lindenow Glenaladale Road, a Declared Road, by project traffic would see a doubling of existing heavy vehicle demands on this road which may result in amenity impacts to residents of Lindenow.

Rehabilitation

- Closure criteria – SLR considers the following feedback and/or checks are considered relevant to the proposed performance criteria and associated monitoring/measurement:
 - Carrying capacity measurement is not included for grazing land.
 - Auditing for post mining land use compliance is not clearly applicable to progressive rehabilitation and not just at end of mine life.
 - Comparison to pre-mining information for land capability etc. is not clearly identified while that pre-mining or better condition is the target.
 - Radiation surveys and monitoring is not clearly to be taken on rehabilitated areas during progressive rehabilitation and not just at project completion.

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- Site contamination assessment is not clearly considered or related to progressive rehabilitation should it be required based on incidents, historic or recent land use impacts etc. prior to undertaking progressive rehabilitation of relevant areas.
- Unplanned closure- SLR considers that inadequate information is provided about specific risks associated with unplanned closure and how they would be considered to meet the rehabilitation success and performance. Specifically, additional consideration of the void (stability), erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided in context of unplanned temporary (care and maintenance) or permanent closure.
- Proposed agreements with landholders – while this has been identified as a requirement in the rehabilitation planning, considerations and content are outlined without definition of proposed changes to land use through construction, operations, etc. to closure.

Draft Work Plan

- The work plan does not address project-related activities outside the mining lease area, including modifications to roads infrastructure, groundwater extraction from bores, rail sidings, pipelines, power transmission infrastructure. It is noted that Appendix B 42(a) of the Guidelines indicate “A description of sensitive receptors in relation to the environment, any member of the public, or land, property or infrastructure in the vicinity of the work” are a required item to both address planning scheme components and the requirements of the guidelines for inclusion in Work Plans. Additional information should be included in the Work Plan to address these issues required by the Guidelines.
- The Tailings storage facility (TSF) concept design has been based on material properties interpreted from classification tests. It would be expected that specific geotechnical shear strength testing and more detailed laboratory analysis would have been undertaken to support the tailings storage design, in particular shear strength testing. The assessment does not appear to be as detailed as for the pit stability assessment in Appendix -003 Geotechnical Assessment.

Site specific geotechnical investigations should be undertaken to inform the design.

- Section 8.5.3 of the Work Plan- design allows for stage construction of the TSF . However, it is not clear how this is done and whether part or all of the TSF wall when raised will be placed directly on the tailings surface. The general region has experienced earthquake magnitudes of 5.4. This section should be revised to include information on the potential for earthquakes to impact slope stability. The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings.

The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings.

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Draft EPA Works Approval

- The Exemption for water treatment and discharge system from the requirement for a planning permit under 52.17 of the East Gippsland Planning Scheme is based on its association with a proposed ongoing mining operation and that it will involve no additional vegetation clearing.

What assurance is there that this condition of no additional vegetation clearance is both currently applicable and will be adhered to during the lifespan of the project

- Mine contact water is described as having the potential to contain suspended solids, nutrients and elements.

Consideration should also be given to the potential for mine contact water to contain radionuclides. This is not considered throughout the draft WAA.

- Site water management modelling indicates that there will be a very low likelihood of spillway discharge from mine contact dams (EMM, 2020). It is predicted that there would be three(3) years over the 117 years modelled where spillway discharge would occur.

This may not be considered acceptable as spillway discharge would initiatively lead to significant sediment releases into Mitchell and Perry River catchments?

- Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment systems. MSDS information in Appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota.

Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.

- Predicted annual volume of water flowing in the Mitchell River may be reduced by 130-270 ML/year (0.02% of annual flow volume) and flows to Perrys River System could be reduced by between 0.05% and 1.05% depending on mine operational conditions.

Do the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweigh the reduction in water flowing to each system?

- Suggested once treatment storage and discharge has been demonstrated to work effectively during first three years of mining operations, Kalbar will seek a licence amendment to allow a second licenced discharge point to the Perry River System.

This license amendment process requires clarification for if undertaken through an EPA license amendment what consultation will be undertaken with Council and other stakeholder and community groups during this process.

- Treatment with Dissolved Air Flotation (DAF) has not been shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment.

It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system.

- How will Total Nitrogen inputs into freshwater dam be quantified given identified levels in treated water?

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Details on quantification of nitrogen inputs into freshwater dam from treated water is required.

- Frequency of water quality sampling during construction, operation and rehabilitation is proposed to occur every two months initially and then quarterly thereafter with the agreement of the regulator.

After an initial period of how long will agreement from the regulator be sought to reduce bimonthly monitoring?

- In addition to requirements for the submission of annual performance statements to EPA Victoria does Kalbar propose to provide the community and other stakeholder groups with regular updates on performance tracking against EPA licence requirements inclusive of responses to any non-compliance incidents?

Reference to any proposed methods for dissemination of annual performance statements and reporting to community and stakeholder groups is required.

Additional key issues were identified in the following technical areas as follows:

Noise and vibration

- Of concern is the predicted exceedances of the construction noise levels at numerous sensitive properties, are demonstrated to give rise to non-conformance of the criterion. Additionally, there is some questions whether the process has under-estimated the internal noise level.

The EES approach is to wait for the project to commence and subsequent monitoring results to trigger further mitigation. This is not a common approach and does not represent industry best practice, usually mitigation is triggered on the predicted levels.

Ecology

- Risk Assessment should consider loss of aquatic habitat through loss of containment (hazardous materials/chemical spills) including but not limited to Flocculants toxic to aquatic biota and with long retention times on all species and communities. For example, state listed aquatic flora, GDE's, Ecological Communities. Accordingly, further management measures to negate any potential loss of aquatic habitat should be further developed.

Risk Assessment considering loss of aquatic habitat through materials/chemicals spills and further management measures to negate potential impacts should be developed.

- The impacts of contaminants (including nutrients) and their potential impacts on water quality of the Mitchell and Perry Rivers which are connected to the Gippsland Lakes have not been fully discussed other than to assert that under normal conditions no contaminant or sediment related impacts are expected. This requires further consideration with regard to impacts of contaminants (particularly nutrients).

The impacts of contaminants including nutrients on water quality of Perry and Mitchell Rivers requires further consideration.

- The detailed ecological report asserts that the proposed development will not lead to a significant impact to the Gippsland Lakes Ramsar site or any other Ramsar wetland. Table 5.4 of Appendix 5- Significant Impact Assessment concludes that there may be minor changes to groundwater and surface flows and in water chemistry and that the mine is not expected to have impacts on the sub-tidal aquatic beds, coastal brackish or saline lagoons, fringing wetlands, threatened fauna species, threatened flora, waterbird breeding and fisheries resources values of the Gippsland Lakes Ramsar site.

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The potential impacts of minor changes to groundwater, surface water flows and water chemistry due to the proposed mine and the assertion of no effects on the downstream Gippsland Lakes Ramsar site requires further justification.

Cultural Heritage

Aboriginal Cultural Heritage:

- The Cultural Heritage Management Plan (CHMP) is still in preparation and has not been approved. An already approved CHMP is required to be submitted to Council before any statutory authorisation can be granted.

The approved CHMP must not be inconsistent with any statutory authorisation. If the approved CHMP is inconsistent, an amended or new CHMP may be required before the statutory authorisation can be granted.

Historic Cultural Heritage:

- Due to the lack of an historian's report, historic heritage assessment or Archaeological Management Plan, the potential historic heritage values of the project study area have not been sufficiently investigated.

No Historic Heritage Assessment report for the project has been submitted to Heritage Victoria.

Soils

- No detailed map of Australian Soil Classification (ASC) soil types or recommended stripping depths of soil types. "Mixing" of different soil type topsoil and subsoil during reinstatement-rehabilitation is a key risk. Different soil types (i.e. soil units) should be stripped and stockpiled separately for reinstatement as per the "original" soil type.

A map of ASC soils types within the project area and also recommended topsoil and subsoil stripping depth should be developed.

Land use

- Key areas of concern (water and dust) comprehensively addressed in the Horticultural Impact Assessment.
- The design criteria in the EES for the site is suitable for the intended end land-use (agricultural and native areas) and will not result in long term degradation.
- Both the Agricultural and Horticultural Impact Assessment have adequately described agricultural practices in the project area, including key factors influencing sustainable cropping and outputs.

Agriculture

- The Agricultural and Horticultural Impact Assessments have adequately described planned land use and the existing beneficial uses within and in the vicinity (local and regional) of the proposed project.

Horticulture

- The Horticultural Impact Assessments have adequately described planned land use and the existing beneficial uses within and in the vicinity (local and regional) of the proposed project.

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Radiation

- Radiological impacts of the Project to workers, the public and the environment are low.
- Adequate controls, that are commensurate with the potential radiological impacts, have been incorporated into the design of the project.
- Management controls are detailed in the documentation but have yet to be collated into final drafts of a Radiation Transport Management Plan (RTMP), Radiation Management Plan (RMP) and Radioactive Waste Management Plan (RWMP).
- A number of improvement opportunities have been identified within the EES and supporting documentation, however there were no identified radiological related barriers.
- It is suggested that the baseline radiation monitoring is incomplete. Additional pre-operational monitoring to include;
 - Radon and thoron,
 - Radionuclides in flora,
 - Analyses of specific radionuclides (not covered in monitoring to date), and
 - Airborne dust as total suspended particulate (TSP) concentrations.

Air quality

- Compliance with relevant assessment criteria is predicted for all key indicators of air quality, with the exception of PM₁₀ for which there is the potential for non-compliance with the 24-hour criterion at nearby sensitive receptors during abnormal meteorological conditions (up to four days per year).

The assessment finds that substantial mitigation measures (e.g. ceasing some operations) may be required to avoid exceedances of the 24-hour PM₁₀ air quality criterion under certain meteorological conditions. These mitigation measures should be documented as part of the management plan along with the trigger for their application (e.g. forecast high winds from directions that would increase the risk of impacts at identified receptors).

Greenhouse Gas

- This project is expected to be a relatively minor contributor the state and national GHG inventories when considering the direct (Scope 1) emissions only.
- GHG emissions associated with road/rail transport are estimated to be a relatively minor contributor to the total Scope 1,2 & 3 emissions from the Project, but the emission factors used in the calculations, or where they were sourced from, is not documented

The emission factors used to estimate the road/rail GHG emissions associated with product transport should be documented in the report to give confidence in the reported Scope 3 emissions.

Social Impact Assessment

- Whilst the Social Impact Assessment is generally considered adequate, a key concern for some stakeholders/community is their perception on how the proponent (Kalbar) conducts its engagement activities.

EXECUTIVE SUMMARY

- Whilst the Risk Assessment and proposed Mitigation Measures under Table 6.1 of the Socioeconomic Assessment are generally clearly outlined, the process for implementing these mitigation measures is a Social Management Plan that will be prepared for the project prior to construction commencing in consultation with key stakeholders including, East Gippsland Shire Council. The absence of a Draft Implementation Strategy/Social Management Plan or Framework as part of the Draft EES is a concern, the key stakeholders and the broader community, including traditional owners, should have the opportunity to review and comment on the proposed implementation strategies that will mitigate and/or compensate for projects impacts as well as those strategies that will provide future community and regional benefits (directly & indirectly).
- We also note that there is no 'cumulative effects assessment' as part of the EES (also noted in the Economics Peer Review), this limits the proponents/projects ability to understand the impacts of the competing interests of other regional and sub-regional projects on the labour market, the vulnerable members of the community, businesses, Council's, NGO's, community groups and sporting groups etc. The combination of no cumulative effects assessment and no implementation strategy/framework makes it difficult for key stakeholders and the broader community, including traditional owners, to quantify the impacts and expected benefits of the proposed project.

Economic Impact Assessment

- The Economic Impact Assessment is considered technically adequate and the mitigation measures proposed are clearly outlined and appropriate.
- Results and commentary would be easier to understand (for multiple audiences) if the term 'local' was substituted for Study Area throughout the EIA. The Study Area comprises the LGAs of East Gippsland Shire, Latrobe And Wellington Shire, and is the basis on which local impacts are assessed.
- However, the EIA has been prepared as a stand-alone project with no cumulative effects assessment undertaken (also noted in the Social Impact Peer Review). A cumulative effects assessment is required to identify potential economic impacts associated with other regional infrastructure projects being constructed concurrently with the Fingerboards project. These factors include potential impacts on the availability labour and skills, key services (e.g. transport, construction) and tourist / housing accommodation due to aggregated demand generated from multiple concurrent major projects. Depending on the results of a cumulative effects assessment, further economic/business risks might be identified requiring additional targeted mitigation measures.
- The Tourism analysis included in the EES is not sufficiently detailed to confirm impacts of the project on the broader tourism sector (beyond a 5-10km area) and is based primarily on visual, landscape analysis and case studies and not a technical Tourism Impact Assessment. Detailed analysis of factors such as potential impacts on accommodation availability during peak tourism periods for specific establishments (likely to have the highest project demand), impacts of construction and operational traffic on tourist routes and visitation patterns etc. should also be factored into potential industry costs. Cumulative impacts of multiple concurrent regional infrastructure projects on the tourism sector / visitor economy have not been assessed.

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APPENDICES

Appendix A- EES Scoping Requirements Released by DELWP March 2018

1 Introduction

1.1 Background to project

The Project includes the development of an open pit mineral sands mine, two mining unit plants, wet concentrator plant (comprising mineral separation processing and tailings thickening and disposal plant), water supply infrastructure, tailings storage dam and additional site facilities (i.e. site office, warehouse, workshop, loading facilities and fuel storage). The proposed site layout as proposed at the point of public release of the EES can be seen in Figure 1.

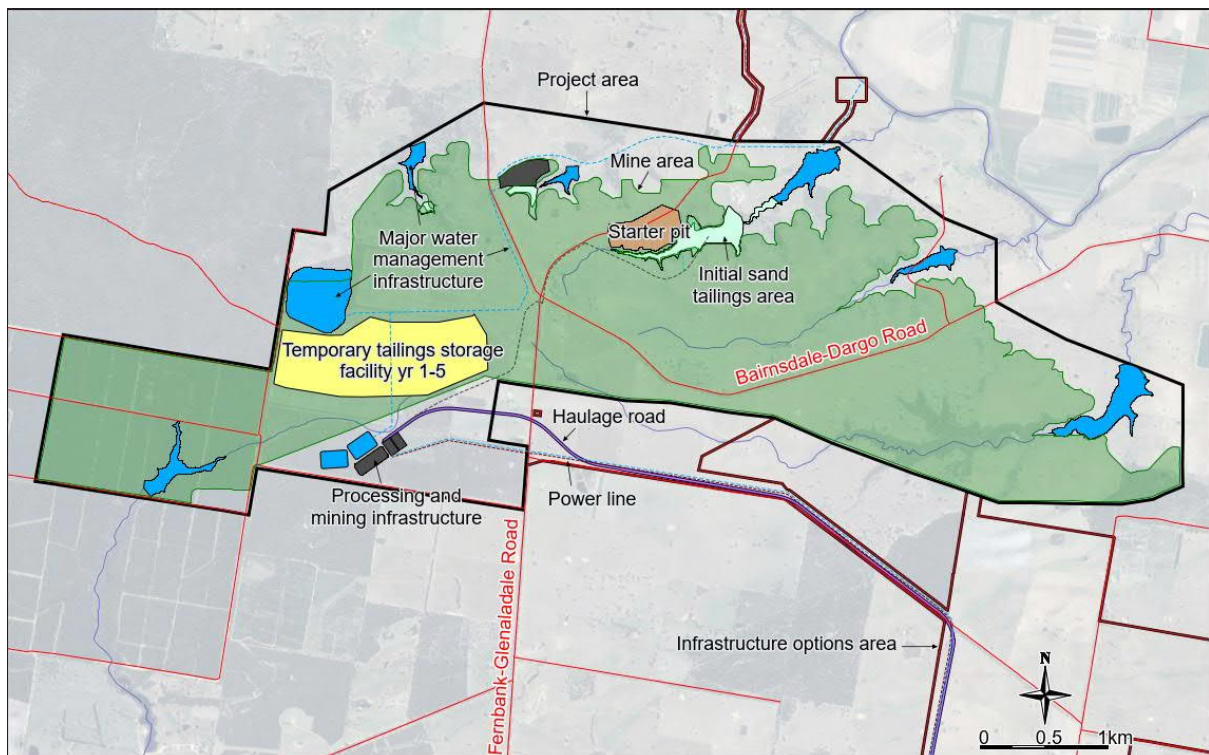


Figure 1-1- Kalbar MSP Site Layout (excerpt from Chapter 1- Summary report- EES public comment release September 2020)

The proposed mining methods involve open pit mining to extract approximately 170 million tonnes (Mt) of ore over a projected mine life of 20 years to produce 6 Mt of mineral concentrate. Heavy mineral concentrate, separated into magnetic and non-magnetic concentrates, are proposed to be transported via road, rail or a combination of both for export overseas.

In March 2018, the Department for Environment, Land, Water and Planning (DELWP) issued the final Scoping Requirements for the Fingerboards Mineral Sands Project Environment Effects Statement (EES) Appendix A. This document set out the specific matters to be investigated and documented in the EES.

The Scoping Requirements specified the following objectives for the EES:

- Resource development – To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of other local industries.
- Biodiversity – To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and Commonwealth policies.
- Water, catchment values and hydrology – To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Gippsland Lakes Ramsar site) over the short and long-term.
- Amenity and environmental quality – To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.
- Social, land use and infrastructure – To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.
- Landscape and visual – To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.
- Cultural heritage – To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage.
- Rehabilitation – To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.

The EES for the Project was released for public comment on 3 September 2020 by DELWP for a period of 40 business days. Council was granted an extension for provision of an endorsed response to the EES of the 11 December 2020 by the Minister in a letter ref MIN078122 dated 20 September 2020.

1.2 Approach to Technical Review

The overarching goal of the technical review was principally founded on a review against each of the Scoping Requirements (DELWP 2018) and to assess technically whether the EES and supporting technical documents address the following:

- The eight objectives of the EES (refer section 1.1)
- Risk and impact assessments
- Key regulatory requirements of relevant Victoria and Commonwealth legislation, policies and guidelines
- currently accepted best practice

1.3 Review of EES and supporting documentation

The review of the EES considers construction, operation, rehabilitation, decommissioning and post closure phases of the Fingerboards Mineral Sands Project.

Based on the scope of work proposed by SLR, a targeted review of technical reports and supporting documentation within the EES package was undertaken. The review of technical reports focused on key questions developed based on the EES scoping requirements (DELWP 2018) for the below technical disciplines. Although no specific listing of draft Environmental Performance Requirements (EPR) were included within the public information release technical review was also undertaken of identified future environmental management requirements contained throughout the EES and supporting documentation for adequacy.

- Planning Scheme Amendment and Land Use Planning Impact Assessment
- Land use
- Soils
- Agriculture
- Horticulture
- Surface water
- Groundwater
- Noise and vibration
- Traffic and transport
- Ecology
- Cultural Heritage
- Radiation
- Air quality and Greenhouse gas
- Rehabilitation
- Social Impact Assessment
- Economic Impact Assessment

More specific technical disciplines emerging during the exhibition period identified by the public e.g. dust deposition on vegetables were not considered in detail at this stage in the targeted Technical report outlined herein.

A Technical review of the Draft Work Plan and Draft EPA Works Approval Application were also undertaken against requirements for preparation of Work Plans and Work Plan Variations- Guidelines for Mining Projects September 2019 under the Mineral Resources (Sustainable Development) Act 1990 and associated regulations and EPA Works Approvals Publication 1658 June 2017 respectively.

Finally, a high-level review of the EES was undertaken as a general check on consistency between the technical reports examined in the targeted review as was a review of the Environmental Risk Assessment undertaken across all Technical disciplines included in the EES.

The following sections summarise concerns identified within the EES documentation and technical reports package provided for public comment by DELWP when considering the scoping requirements. Detailed technical review comments against questions developed from the DELWP scoping requirements are provided in Tabular format in Section 3.

2 Technical review outcomes

2.1 Key Areas of Concern

The Targeted Technical review identified significant key concerns in the following technical areas within the EES public release package. These key concerns are outlined in the Executive Summary and more detail provided in tabulated format in Section 3.

- Planning Scheme Amendment
- Land Use Impact Assessment
- Surface Water
- Hydrogeology/groundwater
- Traffic and Transport
- Rehabilitation
- Draft Work Plan
- Draft EPA Works Approval

2.2 Environmental Risk Assessment

An overview of the Environmental Risk Assessment undertaken and included in the EES for consistency across Technical Disciplines identified the following deficiencies:

- The Environmental Risk Assessment does not consider loss of aquatic habitat through loss of containment (hazardous materials/chemical spills including but not limited to Flocculants toxic to aquatic biota and with long retention times on all species and communities (e.g.) state listed aquatic flora, GDE's, Ecological Communities.
- Concern regarding the potential for the project to be shut down safely if the economics or water resources are reduced or not able to be met in any one year requires a Risk Assessment be undertaken and a strategy developed for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation.
- Risk assessment of closure undertaken across the disciplines, only looks at the closure process i.e. during closure, and not necessarily post-closure.

2.3 Consistency of the EES and technical reports

A high-level review of the EES and the technical reports examined in the Targeted Technical review identified the following inconsistencies, omissions and deficiencies:

- The Air Quality and Greenhouse Impact Assessment in the Work Plan is dated April 2020 whereas the document in the EES is dated August 2020
- The Surface Water Impact Assessment in the Work Plan is dated 9 May 2019 whereas the document in the EES is dated August 2020
- The Detailed Ecological Investigation in the Work Plan is dated April 2020 whereas in the EES is dated August 2020
- The Water Supply Options Study – Technical Groundwater Assessment in the Work Plan is dated July 2018 whereas in the EES is dated April 2020
- The Agricultural Impact Assessment in the Work Plan is dated April 2020 whereas in the EES is dated July 2020
- The Land Use and Planning Impact Assessment in the Work Plan is dated April 2020 whereas in the EES is dated August 2020
- There is a discrepancy in the consideration of impacts on farmers when comparing the Agricultural and Horticultural Impact Assessment Reports
- The Mine Closure and Rehabilitation Plan provides the most overarching information when read in context with the Work Plan and specifically provided clarity about the pre-mining land use of plantations being modified to replace with threatened community vegetation and a high-level linkage to stakeholder consultation which was absent from much of the other documentation contained within the EES package.
- Under the heading “Assessing the projects impacts” within the EES Executive Summary the EES is described as assessing “potential project impacts associated with construction, operations and closure (including decommissioning, rehabilitation and post closure activities)” The Risk Assessment presented does not appear to consider post closure impacts as follows:
 - When the risk assessment of closure is undertaken across the environmental disciplines, it appears to only consider the closure process i.e. during closure, and not necessarily post-closure. For example, poor quality runoff impacts on surface water quality (outside of sediment dams spillway discharge) does not appear to be addressed in the surface water environmental impacts assessment chapter for surface water impacts at closure; however; Section 7.3 of the Work Plan has a target “Concentration of soluble contaminants and suspended sediment / turbidity in runoff water from rehabilitated areas which should not exceed that present pre-mining runoff or (if insufficient data available for pre-mining runoff) does not exceed concentrations in runoff from agreed analogue areas.” Despite this there are however a range of relevant criteria in the closure plan that address these aspects.

- The Groundwater Risk Assessment (Appendix A006) includes far greater detail and identified risks than is presented in the EES Attachment F Risk Report.
- Existing radiation levels within the project area including radionuclide content of soils and crops are described in detail in the EES executive summary. Improvements to the baseline monitoring data from which these conclusions are based have been identified in the Technical review in Section 3.10. The limitations of baseline monitoring data should be described in the Executive Summary.
- The EES Executive Summary, Conclusion and Chapter 10 refers to residual impacts to biodiversity from project activities including removal of 188.5 Ha of remnant vegetation. The Detailed ecological investigation by Ecology and Heritage Partners (Appendix A005) refers to residual impacts to 160.3 Ha of remnant vegetation. There are numerous further inconsistencies between the EES and Appendix A005 including but not limited to number of scattered trees proposed to be removed and area of state significant Forest red Gum Grassy Woodland Ecological community. State offset requirements for listed vegetation removal in the EES do not correlate with that presented in Appendix 005 e.g. 764 large trees listed in EES versus 704 large trees listed in Appendix A005. Similarly, calculated species habitat units are also inconsistent between the EES and Appendix A005.
- Both the EES Executive Summary and Conclusion states “No non-aboriginal cultural heritage sites have been identified within the project area”. The Technical review identified that a historic heritage assessment or Archaeological Management Plan had not be undertaken and that resultantly the potential historic heritage values of the project study area have not been sufficiently investigated. Additionally, no Historic Heritage Assessment report for the project has been submitted to Heritage Victoria. The PSA is silent on any possible impacts to non-aboriginal cultural heritage sites.
- The EES Executive Summary and Conclusion both state that during project operations, ground-concentrations of small particulate matter (PM_{2.5} and PM₁₀), respirable crystalline silica, heavy metals and dust deposition rates, all comply with the relevant criteria at all sensitive receptors. A review of the supporting technical reports identified an exception to this for PM₁₀ for which there is the potential for non-compliance with the 24-hour criterion at nearby sensitive receptors during abnormal meteorological conditions (up to four days per year). The Executive Summary or conclusion does not include any discussion of this finding.
- The PSA under Clause 13.05-1S: Noise Abatement and Clause 13.06-1S: Air Quality makes reference to relocating landholders affected by project activities so that accepted noise and air quality standards are maintained in accordance with the policies this measure is not discussed in the EES.
- The EES Executive Summary does not make any reference to the Mine Contact Water Treatment Plant and only a brief mention is included in the EES conclusion” The use of water treatment methods to actively reduce suspended sediment loads in runoff water will also be further investigated” No discussion of the levels of nutrients (nitrogen) or metals (copper) remaining in treated water to be pumped and stored in the freshwater lagoon is included under the heading “Assessing the projects impacts” in the EES Executive summary or anywhere within the EES conclusion. Levels of nutrients and metals remaining in treated water have been identified in the Draft Works Approval Application.

- The EES Executive Summary under the “Noise and Vibration” or EES conclusion heading makes no reference to the proposed approach outlined in the EES of waiting for the project to commence and subsequent monitoring results to trigger further mitigation of noise and vibration impacts on sensitive receptors.
- The EES documentation refers to Final Scoping requirements released by DELWP in April 2018 although Kalbar website refers to and the final Scoping Requirements were issued by the Minister dated March 2018.

2.4 Adequacy of identified future Environmental Performance Requirements (EPR).

Although a listing of draft Environmental Performance Requirements has yet to be released a review of future environmental requirements identified within the EES and supporting technical assessments for each technical area examined in the targeted review are included in Section 3. Generally identified future environmental requirements discussed throughout the EES were considered adequate. The following improvements to proposed EPR were identified by the technical review:

Surface Water

- It should be insisted that strict regulation of the EPRs associated with water offsets are implemented to ensure that potential adverse impacts to downstream receiving waters are prevented. SLR advise that Council seeks to be involved with the water offset EPR process with Southern Rural Water to ensure Council are satisfied with the proposed strategy.
- Further EPR clarification should be sought on the channel stability of downstream drainage lines and watercourses. What specific methodology is proposed to ensure that the EPRs regarding channel stability are achieved?
- Additional details of how continuous monitoring will be undertaken for metals is required.

Groundwater

- Groundwater Monitoring Program (proposed management measure 013), The groundwater bore locations and monitoring program should:
 - reflect the location of potentially impacted GDE and groundwater users
 - address gaps in the understanding of groundwater flow at the site
 - address uncertainties in connections and impacts on groundwater and surface water north of the site
 - include monitoring of impact on groundwater level and quality nearby groundwater users of shallow and deep groundwater
 - The program should encompass operation and post-closure and include monitoring for shallow perching (waterlogging / land salinisation) and groundwater discharge to ground surface.

Traffic and Transport

- There is a lack of clarity in relation to the intervention mechanism that might be adopted for instance with the contemplated Asset Protection Plan.

Ecology

- Additional mitigation measures should populations of Giant Burrowing Frog be identified within or adjacent the project area should be developed and included in the EES and incorporated into subsequent Management Plan documentation and Environmental Performance Requirements.

Cultural heritage

Aboriginal cultural heritage:

- EPRs should be adequate because they default to the approved CHMP which is still in preparation and will not be evaluated until the Minister has made a decision in regard to the EES.

Historic cultural heritage:

- EPRs are yet to be sufficiently determined because no historian's report or historic heritage assessment has been prepared for the project study area. These reports would assist in the development of any Archaeological Management Plan to mitigate and manage harm to any historic heritage values that may be present in the project study area.

Radiation

- It is suggested that a draft Remediation Management Plan, Radioactive Works Management Plan and Radiation Transport Management Plan be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately.

Greenhouse Gas

- There is no sustainability or energy efficiency sub plan proposed that would address and support the mitigation and management of GHG emissions.

Rehabilitation

- Closure criteria – the following are considered relevant to the proposed performance criteria and associated monitoring/measurement:
 - Carrying capacity measurement is not included for grazing land.
 - Auditing for post mining land use compliance is applicable to progressive rehabilitation and not just at end of mine life.
 - Comparison to pre-mining information for land capability etc. is not identified while the pre-mining or better condition is the target.

- Radiation surveys and monitoring should be undertaken on rehabilitated areas during progressive rehabilitation and not just at project completion.
- Site contamination assessment is not considered or related to progressive rehabilitation should it be required based on incidents, historic or recent land use impacts etc. prior to undertaking progressive rehabilitation of relevant areas.
- Unplanned closure –Inadequate information is provided about specific risks associated with unplanned closure and how they would be considered to meet the rehabilitation success and performance. Specifically, additional consideration of the void (stability), erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided in context of unplanned temporary (care and maintenance) or permanent closure.
- Proposed agreements with landholders – while this has been identified as a requirement in the rehabilitation planning, considerations and content are outlined without definition of proposed changes to land use through construction, operations, etc. to closure.

2.5 Recommendations

In addition to the key issues identified and outlined in the Executive Summary the technical review has also identified numerous areas in which additional technical assessment or information/discussion inclusion would assist the Minister for Planning to make a determination on the adequacy of the EES. Key areas are outlined below, and further detail is tabulated in Section 3:

Planning Scheme Amendment

- The explanatory report needs to provide comment around the broader area outside of the mining lease area.
- PSA needs to explicitly state that works are exempt from a planning permit, subject to a building permit or equivalent as Council as the RA.
- The PSA does not address the Gippsland Regional Growth Plan in detail or the Gippsland Regional Plan 2015-2020.
- Further details relating to infrastructure are required to be addressed in the incorporated document as well as the staging of the proposal.
- Provide discussion around the Public Acquisition Overlay including relevant authority consultation and indicate the approach which was or will be undertaken with private landowners to signify the purpose and impacts on private land.
- Consider net community benefit.

- Discuss how the proposed fire management plans which are required under the incorporated plan will address the strategies of the SPPF Clause 13.02-1S bushfire planning.
- Discuss in further detail how the amendment supports or gives effect to any relevant state policy, many of these PPF's are only briefly touched on.
- Discuss in further detail how the amendment supports the MSS Clause 21.06-4 or reference a document which provides such support. Discuss further how the proposal gives effect to any relevant local policy, many of these PPF's are only briefly touched on.
- Under section entitled "How does the amendment address the views of any relevant agency?" Who else has been consulted outside of the EPA? what relevant authorities in relation to the Public Acquisition Overlay have been consulted?
- Elaborate on why the amendment does not have an impact on the transport system or roads when they are sought to be acquired.

Land use Impact Assessment

- Further detail to characterise temporary land uses outside of the proposed mining area and associated works of mining lease area.
- Ensure accurate and consistent characterisation of temporary land uses and future land uses post-mining, which meet the objectives of the surrounding land zonings.
- Further discussion is required for how the proposed Fingerboards project impacts the surrounding farming zone and how the proponent will assist the Responsible Authority (RA) in addressing the impacts of agglomeration and adjoining land uses.
- The agglomeration impact section of the report puts responsibility on Council to deal with an unfavourable process. The land use and planning impact assessment needs to provide an indication or solution to the Responsible Authority of how this is managed.
- It is seen unfavorable that a PSA is required to be undertaken by each future proponent to include an additional permitted use in surrounding land zones, when the need for uses discussed in the agglomeration impacts section is directly impacted by the mining project.
- Provide clarity around Section 3.3 – Indicate that a planning scheme amendment was submitted for works outside of the mining license area.
- Provide further detail around consistency with the LPPF and MSS as currently situated, during mining operation and post operation.
- Provide further detail of how the proposal satisfies Section 43(3) and Section 42(7) of the MRSD Act.
- Provide a summary of the post-mining rehabilitation commitments.

- The land use and planning impact assessment has correctly addressed the need for planning approvals outside of the mining area which coincides within the East Gippsland Planning Scheme. The report correctly addresses that the neighbouring municipal boundary is approximately 1km from the project area (Wellington Shire) and is therefore of no relevance to the required planning approvals.
- Provide a more succinct comment in Section 3.3.4 that a Planning Scheme Amendment will support the work outside of the mining area, rather than relying specifically on the Specific Controls Overlay comment at 3.3.4. Providing clarity of the process.
- Highlight the EMO and BMO purpose/objectives.
- The land use and planning impact assessment and the assessment framework at Chapter 7 of the EES needs to demonstrate further satisfaction or appropriateness of the temporary changes of land use and impacts to adjacent land uses and agglomeration impacts relating to land uses and land zoning.
- Address SPPF Clause 13.04-2S Erosion and Landslip and SPPF Clause 13.07-1S Land Use Compatibility.
- Existing State and local planning policy favours new industry and commercial activities, however, further comment is required as the MSS has many components to be addressed.

Land use

- Analyse end of pot trial subsoil samples for arsenic and Add certificate of analysis showing As results
- 100% coarse tailings treatment was indicated to be analogue for the subsoil currently on site. Further discuss the basis for this comparison.
- Use of several options subsoil combinations for different areas of rehabilitation. When and where to use which combination or what criteria to use to select which combination to use is not described. Addition of table showing each option with advantage and disadvantage of each and criteria of where the use of this combination is most suitable would be of benefit.

Soils

- Present ASC types in a table to make it clearer what soil types are present and their distribution.

Agriculture and Horticulture

- Provide soil map showing distribution of ASC soil types within the project footprint.
- Provide soil stripping maps showing ASC soil types with topsoil and subsoil stripping depths.

Surface Water

- Clarification of the expected haul road runoff quality and details of how this will be managed throughout all stages of the Project.

- Clearly document design criteria for the proposed clean water diversions and conveyance channels.
- The baseline monitoring program should be continued and include an assessment of risk associated with the existing uncertainty. Typically require 2 years of monthly sampling to effectively characterise the water quality.
- An assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life.
- Provide further clarification / justification for the 3% AEP Mitchell River spillway discharge design criteria and why this is different to the Perry River design criteria of 1% AEP which is a more widely adopted design criteria for mine water runoff.
- Provide further justification that mine water discharge events will not cause detrimental impacts to the downstream environment with regards to the expected salinity, pH and radionuclides of mine water runoff.
- It is noted that 3 events per 100 years equates to a 3% AEP (and not a 3.3% AEP) as per the surface water discharge objectives. This requires clarification.
- Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. What assurance is there that the dam operating rules detailed in the site water management plan will be adhered to during operation?
- Water balance sensitivity analysis should be expanded to assess other modelling assumptions such as dam seepage rates, dust suppression demand etc.
- Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime need to be further considered.
- Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.
- Clarification is required for the sediment dam design criteria (5 day 90th percentile or 10% AEP). It is noted that a 5 day 90th percentile design storm is in accordance with the IECA guidelines for sediment laden runoff.
- The impacts of contaminants on water quality including loads (not just concentrations) of Perry and Mitchell Rivers requires further consideration and assessment based on the limited baseline monitoring undertaken to date.
- It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. As a dilution strategy is proposed to overcome the DAF system shortcomings a robust assessment of increased contaminant loads to the downstream receiving waters is required.

- The risk management plan should be revised to include contingencies for failure of the water treatment system.
- Further EPR clarification on the channel stability of downstream drainage lines and watercourses. What specific methodology is proposed to ensure that the EPRs regarding channel stability are achieved.
- Additional details of how continuous monitoring will be undertaken for metals is required. Refer to the recommendations in the sections above for additional recommendations regarding the project EPRs.

Groundwater

- There are inconsistencies in the documented Conceptual Model (report A006):
 - Boisdale Formation sands and gravels are reportedly under the deposit (p.40) and table 3-4, but these are not shown on the cross-section through the site (figure 3-3), nor discussed (p.46).
 - EES Table 8.2 does not mention Balook Fm / Latrobe Valley Group. This is inconsistent with EES 8.3.3.1 (Figure 8.3) and the groundwater modelling which assumes Balook Fm / Latrobe Valley Group occur beneath the site (bore MW09d) and receive seepage (if seepage occurs) from tailings in mine voids (Figure 8.17). If not present, the seepage from mine voids would only be to the Coongulmerang Fm.
 - There are gaps in presenting the conceptualisation that would be improved by preparing the following:
 - Include data from groundwater monitoring bores on the site on a north-south hydrogeological cross section that extends from south of the proposed bore field, north through the site.
 - Prepare a west-east hydrogeological cross section extending through the whole site to beneath the Woodglen ASR.
 - A west-east hydrogeological cross section through the whole site, showing the variation in lithology in the Coongulmerang Fm (this is modelled with uniform properties, see Table 5-1).
 - There are uncertainties in the inferred groundwater flow direction in the water table aquifer:
 - It is stated that groundwater beneath the site does not move west towards the Perry River catchment (report A006, p.144).
 - There is insufficient groundwater bore data at the site and vicinity (e.g. see fig 4-14) to support that assertion.

- An alternative interpretation on the data presented, is groundwater beneath the east half of site flows toward Mitchell River, and beneath the west half of site toward Perry River. This possibility does not appear to have been considered in the model conceptualisation and risk assessment.
 - There appear to be no figures that show the modelled groundwater elevation and groundwater flow direction pre-mining, and after 15 years operation, at the site and vicinity.
 - The figures in Appendix F of the model report do not have sufficient detail in the site vicinity.
- Aquifer test and analysis of test (report A007):
 - Pumped at a rate significantly lower than potential rate from at bore field.
 - Maximum drawdown approximately 2 m in Latrobe Group in aquifer test.
 - Insufficient pumping rate and time to enable assessment the properties of the overlying aquitard (i.e. vertical hydraulic conductivity).
 - There is no discussion on vertical hydraulic conductivity of aquitard.
 - Section 4.2 the potential drawdown (> 50m) could be an underestimate, as this assumes the Latrobe Group is infinite extent. [The groundwater model report indicates significantly less drawdown (up to 14m)].
 - There is no mention of groundwater temperature and whether this changed over the test [geothermal properties is a relevant beneficial use].
- There are uncertainties identifying groundwater users:
 - Registered groundwater bores were downloaded from BoM Groundwater Explorer in 2018 (p.54). The Victorian Water Management Information System is the primary data source and should be checked for current registered bores.
 - The groundwater model report states the locations of off-site groundwater extraction used in the groundwater model are from a report dated 2010 (model report Table 2.1).
 - The location of as of right uses (stock and domestic bores, springs) is subject to error, and it is possible not all are registered. The assessment of groundwater users should be updated, and a bore census undertaken in the inferred impact area.
 - Further testing and assessment will be needed to optimise bore locations and yields, and to minimise drawdown impacts.

- Perry Gully (discharges to Mitchell River) is to be filled with coarse sand tailings. Consideration of an alternative approach does not appear to be discussed in EES Chapter 4.
- GDE Identification
 - The approach relies on published maps and modelling to identify GDE.
 - The status of Perry River is confusing - in the EES it is listed as a significant GDE (p 8-78) but based on the GDE assessment Perry River "... not mapped as GDEs..." (p 9-42).
- Impact
 - Modelled water table level and water table change are used to assess potential impacted GDE (see comments below on the model).
 - Uses an arbitrary sliding scale of GDE "sensitivity" based on the type of GDE. This approach does not appear to consider the change in the "quality" of groundwater discharging to the GDE.
 - Assessment focusses on the quality of tailings seepage water and does not appear to consider the water quality impact of displacement and increased discharge of "natural" groundwater (groundwater quality is discussed below).
 - Unclear the impact of increased groundwater discharge throughout the year, and also possible change of drainage lines from intermittent to perennial flow.
- Mitchell River
 - There is uncertainty in the current groundwater contribution to Mitchell River. EES 8.3.3.1 reports groundwater to Mitchell River of 14.17 GL/year (groundwater model) and analysis using river gauge indicates 29 GL/year.
 - Mitchell River is modelled with a fixed water level. This means the change in groundwater level adjacent the river might be underestimated.
 - There is a modelled increase in groundwater flow to the river of 0.72 ML/day throughout the year due to mounding (report A006, p.232). The river level is not modelled to change seasonally, and so it is likely that in dry conditions, the additional groundwater discharge to the river will be higher than this amount.
- Existing Conditions
 - Appendix A006: groundwater can have high phosphorous and elevated salinity (e.g. p.60 and Table 4-17 MW04 adjacent Mitchell River >2000 mg/L TDS, phosphorous 0.48 to 6.24 mg/L).
 - Table 4-18 - many Coongulmerang Fm groundwater samples exceed beneficial use criteria.

- Latrobe Group groundwater – bore field LA-01-PB Total-P 0.38 mg/L (A0007; Table 3.5).
- Appendix A006 section 10.2 refers to fresh water (surface water and groundwater). Groundwater cannot be considered “fresh water” similar to Mitchell River water or rainwater (as Latrobe Group groundwater is >500 mg/L TDS).
- Potential Impact
 - The displacement and increased discharge of groundwater that currently has elevated concentrations that exceed criteria do not appear to be discussed.
 - The risk of additional impact if mainly Latrobe Group groundwater is used as process water (different quality to Mitchell River) does not appear to have been considered.
 - Appendix A006 p.143 Latrobe Valley Group / Balook Fm are recharged from seepage from the Coongulmerang Fm (and shown fig 6-1). The impact on water quality and beneficial uses of Latrobe Valley Group / Balook Fm from seepage from tailings does not appear to have been considered.
- Leachability Testing
 - Appendix A006 Table 7-7 shows the 1:5 leach Mitchell River water many analytes are at least one order of magnitude higher than the test with deionised water.
 - Total phosphorous 1.07 mg/L is not highlighted in the table to show it exceeds ecosystem criteria.
 - There appears to have been no testing using Latrobe Group groundwater.
 - The volume of groundwater to be used in operation is not known, and subject to how much is available from the Mitchell River.
 - The assumed 16 ML/yr. in water balance appears low given the volume needed for processing and the rules / restrictions for the Mitchell River and needs of downstream irrigators.
 - Extraction of groundwater up 3 GL/yr. is modelled for the impact assessment.
- Software and structure:
 - Using MODFLOW-USG allows better representation of discontinuous geological units. Include a cross-section showing the model layers.
 - Table 2.1 notes pumping well locations in the modelled area are from a 2010 report – the suitability of that data should be discussed.

- Include discussion of the effect of Latrobe Group groundwater temperature on modelled Latrobe Group groundwater elevation.
- Boundary Conditions:
 - The implication of a constant head boundary at the northern edge of the model (near the site) is not discussed in model report Section 9, nor whether a different boundary would impact the model.
 - Constant head "... represent groundwater inflow from highlands ..." (section 4.8) requires justification - is this from Palaeozoic bedrock?
 - Table 5.2 shows constant head plus leakage from rivers is major source of water to the model. The modelled drawdown from the bore field north of the site might be underestimated.
 - Figure 5.4 suggests inflow from rivers and constant head increases over the modelled period. The impact on river baseflow due to drawdown from the bore field pumping should be discussed.
 - Using DRN in Layers 10 and 11 and constant head at 0 mAHD for layers 1 to 9 at the southern boundary causes recharge of groundwater from the ocean.
- Calibration
 - There is no groundwater level data available to assist model calibration west and north of the site. The implications for model uncertainty, and the model sensitivity study should be discussed.
 - Discuss general over-prediction of groundwater levels (Figure 5.3).
- Prediction
 - An assumed seepage rate (53 L/s) is used for the tailings based on a "preliminary water balance" (p.128). The properties of the model layer do not change to reflect the properties of tailings.
 - Seepage from tailings is assumed however it is uncertain if seepage will occur (section 7.12). Suggest do a predictive run to assess bore field drawdown, with no seepage from tailings.
 - The predicted drawdown in Latrobe Group reaches the layer boundary – discuss the implications for model prediction.

Noise and vibration

- Additional noise and vibration mitigation measures should populations of Giant Burrowing Frog be identified within or adjacent the project area should be developed and included in the EES and incorporated into subsequent Management Plan documentation.

- NIRV requires 'The background level should be assessed following the procedures of SEPP N-1, Schedule C, C3' – which the report does not present, instead the report provides the range in the background noise levels.
- It is noted that the background noise does not feed into the determination of the NIRV criterion.
- The manner in which the background levels are reported, may affect the perception of the background noise environment.
- The 'average level' appears to be higher than the highest 10th percentile of the dataset - which is an unusual situation. Some clarification on the prevailing activities that resulted in this condition should be provided.
- The duration adjustment is a correction applied to the predicted levels which acts to reduce it, to account for plant that does not operate continuously. All duration adjustments should be clearly documented.
- Justification to the use of the assumed 10dBA transfer is required, as it may under-estimate the internal noise levels (and therefore the impacts) at night.
- There does not appear to be any reference to a Strategy or Actions in relation to noise emissions, in the Amenity and Environmental Quality section.
- The reports states at mitigation will be considered, where practical, based on the results of the monitoring – though no details of the available measures to the project are provided. There should be some description of additional measures that can be adopted, given the predicted exceedances are up to 13 dBA (depending on the prevailing meteorological conditions).
- The Environmental Management Plans need to have a clear process for identifying the need for mitigation prior to the commencement of the project. The prediction of exceedances should be the basis of triggering the need for mitigation.
- If mitigation is not considered to be warranted, strong justification should be supplied.

Traffic and transport

- Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options. It is therefore not possible to confirm for instance if the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service..

- The proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is inconsistent with EGSC's planning intent for the road network. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road however EGSC's subsequent planning (i.e. Bairnsdale Southern Alternative Freight Route) establishes that the intent is for freight movement to be facilitated by Collins Street and Bosworth Road, not Racecourse Road. The assessment of potential transport routes should consider the accordence of the proposed routes with Council's planning intent for the area and should substantiate the basis for any departures from this.
- It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available.
- Limited information has been provided to validate the likely representativeness of the heavy vehicle demands forecast to be associated with the project's construction phase. It is unclear for instance if appropriate allowance has been made for the material requirements associated with the significant construction activity associated with the proposed road realignments as a breakdown of the heavy vehicle forecast by material type (i.e. beyond what would appear to be a nominal 20 vehicles) is not provided within the technical report.
- The heavy vehicle forecasts for the projects operational phase only includes allowance for the haulage of product. No allowance appears to have been made for movements associated with ongoing operational inputs such as diesel and operational outputs such as site waste. Furthermore, no allowance has been made within the operational forecasts for the material that might be required to facilitate the road realignments that are proposed to occur in the years following commencement of the project.
- Detailed intersection modelling has only been completed for the Pre-Avon River Bridge Option routing scenario. As a result, it is not possible to confirm that the proposed conversion of the Princes Highway / Racecourse Road intersection to a roundabout under the Post-Avon River bridge - Option 2 routing scenario would for example provide an appropriate level of service
- It is also noted that the intersection analysis (with the exception of that completed for the Princes Highway / Bairnsdale–Dargo Road intersection) has been undertaken utilising the Cap-X method that is a simplistic American methodology which is not widely utilised to inform development assessment in Australia. SLR acknowledges that we are not experts in the use of the Cap-X analysis methodology given that the tool is not commonly utilised in the Australian market. Nevertheless, SLR has some familiarity with the methodology through international work previously undertaken. Based on this previous exposure it would appear that ARUP have utilised an incorrect capacity value for the reported analysis. The assessment adopts a capacity value of 1,800 vehicles per lane which SLR understands is reflective of a two-phase signalised intersection arrangement and is not a representative value for the priority-controlled junctions assessed. Notwithstanding this apparent error SLR considers that it would be appropriate for any updates to the modelling to be completed utilising SIDRA Intersection instead of updating the previous Cap-X modelling as the Cap-X methodology is not widely utilised to inform development assessment in Australia and hence it is unclear if the results are representative for the Australian context.

- Safety:
 - Whilst Section 7.3.1 of the technical assessment describes common treatments provided at intersections to manage safety risks limited information is provided to validate the turn warrants assessment presented for the Pre-Avon River Bridge Option routing scenario. Furthermore, no turn warrants assessment has been completed for the two Post-Avon River bridge routing scenarios. The potential need for turn lanes at the Bosworth Road / Bairnsdale Rail Siding Access should for instance be confirmed. Alternatively, if such treatments are not required as the rail siding would continue operating within existing approved capacity limits and hence not trigger a mechanism for requiring upgrades (irrespective of the safety merits) than this “entitlement” should be established by reference to relevant existing statutory approvals.
 - Insufficient geometric details have been provided to substantiate that the proposed road realignments would afford an appropriate level of safety. Whilst, basic cross-sectional details are provided for Fernbank-Glenaladale Road, Chettles Road and Careys Road the practicality of the proposed alignments should be confirmed through the provision of more advanced engineering drawings including for instance long-sections. The proposed re-alignment of Fernbank-Glenaladale Road results in the need to negotiate challenging topography which may in turn limit the ability to meet various design requirements such as sight distance.
 - The ability to achieve suitable intersection spacing between the proposed Fernbank-Glenaladale Road / Private Haulage Road intersection and the proposed roundabout on Barinsdale-Dargo Road should be confirmed with consideration also given to the ability to safely introduce the proposed signalised intersection control in a rural road environment.
- Operational Performance:
 - As described earlier intersection performance assessments have only been completed for the Pre-Avon River Bridge Option routing scenario
 - It would be appropriate for instance to confirm that the Princess Highway/Racecourse Road intersection would continue to operate acceptably following the proposed conversion to a roundabout.
- Amenity:
 - No consideration has been given to amenity impacts potentially associated with product haulage.
 - Whilst SLR has focused its assessment on the use and mitigation of impacts on the EGSC’s controlled road network, it is noted that amenity impacts to residents of EGSC may arise as a result of the use of Declared Roads. For instance, the use of Lindenow-Glenaladale Road, a Declared Road, by project traffic would see a doubling of existing heavy vehicle demands on this road which may result in amenity impacts to residents of Lindenow.
 - It is further noted that the proposed use of Racecourse Road departs from Council’s planning intent for the area and would introduce potential amenity

impacts to fronting residential properties however no consideration has been given to quantifying this impact in the submitted material.

- Service Life
 - Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm indication of the specific mechanism to manage these impacts is however identified. The use of a "make-good" mechanism as contemplated is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration that occurs remote from the project.
- Whilst the conversion of two existing intersections on the Princess Highway to roundabout control has been proposed based on safety considerations it would appear that limited consideration has been given to the appropriateness of this outcome from a road hierarchy perspective. Whilst this outcome ultimately relates to a Designated Road outside EGSC's jurisdiction the outcome would result in lower order roads being afforded priority over traffic travelling along the Princess Highway.

Biodiversity/Ecology

- The potential impacts of minor changes to groundwater, surface water flows and water chemistry due to the proposed mine and the assertion of no effects on the downstream Gippsland Lakes Ramsar site requires further justification.
- The risk rating of "low" for potential impacts on downstream waterways, including wetlands such as the Gippsland Lakes Ramsar site, and assertion that impacts on surface water and hence downstream from spills and/or leaks or accidental discharge of wastewater is negligible both require further justification. This justification should consider, but not be limited to spills of hazardous substances, such as concentrated flocculant (hydrobond and hydraprime, which are identified as toxic to aquatic biota).
- The residual risk rating of 'low', even with a predicted reduction of 51.5% of the Perry Gully Catchment, requires further justification given consideration of mitigation measures outlined in section 10.7.1.2. Specifically, additional mitigation measure SW28 which includes surface water managed through an adaptive management strategy and states "the Australian Grayling will not be impacted if the water quality and quantity of the Mitchell River is not significantly affected by project activities".
- The impacts of contaminants (including nutrients) and associated potential impacts on water quality of the Mitchell and Perry Rivers which are connected to the Gippsland Lakes (section 10.6.5.3) have not been fully discussed other than to assert that under normal conditions no contaminant or sediment related impacts are expected. This requires further consideration with regard to impacts of contaminants (particularly nutrients).

- Risk Assessment should consider loss of aquatic habitat through loss of containment (hazardous materials/chemical spills) on species other than the Australian Grayling. For example, state listed aquatic flora, GDE's, Ecological Communities. Accordingly, further management measures to negate any potential loss of aquatic habitat should be further developed.
- General and specific requirements for monitoring of biodiversity are considered adequate. Site inspections including visual inspections proposed are also considered adequate.

Cultural Heritage

- It is incorrectly stated that Fingerboards LDAD 2 is registered (page xxxii- EES Executive Summary). It is currently not registered on the Victorian Aboriginal Heritage Register (VAHR) (ACHRS accessed on 20.10.2020). This requires correction.
- Additional consultation with GLaWAC is required to identify cultural values. Ongoing consultation is required during the continued preparation of the CHMP. Additional consultation with Traditional Owners occurred but is not included in A017, Section 3.3.
- The desktop under-utilised data which has constrained the effectiveness of the preliminary site predictive model.
- The methodology for the subsurface testing is incorrect. Excavations consisted of 2mx1m mechanical test pits, and hand excavated 1mx1m test pits and 0.5mx0.5m shovel test pits, not 1mx1m mechanical test pits and 0.5mx0.5m shovel test pits. Discrepancies in the data in A017, Section 7 (Subsurface Testing) cast doubt on validity of the updated Aboriginal cultural heritage predictive model. See also comments below for survey and subsurface testing in Appendix A017 Sections 6 and 7.
- Fingerboards LDAD 2 (p182) is yet to be registered, cf, EES executive summary (page xxxii). VAHR 8322-0244 [Thurrung 1] is registered in the activity area, but not listed as one of the known places. The assessment for the CHMP is incomplete and additional sites are highly likely to be discovered. The extent, nature and significance of known sites has not been demonstrated. The validity of the predictive model is in doubt until discrepancies in the data are clarified.
- Additional consultation with GLaWAC is required to identify cultural values and ongoing consultation during the continued preparation of the CHMP.
- The desktop does not include CHMP 16068 which includes part of the project study area and registered artefact scatter VAHR 8322-0244 [Thurrung 1] within the project study area. The desktop assessment review of previously registered Aboriginal sites under-utilised the data available to characterise the nature of Aboriginal cultural heritage in the geographic region. This data can be used to assess the significance of sites and hence also the level of risk in the impact assessment for the project. The data can also provide more detailed predictions on the likely nature of stone artefact sites for the preliminary Aboriginal cultural heritage prediction model, in particular, in relation to landforms and distance from waterways, such as the Mitchell River.

- The survey was conducted based on the third iteration of the project study area. The survey was not complete because access was not granted to some private land and VAHR 8322-0369 [West Bairnsdale IA 1] was not inspected. There are discrepancies in the reporting of numbers of surface stone artefacts in some investigation areas.
- The report acknowledges that the subsurface testing is incomplete. Further subsurface testing is required. This means that the known Aboriginal cultural heritage values have not been sufficiently determined to the satisfaction of CHMP requirements.
- There are numerous discrepancies in the presentation of the data for stone artefacts found during the assessment. Based on these discrepancies, the data can be reworked to come to different outcomes to those presented in the updated Aboriginal cultural heritage prediction model.
- The assessment of significance for known Aboriginal cultural heritage does not adequately take into account the nature of the sites in the geographic region, in particular, representativeness or rareness. At least one site, VAHR 8322-***b [Fingerboards Artefact Scatter Components] is likely to have medium significance. This changes the risk rating from high to major. Site VAHR 8322-0244 [Thurrung 1] has not been assessed.
- The assessment of risk for unknown Aboriginal cultural heritage is predicated on the updated Aboriginal cultural heritage site prediction model. Since the data from the assessment used to formulate the model is potentially fatally flawed, this may render the model invalid and hence also the risk assessment.
- There is no assessment of cumulative impact.
- Intangible Aboriginal cultural heritage values have not been assessed.
- No consultation seems to have occurred with any local historical society.
- No historian's report or stand-alone historic heritage assessment appears to have been commissioned. These reports would provide a more comprehensive assessment of the known and potential for unknown non-indigenous cultural heritage values in the project study area.
- Consultation with local council did not require management of structures at 2495 Bairnsdale-Dargo Road. It is unclear if council would consider registration of the site on the Heritage Overlay.
- Fieldwork assessment for historic heritage values is incomplete. Known historic site at 2495 Bairnsdale-Dargo Road, although unlikely to be registered with local council, is not mentioned.
- There is no evidence that the local historical society has been consulted in regard to historic cultural heritage values in the project study area.
- The historical background is general in nature and there is little specific reference to the project study area.
- There is no reference to whether historic heritage reports have been searched for at Heritage Victoria or any heritage studies conducted by Local Council.

- No historian's report appears to have been commissioned to investigate the historic heritage cultural values or provide a thematic history of the project study area.
- No preliminary historic heritage prediction model has been formulated even though one was formulated for Aboriginal cultural heritage.
- Regulation 31, Heritage Regulations 2017 require a report to be submitted following every survey undertaken for the purpose of finding historical archaeological sites, even if no sites are discovered during a survey. No historic report appears to have been submitted to Heritage Victoria.
- A former primary school site was surveyed but is not mentioned in this section of the report (it was mentioned in Section 8).
- Part of the project study area was not surveyed.
- No subsurface testing for historical cultural heritage was required based on information presented in the previous sections of the assessment.
- The preparation of an historic heritage assessment would have more fully documented the history of the project study area, potentially identified historic archaeological sites, more fully documented sites investigated in the assessment, and formulated an historic cultural heritage site prediction model, including identifying any areas of significant archaeological interest. An historian's report and historic heritage assessment would provide the appropriate level of assessment to assess the risk to known and unknown historic cultural heritage.
- The CHMP is still in preparation and additional assessment is required. Additional cultural heritage is highly likely to be discovered. Known cultural heritage will be managed / mitigated in the conditions and unknown cultural heritage discovered during construction will be managed / mitigated by the Contingency Plan in the approved CHMP. The CHMP Contingency Plan will management any new sites that are discovered during construction or operation.
- Four potential historic places are mentioned in the Cultural Heritage Impact Assessment but only 2495 Bairnsdale -Dargo Road is mentioned. Additional survey is required. Additional historic cultural heritage may be discovered. There is no mention of the preparation of the Archaeological Management Plan discussed in the Cultural Heritage Impact Assessment. Potential impacts on unknown historic cultural heritage will be mitigated by consultation with Heritage Victoria and the chance finds protocol.
- It is unclear whether any further investigation is required at 2495 Bairnsdale-Dargo Road.
- An historian's report and historic heritage assessment would more fully identify the historical cultural heritage values of the project study area and any areas of significance and mitigate potential impacts. The results of this assessment would then inform any Archaeological Management Plan for the project.
- There is no mention of the Archaeological Management Plan discussed in the Cultural Heritage Impact Assessment which is proposed to manage any new sites discovered during the life of the project

- No historian's report, historic heritage assessment or archaeological management plan has been prepared for the project. The preparation of an historian's report and historic heritage assessment would be appropriate to identify historic cultural heritage sites and areas of historic archaeological potential. These reports would provide the basis for an Archaeological Management Plan to manage any new sites discovered during the life of the project.

Radiation

- It is suggested that additional baseline monitoring be conducted to better quantify baseline levels as follows:
 - Radon and Thoron
 - Passive monitoring of radon and thoron is useful for long term trends when aligned with the seasons and also over a number of years
 - Real time radon and thoron monitoring equipment is available and able to better characterise diurnal variation for each of the seasons
 - Ongoing passive radon and thoron monitoring on a seasonal basis at key locations
 - Radionuclides in Flora
 - Radionuclide analysis of flora and crops should be conducted (note that the presented data is calculated from soil concentrations)
- Radionuclide Analyses
 - Consideration of all long-lived uranium and thorium radionuclides should be conducted.
 - The suggested radionuclides are:
 - U-238, Th-230, Ra-226, Pb-210, Po-210
 - Th-232, Ra-228, Th-228
- Airborne Dust Monitoring
 - High volume dust sampling was undertaken for PM10 material
 - For radiation dose assessment, it is usual to consider TSP. Consideration of the ratio between TSP and PM10 concentrations should occur.
 - It is suggested that regular monitoring of the ore, HMC concentrate and tailings be conducted to confirm the classification of the materials.

- It is suggested that a draft RMP and RWMP be prepared, outlining the operational systems measures and controls for radiation. It is noted that these documents are part of a later secondary licensing process, however a draft at this stage is useful for providing confidence of the document's contents.
- It is suggested that regular monitoring of the ore, HMC concentrate and tailings be conducted to confirm the classification of the materials.
- It is suggested that the potential doses be re-assessed using the latest dose factors. This will provide a "best practice" assessment of doses.
- It is suggested that a draft RMP and RWMP be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately. However, it is noted that approval of the final RMP and RWMP documents is part of a secondary approval process and it not necessary for the final RMP or RWMP to be developed at this stage.

Air Quality

- Gaps in the continuous monitoring dataset (i.e. when neither PM10 or PM2.5 data is available, a total of 11 days) have been filled with data generated using a stochastic algorithm utilising random numbers and based on the distribution of concentrations measured during that time of year. While novel, it is questionable whether creating data is appropriate. There is precedence in Victoria to use the 70th percentile of available data to fill gaps (e.g. Westgate Tunnel EES; North East Link EES). The average of the randomly generated concentrations would potentially have the same average as the dataset on which it is based, which would be less than the 70th percentile of that same dataset.
- Gaps in RCS data have been filled based on a conservative fraction of the corresponding PM2.5 concentration. While conservative, again it is not certain whether creating data is appropriate, or indeed required. An annual average based on the collected data would likely have sufficed.
- The example mitigation measures required to mitigate against exceedances of criteria at nearby sensitive receptors during adverse meteorological conditions include relatively large-scale reduction in site activities. It is perhaps unreasonable to expect that e.g. extraction from the Eastern pit and product haulage in both pits will be ceased.
- The modelling analysis showing the effects of implementing the identified mitigation measures and the number of days on which they may be required to be used could also be considered overly detailed and indicate an inappropriately high level confidence in the precision of fugitive dust emission estimation and dispersion modelling techniques.
- SEPP(AAQ) 2025 reduced PM2.5 24-hour and annual average standards are not presented or discussed. Given the timescale of the Project, these are relevant.
- In the absence of Mining PEM criteria, the assessment has adopted criteria from other jurisdictions. While consultation with EPA is indicated, no further discussion is provided as to why this may be considered appropriate in place of SEPP(AQM) criteria.

- Predicted cumulative impacts are not presented in the context of the SEPP(AAQ) standards. EPA generally require comparison, if not assessment, against SEPP(AAQ) standards.
- The assessment adopts QLD and NSW dust deposition criteria. The Mining PEM provides a criterion for dust deposition monitoring of 4 g/m²/month (2 g/m²/month over background). The Mining PEM does not specifically state that the monitoring criterion should not be used for modelling assessment results. It is convention in Victoria to apply this criterion to monthly averaged modelling results.
- The modelling predicts concentrations using 200 m spaced gridded receptors – VIC Publication 1551 states that the grid spacing should not be greater than 100 m.
- No gridded receptor results are presented. Schedule C of the SEPP(AQM) states that design criteria are applicable everywhere except inside buildings.
- Adjusted U* is a default option in the most recent version of AERMOD. Preference would therefore be to use adjusted U* and do not use sigma-theta, however the opposite has been done here.
- Model sources (volume, line volume, area etc.) representing mining activities, including layout(s) are not presented or discussed.
- Providing predicted ground level PM10 and PM2.5 concentrations to three significant figures presents a level of precision in the results that does not reflect the various uncertainties in the assessment.
- Results from Appendix-A009 are referenced, however no conclusion is offered with respect to local primary industry and water supplies other than to state dust emissions will be managed.

Greenhouse Gas Emissions

- The GHG emission inventory uses the latest National Greenhouse Accounts Factors (2019) so the appropriate GWPs have been incorporated into the calculations. Appears to just be a typographical error.
- To be transparent, the emission factors used to estimate the Scope 3 road/rail GHG emissions associated with product transport should be documented in the report.

Rehabilitation

- As required in the Preparation of Rehabilitation Plans: Guideline for Mining and Prospecting Projects (Earth Resources Regulation Victoria, 2020) Section 7.6 Rehabilitation Domains for each rehabilitation domain “A description of the availability and volumes of key materials required for rehabilitation (e.g. competent waste rock, subsoil topsoil, alternative growth media, capping materials, and materials characterisation for these materials)”.
- Proposed landholder agreements not provided but content identified.
- With regard Closure Criteria the following is noted:

- Carrying capacity measurement should be considered for grazing land.
 - Confirm auditing for post mining land use compliance will apply to progressive rehabilitation and not just at end of mine life.
 - Confirm comparison to pre-mining information for land capability and not just reference sites.
 - Confirm radiation surveys will be taken on rehabilitated areas during progressive rehabilitation and not just at project completion.
 - Site contamination assessment should be undertaken during progressive rehabilitation if required based on incidents, historic or recent land use etc. prior to undertaking progressive rehabilitation of relevant areas.
 - Specific criteria around human health relates to radiation and hazardous materials.
- With regard the Mine Rehabilitation Plan inadequate information provided relevant to unplanned closure. Additional consideration of the void – stability, erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided.
 - Ongoing community engagement is required to actively manage issues with public perception; a working group with growers to discuss specific issues of concern and potential responses, encouragement to obtain EnviroVeg or Freshcare environmental certification and an annual local community event to attract visitors to the region.

Social

- The EES does not provide an indication of how the Project will aim to be sensitive towards or assist these existing vulnerable communities. The opportunity for skills development is not discussed in detail.
- Generally, the feedback from stakeholder engagement was mixed with strong opinions in support and opposition of the mining activities. There is also no specific strategy to ensure that the people opposing the development are incorporated into project development and mitigation measures. This should be addressed as concerned members of the local community will cause the most delay and resistance to the project's development.
- As mentioned, there is no recognised implementation plan for mitigation measures, Kalbar has not provided an example local employment framework, or information on how they will practically implement an incentive program for new residents to buy locally.
- Kalbar's Local Content Guidelines discussed in section 6.3.2 could be explored further to deliver this local employment framework. It doesn't address these matters directly but seems to have other relevant considerations. Also table 6.12 makes some broad commitments on employment. The ideas of how to deliver a local employment and procurement guideline have been discussed and overarching commitments made (refer section 6.4.3) but, the implementation strategy/social management plan has not been prepared.

- Section 6.9.1 confirms that Kalbar will be required to produce a rehab plan which is approved by the Minister prior to construction. Section 6.9 states there is a Rehab and Closure plan with overarching goals that include being able to sustain post mining land uses agreed with stakeholders. The plan may have more detail on how this is to be achieved and whether it includes the potential improvement procedures raised in the Agricultural Impact Assessment. In comparison recommendations from the Horticultural Impact Assessment are found as mitigation measures in Table 6.13
- . It was noted that the Traditional Owner representatives were absent from the Cultural Values Workshop was held in December 2018. Section 2.5.3 of the SIA states there was a March 2019 meeting with the traditional owner group represented by GLaWAC where key areas of concern were raised as stated in Section 4.1, but Section 5.10 comments that there is no statement of cultural values provided. Further consultation in the form of a Cultural Values Workshop, or a direct method of engaging with the Traditional owners should they prefer, to ascertain their concerns over specific intangible heritage values is required. Traditional owner engagement should be undertaken and incorporated into the findings of the EES before the Project is finalised.
- A community fund is highlighted as one of the additional mitigation measures to be provided by Kalbar. However, there is no implementation plan or objectives/goals demonstrated in the EES documentation for this community fund.
- Industry and business definitions are generally adequate at a high-level; however, detailed analysis of local/regional industry, business, and workforce is lacking. More detailed information of the following would enhance definitions:
 - Industry structure (e.g. number and share of resident workers by industry sector at a local & regional level)
 - Business counts by sector (e.g. number and types of businesses located locally/regionally by industry sector)
 - Occupational structure (e.g. number and share of resident workers by occupation at a local & regional level).
- Given that ABS data is self-reported by agricultural producers there is some potential for inaccuracy in aggregated data, the total production values are predicted to be greater than determined in the report.
- The ABS data utilised in forming the descriptions of agricultural production values is from 2016 and earlier. This could also lead to on ground inconsistencies as the data is outdated.
- Agricultural definitions are generally adequate, but could be enhanced by the following:
 - Specific details on number of enterprises and employment for each agricultural sub-sector.

- The agricultural impact assessment makes note that the technical studies are being undertaken to determine the level of impact from the mine to the local vegetable industry, this will need to be updated to include the latest results and actual impacts to local farmers. Section 5.1.2 of the Agricultural Impact Assessment refers to current technical studies and a subsequent project EMP, we're not sure of the status of these documents.
- The EES satisfactorily identifies potential benefits to workers, businesses, and suppliers, with the following caveats:
 - While direct construction jobs have been estimated, indirect jobs for the construction phase have not been calculated. This gap understates the employment benefit of the construction phase of the project. While indirect job creation generally benefits the wider national and state economies, some indirect employment benefits are likely to accrue at a local/regional level.
 - The term 'jobs' needs to be expressed consistently throughout the EES. At present the term employment is expressed interchangeably between jobs/people employed and Full Time Equivalent (FTE) positions.
- Cumulative impacts-effects associated with known/planned and potentially concurrent regional infrastructure projects are not considered. Concurrent projects might create competition and associated impacts for labour/skills supply/availability in local and regional communities. Competing projects (depending on planning approvals, financing and construction timing), might include road, rail, renewable energy – including the Star of the South Offshore Wind Farm, hospital, education, tourism, irrigation projects, bushfire recovery projects etc. which could commence across Gippsland over the coming years.
- There is a need for Kalbar to provide greater detail around mitigation measures and potential community benefits of the Project. There is limited indication as to whether the project will provide the local community with any new infrastructure or investment. This information should be documented in detail in the Project's Social Management Plan.
- The EES does not include a detailed description of the disruption's communities will face in relation to the valued places such as Mitchell River National Park. There is also limited assessment of how the project will impact local tourism and in turn the local economy.
- The focus of workforce is on local and sub-regional employment scale and the potential effects and opportunities associated with the project are not supported in detail by a management plan or implementation plan.

Economic

- Cumulative impacts associated with known/planned and potentially concurrent regional infrastructure projects are not considered. Concurrent projects might create competition and associated impacts for labour/skills supply/availability in local and regional communities. Competing projects (depending planning approvals, financing and construction timing), might include road, rail, renewable energy – including the Star of the South Offshore Wind Farm, hospital, education, tourism, irrigation projects, bushfire recovery projects etc. which could commence across Gippsland over the coming years.

- Impacts on the tourism sector are based primarily on visual, landscape analysis and case studies and not a specific Tourism Impact Assessment. Detailed analysis of factors such as potential impacts on accommodation availability during peak tourism periods for specific establishments (likely to have the highest project demand), impacts of construction and operational traffic on tourist routes and visitation patterns etc. should also be factored into potential industry costs. Cumulative impacts of multiple concurrent regional infrastructure projects on the tourism sector / visitor economy have not been assessed.

Draft Work Plan

- Clarification required of the clearance areas, and tree removal should be provided.
- Information on the potential for earthquakes to impact slope stability and tailings liquefaction by incorporating information that has been included in Appendix -003 of the EES.
- Before full approval of the project It is recommended that a trial open pit be developed to confirm design slopes, and this be followed by a field trial of the proposed backfilling method. It is recommended/suggested that a trial be undertaken. This could also serve as an opportunity to assess slope angles for the open pit. Approval for the full mining operation should not be granted until the results of the trial. This approach has been adopted for many sensitive projects, e.g. in-situ uranium leach mining, in-situ coal gasification
- Water usage to be confirmed and a table provided with the project water need.
- Use of flocculants which are indicted as non-toxic to fauna and people and not expected to bioaccumulate. The Works Approval Application refers to possible use of hydrobond and hydraprime products which are indicated as being toxic to aquatic biota. Clarification and consistency in the proposed products and toxicity is required. It is recommended that consistency be maintained and include reference to potential toxicity in the water treatment section (3.7.4.3) of the EES.
- It is recommended that investigations are indicated prior to a decision been made on the project to justify that proposed design.
- The Work Plan should specify site vehicle speeds.
- The EES should include a summary table of the risks as indicated in the Risk Management Plan.

Draft Works Approval

- Further detail should be provided or referenced that outlines a stepwise approach demonstrating best practice as illustrated in Table 2 of EPA publication 1517.1
- Further discussion should be provided on avoidance and/or minimising GHG emissions.
- Consideration should also be given to the potential for mine contact water to contain radionuclides. This is not considered throughout the draft WAA.

- Further consideration of other weather conditions be considered in the management strategy related to the discharge of treated water.
- Discussion of the MSDS information should be included in the body of the report and include consideration of the following; toxicity of proposed flocculant products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.
- Aquifer recharge is a proven technology and should be duly considered as an option in the absence of a valid argument to the contrary.
- Further discussion should consider the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweighing the reduction in water flowing to each system.
- The assessment of potential noise impacts from the wet concentrator plant should be further considered
- This license amendment process requires clarification for if undertaken through an EPA license amendment what consultation will be undertaken with Council and other stakeholder and community groups during this process.
- Consideration should be given as to a shorter period to determine effectiveness. What is the proposed fallback position/contingency should the wastewater treatment system prove ineffective upon commissioning?
- Further consideration should be given as to why the wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. This should include consideration of the inclusion of additional treatment modules within the water treatment facility which can reduce levels of these constituents to within water quality objectives.
- Exceedance of water quality objectives for copper requires further discussion
- If waste is classified as Category C waste is comingling with tailings fines and disposal in on site Tailings Storage Facility considered appropriate disposal in accordance with IWR regulations and the principles of the waste hierarchy?
- The risk management plan should be revised to include contingencies for failure of the water treatment system.
- The Risk management plan should also consider risks associated with the storage and use of chemicals (spills, runoff). Of specific consideration should be the storage in concentrated form of hydrobond with a biodegradation of greater than 28 days and its toxicity to aquatic biota.
- Consideration of water quality and hydrology should be included within the EMF.
- Construction impacts during establishment and commissioning of the DAF should be included in any construction impact management

- How will the Water Treatment Management Plan be implemented as it is not currently included in the EMF?
- Protocol to be used to undertake in stream monitoring and assessment should be included
- It is not clear how continuous monitoring will be undertaken for metals, this is considered particularly important given identified elevated aluminum and copper levels in treated water.
- Details on quantification of nitrogen inputs into freshwater dam from treated water is required.
- Clarification is required as to after an initial period of how long will agreement from the regulator be sought to reduce bimonthly monitoring.
- Reference to proposed methods for dissemination of annual performance statements and reporting to community and stakeholder groups is required.

3 Technical Review of EES and Supporting Documentation

3.1 Planning Scheme Amendment

Relevant documentation considered as part of this review includes:

- Planning and Environment Act 1987;
- Mineral Resources (Sustainable Development) Act 1990;
- East Gippsland Planning Scheme; and
- The Environmental Effects Statement Report and the following appendices:
 - Attachment C – Planning Scheme Amendment (C156)

The review also considers the following guidelines:

- Strategic Assessment Guidelines (DELWP);

Table 1 Planning Scheme Amendment Technical Review

Item	Consideration	Matter Considered	Report Reference	High-Level Summary	Comments/ Gaps
1	Ministerial guidelines/Scoping requirements	Objective - To minimise potential adverse social and land use effects, including on agriculture, dairy, irrigated horticulture, tourism industries and transport infrastructure.	Explanatory Report - Strategic Assessment Section	<ul style="list-style-type: none"> The Planning Scheme Amendment explanatory report covers predominately all of the scoping requirements and cross references the relevant sections of Chapter 9 of the EES 'Environmental and Socioeconomic Impact Assessment' which individually address the social, economic and environmental impacts from the proposed project. 	<ul style="list-style-type: none"> Does not address chapter 9.5 Greenhouse Gases, chapter 9.9 Land Use Planning and chapter 9.11 Agriculture and Horticulture of the main body of the EES within the explanatory report.
2	Planning and Environment Act 1987	Part 1 Section 4 Part 2 Section 7(5) and 12(2) Part 3 – Amendment of Planning Schemes Incorporated Document	Explanatory Report and Incorporated Document	<ul style="list-style-type: none"> Planning and Environment Act 1987 is required for associated infrastructure on land that is not covered by a mining licence. The Planning Scheme Amendment (PSA) has adequately addressed the objectives of planning in Victoria under part 1 section 4 of the Act. Under section 7(5) of the Act the PSA has addressed the Ministerial Direction on the Form and Content of Planning Schemes, this is addressed in further detail at item 4. Under section 12 (2) of the act, the PSA has considered the Ministerial direction No.11 Strategic Assessment of Amendments (see item 5 of this table), Victorian planning provisions (VPP), municipal strategic statement (MSS) and any social, environmental and economic effects. The PSA has been prepared in accordance with the relevant sections of the P&EA Act 1987 and is in accordance with Part 3 of the Act – Amendment of Planning Schemes. The incorporated document has appropriately addressed the requirement to incorporate any document which relates to the use, development or protection of land under section 6 (2)(j) of the Act to facilitate the delivery of the project outside of the mining lease area. 	<ul style="list-style-type: none"> Under section 12(ab) of the Act, the PSA must have regard to any municipal strategic statement, strategic plan, policy statement, code or guideline which forms part of the scheme – the PSA does not address the Gippsland Regional Growth Plan in detail or the Gippsland Regional Plan 2015-2020. The incorporated document defers the plans listed under the relevant sub-sections to be to the satisfaction of the RA which is considered appropriate.
3	Mineral Resources (Sustainable Development) Act 1990	Section 43 (3) Section 42 (6) and (7)	Explanatory Report - Strategic Assessment	<ul style="list-style-type: none"> Section 43(3) of the Mineral Resources (Sustainable Development) Act states that any provision of a planning scheme that seeks to prohibit, require a planning permit or restrict by condition the carrying out of mineral exploration, does not apply to the area to which an exploration licence or mining licence applies. An exploration licence overrides the provisions of a planning scheme with respect to mineral exploration The proposed planning scheme amendment is required to carry out use and development associated with works proposed to be located outside of the proposed mining licence area. By virtue of section 42(7) of the Mineral Resources (Sustainable Development) Act 1990, planning permits are not required for the development and operation of the project undertaken within the mining licence area. In accordance with the relevant legislation, a PSA was required to be undertaken to simplify the planning approval process and ensure a coordinated approach for the approvals. 	<ul style="list-style-type: none"> Update Mineral Resources (Sustainable Development) Act 1995 to Mineral Resources (Sustainable Development) Act 1990. The PSA has addressed the relevant legislation with due consideration and is considered appropriate.
4	East Gippsland Planning Scheme	Consistency and appropriateness	Explanatory Report and Incorporated Document	<ul style="list-style-type: none"> The PSA adequately addresses the requirement for undertaking a planning scheme amendment. As discussed at this item of the table. The PSA identifies the changes to the East Gippsland Planning Scheme, which includes; <ul style="list-style-type: none"> Introduction of the Specific Controls Overlay into the East Gippsland Planning Scheme Insertion of a new Schedule 1 to the Specific Controls Overlay at Clause 45.12 Insertion of a new incorporated document titled 'Fingerboards Mineral Sands Project Incorporated Document, October 2018' to the Schedule to Clause 72.04. These changes sought as part of the PSA simplify the planning approval process and ensure a coordinated approach for the approvals outside the mining licence area. The incorporated document in accordance with section 7(5) of the Act, and the explanatory report have addressed the Ministerial Direction on the Form and Content of Planning Schemes. <ul style="list-style-type: none"> It has provided an introduction sheet which lists all amendment planning scheme maps that are sought to be amended and it lists the planning scheme and schedules which are proposed to be amended. The PSA has correctly provided and amended the map sheet, clauses and schedule correctly in accordance with formatting guidelines. The incorporated document must be supplied to the department electronically, and must include a date. (month and year) which the associated incorporated document has correctly undertaken. 	<ul style="list-style-type: none"> List of amendments sheet to include the most recent amendments. Currently the list of amendments shown are last dated 26 Sep 2019. The most recent amendment within the East Gippsland Planning Scheme list of amendments is VC169 which was in operation from 9 October 2020. This review has sought clarity, accuracy typographical errors, compliance with the Ministerial Direction on the Form and Content of Planning Schemes, compliance with the Minister's authorisation for the preparation of the amendment, consistency between the Instruction Sheet and attached map and documents and correct electronic format and naming conventions. The explanatory report and incorporated documents are considered to address all relevant requirements. The predominate use surrounding the site is Farming zone. The explanatory report or incorporated document does not provide detail of land outside of the mining lease area in broader context of the works associated with the mine. The proposed project constrains the surrounding area, putting onus on the Responsible Authority or individual applicant to prepare PSA's to facilitate associated mining personnel with specific commercial and accommodation uses which are generally prohibited in the zone. The burden is left to the RA/future applicant to strategize how to provide relevant commercial/accommodation uses for the expected increase in workers associated with the mine. The explanatory report needs to provide comment around the broader area outside of the mining lease area and the land use impacts. Council are unsupportive of commercial/accommodation uses in the surrounding area. The explanatory report needs to provide comment around the broader area outside of the mining lease area.

				<ul style="list-style-type: none"> The explanatory report and incorporated document have explained appropriate planning controls and provisions which would apply to the proposed works relating to the mine outside of the mining lease area. The Act has been adequately addressed as part of these reports. The information has considered the correct zone, overlays and particular provisions and have identified the provision of preparing the insertion of a new amendment in the form of an overlay in accordance with Ministerial Direction on the Form and Content of Planning Schemes under section 7(5). 	<ul style="list-style-type: none"> Ancillary car park to be addressed as a use proposed or detailed in the CMP. Need to identify purpose and land under separate sub-sections of the incorporated document. Further details relating to infrastructure and utilities are required to be addressed in the incorporated document. Staging of the proposal to be discussed in further detail and fleshed out in the CMP. as well as the staging of the proposal. Provide discussion around the Public Acquisition Overlay including relevant authority consultation and indicate the approach which was or will be undertaken with private landowners to signify the purpose and impacts on private land. Further details are required to be addressed under the general conditions in the incorporated document. Consultation with authorities and landowners to be documented, and further details are required in relation to any agreements which may be in place. EMP condition to include that referral is required to EGCMA. Further to comments listed above, the PSA will need to provide further detail relating to specific land which applies to the Specific Control Overlay and discuss who was notified of the amendment to acquire such land i.e. private land owners and relevant authorities. No further detail is required for the proposed plans discussed in the incorporated plan. This will be dealt with via the proponent and assessed by the RA.
5	Ministerial Direction 11 - Strategic Assessment Guidelines	Ministerial Direction 11	Strategic Assessment Section	<ul style="list-style-type: none"> The explanatory report has adequately addressed the strategic assessment of the Ministerial Direction 11. It has answered predominately all questions appropriately and is considered to satisfy the requirements. 	<ul style="list-style-type: none"> Under section why is the amendment required? Discuss the support of the amendment by referencing the technical studies and the main body of the EES, also touch on the net community benefit. As stated at item 1 of this table the PSA explanatory report does not address chapter 9.5 Greenhouse Gases, chapter 9.9 Land Use Planning and chapter 9.11 Agriculture and Horticulture of the main body of the EES. Under section Does the amendment address relevant bushfire risk? Briefly discuss how the proposed fire management plans which are required under the incorporated plan will address the strategies of the SPPF Clause 13.02-1S bushfire planning. Under section Does the amendment support or implement the Planning Policy Framework and any adopted State Policy? Discuss in further detail how the amendment supports or gives effect to any relevant state policy, many of these PPF's are only briefly touched on. Under section How does the amendment support or implement the Local Planning Policy Framework, and specifically the Municipal Strategic Statement? Discuss in further detail how the amendment supports the MSS Clause 21.06-4 or reference a document which provides such support. Discuss further how the proposal gives effect to any relevant local policy, many of these PPF's are only briefly touched on. Under section How does the amendment address the views of any relevant agency? Who else has been consulted outside of the EPA? what relevant authorities in relation to the Public Acquisition Overlay Elaborate on why the amendment does not have an impact on the transport system or roads when they are sought to be acquired.
Key Matters for Council					
	Applications not specific to the mining lease area or associated infrastructure under the associated PSA	Town Planning Matters	Planning Scheme Amendment	<ul style="list-style-type: none"> Overall, the PSA adequately addresses the need for the specific controls overlay to simplify the approvals process. 	<ul style="list-style-type: none"> The predominate use surrounding the site is Farming zone. The Planning Scheme Amendment puts pressure on the surrounding land zone and RA. Discuss further, how the proposal gives effect to any relevant state policy, many SPPF's are only briefly touched on. The PSA is to provide further comment on how it aligns with the local planning policy framework which encourages mining but also provide a clearer and more contemporary strategic direction on matters included in the MSS such as; <ul style="list-style-type: none"> Future agricultural land use Goods and services to facilitate personnel – Economic development and business facilitation Housing to facilitate expected mining personnel This amendment makes a range of changes to provide certainty for the specific project and will ensure a more coordinated planning approval process.
	Is there consistency between technical reports and	EES and supporting documents	Planning Scheme Amendment	<ul style="list-style-type: none"> There was consistency between the technical reports which were produced for the EES and the proposed Planning Scheme Amendment. 	<ul style="list-style-type: none"> The PSA references associated technical studies, attachments and main body of the EES. The cross-reference attachment and this Technical Review finds that there is consistency across all documents.

	strategic and statutory planning				<ul style="list-style-type: none">The PSA has been prepared in accordance with relevant legislation and ministerial directions and guidelines, however, as listed above throughout this review further information is required to be addressed.
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3.2 Land Use Planning Impact Assessment

Relevant documentation considered as part of this review includes:

- Environmental Effects Act 1978;
- Planning and Environment Act 1987;
- Mineral Resources (Sustainable Development) Act 1990;
- East Gippsland Planning Scheme; and
- The Environmental Effects Statement Report and the following appendices:
 - Appendix A013 – Land Use and Planning Impact Assessment

The review also considers the following guidelines:

- Ministerial guidelines for assessment of environmental effects under the Environmental Effects Act 1978;
- Gippsland Regional Growth Plan; and
- Gippsland Regional Plan 2015-2020.

Table 2 land Use Planning Impact Assessment Technical Review

Item	Consideration	Matter Considered	Report Reference	High-Level Summary	Comments/ Gaps
1	Ministerial guidelines/Scoping requirements	Objective - To minimise potential adverse social and land use effects, including on agriculture, dairy, irrigated horticulture, tourism industries and transport infrastructure.	Sections 2 - 5	<ul style="list-style-type: none"> All matters to minimise potential adverse social and land use effects have been discussed in Section 2 - 5 of the land use and planning impact assessment appropriately. The land use and planning impact assessment is reliant upon associated technical studies which support the EES and address the scoping requirements. Addressed at Section 9.9 Land Use and Planning of the main report of the EES. 	<ul style="list-style-type: none"> In addition to the Land Use and Planning Impact Assessment, further supporting information and documentation to address the ministerial scoping requirements are provided as technical studies, attachments or can be located in the main report of the EES.
2	Key Issues	Statutory and Strategic Context	Sections 3, 4, 5 & 6	<ul style="list-style-type: none"> Addressed within EES and Land Use and Planning Impact Assessment. Refer to item 5 and 6 of this table. 	N/A
		Change of Land Use Impacts – Social and Environmental	Section 6.2	<ul style="list-style-type: none"> Provides a brief summary of impacts. Supporting technical studies expand on the change of land use impacts such as noise, dust, erosion etc, conflicts with adjacent land uses, inconsistency with planning policy and agglomeration impacts. 	<ul style="list-style-type: none"> Requires further detail to characterise temporary land uses outside of the proposed mining area and associated works of mining lease area. Ensure accurate and consistent characterisation of temporary land uses and future land uses post-mining, which meet the objectives of the surrounding land zonings. Further discussion is required for how the proposed Fingerboards project impacts the surrounding farming zone and how the proponent will assist the RA in addressing the impacts of agglomeration and adjoining land uses. The agglomeration impact section of the report puts responsibility on Council to deal with an unfavourable process. The land use and planning impact assessment needs to provide an indication or solution to the RA of how this is managed. It is seen unfavorable that a PSA is required to be undertaken by each future proponent to include an additional permitted use in surrounding land zones, when the need for uses discussed in the agglomeration impacts section at 6.4 is directly impacted by the mining project.
3	Planning and Environment Act 1987	Victorian Planning Objectives (Framework) - Part 1 Clause 4	Section 3.1 & 3.3	<ul style="list-style-type: none"> Objectives were considered and have been addressed throughout the EES. Mineral exploration and mineral extraction do not require a permit within the license area if it complies with MRSDA. The proposed mining license area and use is considered to be consistent with the LPPF and MSS. Addressed appropriately within EES at Section 8.9 of Chapter 8 Environmental and Socioeconomic Context in the Main Report. 	<ul style="list-style-type: none"> Provide clarity around Section 3.3 – Indicate that a planning scheme amendment was submitted for works outside of the mining license area. Provide further detail around consistency with the LPPF and MSS as currently situated, during mining operation and post operation.
4	Mineral Resources (Sustainable Development) Act 1990	Regulations and Guidelines	Section 3.2 & 6.5	<ul style="list-style-type: none"> The land use and planning impact assessment has considered the objectives of the MRSDA and has discussed mitigation measures, facilitating the establishment of a legal framework ensuring that work being done under a license or extractive industry work authority are identified and are eliminated or minimised as greatly as possible. Supporting technical studies discuss mitigation measures and the appropriateness of the proposed works. A draft work plan has been prepared and a rehabilitation plan will be developed and updated as part of the operation's Work Plan. Schedule 15 of the MRSD Regulations specifies the requirements for the Rehabilitation Plan. 	<ul style="list-style-type: none"> Provide further detail of how the proposal satisfies Section 43(3) and Section 42(7) of the MRSD Act. Provide a summary of the post-mining rehabilitation commitments.
5	East Gippsland Planning Scheme – SPPF, LPPF, VPP and Particular Provisions	Planning Scheme Controls	Section 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 4.1, 4.2, 6.2, 6.3 & 6.4	<ul style="list-style-type: none"> The appropriate planning controls and provisions which would apply outside of the mining lease area have mostly been addressed as part of this report as it has identified specific issues that should be considered as part of the EES process. However, further detail is required in relation to adjacent land uses. The information has considered the correct zone, overlays and particular provisions and have identified most of the objectives/statements of the appropriate schedules. 	<ul style="list-style-type: none"> The land use and planning impact assessment has correctly addressed the need for planning approvals outside of the mining area which coincides within the East Gippsland planning Scheme. The report correctly addresses that the neighbouring municipal boundary is approximately 1km from the project area (Wellington Shire) and is therefore of no relevance to the required planning approvals. Has not highlighted the farming zone purpose 'To provide for the use and development of land for the specific purposes identified in a schedule to this zone' at section 3.3.1.1

				<ul style="list-style-type: none"> The technical report has considered majority of the relevant SPPF's and LPPF's to an appropriate standard. The land use impact section discusses the main risks in sufficient detail, the EES and supporting technical studies for the associated areas go into further detail. The land use and planning impact assessment report in accordance with the Assessment Framework at Chapter 7 of the EES, assessed the compliance for land use change, based on the Planning Policy Framework and considers the potential impacts of permanent or temporary changes of land use, conflicts with adjacent land uses, inconsistencies with planning policies, and agglomeration impacts. The report acknowledges that there is a statutory obligation that land will be rehabilitated and made suitable for agricultural production or other beneficial uses as soon as practicable after it is mined and landowners will be consulted about the details of rehabilitation. A draft work plan has been prepared and a rehabilitation plan will be developed and updated as part of the operation's Work Plan. Schedule 15 of the MRSD Regulations specifies the requirements for the Rehabilitation Plan. 	<ul style="list-style-type: none"> Provide a more succinct comment in section 3.3.4 that a Planning Scheme Amendment will support the work outside of the mining area, rather than relying specifically on the Specific Controls Overlay comment at 3.3.4. Providing clarity of the process. ESO1-51 has no mention of the management practices – reference the management practice and tie it to supporting technical studies. Highlight the EMO and BMO purpose/objectives. The land use and planning impact assessment and the assessment framework at Chapter 7 of the EES need to demonstrate further satisfaction or appropriateness of the temporary changes of land use and impacts to adjacent land uses and agglomeration impacts relating to land uses and land zoning. For consistency at section 4.1 Clause 11.01-1S should indicate the objective. All SPPF Clauses should indicate consistency with the objective or reference an appropriate technical document which discusses the consistency in detail such as how the Noise Abatement clause is addressed in part. Address SPPF Clause 13.04-2S Erosion and Landslip and SPPF Clause 13.07-1S Land Use Compatibility. Existing State and local planning policy favours new industry and commercial activities, however, further comment is required as the MSS has many components to be addressed.
6	Strategic Planning	Gippsland Regional Growth Plan and Gippsland Regional Plan 2015-2020	Section 5.1 & 5.2	<ul style="list-style-type: none"> The Land Use and Planning Impact Assessment generally identifies and addresses the relevant directions and strategies of the Gippsland Regional Growth Plan and Gippsland Regional Plan 2015-2020. All potential mining exploration and extraction are encouraged in the area where the proposal (EES) meet the requirements of relevant environmental and regulatory processes. 	<ul style="list-style-type: none"> The strategic plans are supportive of the proposed mineral exploration and extraction, long as it meets all relevant legislation which has been demonstrated in the EES and supporting attachments and technical studies.
Key Matters for Council					
	Are the proposed temporary change of land use, land use impacts and mitigations considered adequate?	Town Planning Matters	Land Use and Planning Impact Assessment Report (Appendix – A013)	<ul style="list-style-type: none"> Overall, the land use and planning impact assessment adequately addresses mitigation measures relating to the physical environment, biological environment and majority of the socioeconomic and cultural environment, however, it needs to discuss in further detail the impacts on adjacent land uses/zones and planning and agglomeration impacts. The Planning Scheme Amendment which supports the Land Use and Planning Impact Assessment has addressed the technical requirements of the ministerial directions and has addressed the scoping requirements sufficiently. 	<ul style="list-style-type: none"> Existing State and local planning policy favours new industry and commercial activities, however, further comment is required as the MSS has many components to be addressed. The agglomeration impact section of the report puts responsibility on Council to deal with an unfavorable process. Need further comment around the proposed mitigation.
	Is there consistency between technical reports	EES and supporting documents	Land Use and Planning Impact Assessment Report (Appendix – A013)	<ul style="list-style-type: none"> The EES accurately characterised the temporary change of land use, however, requires further detail and discussed satisfactorily the requirement for rehabilitation of the land to restore it for agricultural purposes or the preferred land use as described in the rehabilitation chapter of the EES. The EES accurately characterised the proposed mining exploration and extraction and project area using current accepted investigation practice, state and commonwealth guidelines. There was consistency between the technical reports which were produced for the EES. 	<ul style="list-style-type: none"> The land use and planning impact assessment references associated technical studies, attachments and main body of the EES. The cross-reference attachment and this Technical Review finds that there is consistency across all documents.

3.3 Land use, soils, agriculture and horticulture

Relevant documentation considered as part of this review includes:

- The Environmental Effects Statement – Fingerboards Mineral Sands Project (August 2020) and the following attachments/appendices:
 - Appendix A001 Landform, Geology and Soil Investigation
 - Appendix A015 Agriculture Impact Assessment
 - Appendix A016 Horticultural Impact Assessment
 - Appendix A021 Soil Profile Reconstruction Study 1
 - Appendix A022 Soil Profile Reconstruction Study 2

The review will consider the following Acts:

- Catchment and Land Protection Act 1994
- Climate Change Act 2017
- Conservation, Forests and Land Act 1987 (CF&L Act)
- Environment Effects Act 1978
- Environment Protection Act 1970 (Vic)
- Environment Protection Act 2017
- Environment Protection and Biodiversity Conservation Act 1999
- Forests Act 1958
- Flora and fauna Guarantee Act 1988
- Land Act 1958
- Mineral Resources (Sustainable Development) Act 1990 (MRSDA)
- Planning and Environment Act 1987
- Radiation Act 2005 and relevant regulations
- Road Management Act 2004
- State Environmental Protection Policy (SEPP) - Ambient Air Quality
- SEPP - Air Quality Management
- SEPP - Groundwaters of Victoria
- SEPP - Prevention and Management of Contamination of Land
- SEPP - Waters of Victoria
- Water Act 1989

The review will consider the following Regulations:

- Environment Protection (Industrial Waste Resource) Regulations 2009

- Mineral Resources (Sustainable Development) (Mineral Industries) Interim Regulations 2018 (Regulations)

The review also considers the following guidelines:

- ANZMEC and MCA, 2000
- Guidance Material for the Assessment of Geotechnical Risks in Open Pit Mines and Quarries, Earth Resources Regulation (DEDJTR) 2015;
- Minerals Guidelines and Codes of Practice: Rehabilitation - Guidelines for Environmental Management in Exploration and Mining, Earth Resources Regulation (DEDJTR) 2014
- Mine Rehabilitation - Leading Practice Sustainable Development Program for the Mining Industry. Department of Foreign Affairs and Trade, 2016a
- Rehabilitation and Closure Plan Guideline for the Mining Industry, Department of Economic Development, Jobs, Transport and Resources, Earth Resources Regulation Branch 2017
 - Strategic Framework for Mine Closure, Australian and New Zealand Minerals and Energy Council Minerals Council of Australia 2000

Table 3 Land use, Soils, Agriculture & Horticulture Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Soil Investigation			
Has the EES reasonably described the soils & soil profiles within the project area, in particular in the proposed mine footprint over the proposed mine life?	Section 6 of Appendix A001	ASC classification is unclear, there is mention of Sodosols and Podosols, however it also mentions shallow sandy soils overlying gravel with no ASC classification.	Present ASC types in a table to make it clearer what soil types are present and their distribution.
	Section 6 of Appendix A001 Figure 7	No ASC classification on Figure 7 Difficult to see 20-year project boundary on Figure 7 No soil map provided; no clear distribution of ASC soil types shown. The only soil map provided is Figure 5 from Agriculture Victoria at 1:100,000 scale which is not adequate for a soils investigation.	Provide soil map showing distribution of ASC soil types within the project footprint.
	Section 6 of Appendix A001	No soil stripping map provided; only very general comments given suggesting topsoil depths range from 0.2 – 0.3 m	Provide soil stripping maps showing ASC soil types with topsoil and subsoil stripping depths
	Appendix 2 of Appendix A001	ASC type Podosol is spelt Podsol throughout Appendix 2	Correct spelling
Has the EES characterised the relevant physical and chemical properties of the topsoil & subsoil materials?	Section 7.6.2 of Appendix A001	Total phosphorus doesn't tell us what is actually available for plant uptake. The Bray Phosphorus test (for acidic soils) would have been a much more accurate determination of available phosphorus.	Re-test samples if possible
	Section 11.3 of Appendix A001	Suggest including a recommendation for weed control to be undertaken in the years prior to topsoil stripping to decrease available weed seed bank (ideally weed control is undertaken from 2020 onwards)	Add in weed control recommendation
Agriculture & Horticulture			
Has the EES reasonably characterised the existing and planned land use and the existing beneficial uses within and in the vicinity of the proposed project?	Section 2 of Appendix A015 and Section 5 of Appendix A016	Adequately described planned land use and the existing beneficial uses within and in the vicinity (local and regional) of the proposed project	Nil
Has the EES described the existing topography, soil profiles, drainage, plant-soil-water interactions and vegetation cover within the project area, in particular in the proposed mine footprint over the proposed mine life?	Section 2.3 and Appendix 3 of A015 and Section 5 of A016	Information derived from A001. No detailed soil map. Mention of pale sands and duplex soils (kurosols and sodosols)	Provide detailed soil map showing distribution of ASC soil types within the project footprint (this should come from the updated soils report A001)
Have the current agricultural and horticultural practices in the project area, including key factors influencing sustainable cropping and outputs been reasonably addressed in the EES.	Section 2 of A015 and Section 5 of A016	Adequately described agricultural practices in the project area, including key factors influencing sustainable cropping and outputs	Nil
Does the design and proposed mitigation measures reasonably address the potential for adverse land use effects?	Section 5 of A015 and Sections 6 & 7 of A016	Key areas of concern (water and dust) comprehensively addressed in Section 6 of A016	Nil
Are there design criteria in the EES to the site is suitable for the intended end land-use (agricultural and native areas) and does not result in long term degradation?	Section 5 of A015 and Sections 6 and 7 of A016	The design criteria in the EES for the site is suitable for the intended end land-use (agricultural and native areas) and will not result in long term degradation	Nil
Are the proposed management measures and Environmental Performance Requirements (EPRs) reasonable and appropriate?	Section 11 of A001, Section 5.2 of A015 and Section 7 of A016	The proposed management measures are reasonable and appropriate	Nil
Soil Profile Reconstruction			
Does the design and proposed mitigation measures reasonably address the potential for adverse land use effects?	Section 2.1.2 of Soil Profile Reconstruction Study 1	Subsoil constructed from different combinations of coarse (sand) tailings, fine tailings, HHF gravel overburden, HHF sand overburden. Limitation of fine tailings is given as elevated arsenic (As). 97% of dry matter intake of As by grazing animals may be via soil ingestion. 20cm topsoil will be placed over subsoil. Subsoil exposure not taken into consideration. Arsenic analysed only in plant material and not end of trial soil.	Analyse end of pot trial subsoil samples for arsenic.
	Section 2.1.2 of Soil Profile Reconstruction Study 1	Do not see arsenic analytical results reported in Table 3 in Appendix A1. Arsenic	Add certificate of analysis showing As results
	Section 4.1.4 of Soil Profile Reconstruction Study 1	Detection limit of arsenic analysis (5 mg/kg) is less than the guideline value used for comparison of data (4.5 mg/kg (dry weight) European Commission 2002)	

	Section 5.3.2 of Soil Profile Reconstruction Study 1	100% coarse tailings treatment indicated to be analogue for the subsoil currently on site.	Confirm what that comparison is based on. Justify this comparison.
Are the proposed management measures and Environmental Performance Requirements (EPRs) reasonable and appropriate?	Section 7.1.1 of Soil Profile Reconstruction Study 2	Use of several options subsoil combinations for different areas of rehabilitation. When and where to use which combination or what criteria to use to select which combination to use is not described.	Add table showing each option with advantage and disadvantage of each and criteria of where the use of this combination is most suitable.
Key Concerns for Council			
What are the key risk issues?	Section 6 of A001	No detailed map of ASC soil types or recommended stripping depths of soil types. "mixing" of different soil type topsoil and subsoil during reinstatement-rehabilitation is the key risk. Different soil types (i.e. soil units) should be stripped and stockpiled separately for reinstatement as per the "original" soil type.	Provide map of ASC soils types within the project area and also recommended topsoil and subsoil stripping depth
Are the proposed EPRs adequate?	Section 11 of A001, Section 5.2 of A015 and Section 7 of A016	Yes, specific mention of comparison against analogue sites for rehabilitation criteria	Nil
Is there consistency between technical reports	Yes	References, impacts and proposed mitigation measures are consistent between the relevant reports.	Nil

3.4 Surface water

Relevant documentation considered as part of this review includes:

- Catchment and Land Protection Act 1994 (Vic)
- Environment Protection Act 1970 (Vic)
- Water Act 1989 (Vic)
- CALP Act
- Environment Protection (Scheduled Premises) Regulations 2017
- Mineral Resources (Sustainable Development) Act 1990
- Climate Change Act 2017 (Vic).
- State Environment Protection Policy (SEPP) (Waters)
- East Gippsland Waterway Strategy 2014-2022
- East Gippsland Floodplain Management Strategy (2017)
- The Environmental Effects Statement Report and the following attachments/appendices
 - Attachment I - Water peer review report and proponent response
 - Appendix 6 – Groundwater and Surface Water Impact Assessment

The review with also considers the following guidelines:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality ANZECC/ARMCANZ (2000): Used where targets for water quality are not defined elsewhere in the SEPP (Waters)
- Guidelines on Tailings Dam – Planning, Design, Construction, Operation and Closure (ANCOLD, 2012a).
- Guidelines on the Consequence Categories for Dams (ANCOLD, 2012b).
- Guidelines for the management of water in mines and quarries (2020).
- International Erosion Control Association (2008), Best Practice Erosion and Sediment Control. (IECA, 2008)

Table 4 Surface Water Technical Assessment

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES identified all relevant surface water bodies that could be impacted by the project?	EES (Summary report, Figure ES-7, 8.4, 10.6.5) App 6 (Executive Summary, 1.2, 3.6, 7.6, App C (4), App E, App F)	The EES has identified Mitchell and Perry Rivers, King and Wellington Lakes and Gippsland Lakes Ramsar wetland as well as smaller ephemeral drainage channels and additional river systems as the relevant surface water bodies that could be impacted by the project. These surface water bodies have been assessed extensively in numerous sections of the EES.	NA
Have the project components been designed and sited to minimise potential impacts to surface water, including, water extraction, interception and diversion of flows, discharges from operational areas or saline water intrusion?	EES (Summary report, Executive Summary, 3.7, 9.3, 10.7.3, 13.1.3) Attachment I App 6 (Executive Summary, 1.2, 1.4, 3.6.3, 7.1, 7.6, 8.2, 8.3, 8.4, 10, App A (4, 5, 6), App C, App E, App F)	It is not clear how runoff from hauls roads will be managed during the project. Runoff from haul roads should be classed as 'mine water' and managed accordingly. Water will be managed around the mine site, including the flow frequency in project area gullies to reduce the potential loss of beneficial uses of downstream ponds. Project activities are not expected to significantly affect the beneficial uses of surface water. The level of water management design is generally suitable for the purpose and objectives of the EES however, design criteria for the proposed clean water diversions and conveyance channels should also be clearly documented. The success of the proposed surface water management strategy largely depends on the site water balance and the proposed water extraction licences. These are discussed in the sections below.	Clarification is required of the expected haul road runoff quality and details of how this will be managed throughout all stages of the Project. The EES should clearly document design criteria for the proposed clean water diversions and conveyance channels.
Have surface water investigations been undertaken to define water quality to enable assessment of potential impacts on, Mitchell and Perry Rivers, King and Wellington Lakes and Gippsland Lakes Ramsar wetland?	EES (Summary report, 8.4, 9.3 10.6.5, 10.7.3) App 6 (3.6, 4, 7.6, 8, 9, App C, E, F)	A baseline monitoring program commenced in 2017 at ephemeral drainage features within the project area, and perennial rivers outside of the project area. Due to the lack of surface water flow during this period the baseline monitoring program did not achieve a sufficient quantity of results to effectively characterise the water quality in the local environment. These data gaps are considered to be unavoidable and acknowledged within the EES with a recommendation to continue the event monitoring of the drainage lines to define a robust baseline, as opposed to comparison with the ANZECC aquatic ecosystem trigger values. The monitoring program will also include a suitable number and arrangement of surface water monitoring locations so that the concentration of sediments and contaminants released during a large storm events can be directly measured, and appropriate action can be taken to prevent impacts to the beneficial uses of water in the Perry River, and Lake Wellington. The baseline gaps do add some uncertainty of the existing conditions and an assessment of risk associated with the uncertainty is recommended. Section 9 of the EES attempts to characterise the water quality of mine runoff. This characterisation includes sediment, nutrients and heavy metals but makes no mention of salinity, pH or radionuclides.	The baseline monitoring program should be continued as stated in the EES. An assessment of risk associated with the existing uncertainty is also recommended. It is noted that the ANZECC guidelines typically require 2 years of monthly sampling to effectively characterise the water quality. An assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life.
Does the water balance model reasonable describe the project demand for water (quantity and quality), source, volumes to be used?	EES (Summary report, 3.7.3, 4.9, 9.3) Attachment I App 6 (App A, E)	The site water balance documented in Appendix A of the EES Appendix 6 is generally considered to be successful at providing an indication of the overall functionality of the system particularly with respect to external water demands and collection of surface runoff. Approximately 1.5 GL of water will be required per annum during mine construction and initial start-up. Approximately 3 GL of water per annum will be required thereafter on an annual basis for mining activities such as ore processing, dust suppression, rehabilitation, and wash-down, as well as for onsite drinking water and ablutions. During dry years, additional top-up from an external supply may be needed. The water balance predicts that the mine water management system will discharge into the Perry River catchments once per 100 years on average (1% AEP) and three times per 117 years on average (2.5% AEP) for the Mitchell River catchments. Table 4-1 states that these results meet the design criteria however it is not clear how the Mitchell River design criteria of < 3 events per 100 years on average (3.3% AEP) was determined and whether this an acceptable level of risk. It is noted that a 2.5% AEP corresponds to a 37.5% probability that a mine water discharge event will occur during the 15-year project life. It is noted that the probability of mine water discharge could be higher due to uncertainties as noted in the sensitivity analysis. The EES states that during the rare spillway discharge events the mine water will not cause detrimental impacts to the downstream environment due to the dilution of flows during these overflow events. This needs further justification as the expected salinity, pH and radionuclides of mine water runoff has not been predicted. The EES surface water impact assessments rely heavily on the site water balance investigation. Although comprehensive, the GoldSim model is based on a number of assumptions and limitations which are detailed within the water balance report. These assumptions and limitations bring with them uncertainty and risk which SLR believes has not been adequately assessed within the EES and water balance. This concern was also raised during the Peer Review undertaken by AECOM in August 2020. SLR shares the concern regarding the potential for the project to be shut down safely if the economics or water resources are reduced or not able to be met in any one year. The water balance investigation did include a sensitivity analysis but this analysis predominately concentrated only on catchment runoff, process flow rates and climate change. For example, if the dam seepage rates are greater than what has been assumed then this would reduce the risk of mine water discharges but may cause water security issues.	Provide further clarification / justification for the 3% AEP Mitchell River spillway discharge design criteria and why this is different to the Perry River design criteria of 1% AEP which is a more widely adopted design criteria for mine water runoff. Provide further justification that mine water discharge events will not cause detrimental impacts to the downstream environment with regards to the expected salinity, pH and radionuclides of mine water runoff. It is noted that 3 events per 100 years equates to a 3% AEP (and not a 3.3% AEP) as per the surface water discharge objectives. This requires clarification. Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. What assurance is there that the dam operating rules detailed in the site water management plan will be adhered to during operation? SLR believes that the water balance sensitivity analysis should be expanded to assess other modelling assumptions such as dam seepage rates, dust suppression demand etc. The GoldSim water balance model requires ongoing refinement and review to ensure the system meets to the design objectives.

		It is noted that the EES acknowledges that the water balance will require progressive development and review to ensure the system meets to the design objectives.	
Has the assessment been undertaken consistent with relevant guidelines to assess potential effects of the project on existing surface water users;	EES (Summary report, 4.9, 9.3, 13.1.3) App 6 (Executive Summary, 1.2, 3.6, 7.1, 8.4, App A (5,6.5))	The EES has generally assessed potential effects of the project on existing surface water users in accordance with the relevant guidelines. Several project activities could affect the availability of surface water for licenced and other users, largely through extraction for project water supply from the Mitchell River flow rates, and changes to runoff entering the Mitchell and Perry river catchments. Surface water extraction for the project is subject to the granting of a winter-fill licence by the relevant regulators. Extraction would only occur in line with the conditions, timings, and limits detailed in the licence. Extraction will be restricted to days between July and October when flows exceed 1,400 million litres/day and will not impact year-round licence holders, namely irrigators, or the environmental, social or cultural values of the river which are linked to environmental flows (i.e., a target of 15 million litres/day). The project is not expected to impact on the rate at which the winter-fill threshold is reached. Analysis of flow data for the past 10 years identified only 16 days over the 10-year period where the additional extraction for the project (24 million litres/day or 3 gigalitres/year) would have led to restrictions. Surface water availability for winter-fill licence holders will not be impacted by the project. Additional water supply, if required, is proposed to be obtained from groundwater within the Latrobe group aquifer.	Kalbar recognises that while discussions have commenced with Southern Rural Water to understand the availability of winter-fill licence allocations for the Mitchell River, and potential purchase and transfer of groundwater licence allocations, no assurances have been made that this water will be made available for the project. A formal licence application will be required from Kalbar which will be considered by Southern Rural Water. Refer to Groundwater Technical Assessment Review for any additional gaps / comments.
dependent ecosystems, including, seepage from the backfilled open pits and tailings dam;	EES (Summary report, Executive Summary, 3.6, 7.7.2, 9, 13.1.3) Attachment I App 6 (Executive Summary, 1.2, 2, 3.5.4, 7.3, 7.7.2, 8.3, 9.5)	Impacts to dependent ecosystems are predominately assessed as part of the Groundwater and Ecology Technical Assessment Reviews. It is noted that many of the concerns raised in the AECOM Peer Review Report have been addressed by a revised assessment by EHP in 2020. The study concluded that there were no river segments, wetlands or patches of vegetation that could potentially change from non-GDEs to GDEs as a result of mounding. Water infiltrating through deposited tailings may leach aluminium (0.08 mg/L) and copper (0.02 mg/L) at concentrations exceeding freshwater aquatic ecosystem protection criteria. Tailings infiltration water is not expected to exceed drinking water health criteria, however leachable concentrations of aluminium and iron may create aesthetic issues if impacted groundwater is sourced for drinking water. This screening process identifies the need for ongoing consideration of aluminium and copper in tailings infiltration water. A risk assessment was undertaken on potential impacts to GDEs. This risk assessment concluded a low residual risk.	Refer to the Groundwater and Ecology Technical Assessment Reviews for any additional gaps / comments.
storage and use of fuels and chemicals;	EES (3.11, 9.1.3, 10.7.3) App 6 (Table 8-6)	Section 10.7.3 of the EES details numerous mitigation measures for the storage and use of fuels and chemicals. SLR is content that these mitigation measures are primarily sufficient to manage the associated risks. Table 8-6 of appendix 6 states that "If required, flocculant treatment (i.e., alum, gypsum or hydrated lime) will be used to drop suspended sediment levels in the stormwater". However, testing of these flocculants described in Section 6.6 of the 'Surface Water Assessment Site Study' identified that alum and hydrated lime were not recommended due to the site-specific characteristics. Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment systems. MSDS information in appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota.	Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime. Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.
potential acid sulfate soil and rock;	EES (8.1.3.3, Table 10.28) App 6 (1.2, 3.3)	Potential acid sulfate soil and rock are not expected to be an issue to the Project. EGi (2020) completed a review of available geochemical data to assess the acid generation potential of soils. The sulfur content of overburden samples from above the ore zone is low, with most of the profile containing as little as 0.01% sulfur. Concentrations in topsoil and subsoil samples are slightly higher. Within this highly weathered zone, the sulfur is assumed to occur exclusively as sulfate, which does not contribute to acid forming potential. Sulfur content within the ore zone is low. The project area/infrastructure options area is located well outside the region considered to have prospective coastal acid sulfate soils. The nearest prospective area is located between 25 to 30 km from the project area.	NA
sedimentation due to runoff from the project site;	EES (Summary report, Executive Summary, 3.7, 3.9.2, 8.4, 9.3, 10.28, 13.1.3) App 6 (Executive Summary, 1.2, 7.2, 8, App C, App E, App F)	Appropriate sedimentation management and potential impact assessments have been documented in the EES in accordance with the relevant guidelines. Runoff from disturbed and mining activity areas will be captured and directed to water management dams, reducing runoff volumes within gullies and the risk of erosion and sedimentation of downstream watercourses. Sediment dams will also be designed and constructed in accordance with the IECA guidelines for smaller disturbance areas during construction and operation. This typically equates to a 5 day 90 th percentile design criteria which is documented throughout the EES. However, a dot point in Section 9.3 states that a sub-plan will be developed including measures such as 'Retaining water on site from the contributing catchment to approximately the 10% AEP event'. It was estimated that with the proposed ESC measures the concentration of sediments in runoff during a storm event (up to 941 mg/L) is predicted to have no measurable effect on background TSS levels in the Mitchell River. The potential impacts of construction and operation of the pump station on the ecological values within the Mitchell River (including the Australian grayling) can be largely avoided through implementing standard mitigation. No adverse impacts to the Mitchell River and Perry River Systems are predicted apart from moderate increases in TSS and nutrient concentrations above background levels for short periods of time during dam spillway releases in the Perry. The increased sedimentation rate to the Gippsland Lakes from project activities (2.5 x 10-10 mm/year) is not expected to have a measurable impact on the Ramsar site.	Clarification is required for the sediment dam design criteria (5 day 90 th percentile or 10% AEP). It is noted that a 5 day 90 th percentile design storm is in accordance with the IECA guidelines for sediment laden runoff.

		<p>Within the operational mine boundary all soils are to be placed within a metre of the surface will be treated with Gypsum prior to being replaced and vegetation (including trees) is to be immediately planted. As such the susceptibility of these soils to tunnel erosion will be substantially reduced.</p> <p>Rumble or shaker strips are likely to be installed to prevent mud tracking onto the local road network.</p> <p>The final post-mining landform will be designed to be safe to humans and the environment, non-polluting, geotechnically and erosionally stable, and able to sustain the post-mining land uses agreed with stakeholders.</p>	
change in water quality;	<p>EES (Summary report, Executive Summary, 8.4, 9.3, 10.7.3) App 6 (Executive Summary, 1.2, 3.6, 7.5, 7.6, 8, 9, App A (4), App C (6), App E (6), App F (5))</p>	<p>As described earlier, a baseline water quality monitoring program commenced in 2017 but due to the lack of flows in the ephemeral drainage lines it has not yet been able to provide a robust characterisation of existing water quality in the downstream environment. Based on the existing monitoring and the proposed surface water management strategy the risk to the downstream environment was assessed as being low.</p> <p>Overall, existing flows - in combination with the very low volume of site runoff - ensure that any pollutant discharged from the site will quickly dilute within the system. The impact assessment spreadsheet model results indicated no increase above background levels for sediment, nutrients or metals due to mining operations.</p> <p>The impacts of contaminants (including overall loads) and their potential impacts on water quality of the Mitchell and Perry Rivers which are connected to the Gippsland Lakes have not been fully discussed other than to assert that under normal conditions no contaminant or sediment related impacts are expected.</p> <p>Treatment with Dissolved Air Flotation (DAF) is not generally successful at treating metals and has not shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment. Kalbar proposed to overcome this by pumping treated water to the freshwater dam for storage where it will be mixed with large volumes of water (up to 2GL) drawn from the Mitchell River. This will dilute treated water and thereby reduce contaminant levels to ensure water released to Mitchell River is within water quality objective limits. It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system.</p> <p>As described above, Section 9 of the EES attempts to characterise the water quality of mine runoff. This characterisation includes sediment, nutrients and heavy metals but makes no mention of salinity, pH or radionuclides.</p>	<p>The impacts of contaminants on water quality including loads (not just concentrations) of Perry and Mitchell Rivers requires further consideration and assessment based on the limited baseline monitoring undertaken to date.</p> <p>SLR agrees that event monitoring be undertaken as frequently as possible to characterise the existing water quality of the gullies to define a robust baseline, as opposed to comparison with the ANZECC aquatic ecosystem trigger values.</p> <p>It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. As a dilution strategy is proposed to overcome the DAF system shortcomings a robust assessment of increased contaminant loads to the downstream receiving waters is required.</p> <p>As described above, SLR believes that an assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life.</p>
alteration of flow regimes; and	<p>EES (Summary report, Executive Summary, 9.1, 9.3, 10.7.3, 13.1.3) App 6 (Executive Summary, 1.2, 7.4, 7.6, 8.4.3, App A (5.2, 6, 8.5), App C, App E, App F)</p>	<p>Table 9.11 of the EES demonstrates that changes to existing catchments are proposed both during the operational phase of the Project and post mining. The biggest change is predicted in the Perry Gully with a 51.5% reduction in catchment area. Moilun Creek, Simpson Gully and Lucas Creek will drain additional land areas, increasing runoff volumes to these catchments by up to about 15%. Changes to runoff velocity within each catchment are predicted to be minor once gullies are vegetated and are not expected to increase erosion rates.</p> <p>Runoff from outside the mine void, or water intercepted by dams is proposed to be offset by the release of water from a freshwater storage dam to the appropriate catchment.</p> <p>The water balance results indicate that the system is capable of offsetting unlicensed runoff intercepted by the water management dams. Surpluses occur due to the planned treatment of mine contact water. When the freshwater dam is full and mine contact dams require emptying ahead of further storm events, excess water will be released to the Mitchell River via the winter-fill pipeline. This can cause releases to the Mitchell River to be higher than offset requirements. The offset delivery regime is proposed to be refined in close collaboration with Southern Rural Water as the project advances to detailed design.</p> <p>Numerical modelling predicted a maximum reduction in annual flow volumes of 0.02% in the Mitchell River and an increase in annual flow volumes of 1% in the Perry River. The effect on the receiving waterways was assessed as being negligible and was not predicted to impact Mitchell River licenced users or Perry River beneficial uses.</p> <p>The process of retaining water onsite may reduce the periodic flows to the pools of water and vegetation that remain within ephemeral drainage gullies and creeks to the north and northeast of the project area. In particular, this reduced flow may impact on the health of aquatic and terrestrial ecosystems, aesthetic enjoyment, agriculture and irrigation water supply (from farm dams), and cultural-spiritual values of these surface water features. The construction phase of the project is unlikely to significantly reduce flows to drainage gullies compared to operations.</p> <p>To address this, Kalbar will undertake periodic monitoring of surface water levels, quality and ecosystem health features downstream of the project area to assess water level and quality to ensure that ecosystem health is not adversely affected. Adaptive management will be implemented and, based on monitoring results, the offset of water that would typically be returned via the water pipeline to the Mitchell River, may alternatively be directed down drainage gullies in a controlled manner.</p> <p>It is important to remember that these gullies are already highly disturbed and are subject to very little flow. Only one flow event was reported during the two-year-long baseline monitoring undertaken on site. While flow events are important to ecosystem health, the gully ecosystems have been established based on extended periods without active flow occurring. As such, percent changes can be misleading if they are not considered in the context of absolute changes to flow.</p>	<p>SLR Advises Council insists on the strict regulation of the EPRs associated with water offsets to ensure that potential adverse impacts to downstream receiving waters are prevented. Council should seek to be involved with the water offset EPR process with Southern Rural Water to ensure Council are satisfied with the proposed strategy.</p> <p>Refer to the Ecology Technical Assessment Review for any additional gaps / comments including potential impacts to the Australian Grayling and other flora / fauna.</p>
presence of radionuclides?	<p>EES (Summary report, Executive Summary, 10.6.6, 10.6.7)</p>	<p>As described above, Section 9 of the EES attempts to characterise the water quality of mine runoff. This characterisation includes sediment, nutrients and heavy metals but makes no mention of salinity, pH or radionuclides.</p>	<p>As described above, SLR believes that an assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that</p>

	App 6 (Executive Summary)		mine water discharges could occur through the dam spillways during the Project life. Refer to Groundwater Technical Assessment Review for any additional gaps / comments.
Have the risks of impact to surface water been reasonably determined and appropriate?	EES (Summary report, Executive Summary, 8.4, 9.3, 10.7.3, 13.1.3) Attachment F Attachment I App 6 (Executive Summary, 7.1, 7.4, 8.4, 9, 10.5, App A (4), App C (7), App E, App F)	Generally surface water related risks have been reasonably determined and appropriate. SLR believes some risk assessments require further justification as detailed in the sections above (e.g. potential impacts associated with contaminants and the frequency of dam spillway discharge events into the Mitchell River). The water risk management plan and its associated procedures does not include contingencies for failure of the water treatment system. This is recommended as one of the key risks to the downstream waterways is dam failure. The potential environmental consequences associated with failure of the temporary TSF would be extreme, with destruction of downstream aquatic habitats and scour and/or sedimentation of the fine tailings in the receiving creeks and rivers, largely in the Perry River catchment. A failure such as this is a rare event in the mining sector. The Perry River catchment and Gippsland Lakes Ramsar site are highly unlikely to be impacted (as the event is not expected to occur) given the standards required for design and operation of such a facility, and short period (five years) proposed for operation. The temporary TSF will be designed, constructed and operated in accordance with the relevant ANCOLD Guidelines on the Consequence Categories for Dams. A Moderate residual risk is the lowest possible ranking for a scenario with an inherent Significant consequence rating. No land within the project area has been classified as subject to inundation in the event of a 1 in 100-year flood. A maximum increase in flood level of up to 300 mm was predicted in the project area in response to altered topography and the installation of water management infrastructure. Downstream of the project area, the observed changes were typically not measurable, except for year 15 where water level increases of less than 100 mm and velocity increases up to 0.1 m/s were predicted. The predicted changes in velocity, water level and flow are not expected to alter flood impacts downstream when compared to the baseline conditions. The absence of design for the proposed water management structures, including the temporary TSF, means it is not possible to assess constructability, operational constraints and the associated risks.	Refinement of all risks associated with gaps / comments in this Surface Water Technical Assessment Review are required. Refinement of all risk assessments are also required for any future changes to the Project that impact on surface water. The risk management plan should be revised to include contingencies for failure of the water treatment system.
Are the proposed management measures and EPRs reasonable and appropriate?	EES (Summary report, Executive Summary, 9.3, 10.7.3, 12.9, 13.1.3) App 6 (Executive Summary, 3.6, 4, 8, 9, App A, App E)	Key indicators of water quality, quantity, offsetting and other surface water values against the EES scoping requirements draft evaluation criteria are generally considered to be adequate. The EPRs associated with the water offsets from the freshwater dam still need to be determined with Southern Rural Water. Further EPR clarification on the channel stability of downstream drainage lines and watercourses is also recommended. Project impacts on surface water values will be monitored against the predicted impacts through a detailed surface water monitoring program. Monitoring will focus on recording any changes in baseline flows and water quality. The development of specific monitoring requirements, mine closure targets and criteria and ongoing monitoring and review of mine closure activities are generally considered adequate with regards to surface water. However, it is not clear how continuous monitoring will be undertaken for metals, this is considered particularly important given identified elevated aluminium and copper levels in treated water.	As detailed above, SLR advises Council insists on the strict regulation of the EPRs associated with water offsets to ensure that potential adverse impacts to downstream receiving waters are prevented. Council should seek to be involved with the water offset EPR process with Southern Rural Water to ensure Council are satisfied with the proposed strategy. SLR advises that Council seek further EPR clarification on the channel stability of downstream drainage lines and watercourses. What specific methodology is proposed to ensure that the EPRs regarding channel stability are achieved. Additional details of how continuous monitoring will be undertaken for metals is required. Refer to the recommendations in the sections above for additional recommendations regarding the project EPRs.
Key Concerns for Council			
What are the key risk issues?		It is not clear how the Mitchell River 3% AEP design criteria was determined and whether this an acceptable level of risk. It is noted that the water balance predicted 3 overflow events during a 117-simulation period which corresponds to a 2.5% AEP event and a 37.5% probability that a mine water discharge event will occur during the 15-year project life.	Provide further clarification / justification for the 3% AEP Mitchell River spillway discharge design criteria and why this is different to the Perry River design criteria of 1% AEP which is a more widely adopted design criteria for mine water runoff.
		The EES attempts to characterise the water quality of mine runoff. This characterisation includes sediment, nutrients and heavy metals but makes no mention of salinity, pH or radionuclides.	SLR believes that an assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life.
		Treatment with Dissolved Air Flotation (DAF) has not however been shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment.	It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. As a dilution strategy is proposed to overcome the DAF system shortcomings a robust assessment of increased contaminant loads to the downstream receiving waters is required.

		<p>The EES surface water impact assessments rely heavily on the site water balance investigation. Although comprehensive, the GoldSim model is based on a number of assumptions and limitations which are detailed within the water balance report. These assumptions and limitations bring with them uncertainty and risk which SLR believes has not been adequately assessed within the EES and water balance. This concern was also raised during the Peer Review undertaken by AECOM in August 2020. SLR shares the concern regarding the potential for the project to be shut down safely if the economics or water resources are reduced or not able to be met in any one year.</p> <p>The potential environmental consequences associated with failure of the temporary TSF would be extreme, with destruction of downstream aquatic habitats and scour and/or sedimentation of the fine tailings in the receiving creeks and rivers, largely in the Perry River catchment. A failure such as this is a rare event in the mining sector. The Perry River catchment and Gippsland Lakes Ramsar site are highly unlikely to be impacted (as the event is not expected to occur) given the standards required for design and operation of such a facility, and short period (five years) proposed for operation. The temporary TSF will be designed, constructed and operated in accordance with the relevant ANCOLD Guidelines on the Consequence Categories for Dams. A Moderate residual risk is the lowest possible ranking for a scenario with an inherent Significant consequence rating.</p> <p>Due to the lack of surface water flow, the baseline monitoring program did not achieve a sufficient quantity of results to effectively characterise the water quality in the local environment. These data gaps are considered to be unavoidable and acknowledged within the EES with a recommendation to continue the event monitoring of the drainage lines to define a robust baseline, as opposed to comparison with the ANZECC aquatic ecosystem trigger values.</p> <p>Table 8-6 of appendix 6 states that "If required, flocculant treatment (i.e., alum, gypsum or hydrated lime) will be used to drop suspended sediment levels in the stormwater". However, testing of these flocculants described in Section 6.6 of the 'Surface Water Assessment Site Study' identified that alum and hydrated lime were not recommended due to the site-specific characteristics. Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment systems. MSDS information in appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota.</p>	<p>Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. What assurance is there that the dam operating rules detailed in the site water will be adhered to during operation?</p> <p>The risk management plan should be revised to include contingencies for failure of the water treatment system.</p> <p>The baseline monitoring program should be continued as stated in the EES. An assessment of risk associated with the existing uncertainty is also recommend. It is noted that the ANZECC guidelines typically require 2 years of monthly sampling to effectively characterise the water quality.</p> <p>Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime</p> <p>Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.</p>
<p>Is there consistency between technical reports</p>		<p>The surface water technical reports are generally consistent with only a few discrepancies noted during the technical review. Many sections of the EES state that sediment dams will be designed and constructed to contain sediment laden runoff during a 5 day 90th percentile design storm in accordance with the IECA guidelines. However, a dot point in Section 9.3 states that a sub-plan will be developed including measures such as 'Retaining water on site from the contributing catchment to approximately the 10% AEP event'. Inconsistency exists in the Mitchell River mine water discharge design criteria. Throughout the EES and Appendices this is listed as the 3%, 3.3% and 3.5% AEP.</p> <p>There is also an inconsistency with the predicted Mitchell River discharge frequency. The water balance states 3 overflows in 117 years which equates to a 2.5% AEP event. However, the Appendix 6 EES also quotes a discharge frequency of 1 in 50 years (as opposed to 1 in 40 years which roughly equates to a 2.5% AEP).</p>	<p>Clarification is required for the sediment dam design criteria (5 day 90th percentile or 10% AEP). It is noted that a 5 day 90th percentile design storm is in accordance with the IECA guidelines for sediment laden runoff.</p> <p>Clarification is required for the Mitchell River mine water discharge design criteria and the predicted frequency of overflows. The EES needs to then be updated to ensure consistency.</p>

3.5 Groundwater

Relevant documentation considered as part of this review includes:

- Water Act (1989);
- SEPP (Waters); and
- The Environmental Effects Statement Report and the following attachments/appendices:
 - EES Chapter 3, 8, 9, 10
 - Attachment F Risk report
 - Attachment I Water Peer review report and proponent response
 - Appendix A005- Detailed Ecological Assessment
 - Appendix A006 Groundwater and Surface Water Impact Assessment (Coffey)
 - Appendix A006 AppA Conceptual Surface Water Management strategy and Water Balance
 - Appendix A006 AppB Groundwater Modelling Report
 - Appendix A006 AppG-L Groundwater and Surface Water Impact Assessment
 - Appendix A007 Water Supply Options Study: Technical Groundwater Assessment

Table 5 Groundwater Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Overall Has the EES characterised the distribution and quality of groundwater, and potential impacts and risks of the proposal, using current accepted investigation practice, and relevant guidelines?	EES and Appendix A006 Groundwater and Surface Water Impact Assessment	The EES has: <ul style="list-style-type: none"> characterised the distribution and quality of groundwater identified potential impacts and risks of the proposal used current accepted investigation practice, and relevant guidelines 	Gaps and uncertainties described below primarily relate to the potential impact on beneficial uses due to groundwater extraction at the proposed bore field, and the impact of the disposal of tailings to mine voids.
Are all relevant aquifers that could be impacted by the project identified?	Appendix A006 Groundwater and Surface Water Impact Assessment Appendix A006 Appendix B Groundwater Modelling Report Appendix A007 Water Supply Options Study: Technical Groundwater Assessment	Aquifers identified that could be impacted: <ul style="list-style-type: none"> Alluvium (including Mitchell River alluvium) Haunted Hills Formation Coongulmerang Fm (contains mineral sands) Boisdale Fm Balook Fm / Latrobe Valley Group Seaspray Group Latrobe Group All relevant aquifers are discussed, and aquifer properties described. In Appendix A006 Appendix B groundwater modelling report: <ul style="list-style-type: none"> Maps showing the measured groundwater levels contours in different aquifers (Figure 2.12 to 2.17). Previous hydrogeological studies in the region are documented. Groundwater stresses and extractions and recharge (section 2.9). Regional decline in groundwater pressure in Latrobe Group aquifer (Section 2.7.5). 	There are inconsistencies in the documented Conceptual Model (report A006): <ul style="list-style-type: none"> Boisdale Formation sands and gravels are reportedly under the deposit (p.40) and table 3-4, but these are not shown on the cross-section through the site (figure 3-3), nor discussed (p.46). EES Table 8.2 does not mention Balook Fm / Latrobe Valley Group. This is inconsistent with EES 8.3.3.1 (Figure 8.3) and the groundwater modelling which assumes Balook Fm / Latrobe Valley Group occur beneath the site (bore MW09d) and receive seepage (if seepage occurs) from tailings in mine voids (Figure 8.17). If not present, the seepage from mine voids would only be to the Coongulmerang Fm. There are gaps in presenting the conceptualisation that would be improved by preparing the following: <ul style="list-style-type: none"> Include data from groundwater monitoring bores on the site on a north-south hydrogeological cross section that extends from south of the proposed bore field, north through the site. Prepare a west-east hydrogeological cross section extending through the whole site to beneath the Woodglen ASR. A west-east hydrogeological cross section through the whole site, showing the variation in lithology in the Coongulmerang Fm (this is modelled with uniform properties, see Table 5-1). There are uncertainties in the inferred groundwater flow direction in the water table aquifer: <ul style="list-style-type: none"> It is stated that groundwater beneath the site does not move west towards the Perry River catchment (report A006, p.144). There is insufficient groundwater bore data at the site and vicinity (e.g. see fig 4-14) to support that assertion. An alternative interpretation on the data presented, is groundwater beneath the east half of site flows toward Mitchell River, and beneath the west half of site toward Perry River. This possibility does not appear to have been considered in the model conceptualisation and risk assessment. There appear to be no figures that show the modelled groundwater elevation and groundwater flow direction pre-mining, and after 15 years operation, at the site and vicinity. The figures in Appendix F of the model report do not have sufficient detail in the site vicinity.
Groundwater investigations to define aquifer parameters for modelling.	Appendix A007 Water Supply Options Study: Technical Groundwater Assessment	Investigations include: <ul style="list-style-type: none"> Bore installation and slug testing bores in Coongulmerang Fm on the site Aquifer testing for hydraulic properties of the source aquifer proposed for bore field supply. Aquifer parameters from previous (regional) studies are documented and listed in Table 2.3. Additional drilling undertaken to assess the extent of the Seaspray Group; an aquitard inferred to limit the impact of bore field extraction on the shallow aquifer(s). 	Aquifer test and analysis of test (report A007): <ul style="list-style-type: none"> Pumped at a rate significantly lower than potential rate from at bore field. Maximum drawdown approximately 2 m in Latrobe Group in aquifer test. Insufficient pumping rate and time to enable assessment the properties of the overlying aquitard (i.e. vertical hydraulic conductivity). There is no discussion on vertical hydraulic conductivity of aquitard. Section 4.2 the potential drawdown (> 50m) could be an underestimate, as this assumes the Latrobe Group is infinite extent. [The groundwater model report indicates significantly less drawdown (up to 14m)]. There is no mention of groundwater temperature and whether this changed over the test [geothermal properties is a relevant beneficial use].
Has report defined existing groundwater users in the project area?	Appendix A006 Groundwater and Surface Water Impact Assessment	Groundwater receptors are discussed in Section 3. Nearby groundwater users are identified in each aquifer. The most common nearby use is domestic and stock. There is also significant extraction for irrigation on the Mitchell River flood plain. Table 3-5 lists 67 of 270 bores with use unknown. GDEs (or potential GDEs) including Mitchell River, Perry River, Providence Ponds, Gippsland Lakes, vegetation, are identified.	There are uncertainties identifying groundwater users: <ul style="list-style-type: none"> Registered groundwater bores were downloaded from BoM Groundwater Explorer in 2018 (p.54). The Victorian Water Management Information System is the primary data source and should be checked for current registered bores. The groundwater model report states the locations of off-site groundwater extraction used in the groundwater model are from a report dated 2010 (model report Table 2.1).

			<ul style="list-style-type: none"> The location of as of right uses (stock and domestic bores, springs) is subject to error, and it is possible not all are registered. The assessment of groundwater users should be updated, and a bore census undertaken in the inferred impact area.
Have the project components been designed and sited to minimise potential impacts to groundwater?	EES summary report	The siting reflects the constraints of the extent of the deposit. The water storage(s) and tailings storage facility are proposed to be lined. The bore field location is proposed as far south as practicable.	Further testing and assessment will be needed to optimise bore locations and yields, and to minimise drawdown impacts. Perry Gully (discharges to Mitchell River) is to be filled with coarse sand tailings. Consideration of an alternative approach does not appear to be discussed in EES Chapter 4.
Groundwater Dependant Ecosystems (GDE)	Appendix A005- Detailed Ecological Assessment: Section 4.5, 4.8.4, and Appendix 8 (Austral, 2020) Appendix A006 Groundwater and Surface Water Impact Assessment	Potential GDE are identified using the national GDE atlas. Modelled depth to water table is used to eliminate previously mapped potential GDE from further assessment. The assessed risk to GDE is based on the modelled change in depth to water table, with impact area considered the extent of 0.1m water table rise at end of mine year 15. GDE assessment excludes within the mine site footprint. No wetlands with GDE potential were identified in the study area. There is a major difference (20 m to >50 m) between groundwater model depth to water table (pre-mine) and previously reported depth to water table (which was the basis for the GDE atlas). It is concluded that no river segments, wetlands or patches of vegetation could change from non-GDE to GDE due to water table rise.	GDE Identification <ul style="list-style-type: none"> The approach relies on published maps and modelling to identify GDE. The status of Perry River is confusing - in the EES it is listed as a significant GDE (p 8-78) but based on the GDE assessment Perry River "... not mapped as GDEs..." (p 9-42). Impact <ul style="list-style-type: none"> Modelled water table level and water table change are used to assess potential impacted GDE (see comments below on the model). Uses an arbitrary sliding scale of GDE "sensitivity" based on the type of GDE. This approach does not appear to consider the change in the "quality" of groundwater discharging to the GDE. Assessment focusses on the quality of tailings seepage water and does not appear to consider the water quality impact of displacement and increased discharge of "natural" groundwater (groundwater quality is discussed below). Unclear the impact of increased groundwater discharge throughout the year, and also possible change of drainage lines from intermittent to perennial flow. Mitchell River <ul style="list-style-type: none"> There is uncertainty in the current groundwater contribution to Mitchell River. EES 8.3.3.1 reports groundwater to Mitchell River of 14.17 GL/year (groundwater model) and analysis using river gauge indicates 29 GL/year. Mitchell River is modelled with a fixed water level. This means the change in groundwater level adjacent the river might be underestimated. There is a modelled increase in groundwater flow to the river of 0.72 ML/day throughout the year due to mounding (report A006, p.232). The river level is not modelled to change seasonally, and so it is likely that in dry conditions, the additional groundwater discharge to the river will be higher than this amount.
Beneficial Uses - Water Quality Impact	EES Section 9.2.1 Appendix D (EGI, 2020) in Appendix A002 Geochemistry and Mineralogy Summary Report. Appendix A006 Groundwater and Surface Water Impact Assessment Appendix A007 Water Supply Options Study: Technical Groundwater Assessment	Assesses potential impact on water quality from leaching from tailings in the mine void and Perry Gully. Leachability tests to assess potential composition of seepage water use: <ul style="list-style-type: none"> deionised water ore mixed with water from Mitchell River. Leachability tests show Al, Cu above aquatic ecosystems criteria, considered similar concentrations to groundwater in Coongulmerang Fm, and so would not impact GDE.	Existing Conditions <ul style="list-style-type: none"> Appendix A006: groundwater can have high phosphorous and elevated salinity (e.g. p.60 and Table 4-17 MW04 adjacent Mitchell River >2000 mg/L TDS, phosphorous 0.48 to 6.24 mg/L). Table 4-18 - many Coongulmerang Fm groundwater samples exceed beneficial use criteria. Latrobe Group groundwater – bore field LA-01-PB Total-P 0.38 mg/L (A0007; Table 3.5). Appendix A006 section 10.2 refers to fresh water (surface water and groundwater). Groundwater cannot be considered "fresh water" similar to Mitchell River water or rainwater (as Latrobe Group groundwater is >500 mg/L TDS). Potential Impact <ul style="list-style-type: none"> The displacement and increased discharge of groundwater that currently has elevated concentrations that exceed criteria do not appear to be discussed. The risk of additional impact if mainly Latrobe Group groundwater is used as process water (different quality to Mitchell River) does not appear to have been considered. Appendix A006 p.143 Latrobe Valley Group / Balook Fm are recharged from seepage from the Coongulmerang Fm (and shown fig 6-1). The impact on water quality and beneficial uses of Latrobe Valley Group / Balook Fm from seepage from tailings does not appear to have been considered. Leachability Testing <ul style="list-style-type: none"> Appendix A006 Table 7-7 shows the 1:5 leach Mitchell River water many analytes are at least one order of magnitude higher than the test with deionised water. Total phosphorous 1.07 mg/L is not highlighted in the table to show it exceeds ecosystem criteria. There appears to have been no testing using Latrobe Group groundwater.

<p>Water balance Does the water balance describe the project demand for water (quantity and quality), source, volumes to be used?</p>	<p>Appendix A006 App A Conceptual Surface Water Management Strategy and Water Balance</p>	<p>Up to 1.5 GL/yr. groundwater use in construction and initial start-up (p.16). Then, groundwater would <u>supplement</u> surface water for process water. Groundwater quality is assumed suitable for processing. Model says 16 ML/yr. groundwater in dry (10%) year (14-32 ML in Coffey report table 7-1), the remainder being surface water from Mitchell River.</p>	<p>The volume of groundwater to be used in operation is not known, and subject to how much available is from the Mitchell River. The assumed 16 ML/yr. in water balance appears low given the volume needed for processing and the rules / restrictions for the Mitchell River and needs of downstream irrigators. Extraction of groundwater up 3 GL/yr. is modelled for the impact assessment.</p>
<p>Groundwater Modelling Have appropriate modelling methods been used to assess potential effects of the project on existing groundwater users, groundwater dependent ecosystems and surface water interaction, including groundwater level drawdown and recovery, to address ANZECC and SEPP (Water) requirements. Has the modelling considered the potential for impact on beneficial uses due to seepage from backfilled open pits and tailings dam(s), storage and use of fuels and chemicals, potential acid sulfate soil and rock, and the presence of radionuclides?</p>	<p>Appendix A006 Appendix B Groundwater Modelling Report</p>	<p>The model has been constructed using the available hydrogeological data from state databases and Kalbar's datasets. The model is calibrated to groundwater level with calibration statistics, results and sensitivity discussed in Section 5. Predictive and recovery model set up and assumptions are stated in Section 7.1 to 7.5. The prediction results are presented in Section 7.6 to 7.7. The post-mining recovery set up and results are discussed in Section 7.9. The impacts on groundwater and surface water interaction, groundwater levels drawdowns and mounding and potential impact on groundwater users are discussed in Section 7.12. Groundwater modelling showed groundwater mound development beneath the site due to tailing seepage. Groundwater drawdown is predicted in the Latrobe Group to reach the coast. Drawdown predicted in the overlying Seaspray Group extends approximately 5 km to the west of the bore field. Residual drawdown is predicted to remain in the Latrobe Group after cessation of mining, with a large area predicted to 1 m or more drawdown. Uncertainty associated with the assumed aquifer properties of the Latrobe Group assessed as outline in Table 8.1. Constant rainfall and river stage height for calibration and prediction mean there is no climate seasonality. Results of climate change assessment are in Section 8.5. A revised conceptualisation for scenario of Seaspray Group or the younger Gippsland Limestone extend further north towards the mine site, indicated by 2019 drilling, is also simulated and discussed.</p>	<p>The model assists with evaluation of mounding due to seepage from tailings disposal, and drawdown from bore field. The modelled groundwater response informs assessment of risk for the storage and use of fuels and chemicals, potential acid sulfate soil and rock, and the presence of radionuclides. The modelling approach is generally appropriate, however there are gaps and issues identified below which, if addressed, would improve the confidence in the model predictions. Software and structure:</p> <ul style="list-style-type: none"> Using MODFLOW-USG allows better representation of discontinuous geological units. Include a cross-section showing the model layers. Table 2.1 notes pumping well locations in the modelled area are from a 2010 report – the suitability of that data should be discussed. Include discussion of the effect of Latrobe Group groundwater temperature on modelled Latrobe Group groundwater elevation. <p>Boundary Conditions:</p> <ul style="list-style-type: none"> The implication of a constant head boundary at the northern edge of the model (near the site) is not discussed in model report section 9, nor whether a different boundary would impact the model. Constant head "... represent groundwater inflow from highlands ..." (section 4.8) requires justification - is this from Palaeozoic bedrock? <p>Table 5.2 shows constant head plus leakage from rivers is major source of water to the model. The modelled drawdown from the bore field north of the site might be underestimated. Figure 5.4 suggests inflow from rivers and constant head increases over the modelled period. The impact on river baseflow due to drawdown from the bore field pumping should be discussed.</p> <ul style="list-style-type: none"> Using DRN in Layers 10 and 11 and constant head at 0 mAHD for layers 1 to 9 at the southern boundary causes recharge of groundwater from the ocean. <p>Calibration</p> <ul style="list-style-type: none"> There is no groundwater level data available to assist model calibration west and north of the site. The implications for model uncertainty, and the model sensitivity study should be discussed. Discuss general over-prediction of groundwater levels (Figure 5.3). <p>Prediction</p> <ul style="list-style-type: none"> An assumed seepage rate (53 L/s) is used for the tailings based on a "preliminary water balance" (p.128). The properties of the model layer do not change to reflect the properties of tailings. Seepage from tailings is assumed however it is uncertain if seepage will occur (section 7.12). Suggest do a predictive run to assess bore field drawdown, with no seepage from tailings. The predicted drawdown in Latrobe Group reaches the layer boundary – discuss the implications for model prediction.
<p>Key Concerns for Council</p>			
<p>What are the key risk issues? Have the risks of impact to groundwater been reasonably determined and appropriate?</p>	<p>Risk Report Attachment F Appendix A006 Groundwater and Surface Water Impact Assessment Table 8-8</p>	<p>Key risks during construction, operation and rehabilitation relate groundwater level and quality for:</p> <ul style="list-style-type: none"> Groundwater users Mitchell River Other existing or potential GDE <p>The EES identifies impacts on groundwater for:</p> <ul style="list-style-type: none"> Availability Quality <p>Due to:</p> <ul style="list-style-type: none"> seepage from <ul style="list-style-type: none"> Freshwater storages Temporary TSF or Mine Void (tailings) 	<p>The Groundwater risk assessment (Appendix A006 Table 8-8) has more detail and identified risks than presented in the Attachment F risk report. The following <u>risks</u> do not appear to have been considered in either Appendix A006 Table 8-8, or Attachment F:</p> <ul style="list-style-type: none"> Drawdown at the bore field is significantly greater than modelled with implications for groundwater availability, and quality. The bore field is unable to provide the required supply volume and/or a 3 GL/year groundwater licence for Latrobe Group cannot be sourced through trade. Groundwater extraction from shallow aquifer(s) is required to augment supply. Seepage from TSF and/or mine void tailings impacts the beneficial uses of Balook Formation / Latrobe Valley Group groundwater. Impact of groundwater extraction on the geothermal properties beneficial use, at depths shallower than 2500 m Beneficial Uses (p.63 refers to 2500 m to 4000m depth).

		<ul style="list-style-type: none"> • Groundwater Mounding • Groundwater Abstraction <p>EES Section 9.1 Overall impact of groundwater mounding on ecological communities including GDEs is negligible or low. "Very low likelihood that any GDEs will be impacted by the project"</p> <p>Section 7.8 discusses the predicted Impact at key receptors. Impacts on water balances at key receptors were investigated, with the largest water balance change reported to be no larger than 1.3 %, corresponding to a small increase in inflow and outflow reporting to the Mitchell River alluvial and associated river. Insignificant effects are reported for the Gippsland Lakes system, Providence Ponds, the Perry River, the Woodglen ASR site and the Boisdale groundwater resource.</p>	<ul style="list-style-type: none"> • Saline intrusion to the Latrobe Group aquifer due to decline in groundwater pressure at coast. The risk assessment would be improved if the following uncertainties are considered more thoroughly: <p>Bore field</p> <ul style="list-style-type: none"> • Identify all potentially impacted groundwater users (including spring-fed dams, domestic and stock groundwater users). • The long-term water supply from the Latrobe Group is based on a short term, low yield, aquifer test. <p>Filled voids and mounding</p> <ul style="list-style-type: none"> • Layering in the Coongulmerang Fm impedes the downward drainage from filled voids • The use of groundwater for processing and implications for mine void seepage water chemistry • Increased discharged to GDE and Mitchell River of groundwater with natural concentrations above criteria • Shallow water table activates discharge to drainage lines on-site, land salinisation, impact on site structures and adjoining pit(s) • The hydraulic connection between sediments under site, the Mitchell River flats and the Latrobe Valley Group at Woodglen is greater than indicated by the groundwater model. • Implication for bore field drawdown if tailings seepage is less than modelled.
<p>Are the proposed management measures and EPRs reasonable and appropriate?</p>	<p>Risk Report Attachment F</p> <p>Appendix A006 Groundwater and Surface Water Impact Assessment Table 8-8</p> <p>Appendix A006 - Appendix B</p>	<p>For the reported risks the management measures and EPRs appear reasonable and appropriate Groundwater model report section 7.12.2 discusses "optional groundwater control measures", shown in Figure 7.48.</p> <p>It is stated these measures will be implemented in addition to dewatering of fine tailings. Appendix A0006 section 8.3.2 notes sub-surface drainage channels will maximise recovery of water from coarse sand tailings.</p> <p>A groundwater monitoring program is to be developed.</p>	<p>The risks and response in the Appendix A0006 Table 8-8 appear more comprehensive than those listed in the EES risk report (Attachment F).</p> <p>The additional risks and items requiring more thorough consideration, identified above, should be addressed in the EES risk report, and EPRs developed.</p> <p>Groundwater Monitoring Program (proposed management measure 013).</p> <p>The groundwater bore locations and monitoring program should:</p> <ul style="list-style-type: none"> • reflect the location of potentially impacted GDE and groundwater users • address gaps in the understanding of groundwater flow at the site • address uncertainties in connections and impacts on groundwater and surface water north of the site • include monitoring of impact on groundwater level and quality nearby groundwater users of shallow and deep groundwater <p>The program should encompass operation and post-closure and include monitoring for shallow perching (waterlogging / land salinisation) and groundwater discharge to ground surface.</p>

3.6 Noise and vibration

Relevant documentation considered as part of this review includes:

- Environmental Protection Act, 1970.
- EPA Publication 1411 Noise from Industry in Regional Victoria (NIRV).
- EPA Publication 1254 Noise Control Guidelines (EPA Publication 1254).
- German Standard DIN 4150-3: 2016.

The Environmental Effects Statement Report and the following attachments/appendices:

- EPA Chapter 9 – Environmental and socioeconomic impact assessment.
- EPA Chapter 11 – Closure.
- EPA Chapter 12 – Environmental management framework.
- Appendix 010 – Noise and vibration assessment.

Table 6 Noise and Vibration Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES identified all potential sensitive receptors (dwellings, community centres, schools, recreational facilities, agricultural and tourism businesses) that could be affected by the project.	Appendix 010 : Section 3.7	There appears to be some commercial accommodation places not included in the assessment, however, as there are assessment receivers in closer proximity, this omission does not impede the assessment.	<ul style="list-style-type: none"> Receptors extend a reasonable distance from the Project. The receptors closer to the Project will drive the need for any mitigation, noting that compliance at these closer locations will result in compliance at further locations.
Has the EES identified flora and fauna that could be impacted by noise and vibration from the project?	EES Chapter 9,10	<p>Section 9.6 outlines predicted construction noise levels are at or below the NIRV-recommended noise levels for humans during daytime, evening and night-time periods. In the absence of specific guidance for fauna, overall impact due to project construction is indicated as low based on the preface that existing noise from farm machinery and traffic means that native fauna species are likely to habituate to noise associated with the project and will continue to use the areas adjoining the project footprint for foraging, roosting and/or breeding.</p> <p>Impacts such as species displacement due to noise during construction and operations are considered in a risk assessment for construction and operations in section 10.7.1. residual risk after additional mitigation measures is assigned as moderate.</p> <p>Section 10.7.1.2 further discusses the likely impact of construction and operations and concludes impacts to fauna species are expected to be site specific or at a local scale rather than a regional, state or national level and as the project would occur over multiple years, mobile species would move away from noise sources to recolonise suitable habitat elsewhere. Alternatively, species that cannot easily disperse (i.e. giant burrowing frog) could be impacted by noise to varying degrees dependent upon proximity to noise sources and considering its nature and duration. The EES finally concludes that "none of the EPBC Act listed fauna species are likely to permanently or frequently use habitat resources within the study area and thus no nationally significant fauna species will be significantly impacted by project-generated noise"</p>	Although considered unlikely to be present, the giant burrowing frog was identified as a species that could be impacted by construction or operational noise from the project. Although mitigation measure TE06 considers the location of access tracks expected to experience heavy traffic adjacent potential habitat for the frog species, additional mitigation measures should populations of Giant Burrowing Frog be identified within or adjacent the project area should be developed and included in the EES and incorporated into subsequent Management Plan documentation.
Has background noise/vibration been characterised in accordance with Victoria EPA and SEPP/NIRV requirements?	Appendix 010	There is no statement that the noise or vibration monitoring equipment was covered by current calibration certificates.	Whilst calibration certificated are not required to be included in the report, a statement stating the equipment is covered by a current calibration from a NATA calibrated laboratory should be included.
	Appendix 010 Section 5	The background noise levels are not presented or analysed as required by the NIRV.	NIRV requires 'The background level should be assessed following the procedures of SEPP N-1, Schedule C, C3' – which the report does not present, instead the report provides the range in the background noise levels. It is noted that the background noise does <u>not</u> feed into the determination of the NIRV criterion. The manner in which the background levels are reported, may affect the perception of the background noise environment.
	Appendix 010 Figure 8	There appears to be an inconsistency in the vibration data	The 'average level' appears to be higher than the highest 10th percentile of the dataset - which is an unusual situation. Some clarification on the prevailing activities that resulted in this condition should be provided.
	Appendix 010	Figures 32 and 33 should reference the monitoring location	The figures have a lack of clarity, of the location they represent.
	Appendix 010 Section 6.1	For vibration monitoring locations V3 and V4 there is no ASHRAE curves are provided (as was provided for locations V1 and V2)	Review of the data is not possible without this information.
Has appropriate modelling used appropriate inputs and been undertaken to assess the likely noise levels and vibration impacts at sensitive receptors in the vicinity of the project area and along the proposed transport route?	Appendix A010 - Appendix G4	The duration adjustments are not transparent. For some mobile plant specific duration adjustments are detailed, for others it is implied.	The duration adjustment is a correction applied to the predicted levels which acts to reduce it, to account for plant what does not operate continuously. All duration adjustments should be clearly documented.
	Appendix A010 – Section 8.4.3	The assessment assumed a 10 dBA transfer function between noise outdoor to within the house. Whilst frequently used, it is valid for traffic or construction occurring in close proximity of dwelling (where there is a considerable high-frequency component). The correction, however, may not be valid for noise which has travelled a large distance, and is predominantly low-frequency in nature (as indicated in Appendix I).	Justification to the use of the assumed 10dBA transfer is required, as it may under-estimate the internal noise levels (and therefore the impacts) at night.

	Appendix A010 – Section 2.3.2 and Section 9	No assessment of vibration to in-ground (or above ground) services has been undertaken, this may include high pressure gas pipes, telecoms, water, high voltage towers etc, if present in the area.	Impacts to services may be significant, dependent on where they are located.
Have the risks of impact to sensitive receptors been reasonably determined and considered appropriate?	Appendix A010 – Section 11.3	The German Standard DIN 4150-3 (1999) Structural vibration – Effects of vibration on structure, was updated in 2016 and this document should be used for assessment purposes.	Given the large offset distances to residences, this may not significantly change the assessment.
	Appendix A010 - Figure 12	A compass direction on Figure 12, would be beneficial in reviewing the orientating the cladding arrangement.	Incorrect alignment of the drawing, may result in cladding on the wrong facades of the building.
	Appendix A010 - Table 37	The colours on the legend of Table 37, appears to be incorrect.	This should be corrected as it could result in an inadvertent misinterpretation of the data.
	Appendix A010 - Section 10.2.3	The report recommends that acoustic (absorptive) screens around the 28 transformer and booster pumps sets, when located within 800 m of a dwelling. It is not clear: (a) Whether each individual set requires screening, or one screen is required around the entire group of transformer /pump sets. (b) What is the maximum separation from the screen to the transformer sets? (c) Does the screen need to extend beyond the transformer set? No acoustic specification for the screen is provided.	The requirement for the screens is ambiguous, and could easily be misinterpreted by a contractor, resulting little or no acoustic benefit.
	CH 11, EES Report	The EES scoping requires consideration of noise emissions, regarding the amenity and environmental quality, during closure.	There does not appear to be any reference to a Strategy or Actions in relation to noise emissions, in the Amenity and Environmental Quality section.
	Section 9.6.2.3 of Chapter 9	This section describes the resulting construction noise levels, including the proposed mitigation measures. It is noted that several properties are predicted to exceed the inaudibility criterion of EPA Publication 1252.	The reports states at mitigation will be considered, where practical, based on the results of the monitoring – though no details of the available measures to the project are provided. There should be some description of additional measures that can be adopted, given the predicted exceedances are up to 13 dBA (depending on the prevailing meteorological conditions).
Are the proposed management measures and EPRs reasonable and appropriate?	Chapter 12: Table 12.6	The indicators for noise seem to be reasonable	
	Chapter 12: table 12.8	The scope of the management plans seems to be reasonable, noting that the Construction Nose Management Plan (CNEMP) should also reference the EPA's guidelines on construction noise.	The EMP's needs to have clear process for identifying the need for mitigation prior to the commencement of the project. The prediction of exceedances should be the basis of triggering the need for mitigation. If mitigation is not considered to be warranted, strong justification should be supplied.
	Chapter 12: Table 12.9	The proposed noise and vibration monitoring seem to be reasonable, given the degree of expected impacts	Emissions should be analysed in terms of the common NiRV and SEPP N1 procedures.
Key Concerns for Council			
	Section 9.6.2.3 of Chapter 9	The predicted exceedances of the construction noise levels at numerous sensitive properties, are demonstrated to give rise to non-conformance of the criterion. Additionally, there is some questions whether the process has under-estimated the internal noise level.	The report's approach is to wait for the project to commence and subsequent monitoring results to trigger further mitigation. This is not a common approach, usually mitigation is triggered on the predicted levels. If the report's author, does not consider mitigation is warranted, for example, as impacts would be low (or significantly lower level but of the same character as future operational noise), it should clearly state that in the report.

3.7 Traffic and transport

Relevant documentation considered as part of this review includes:

- Road Management Act (2004);
- Transport Integration Act (2010);
- Bairnsdale Growth Strategy (2009);
- East Gippsland Planning Scheme (21.10 Transport & 21.12 Strategies for Sub-regions, Towns & Localities);
- East Gippsland Shire Council Public Road Register (2020);
- East Gippsland Shire Council Road Management Plan (2017);
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Summary Report
 - Chapter 3 – Project Description
 - Appendix A012 - Traffic and Transport Impact Assessment
 - Draft Planning Scheme Amendment
 - Map Book

The review summarised herein also considers the following guidelines:

- Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (2020);

Table 7 Traffic and Transport Technical Assessment

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES reasonably assessed potential transport routes associated with the project?		<p>The EES:</p> <ul style="list-style-type: none"> • Presents consideration of three potential product haulage route options as follows: <ul style="list-style-type: none"> • Pre-Avon River bridge to Maryvale and Port Anthony or Barry Beach Marine Terminal; • Post-Avon River Bridge - Option 1: to a new Fernbank East rail siding; and • Post-Avon River Bridge - Option 2: to Bairnsdale rail siding • All three options involve impacts to existing EGSC roads as a result of the planned realignment of Fernbank-Glenaladale Road, Chettles Road and Careys Road. • In addition, Option 3 would involve significant use of EGSC roads in proximity to Bairnsdale to transport product to Bairnsdale rail siding. • A qualitative assessment is presented for various variants to the road combinations assumed to form the three route (i.e. origin-destination) options. 	<ul style="list-style-type: none"> • Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options. It is therefore not possible to confirm for instance if the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service. • The proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is inconsistent with EGSC's planning intent for the road network. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road however EGSC's subsequent planning (i.e. Bairnsdale Southern Alternative Freight Route) establishes that the intent is for freight movement to be facilitated by Collins Street and Bosworth Road, not Racecourse Road. The assessment of potential transport routes should consider the accordance of the proposed routes with Council's planning intent for the area and should substantiate the basis for any departures from this. • It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available.
Is the traffic modelling informing the impact assessment consistent with contemporary best practice and importantly does it provide a reasonable representation of the total traffic demands likely to be associated with the project?		<p>The EES has:</p> <ul style="list-style-type: none"> • Derived traffic demands for both the construction and operations phases. • Assessed the operational performance of intersection only under the Post-Avon River Bridge - Option 1 routing scenario during the project's operations phase. 	<ul style="list-style-type: none"> • Limited information has been provided to validate the likely representativeness of the heavy vehicle demands forecast to be associated with the project's construction phase. It is unclear for instance if appropriate allowance has been made for the material requirements associated with the significant construction activity associated with the proposed road realignments as a breakdown of the heavy vehicle forecast by material type (i.e. beyond what would appear to be a nominal 20 vehicles) is not provided within the technical report. • The heavy vehicle forecasts for the projects operational phase only includes allowance for the haulage of product. No allowance appears to have been made for movements associated with ongoing operational inputs such as diesel and operational outputs such as site waste. Furthermore, no allowance has been made within the operational forecasts for the material that might be required to facilitate the road realignments that are proposed to occur in the years following commencement of the project. • Detailed intersection modelling has only been completed for the Pre-Avon River Bridge Option routing scenario. As a result, it is not possible to confirm that the proposed conversion of the Princes Highway / Racecourse Road intersection to a roundabout under the Post-Avon River bridge - Option 2 routing scenario would for example provide an appropriate level of service. • It is also noted that the intersection analysis (with the exception of that completed for the Princes Highway / Bairnsdale-Dargo Road intersection) has been undertaken utilising the Cap-X method that is a simplistic American methodology which is not widely utilised to inform development assessment in Australia. SLR acknowledges that we are not experts in the use of the Cap-X analysis methodology given that the tool is not commonly utilised in the Australian market. Nevertheless, SLR has some familiarity with the methodology through international work previously undertaken. Based on this previous exposure it would appear that ARUP have utilised an incorrect capacity value for the reported analysis. The assessment adopts a capacity value of 1,800 vehicles per lane which SLR understands is reflective of a two-phase signalised intersection arrangement and is not a representative value for the priority-controlled junctions assessed. Notwithstanding this apparent error SLR considers that it would be appropriate for any updates to the modelling to be completed utilising SIDRA Intersection instead of updating the previous Cap-X modelling as the Cap-X methodology is not widely utilised to inform development assessment in Australia and hence it is unclear if the results are representative for the Australian context.
Has the EES robustly considered the potential impact of the selected transport route(s) on the safety, operational performance, amenity and service life of the existing road network, including consideration of the vehicle types and quantum of traffic demands likely to be associated with the project?		<p>The EES has:</p> <ul style="list-style-type: none"> • Derived traffic demands for both the construction and operations phases but with limited details provided to enable validation that the forecasts are likely to be representative. • Assessed in detail intersection performance for the Pre-Avon River Bridge routing scenario for the operations phase. 	<p>Safety:</p> <ul style="list-style-type: none"> • Whilst Section 7.3.1 of the technical assessment describes common treatments provided at intersections to manage safety risks limited information is provided to validate the turn warrants assessment presented for the Pre-Avon River Bridge Option routing scenario. Furthermore, no turn warrants assessment has been completed for the two Post-Avon River bridge routing scenarios. The potential need for turn lanes at the Bosworth Road / Bairnsdale Rail Siding Access should for instance be confirmed. Alternatively, if such treatments are not required as the rail siding would continue operating within existing approved capacity limits and hence not trigger a mechanism for requiring upgrades (irrespective of the safety merits) than this "entitlement" should be established by reference to relevant existing statutory approvals.

			<ul style="list-style-type: none"> Insufficient geometric details have been provided to substantiate that the proposed road realignments would afford an appropriate level of safety. Whilst, basic cross-sectional details are provided for Fernbank-Glenaladale Road, Chettles Road and Careys Road the practicality of the proposed alignments should be confirmed through the provision of more advanced engineering drawings including for instance long-sections. The proposed re-alignment of Fernbank-Glenaladale Road results in the need to negotiate challenging topography which may in turn limit the ability to meet various design requirements such as sight distance. The ability to achieve suitable intersection spacing between the proposed Fernbank-Glenaladale Road / Private Haulage Road intersection and the proposed roundabout on Barinsdale-Dargo Road should be confirmed with consideration also given to the ability to safely introduce the proposed signalised intersection control in a rural road environment. <p>Operational Performance:</p> <ul style="list-style-type: none"> As described earlier intersection performance assessments have only been completed for the Pre-Avon River Bridge Option routing scenario. It would be appropriate for instance to confirm that the Princess Highway/Racecourse Road intersection would continue to operate acceptably following the proposed conversion to a roundabout. <p>Amenity:</p> <ul style="list-style-type: none"> No consideration has been given to amenity impacts potentially associated with product haulage. Whilst SLR has focused its assessment on the use and mitigation of impacts on the EGSC's controlled road network, it is noted that amenity impacts to residents of EGSC may arise as a result of the use of Declared Roads. For instance, the use of Lindenow-Glenaladale Road, a Declared Road, by project traffic would see a doubling of existing heavy vehicle demands on this road which may result in amenity impacts to residents of Lindenow. It is further noted that the proposed use of Racecourse Road departs from Council's planning intent for the area and would introduce potential amenity impacts to fronting residential properties however no consideration has been given to quantifying this impact in the submitted material. <p>Service Life</p> <ul style="list-style-type: none"> Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm indication of the specific mechanism to manage these impacts is however identified. The use of a "make-good" mechanism as contemplated is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration that occurs remote from the project.
<p>Are the proposed road network upgrades and is the proposed road maintenance regime appropriate to effectively address any significant safety, operational performance, amenity or service life impacts generated by the project related traffic demands?</p>		<p>The EES has:</p> <ul style="list-style-type: none"> Derived traffic demands for both the construction and operations phases. <p>Assessed the intersection performance Post-Avon River bridge - Option 1 for the operations phase.</p>	<p>See above response to items.</p>
<p>Are the proposed traffic management and safety principles to address changed traffic conditions during both construction and operation of the project, including where appropriate (road safety, temporary or permanent road diversions, different traffic routes, hours of use, vehicle operating speeds, types of vehicles and emergency services provisions) reasonable?</p>			<ul style="list-style-type: none"> See above responses. Whilst the conversion of two existing intersections on the Princess Highway to roundabout control has been proposed based on safety considerations it would appear that limited consideration has been given to the appropriateness of this outcome from a road hierarchy perspective. Whilst this outcome ultimately relates to a Designated Road outside EGSC's jurisdiction the outcome would result in lower order roads being afforded priority over traffic travelling along the Princess Highway.
<p>Has the potential need for the installation of any proposed mine infrastructure along or across public road reserves been considered?</p>		<p>The EES:</p> <ul style="list-style-type: none"> Identifies various road realignments and upgrades of existing intersection. 	<ul style="list-style-type: none"> Conceptual plans of the proposed roundabout treatments for the Princes Highway/ Racecourse Road and Princes Highway/ Lindenow-Glenaladale Road should be supplied to allow confirmation that the existing road reserve or additional lands facilitated by the draft Scheme Amendment would accommodate the proposed intersection forms.
<p>Key Concerns for Council</p>			

<p>What are the Key Risk issues</p>	<ul style="list-style-type: none"> • Insufficient geometric details have been provided to independently verify that the proposed road realignments that EGSC would assume control of will readily conform with relevant design requirements. This information is needed to fully address the ESS Scoping Requirements. Whilst basic cross-sectional details have been provided the practicality of the proposed alignments should be substantiated through the provision of more advanced engineering drawings including for instance long-sections. The proposed alignment of Fernbank Glenaladale Road would for instance result in the need to negotiate challenging topography which may in turn limit in practice the ability to meet various design requirements such as sight distance requirements. • The proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is inconsistent with EGSC's planning intent for the road network. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road however EGSC's subsequent planning (i.e. Bairnsdale Southern Alternative Freight Route) establishes that the intent is for freight movement to be facilitated by Collins Street/Bosworth Road, not Racecourse Road. • Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options considered. It is therefore not possible to confirm based on the material contained within the Technical Report if for instance the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service as stipulated by the EES Scoping Requirements. • It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available. Adoption of the Post-Avon River Bridge - Option 1 routing scenario would be preferable (from a traffic and transport perspective) given that it minimises impacts to the EGSC road network. • Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm indication of the specific mechanism to manage these impacts is however identified beyond broadly describing a "make-good" type mechanism. Such a mechanism is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration to haulage activity that occurs remote from the project. • Whilst SLR has focused the peer review on the use and mitigation of impacts on the EGSC's controlled road network, it is noted that amenity impacts to residents of EGSC may arise as a result of the use of Declared Roads. For instance, the use of Lindenow Glenaladale Road, a Declared Road, by project traffic would see a doubling of existing heavy vehicle demands on this road which may result in amenity impacts to residents of Lindenow. 	
<p>Are the proposed EPRs adequate</p>	<p>The proposed environmental performance requirements in general terms are considered adequate however there is broadly a lack of clarity in relation to the intervention mechanisms that might be adopted for instance with the contemplated Asset Protection Plan. Broadly the intervention framework that would be adopted under such plans should be identified through reference to relevant standards.</p>	
<p>Other</p>	<ul style="list-style-type: none"> • Whilst the conversion of two existing intersections on the Princess Highway to roundabout control has been proposed based on safety considerations limited consideration has been given to the appropriateness of this outcome from a road hierarchy perspective. Whilst this outcome ultimately relates to a Designated Road outside EGSC's jurisdiction the outcome would result in lower order roads being afforded priority over traffic travelling along the Princess Highway and is therefore subject in SLR's view to a degree of approval uncertainty. 	<ul style="list-style-type: none"> •

3.8 Ecology (Terrestrial and Aquatic Biodiversity)

Relevant documentation considered as part of this review includes:

- Environment Protection, and Biodiversity and Conservation Act 1999
- Planning and Environment Act 1987
- Flora and Fauna Guarantee Amendment Act 2019 (Commenced 1st June 2020);
- Flora and Fauna Guarantee Regulations 2020
- Flora and Fauna Guarantee Act 1988 (Repealed)
- Catchment and Land Protection Act 1994
- Wildlife Act 1975; and
- Wildlife Regulations 2013
- Conservation Forests and Lands Act 1987

Relevant biodiversity related documents reviewed included:

- Attachment A005- Detailed Ecological Investigations, dated 28th August 2020
- EES Chapter 9 Environmental and Socioeconomic Impact Assessment (Section 9.1 Terrestrial and Aquatic Biodiversity)

The review with also considers the following guidelines:

- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)

Table 8 Biodiversity Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES accurately characterised the distribution and quality of native vegetation, terrestrial and aquatic habitat and species in the project area using current accepted investigation practice, state and commonwealth guidelines?	Section 4 Appendix A005- Detailed Ecological Assessment	Describes the desktop, consultation and field survey methods employed to establish the potential extent and significance of flora and fauna values within the project area. Applicable targeted surveys for both flora and fauna were undertaken when target species were known to be most likely detectable. Both desktop and field survey techniques used to assess the project area for both terrestrial and aquatic biota are considered acceptable and meet state and commonwealth guidelines and accepted industry best practice.	
	Section 5,6 of Appendix A005	Presents a detailed overview of the ecological and biodiversity assets of the project area including detailed terrestrial and aquatic flora and fauna habitat descriptions, consideration of migratory species and Groundwater Dependant Ecosystems (GDEs). Connectivity of the various habitat types is also discussed in Section 5.1.5.3. The overview presented is considered to accurately characterised the distribution and quality of native vegetation, terrestrial and aquatic habitat and species in the project area.	
	EES Chapter 9.1	Presents a detailed overview of the presence and existing condition of flora and fauna and biodiversity values within the project area, including both terrestrial and aquatic species and habitats of commonwealth. State and regional scale importance. Matters of National Significance (MNES) relevant to the project developed from a combination of technical studies and associated desktop reviews, field surveys and Protected Matters Search Tool. These techniques are considered acceptable and meet state and commonwealth guidelines and accepted industry best practice.	
Have the existing threats from the project been appropriately characterised?	Section 7 of Appendix A005	Table 22 identifies project activities, key threatening processes and likely or potential impacts. Sections 7.3 and 7.4 detail the known and potential impacts on ecological values associated with each key threatening process. The detailed Ecological Assessment Report is considered to characterise existing threats and likely or potential impacts from the project with the exception of the following: Section 5.2.4.1- citing a detailed Significant Impact Assessment provided in Appendix 5 the reports asserts that the proposed development will not lead to a significant impact to the Gippsland Lakes Ramsar site or any other Ramsar wetland. Table 5.4 of Appendix 5- Significant Impact Assessment concludes that there may be minor changes to groundwater and surface flows and in water chemistry and that the mine is not expected to have impacts on the sub-tidal aquatic beds, coastal brackish or saline lagoons, fringing wetlands, threatened fauna species, threatened flora, waterbird breeding and fisheries resources values of the Gippsland Lakes Ramsar site.	The potential impacts of minor changes to groundwater, surface water flows and water chemistry due to the proposed mine and the assertion of no effects on the downstream Gippsland Lakes Ramsar site requires further justification.
	EES Section 9 and 10	A Risk Assessment is presented in Section 9.1 of the EES (Table 9.2) based on risk criteria listed in Table 9.1. The risk assessment identifies the risk of significant impacts to biodiversity values from project activities Initial risk ratings are listed assuming proposed standard mitigation is implemented. Residual risk ratings are also presented based the application of additional measures where initial risk ratings were moderate to higher (i.e. moderate, major or extreme). This Risk assessment was considered comprehensive and appropriately characterised all existing threats from the project with the exception of the following: 1. Table 9.2 Under "other values" considers risk of impacts to downstream waterways including wetlands (Gippsland Lakes Ramsar site from the loss of habitat through reduced water quality (turbidity, hydrocarbons, heavy metals) as low based on unlikely to occur and a moderate consequence in the qualitative risk assessment. The EES further asserts that impacts on groundwater and surface water due to contamination from spills and/or leaks or accidental discharges of wastewater are negligible and were not assessed further based on the implementation of several water quality mitigation measures to avoid impacts on surface water values from accidental spills and/or leaks and wastewater. 2. Table 9.11 indicates a reduction in catchment area (Ha) of 51.5% for Perry Gully and 6.4% for Lucas Creek North. A recording of Nationally listed species Australian Grayling during an aquatic assessment at the confluence of Perry Gully and Mitchell River was reported. The listed threatened species and communities risk assessment only considers potential impact on Australian Grayling in the Mitchell River, but not specifically Perry Gully. The reduction in catchment area for the Perry Gully has been captured in the Risk assessment for listed threatened species and communities under "impacts to Australian Grayling" from reduced environmental flows to the Mitchell River and Perry River Catchments. Following standard mitigation this was assigned an initial risk rating of moderate and following additional mitigation and residual risk of Low.	1. The risk rating of "low" for potential impacts on downstream waterways, including wetlands such as the Gippsland Lakes Ramsar site, and assertion that impacts on surface water and hence downstream from spills and/or leaks or accidental discharge of wastewater is negligible both require further justification. This justification should consider, but not be limited to spills of hazardous substances, such as concentrated flocculant (hydrobond and hydraprime, which are identified as toxic to aquatic biota). 2. The residual risk rating of 'low', even with a predicted reduction of 51.5% of the Perry Gully Catchment, requires further justification given consideration of mitigation measures outlined in section 10.7.1.2. Specifically additional mitigation measure SW28 which includes surface water managed through an adaptive management strategy and states "the Australian Grayling will not be impacted if the water quality and quantity of the Mitchell River is not significantly affected by project activities".
	EES Section 9	Potential impacts on the following are discussed in this section; vegetation and habitat loss (11 ecological vegetation classes), DELWP mapped current wetlands, threatened ecological communities, threatened flora and fauna species, migratory species, Ramsar wetlands, State and regionally significant native vegetation, flora and fauna species, direct fauna mortality, loss of hollow-bearing trees, loss of habitat, proliferation of weeds and pests, noise/dust/light pollution, spills and hazardous materials, fragmentation and edge effects, loss and degradation of aquatic habitat, including Mitchell and Perry Rivers and Gippsland Lakes Ramsar site. Further discussion of potential downstream impacts on the Mitchell and Perry Rivers and the Gippsland Lakes Ramsar site is presented based on the results of modelling undertaken to assess the impacts to receiving waters of an unplanned discharge of mine contact water into one or both rivers. The minor increase in sedimentation reaching the Gippsland Lakes was not expected to have a measurable impact should such an unplanned event occur. This was supported by findings of a significant impact assessment undertaken in accordance with the MNES significant impact assessment guidelines that determined that the Gippsland Lakes will not be impacted by project related changes to aquatic habitat, changes to water quality, flows or availability.	The impacts of contaminants (including nutrients) and associated potential impacts on water quality of the Mitchell and Perry Rivers which are connected to the Gippsland Lakes (section 10.6.5.3) have not been fully discussed other than to assert that under normal conditions no contaminant or sediment related impacts are expected. This requires further consideration with regard to impacts of contaminants (particularly nutrients).

Do the design and layout of the project elements avoid or minimise significant impacts on native vegetation, listed ecological communities or flora and fauna species?	EES Section 9 and 10	Avoidance and proposed mitigation are outlined, and it is indicated that Kalbar will develop and implement a Biodiversity Risk Treatment Plan for the mining licence area which will need to be approved by Earth Resources Regulation and satisfy both DELWP and East Gippsland Shire Council. This plan will include details on vegetation management and clearing protocols and management of fauna, wetland and aquatic habitat, pest plant and animals, rehabilitation and offsets. These measures are considered appropriate to illustrate that due consideration has been given during the preliminary design and assessment to avoid or minimise impacts of the project on ecological values.	
	Appendix A005 Section 8	Section 8.1.1 outlines the measures that have been undertaken during a three-year preliminary design and assessment of the project including; avoidance and planning measures to avoid and minimise impacts upon ecological values. Consideration has been given to the alignment of haul roads, location of process and water infrastructure. Other avoidance measures including changing the mine area/plan to avoid state parks, locating overburden topsoil dumps to avoid native vegetation, avoidance of native vegetation removal adjacent Boundary No34 track, avoidance of native vegetation on Careys Lane diversion alignment and avoidance of infrastructure and waste dumps in gullies. These measures are considered adequate to illustrate that due consideration has been given during the preliminary design and assessment to avoid or minimise impacts of the project on ecological values.	
Have the likely direct and indirect effects of the project been adequately defined and addressed?	Sections 7,8,9,10 of Appendix A005	Section 7 of the Detailed Ecological Investigation identifies the likely direct and indirect effects of the project on species listed under the FFG Act/EPBC Act, communities listed under the EPBC Act and Groundwater Dependant Ecosystems. Section 7.3 examines in detail direct impacts while Section 7.4 examines indirect impacts. It is considered that the likely indirect and direct effects have been defined. The Detailed Ecological Investigation report also considers both the likely direct and indirect effects of the project throughout. Sections 8, 9 and 10 utilise a risk assessment approach to describe, identify and evaluate mitigation measures and contingency measures to avoid and/or mitigate likely effects, both direct and indirect, of the project. It is considered that through this risk assessment approach the likely indirect and direct effects of the project have been adequately addressed and appropriate mitigation measures developed.	
	EES Section 9	The likely direct and indirect effects of the project are described in detail.	
	EES Section 10	The likely direct and indirect effects of the project on species listed under the FFG Act/EPBC Act, communities listed under the EPBC Act and Groundwater Dependant Ecosystems are considered and addressed. Residual effects following implementation of mitigation during construction and operation include removal of 1.74 Ha of nationally significant Gippsland Grassy Woodland and Associated Native Grassland community, removal of known habitat for the nationally significant grey-headed flying fox, removal of potential habitat for nationally significant flora and fauna species with the potential to occur. Potential impacts during closure were also outlined with no additional impacts to those identified for construction and operation applicable during closure. It is considered that the likely indirect and direct effects, including residual effects following mitigation during construction and operation and also during closure have been fully defined and addressed.	
Are proposed management measures and Environment Performance Requirements (EPRs) reasonable?	Section 8 of Appendix A005	Section 8.1.2 outlines the development of a Biodiversity Management Plan which is to cover both the construction and operational phases on the project. This plan will enact "avoid and mitigate" principles and will include clear objectives, actions, roles and responsibilities. An Environmental Management Plan will also be developed and will include several key sub-plans including; Significant/threatened Species Conservation Management Plans, Significant Flora Salvage and Translocation Plan, Weed Management Plan, Disease and Biocontrol Plan, Land Rehabilitation and Restoration Plan, Construction Noise Management Plan and Construction Environmental Management Plan. Table 25 outlines specific mitigation measures against predicted impacts on biodiversity. Overall the proposed development of an EMP, its subplans and a Biodiversity Management Plan that capture the specific mitigation measures provided in Table 25 is considered reasonable. Table 25 indicates strategies to manage turbidity/sediment control and spills must be developed for implementation during construction and operations. The Risk Assessment outlined in Table 26- Risk appears to only consider possible impact of hazardous materials/chemical spills on aquatic fauna, such as the nationally listed Australia Grayling. This risk assessment should be expanded to include general consideration of loss of aquatic habitat and impacts on other aquatic flora and fauna species.	Risk Assessment should consider loss of aquatic habitat through loss of containment (hazardous materials/chemical spills) on species other than the Australian Grayling. For example, state listed aquatic flora, GDE's, Ecological Communities. Accordingly, further management measures to negate any potential loss of aquatic habitat should be further developed.
	EES Section 10	Inspection and monitoring are proposed to be developed and conducted in accordance with a detailed biodiversity sub-plan to ensure the proposed management and mitigation measures are being implemented effectively and to assess actual impacts on listed threatened species and communities. The plan will include target criteria against which effectiveness of measures can be assessed, location of monitoring sites and a schedule of monitoring. The plan will consider compliance with ground disturbance permits, offset implementation, weed and pathogen hygiene, vegetation condition, fauna occurrence, watercourse health and rehabilitation success. The proposed development of inspection and monitoring in a Biodiversity Sub Plan as outlined in the EES is considered reasonable to address management measures and Environment Performance Requirements.	
	EES Section 5.3.5	Describes key legislation (F&F Guarantee Act and Wildlife Act) applicable to conserve native flora and fauna and manage threatening processes and protection of wildlife in Victoria. Legislative requirements applicable to mining are clearly defined such as the removal, recovery or translocation of protected flora and fauna including fish to enable mining to occur and/or diversion of watercourses. This definition of applicable legislative requirements of the project provides a clear basis for the environmental performance of the project.	
	EES Section 12.4	Biodiversity values, offsets and sustainable vegetation cover-7 key indicators against the EES scoping requirements draft evaluation criteria are; I1, I14, I15, I16, I17, I18, I49 (Table 12.6) Ecological character of the Gippsland lakes- 2 key indicators I19 &I20 (Table 12.6)	The listed key indicators against the EES scoping requirements for biodiversity values, offsets and sustainable vegetation cover and ecological character of the Gippsland lakes are considered adequate.

		A Biodiversity Risk Treatment Plan (mining licence area only- developed for MRSD Act Regs 2019), Native Vegetation Management Plan (Specific controls overlay area only- Planning Scheme Amendment) and offset Management Plan (both mining licence and specific controls area) are all proposed to be developed as Environmental Management sub plans. A description of the content of these plans is outlined in Table 12.8.	The development and description as to the content of these sub plans is considered adequate.
		Both general and specific requirements for monitoring of biodiversity are outlined. Site inspections will also be conducted to verify that management and mitigation actions are being implemented and to evaluate environmental performance with regard to biodiversity and pest and weed control.	General and specific requirements for monitoring of biodiversity are considered adequate. Site inspections including visual inspections proposed are also considered adequate.
	EES Section 11	Mine Closure targets and criteria are outlined with regard to declared or controlled weed species and vegetation in grazing zones with criteria proposed to measure closure target achievement provided.	The criteria for measuring closure target achievement are considered adequate.
	EES Section 11	Ongoing monitoring and review of closure activities is proposed on an annual basis to measure progress towards achieving closure criteria. Monitoring includes vegetation cover and a variety of vegetation establishment parameters as well as weed diversity and abundance and landscape function analysis. Reference sites will be established as part of the monitoring program.	Monitoring and review of closure activities are considered adequate.
Are the proposed off-sets consistent with legislative requirements?	Appendix A005	<u>Commonwealth</u> The EPBC Act Environmental Offsets Policy and associated 'Offset Assessment Guide' (DSEPaC 2012) were used to provide a preliminary analysis of the offset area required for 1.74 Ha of Gippsland Reg-gum Grassy Woodland and Associated Native Grassland (GRGGW) and indicated between 8-10 Ha of GRGGW will be required. Several potential nearby areas have been identified and landholders have been spoken with and once a suitable offset for the EPBC Act listed GRGGW is confirmed then a Commonwealth Offset Management Plan will be prepared for DoAWE. This approach is consistent with commonwealth legislative requirements under the EPBC Act. <u>Victoria</u> Offsets have been considered in accordance with the applicable guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017). Offsets based on the extent of vegetation losses proposed within the surveyed sections of the project footprint, has determined the projects falls under the detailed assessment pathway with a State offset requirement of 1.001 General Habitat Units (GHU) with a minimum Strategy Biodiversity value of 0.253, along with 704 Large Trees and SHU for two (2) fauna species and fourteen (14) flora species. A Species search enquiry to DELWP Victorian Native Vegetation Offset Register has confirmed that the majority of required offsets can be met through the purchase of credits. There is also an opportunity to secure offsets on Crown land if evidence can be provided that demonstrates additionality which constitutes actions that are above the expected role of a public land manager in accordance with section 9.1.7 of the guidelines. Both the attainment of the majority of offset requirements through purchase of credits or securing offsets on crown land are considered viable options in accordance with Victorian legislative requirements.	
	EES section 10	A biodiversity offset management strategy for the project has been prepared to address the Victorian guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017). In accordance with the EPBC Act Environmental Offsets Policy (DSEWP&C 2012), an area of 8-10 Ha (approximately 5:1 ratio) is required to compensate for the proposed removal of 1.74 Ha of GRGGW. This approach is considered appropriate for managing the risk of being able to secure the offset and the benefit gained from securing and improving the quality of an existing area of the ecological community. The actual size of the final offset area will be determined using the Offset Assessment Guide once detailed information on the chosen site is obtained. A detailed offset management plan for the preferred site will ultimately be provided to the DAW&E for approval prior to disturbance to the ecological community. This approach to offsets is considered consistent with both state and commonwealth legislative requirements.	
Key Concerns for Council			
What are the key risk issues?		Risk Assessment should consider loss of aquatic habitat through loss of containment (hazardous materials/chemical spills including but not limited to flocculants toxic to aquatic biota and with long retention times on all species and communities. For example state listed aquatic flora, GDE's and, Ecological Communities. Accordingly further management measures to negate any potential loss of aquatic habitat should be further developed.	Risk Assessment considering loss of aquatic habitat through materials/chemicals spills and further management measures to negate potential impacts developed.
		The impacts of contaminants (including nutrients) and their associated impacts on water quality of the Mitchell and Perry Rivers which are connected to the Gippsland Lakes (section 10.6.5.3) have not been fully discussed other than to assert that under normal conditions no contaminant or sediment related impacts are expected. This requires further consideration with regard to impacts of contaminants (particularly nutrients).	The impacts of contaminants including nutrients on water quality of Perry and Mitchell Rivers requires further consideration.
		The detailed ecological report asserts that the proposed development will not lead to a significant impact to the Gippsland Lakes Ramsar site or any other Ramsar wetland. Table 5.4 of Appendix 5- Significant Impact Assessment concludes that there may be minor changes to groundwater and surface flows and in water chemistry and that the mine is not expected to have impacts on the sub-tidal aquatic beds, coastal brackish or saline lagoons, fringing wetlands, threatened fauna species, threatened flora, waterbird breeding and fisheries resources values of the Gippsland Lakes Ramsar site.	The potential impacts of minor changes to groundwater, surface water flows and water chemistry due to the proposed mine and the assertion of no effects on the downstream Gippsland Lakes Ramsar site requires further justification.

<p>Are the proposed EPRs adequate?</p>	<p>EES Section 11 and 12.4, 12.6 and attachment H</p>	<p>Key indicators of biodiversity values, offsets and sustainable vegetation cover and Ecological characteristics of the Gippsland lakes against the EES scoping requirements draft evaluation criteria are considered adequate.</p> <p>The development of subplans including a biodiversity risk treatment plan, general and specific monitoring requirements, mine closure targets and criteria and ongoing monitoring and review of mine closure activities are all considered adequate with regard to biodiversity.</p> <p>TE01-TE56 (Terrestrial and Aquatic Biodiversity) mitigation measures are listed in Attachment H. Mitigation measures provided are generally considered adequate with exception of mitigation measures considering noise impacts on potential populations of Giant Burrowing Frogs (see Noise and Vibration Technical Assessment).</p>	<p>Should populations of Giant Burrowing Frog be identified within or adjacent the project area additional mitigation measures should be developed and included in the EES and incorporated into subsequent Management Plan documentation.</p>
<p>Is there consistency between technical reports?</p>		<p>The EES Executive Summary, Conclusion and Chapter 10 refers to residual impacts to biodiversity from project activities including removal of 188.5 Ha of remnant vegetation. The Detailed ecological investigation by Ecology and Heritage Partners (Appendix A005) refers to residual impacts to 160.3 Ha of remnant vegetation. There are further inconsistencies between the EES Executive Summary and Appendix A005 e.g. number of scattered trees proposed to be removed and area of state significant Forest red Gum Grassy Woodland Ecological community by way of several examples only. Furthermore state offset requirements for listed vegetation removal in the EES do not correlate with that presented in Appendix 005 e.g. 764 large trees listed in EES versus 704 large trees listed in Appendix A005.</p>	<p>There are numerous inconsistencies between the EES and the Detailed Ecological Investigation (Appendix A005) with regard to remnant vegetation to be removed and areas requiring offsets and amount of species habitat units required on a state basis. These require clarification.</p>

3.9 Cultural Heritage

Relevant Documentation

Relevant documentation considered as part of this review includes:

- Aboriginal Heritage Act 2006;
- Heritage Act 2017;
- Aboriginal Heritage Regulations 2018;
- Heritage Regulations 2017; and
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Attachment A017- Cultural Heritage Impact Assessment

The review with also considers the following guidelines:

- Aboriginal Victoria: Guide to preparing a Cultural Heritage Management Plan (October 2016), Cultural Heritage Management Plan - Evaluation Checklist
- Heritage Victoria: Guidelines for Conducting Historical Archaeological Surveys (January 2020).

Table 9 Cultural Heritage Technical Assessment

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EEs identified and characterised Aboriginal cultural heritage sites or areas of sensitivity within the project area, particularly in the vicinity of Mitchell River, in accordance with the requirements for the Aboriginal cultural heritage management plan (CHMP) under the Aboriginal Heritage Act 2006?	Environment Effects Statement Report		
	Executive Summary, Cultural heritage	A brief outline of cultural heritage values and mitigation is presented.	It is incorrectly stated that Fingerboards LDAD 2 is registered (page xxxii). It is currently not registered on the Victorian Aboriginal Heritage Register (VAHR) (ACHRIS accessed on 20.10.2020).
	Chapter 6: Stakeholder Consultation Section 6.3.1.2: Traditional Owners	The report details consultation with the Gunaikurnai Lands and Waters Aboriginal Corporation (GLaWAC) and the Gippsland and East Gippsland Aboriginal Co-operative (GEGAC).	Additional consultation with GLaWAC is required to identify cultural values. Ongoing consultation is required during the continued preparation of the CHMP. Additional consultation with Traditional Owners occurred but is not included in A017, Section 3.3.
	Chapter 8: Environmental and socioeconomic context, Section 8.12: Cultural heritage	A summary of the following is presented: <ol style="list-style-type: none"> 1. Desktop review and the preliminary predictive model. 2. Field assessments (survey & subsurface testing) and the updated Aboriginal cultural heritage predictive model which is based on the data from the survey and subsurface testing fieldwork. 3. Known sites are listed. Unknown cultural heritage sites or oral tradition sites are potentially present based on the predictive model. 	Comments on the dot points are as follows: <ol style="list-style-type: none"> 1. The desktop under-utilised data which has constrained the effectiveness of the preliminary site predictive model (see comments for Appendix A017 below). 2. The methodology for the subsurface testing is incorrect. Excavations consisted of 2mx1m mechanical test pits, and hand excavated 1mx1m test pits and 0.5mx0.5m shovel test pits, not 1mx1m mechanical test pits and 0.5mx0.5m shovel test pits. Discrepancies in the data in A017, Section 7 (Subsurface Testing) cast doubt on validity of the updated Aboriginal cultural heritage predictive model. See also comments below for survey and subsurface testing in Appendix A017 Sections 6 and 7. 3. Fingerboards LDAD 2 (p182) is yet to be registered, cf, executive summary (page xxxii). VAHR 8322-0244 [Thurrung 1] is registered in the activity area, but not listed as one of the known places. The assessment for the CHMP is incomplete and additional sites are highly likely to be discovered. The extent, nature and significance of known sites has not been demonstrated. The validity of the predictive model is in doubt until discrepancies in the data are clarified.
	Cultural Heritage Impact Assessment - Appendix A017		
	Section 3.3: Stakeholder Engagement	The report states that further consultation is required with Traditional Owner representatives in the form of a Cultural Values Workshop. No formal statement of cultural values has been received from GLaWAC. GLaWAC participated in a project inception meeting held on 12 May 2017. They advised they would prepare a statement of cultural values for the project study area. A summary of the CHMP standard assessment fieldwork was provided on 4 July 2017.	Additional consultation with GLaWAC is required to identify cultural values and ongoing consultation during the continued preparation of the CHMP.
	Section 5: Existing Conditions	This section mirrors the requirements for a CHMP desktop assessment. Two previously registered Aboriginal sites were within the project study area: scar tree VAHR 8322-0090 [W H Dumaresq] and artefact scatter VAHR 8422-0369 [West Bairnsdale IA 1].	The desktop does not include CHMP 16068 which includes part of the project study area and registered artefact scatter VAHR 8322-0244 [Thurrung 1] within the project study area. The desktop assessment review of previously registered Aboriginal sites under-utilised the data available to characterise the nature of Aboriginal cultural heritage in the geographic region. This data can be used to assess the significance of sites and hence also the level of risk in the impact assessment for the project. The data can also provide more detailed predictions on the likely nature of stone artefact sites for the preliminary Aboriginal cultural heritage prediction model, in particular, in relation to landforms and distance from waterways, such as the Mitchell River.
	Section 6: Survey	This section presents the results of a survey for Aboriginal cultural heritage. A total of 68 surface stone artefacts were found. Previously registered scar tree VAHR 8322-0090 [W H Dumaresq] was unable to be relocated. It was likely destroyed by fire. The survey results were used to refine the Aboriginal cultural heritage site prediction model.	The survey was conducted based on the third iteration of the project study area. The survey was not complete because access was not granted to some private land and VAHR 8322-0369 [West Bairnsdale IA 1] was not inspected. There are discrepancies in the reporting of numbers of surface stone artefacts in some investigation areas.
	Section 7: Subsurface Testing	This section presents the results of subsurface testing for Aboriginal cultural heritage. Subsurface testing focussed on the proposed mine area based on the investigation areas of the site prediction model. A total of 281 subsurface stone artefacts were found. Known Aboriginal cultural heritage comprised five sites. Stone artefacts were analysed according to investigation area, site and other attributes. Each site was assessed as having low significance. The results of the geomorphological study by Rosengren was used to refine the investigations areas which provided the landform basis for the updated Aboriginal cultural heritage site prediction model.	The report acknowledges that the subsurface testing is incomplete. Further subsurface testing is required. This means that the known Aboriginal cultural heritage values have not been sufficiently determined to the satisfaction of CHMP requirements. There are numerous discrepancies in the presentation of the data for stone artefacts found during the assessment. Based on these discrepancies, the data can be reworked to come to different outcomes to those presented in the updated Aboriginal cultural heritage prediction model.

	Section 8: Impact Assessment)	This section presents the risk assessment based on the known Aboriginal cultural heritage values (sites) and unknown Aboriginal cultural heritage values.	The assessment of significance for known Aboriginal cultural heritage does not adequately take into account the nature of the sites in the geographic region, in particular, representativeness or rareness. At least one site, VAHR 8322-***b [Fingerboards Artefact Scatter Components] is likely to have medium significance. This changes the risk rating from high to major. Site VAHR 8322-0244 [Thurrung 1] has not been assessed. The assessment of risk for unknown Aboriginal cultural heritage is predicated on the updated Aboriginal cultural heritage site prediction model. Since the data from the assessment used to formulate the model is potentially fatally flawed, this may render the model invalid and hence also the risk assessment. There is no assessment of cumulative impact. Intangible Aboriginal cultural heritage values have not been assessed.
Has the EES identified known and previously unidentified places and sites of historic and cultural heritage significance within and adjoining the project area, including any areas of significant archaeological interest, in accordance with the Guidelines for Conducting Archaeological Surveys (Heritage Victoria 2008) as updated in 2013?	Environmental Effects Statement Report		
	Chapter 6: Stakeholder Consultation	Stakeholder consultation is presented.	No consultation seems to have occurred with any local historical society.
	Chapter 8: Environmental and socioeconomic context, Section 8.12: cultural heritage	A brief historical background. No heritage places are listed on the Victorian Heritage Database within the project area. Structures identified at 2495 Bairnsdale-Dargo Road within the project area did not meet the criteria for registration of the Victorian Heritage Inventory, but could be considered for council heritage registration. Unknown historic sites potentially within areas not surveyed.	No historian's report or stand-alone historic heritage assessment appears to have been commissioned. These reports would provide a more comprehensive assessment of the known and potential for unknown non-indigenous cultural heritage values in the project study area. Consultation with local council did not require management of structures at 2495 Bairnsdale-Dargo Road. It is unclear if council would consider registration of the site on the Heritage Overlay. Fieldwork assessment for historic heritage values is incomplete. Known historic site at 2495 Bairnsdale-Dargo Road, although unlikely to be registered with local council, is not mentioned.
	Cultural Heritage Impact Assessment - Appendix A017		
	Section 3.3: Stakeholder Engagement	The section states that agencies and councils have been engaged through the Technical Reference Group, individual meetings and workshops and provided extensive review and advice which has informed the preparation of the EES.	There is no evidence that the local historical society has been consulted in regards to historic cultural heritage values in the project study area.
	Section 5: Existing Conditions	A brief historic background to the study area region is provided in Section 5.4.2 ("historical" in "Ethnohistorical and Historical Accounts" [Section 5.4]) and Section 5.6 (Land Use History). Four potential historic sites were identified. No registered historic heritage sites were found in the project study area.	The historical background is general in nature and there is little specific reference to the project study area. There is no reference to whether historic heritage reports have been searched for at Heritage Victoria or any heritage studies conducted by Local Council. No historian's report appears to have been commissioned to investigate the historic heritage cultural values or provide a thematic history of the project study area. No preliminary historic heritage prediction model has been formulated even though one was formulated for Aboriginal cultural heritage.
	Section 6: Survey	One of the stated aims of the survey was to identify historical cultural heritage places and to assess historical archaeological potential. The survey identified a dilapidated 19 th century structure at 2495 Bairnsdale-Dargo Road.	Regulation 31, Heritage Regulations 2017 require a report to be submitted following every survey undertaken for the purpose of finding historical archaeological sites, even if no sites are discovered during a survey. No historic report appears to have been submitted to Heritage Victoria. A former primary school site was surveyed but is not mentioned in this section of the report (it was mentioned in Section 8). Part of the project study area was not surveyed.
	Section 7: Subsurface Testing	No subsurface testing was conducted for the purpose of identifying historical cultural heritage.	No subsurface testing for historical cultural heritage was required based on information presented in the previous sections of the assessment.
	Section 8: Impact Assessment	The discussion of historic cultural heritage values notes that after consultation with both Heritage Victoria and Local Council, it was determined that the structure at 2496 Bairnsdale-Dargo Rod did not warrant management conditions at a local, council or state level. Since no known historic heritage sites were identified, no risk rating was given (Table 49, p176).	The preparation of an historic heritage assessment would have more fully documented the history of the project study area, potentially identified historic archaeological sites, more fully documented sites investigated in the assessment, and formulated an historic cultural heritage site prediction model, including identifying any areas of significant archaeological interest. An historian's report and historic heritage assessment would provide the appropriate level of assessment to assess the risk to known and unknown historic cultural heritage.
Does the design and construction reasonably mitigate potential impacts on Aboriginal and historic cultural heritage, particularly in the vicinity of the Mitchell River?	EES Chapter 9: Environmental and socioeconomic impact assessment	Aboriginal cultural heritage: All potential impacts on known and unknown Aboriginal cultural heritage will be mitigated by the preparation of an approved CHMP and chance finds protocol. Historic cultural heritage:	Aboriginal cultural heritage The CHMP is still in preparation and additional assessment is required. Additional cultural heritage is highly likely to be discovered. Known cultural heritage will be managed / mitigated in the conditions and unknown cultural heritage discovered during construction will be managed / mitigated by the Contingency Plan in the approved CHMP. Historic cultural heritage

		There is no registered historic cultural heritage in the project study area. There is one historic place identified but did not meet the threshold for registration with Heritage Victoria but could be considered for listing on the Heritage Overlay with local council. Unknown historic heritage will be mitigated by additional fieldwork and notification process and consultation with Heritage Victoria / chance finds protocol.	Four potential historic places are mentioned in the Cultural Heritage Impact Assessment but only 2495 Bairnsdale -Dargo Road is mentioned. Additional survey is required. Additional historic cultural heritage may be discovered. There is no mention of the preparation of the Archaeological Management Plan discussed in the Cultural Heritage Impact Assessment. Potential impacts on unknown historic cultural heritage will be mitigated by consultation with Heritage Victoria and the chance finds protocol.
	Cultural Heritage Impact Assessment Appendix A017: Section 8: Impact Assessment	<p>Aboriginal cultural heritage: All potential impacts to known and unknown cultural heritage values are to be managed in the approved CHMP. The report anticipates that all known sites will be destroyed in the mining area and ancillary works and infrastructure area. Possible conditions to mitigate impact to known sites and a Contingency Plan for unknown Aboriginal cultural heritage are presented in Section 8.6.1.</p> <p>Historical cultural heritage: The structure at 2495 Bairnsdale-Dargo Road was recommended to have further investigation to determine if it has additional cultural heritage value. Elsewhere the report states that no further management or mitigation of the site was required.</p> <p>Contingency measures were recommended to reduce risk to unknown historic cultural heritage values, if identified during the life of the project.</p> <p>It was recommended that an Archaeological Management Plan be developed to avoid, minimise, mitigate and manage disturbance to archaeological sites and values affected by the works and undertake investigations in accordance to Heritage Victoria guidelines.</p>	<p>Aboriginal cultural heritage: The CHMP is still in preparation and additional assessment is required. The known Aboriginal cultural heritage values have not been fully established for the project study area. There is no assessment of cumulative impact.</p> <p>Any conditions to mitigate harm to known Aboriginal cultural heritage will be detailed in the approved CHMP.</p> <p>Historical cultural heritage: It is unclear whether any further investigation is required at 2495 Bairnsdale-Dargo Road.</p> <p>An historian's report and historic heritage assessment would more fully identify the historical cultural heritage values of the project study area and any areas of significance and mitigate potential impacts. The results of this assessment would then inform any Archaeological Management Plan for the project.</p>
Does the EES provide appropriate management measures and Environmental Performance Requirements (EPRs) to deal with new sites that are discovered during construction or operation?	EES Chapter 9: Environmental and socioeconomic impact assessment	<p>Aboriginal cultural heritage: The CHMP is included within the Environmental management framework.</p> <p>Historic cultural heritage: The chance find protocol and notification to Heritage Victoria will manage any new sites that are discovered during construction or operation.</p>	<p>Aboriginal cultural heritage The CHMP Contingency Plan will management any new sites that are discovered during construction or operation.</p> <p>Historic cultural heritage There is no mention of the Archaeological Management Plan discussed in the Cultural Heritage Impact Assessment which is proposed to manage any new sites discovered during the life of the project.</p>
	Cultural Heritage Impact Assessment, Appendix A017: Section 8: Impact Assessment	<p>Aboriginal cultural heritage: Management measures and EPRs default to the approved CHMP.</p> <p>Historic cultural heritage: Management measures and EPRs are to be developed in the preparation of an Archaeological Management Plan to avoid, minimise, mitigate and manage disturbance of archaeological sites and values. This would include undertaking further investigations.</p>	<p>Aboriginal cultural heritage: The CHMP is still in preparation and has not been evaluated. Additional assessment is required to identify known Aboriginal cultural heritage values.</p> <p>Historic cultural heritage: No historian's report, historic heritage assessment or archaeological management plan has been prepared for the project. The preparation of an historian's report and historic heritage assessment would be appropriate to identify historic cultural heritage sites and areas of historic archaeological potential. These reports would provide the basis for an Archaeological Management Plan to manage any new sites discovered during the life of the project.</p>
Key Concerns for Council			
What are the key risk issues?			<p>Aboriginal cultural heritage: The CHMP is still in preparation and has not been approved. An approved CHMP is required to be submitted to Council before any statutory authorisation can be granted.</p> <p>The approved CHMP must not be inconsistent with any statutory authorisation. If the approved CHMP is inconsistent, an amended or new CHMP may be required before the statutory authorisation can be granted.</p> <p>Historic cultural heritage: Due to the lack of an historian's report, historic heritage assessment or Archaeological Management Plan, the potential historic heritage values of the project study area have not been sufficiently investigated.</p> <p>No Historic Heritage Assessment report for the project has been submitted to Heritage Victoria.</p>
Are the proposed EPRs adequate?			<p>Aboriginal cultural heritage: EPRs should be adequate because they default to the approved CHMP which is still in preparation and will not be evaluated until the Minister has made a decision in regard to the EES.</p>

			<p>Historic cultural heritage: EPRs are yet to be sufficiently determined because no historian's report or historic heritage assessment has been prepared for the project study area. These reports would assist in the development of any Archaeological Management Plan to mitigate and manage harm to any historic heritage values that may be present in the project study area.</p>
Is there consistency between technical reports		The cultural heritage sections in the EES main report are derived from the Cultural Heritage Impact Assessment – Appendix A017	<p>There are some inconsistencies between the main report and the Appendix. For example, the status of the recorded versus registered Aboriginal sites is inconsistently reported (see comments above in relations to Fingerboards LDAD 2). Inconsistency in the reporting of the data for Aboriginal cultural heritage reported in the Cultural Heritage Impact Assessment is not evident in the EES. There are inconsistencies in the reporting of consultation with local council in regard to the management and listing on the Heritage Overlay of 2495 Bairnsdale-Dargo Road structures.</p>

3.10 Radiation

In conducting this review, consideration has been given to;

- Appropriate International Standards and guidance,
- Appropriate Commonwealth and Victorian requirements and guidance,
- Other similar projects, and
- The relatively low concentration of naturally occurring radionuclides present in the various material.

In regard to the last point, it is relevant to note that the radiological risks of the project are very low. This is based on the following;

- The ore does not contain sufficient radionuclide concentrations to be classified as radioactive material,
- The tailings do not contain sufficient radionuclide concentrations to be classified as radioactive material, and
- The heavy Mineral Concentrate (HMC) contains sufficient radionuclide concentrations to be classified as radioactive material.

The HMC contains radionuclide concentrations that exceed the criteria for being defined as radioactive, however, the concentrations are likely to be less than the levels that are high enough to trigger the requirements of the Transport Code.

Based on the information available in the publicly available EES, the following conclusions are made regarding the radiological impacts of the proposed Fingerboards Project:

- Radiological impacts of the Project to workers, the public and the environment are low.
- Adequate controls, that are commensurate with the potential radiological impacts, have been incorporated into the design of the project.
- Management controls are detailed in the documentation and have yet to be collated into final drafts of a Radiation Transport Management Plan (RTMP), Radiation Management Plan (RMP) and Radioactive Waste Management Plan (RWMP).
- A number of improvement opportunities have been identified, however there were no identified radiological related barriers.

Relevant documentation considered as part of this review included:

- Radiation Act 2005 and the Radiation Regulations 2017.
- The Environmental Effects Statement Report and specifically the following attachments/appendices:
 - Attachment B – Draft Works Plan,
 - Attachment F – Risk Report,
 - Appendix A002 – Geochemistry and Mineralogy Summary Report,
 - Appendix A009 – Stage Two Air Quality and Greenhouse Gas Assessment,
 - Appendix A011 Radiation Assessment Report, and
 - Appendix A019 Human Health Risk Assessment.

The review also considers the following guidelines:

- Various publications of the International Commission on Radiation Protection (ICRP), International Atomic Energy Agency (IAEA) and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).
- ARPANSA Radiation Protection Series No. 9, Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing, 2005.
- ARPANSA Radiation Protection Series C-2 Code for the Safe Transport of Radioactive Material (2019).
- Statement on new radon dose coefficients: implications for worker dose assessments February 2018 ARPANSA Radiation Health Committee.
- ICRP137 (Annals of the ICRP Publication 137: Occupational Intakes of Radionuclides: Part 3).
- Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards — Vienna: International Atomic Energy Agency, 2014. — (IAEA safety standards series, GSR Part 3).
- Occupational Radiation Protection - Vienna: International Atomic Energy Agency, 2018. – (IAEA safety standards series, GSG-7).

Table 10 Radiation Technical Assessment

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Have appropriate investigations been undertaken to characterise natural background radiation levels within the project site and broader project area?	Environment Effects Statement Chapter 8 Environmental and socioeconomic context 8.7.2.4 Background measurements Information for chapter 8 sourced from Appendix A011 Radiation Assessment Report	Partially The purposes of baseline monitoring are: <ul style="list-style-type: none"> - Establish sufficient information for final closure - To characterise the natural variation that occurs - To adequately characterise the levels There is insufficient radiological baseline data to achieve these purposes, for the following parameters: <ul style="list-style-type: none"> - Radon and thoron concentrations in air - Radionuclide content of flora and crops - Incomplete radionuclide analyses - Airborne dust monitoring 	It is suggested that additional baseline monitoring be conducted to better quantify baseline levels as follows: Radon and Thoron <ul style="list-style-type: none"> - Passive monitoring of radon and thoron is useful for long term trends when aligned with the seasons and also over a number of years - Real time radon and thoron monitoring equipment is available and able to better characterise diurnal variation for each of the seasons - Ongoing passive radon and thoron monitoring on a seasonal basis at key locations Radionuclides in Flora <ul style="list-style-type: none"> - Radionuclide analysis of flora and crops should be conducted (note that the presented data is calculated from soil concentrations) Radionuclide Analyses <ul style="list-style-type: none"> - Consideration of all long-lived uranium and thorium radionuclides should be conducted. - The suggested radionuclides are: <ul style="list-style-type: none"> o U-238, Th-230, Ra-226, Pb-210, Po-210 o Th-232, Ra-228, Th-228 Airborne Dust Monitoring <ul style="list-style-type: none"> - High volume dust sampling was undertaken for PM10 material For radiation dose assessment, it is usual to consider TSP. Consideration of the ratio between TSP and PM10 concentrations should occur.
Has the EES reasonably assessed the likely radiological content and impacts of the heavy mineral ore, HMC concentrate, tailings and any other waste materials?	Environment Effects Statement Attachment B Draft Works Plan Section 5, Table 5.2 (Note that the radionuclide characterisation of the materials is provided in several other documents)	Yes Adequate characterisation of the various process material has been made. This includes ore, HMC concentrate and tailings. It is relevant to note the following: <ul style="list-style-type: none"> • The ore does not contain sufficient radionuclide concentrations to be classified as ore. • The tailings does not contain sufficient radionuclide concentrations to be classified as ore. • The HMC contains sufficient radionuclides to be classified as radioactive material. The assessment indicates that due to the low levels of radionuclides in the materials, none of the waste products returning to the mine will be classified as radioactive waste.	It is suggested that regular monitoring of the ore, HMC concentrate and tailings be conducted to confirm the classification of the materials.
Has the EES reasonably assessed potential radiological risks to the environment, biodiversity values and human health associated with the production, on-site storage, transportation, and storage at the port?	Environment Effects Statement Chapter 9 Environmental and socioeconomic impact assessment 9.7 Radiation Information for chapter 9 sourced from Appendix A011 Radiation Assessment Report	Yes These results in Appendix A11 have been used in the impact assessment. The assessment used internationally accepted methods to determine potential occupational and public radiation doses. In addition, an assessment of the potential radiological impacts to flora and fauna has been conducted using the internationally recognised ERICA assessment tool. The impact assessment indicates that: <ul style="list-style-type: none"> • Worker doses will generally be less than the member of public limit of 1mSv/y. • The most exposed workers are truck drivers who may receive more than 1mSv/y, however, not enough for them to be classified as “designated radiation workers”. • Public doses will be well below the member of public dose limit of 1mSv/y. • Doses to flora and fauna do not exceed the most conservative screening level. • Doses post closure are anticipated to be negligible and not discernible from natural background. The assessment has indicated that the most exposed workers are likely to be those involved in the handling and transport of HMC.	It is suggested that a draft RMP and RWMP be prepared, outlining the operational systems measures and controls for radiation. It is noted that these documents are part of a later secondary licencing process, however a draft at this stage is useful for providing confidence of the document’s contents.

<p>Has the EES described appropriate methods and strategies to demonstrate the radioactivity of tailings and waste materials stays within environmentally acceptable exposure levels?</p>	<p>Environment Effects Statement Attachment B Draft Work Plan Table 5-9</p> <p>Appendix A011 Radiation Assessment Report</p>	<p>Yes</p> <p>As previously noted, the tailings is not classified as radioactive.</p> <p>The tailings will contain a slightly lower natural uranium and thorium concentration than the original ore.</p> <p>The EES has conducted an assessment on the potential radiological impacts of the tailings, in particular, the potential for seepage into groundwater. It is noted that any seepage is expected to have negligible impacts on the groundwater.</p> <p>The tailings is to be disposed back into the mined out areas and progressively rehabilitated. This design feature ensures that there is no remnant surface facility post closure effectively placed material back from whence it came.</p> <p>A temporary surface facility will be established and utilised until sufficient space is available to safely dispose of the tailings in the mined out voids. The temporary facility will be decommissioned when no longer required.</p>	<p>It is suggested that regular monitoring of the ore, HMC concentrate and tailings be conducted to confirm the classification of the materials.</p>
<p>Has the EES utilized appropriate methods to undertake the radiological impact assessment?</p>	<p>Environment Effects Statement Chapter 9 Environmental and socioeconomic impact assessment</p> <p>9.7 Radiation</p> <p>Appendix A019 Human Health Risk Assessment</p> <p>Information for chapter 9 sourced from Appendix A011 Radiation Assessment Report</p>	<p>Yes</p> <p>The assessment utilised recognised and internationally accepted methods as developed by the ICRP and IAEA and endorsed in Australia by ARPANSA and subsequently in Victoria through the Radiation Protection Act and Regulations.</p> <p>The dose factors for inhalation and ingestion of radionuclides are as outlined in ARPANSA 2005.</p> <p>It is noted that the ICRP have recently published new dose factors for naturally occurring radionuclides. The factors are for inhalation and ingestion of radionuclides, and also for the inhalation of the decay products of radon. The factors apply to occupational exposures only at this stage.</p> <p>Dose factors generally need to be approved by the local authority and adopted in local legislation. It is understood that the new factors are yet to be adopted in Victoria.</p>	<p>It is suggested that the potential doses be re-assessed using the latest dose factors. This will provide a "best practice" assessment of doses.</p> <p>Note that this is not expected to significantly change the final assessed dose, however it is appropriate to consider the new dose factors.</p>
<p>Are the recommended radiation related controls adequate for the go ahead project?</p>	<p>Environment Effects Statement Attachment B Draft Work Plan Section 8.6 and Table B-1</p> <p>Appendix A011 Radiation Assessment Report</p>	<p>Yes.</p> <p>The Draft Work Plan provides a risk assessment for the project and outlines a range of standard mitigation, and additional mitigation measures, that would be adopted for the management of various risks. For radiation, a number of controls are provided (specifically lines 48, 49, 60, 62, 63 and 64). The controls are detailed for each identified radiation risk in Table B1 of the Work Plan Document and are recognised control for exposure to radiation and release of radioactivity. The controls are recognised and are consistent with guidance provided by the IAEA and ARPANSA (through the Mining Code) and include;</p> <ul style="list-style-type: none"> - Occupational and environmental radiation monitoring and reporting, - Standard operating procedures, - Job safety assessments, - Classification of workers, - Record of housekeeping, - Recoding of personal work activities, - Induction and training of personnel, - Signage, - Appropriately qualified staff, - Specific design specification for facilities, - Specific design controls for dust, - Licencing of appropriate personnel, and 	<p>It is suggested that a draft RMP and RWMP be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately.</p> <p>However, it is noted that approval of the final RMP and RWMP documents is part of a secondary approval process and it not necessary for the final RMP or RWMP to be developed at this stage.</p>

		<ul style="list-style-type: none"> - Independent auditing. <p>The controls are to be collated in the operational RMP and RWMP, which requires formal approval by the statutory regulator (Victorian Department of Health and Human Services). It is worth noting that due to the very low levels of radioactivity in the material, the primary controls for occupational hygiene (i.e.; dust controls) are applicable and adequate.</p> <p>Table 7.2 of the Works Plan notes that an environmental objective for radiation is to comply with the Victorian Radiation Act requirements, and the actions outlined in the RMP. It is noted that the performance indicators of this objective are:</p> <ul style="list-style-type: none"> - Radiation levels in water and groundwater. - Radon levels in air. - Radiation levels in airborne dust. <p>It is therefore expected that these parameters would be regularly monitored and reported on.</p>	
Are the proposed Radiation Management Plan (including radioactive Waste Management Plan) and Radiation Transport Management Plan adequate and appropriate?	<p>Environment Effects Statement Attachment B Draft Work Plan Section 5.5 and Table B-1 (risk reference 17.7)</p> <p>Appendix A011 Radiation Assessment Report</p>	<p>Yes with suggestion</p> <p>The Work Plan notes that the RMP and RWMP will be submitted as part of the final work plan.</p> <p>Elements of a final RMP and RWMP are available in the EES document and appear to cover the requirements outlined in the ARPANSA Mining Code and other international guidance.</p> <p>The documentation contains extensive references to the transport of mineral concentrates and a commitment to ensuring that it is transported in accordance with applicable requirements of the Code of Practice for Safe Transport of Radioactive Material.</p>	<p>It is suggested that a draft RMP, RWMP and RTMP be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately.</p> <p>However, it is noted that approval of the final RMP and RWMP documents is part of a secondary approval process and it not necessary for the final RMP or RWMP to be developed at this stage.</p>
Key Concerns for Council			
What are the key risk issues?		Additional and ongoing radiation baseline monitoring should occur to strengthen the current knowledge.	It is suggested that the baseline radiation monitoring is incomplete. Additional pre-operational monitoring to include: <ul style="list-style-type: none"> - Radon and thoron, - Radionuclides in flora, - Analyses of specific radionuclides (not covered in monitoring to date), and - Airborne dust as total suspended particulate (TSP) concentrations.
		Radiation doses to the workers, the public and the environment are well below the respective limits.	
		No radiological risks are foreseen with the tailings	
		No key risks with the dose assessment methods	
Are the proposed EPRs adequate		<p>The background radiation assessment does not require Environmental Performance Requirements (EPRs).</p> <p>The material characterisation does not require Environmental Performance Requirements (EPRs).</p> <p>The impact assessment indicates that impacts to workers, the public and the environment are well below acceptable standards, indicating that controls are adequate.</p> <p>The RMP and RWMP documents are intended to outline the management measures for radiation. Details of the RMP and RWMP are provided in the documents, however, the RMP and RWMP documents are provided and not required at this stage of the process.</p>	<p>It is suggested that a draft RMP, RWMP and RTMP be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately.</p> <p>However, it is noted that approval of the final RMP and RWMP documents is part of a secondary approval process and it not necessary for the final RMP or RWMP to be developed at this stage.</p>
Is there consistency between technical reports		<p>There is generally consistency between reports with the following noted: Appendix A011 Radiation Assessment Report is the primary report for radiation. Information from this report has been used in other documents of the EES.</p>	It is suggested that the Health Risk Assessment rectifies the statement.

		<p>The baseline radiological assessment has been used in Appendix A019 Human Health Risk Assessment. The document incorrectly and incompletely calculates a potential dose from the baseline measurements and notes that the result is less than a screening level of 1mSv/y. This is an incorrect application of the baseline measurements and potentially misleading.</p> <p>The member of public dose limit is 1mSv/y above natural background levels.</p>	
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3.11 Air Quality and Greenhouse Gas

Relevant documentation considered as part of this review includes:

- Environment Protection Act 1970
- Environment Protection Amendment Act 2018
- State Environment Protection Policy (Ambient Air Quality), 1999
- State Environment Protection Policy (Ambient Air Quality) Variation, 2016
- State Environment Protection Policy (Air Quality Management), 2001
- Protocol for Environmental Management, Mining and Extractive Industries, 2007
- The National Greenhouse Accounts Factors, August 2019
- National Greenhouse and Energy Reporting (Measurement) Determination, 2008
- National Greenhouse and Energy Reporting (Measurement) Regulation, 2008
- The Greenhouse Gas Protocol, 2004
- Protocol for Environmental Management, Greenhouse Gas Emissions and Energy Efficiency in Industry, 2002
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Appendix A009 - Stage Two Air Quality and Greenhouse Gas Assessment, August 2020

The review with also considers the following guidelines:

- EPA Victoria Publication 1550: Construction of input meteorological data files for EPA Victoria's regulatory air pollution model (AERMOD)
- EPA Publication 1551: Guidance notes for using the regulatory air model AERMOD in Victoria

Table 11 Air Quality technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES adequately described the physical and chemical characteristics of material(s) to be removed during development and operation of the project in relation to potential emissions to air?	Appendix A009 Section 1.2	<ul style="list-style-type: none"> Extraction rate schedule over project lifetime introduced. 	<ul style="list-style-type: none"> No gaps/issues identified
	Appendix A009 Section 1.3	<ul style="list-style-type: none"> Potential emissions to air from the project consistent with mineral sands operations are introduced and described. 	<ul style="list-style-type: none"> No gaps/issues identified
Has the EES identified sensitive receptors that with the potential to be impacted by emissions to air from the project?	Appendix A009 Section 3.2.2	<ul style="list-style-type: none"> The nearest sensitive receptors comprised of residential dwellings have been identified and included in the modelling assessment. Receptors are identified in all directions and over reasonable distance from the Project. These receptors are generally conservatively representative of receptors further away from the project – i.e. compliance assessed at nearest receptors suggests compliance at receptors further from Project. 	<ul style="list-style-type: none"> No gaps/issues identified
Has the EES adequately monitored and characterised the existing atmospheric environment in the project area in relation to emissions to air resulting from the project?	Appendix A009 Section 3.2.4	<ul style="list-style-type: none"> A twelve-month monitoring campaign was conducted in accordance with the requirements of the Mining PEM and in consultation with EPA and included: <ul style="list-style-type: none"> continuous monitoring of PM₁₀ and PM_{2.5} batch monitoring of RCS and metals monthly sampling of dust deposition rates continuous monitoring of meteorological conditions Monitoring of atmospheric contaminants were conducted in accordance with the relevant Australian Standards. Background concentrations of gaseous products of combustion (namely NO₂ and SO₂) were estimated based on ambient air quality monitoring data reported by EPA from their station at Traralgon. 	<ul style="list-style-type: none"> Gaps in the continuous monitoring dataset (i.e. when neither PM₁₀ or PM_{2.5} data is available, a total of 11 days) have been filled with data generated using a stochastic algorithm utilising random numbers and based on the distribution of concentrations measured during that time of year. While novel, it is questionable whether creating data is appropriate. There is precedence in Victoria to use the 70th percentile of available data to fill gaps (e.g. Westgate Tunnel EES; North East Link EES). The average of the randomly generated concentrations would potentially have the same average as the dataset on which it is based, which would be less than the 70th percentile of that same dataset. Gaps in RCS data have been filled based on a conservative fraction of the corresponding PM_{2.5} concentration. While conservative, again it is not certain whether creating data is appropriate, or indeed required. An annual average based on the collected data would likely have sufficed.
Has the EES adequately characterised background radiation levels within the project and broader area?	Appendix A009 Section 3.2.4.2.4	<ul style="list-style-type: none"> PM10 monitoring was analysed for uranium and thorium Samples indicate that background levels are low (approximately 1% of the adopted criteria). 	<ul style="list-style-type: none"> No gaps/issues identified
Has the EES adequately identified and characterised the potential emissions to air resulting from the material and the actions of removing material in the project area?	Appendix A009 Section 3.4.3; 3.4.4; Appendix B1	<ul style="list-style-type: none"> Potential emissions of dust, respirable crystalline silica and arsenic are described and quantified for construction activities and three operational scenarios. Activity data and emission estimation methods used to calculate the emissions are provided (Appendix B) 	<ul style="list-style-type: none"> No gaps/issues identified
Has the EES adequately identified management and mitigation measures to reduce and manage significant effects for sensitive receptors during construction and operation?	Appendix-A009 Section 3.4.2	<ul style="list-style-type: none"> Mitigation measures proposed to be used on site are identified from relevant NPI Emissions Estimation Technique Manuals and from currently operating coal and mineral sands mines. 	<ul style="list-style-type: none"> Measures for implementation during normal operating conditions (i.e. during normal meteorological conditions) are considered appropriate.
	Appendix-A009 Sections 3.5.2.1; 3.5.3.1; 3.5.4.1		<ul style="list-style-type: none"> The example mitigation measures required to mitigate against exceedances of criteria at nearby sensitive receptors during adverse meteorological conditions include relatively large-scale reduction in site activities. It is perhaps unreasonable to expect that e.g. extraction from the Eastern pit and product haulage in both pits will be ceased. The modelling analysis showing the effects of implementing the identified mitigation measures and the number of days on which they may be required to be used could also be considered overly detailed and indicate an inappropriately high-level confidence in the precision of fugitive dust emission estimation and dispersion modelling techniques.
Has the EES adequately predicted the atmospheric concentrations of the identified emissions to air in accordance with the Mining PEM and state guidelines (including the SEPP(AAQ))?	Appendix-A009 Section 3.1.2	<ul style="list-style-type: none"> SEPP(AAQ) environmental quality objectives are introduced. 	<ul style="list-style-type: none"> SEPP(AAQ) 2025 reduced PM_{2.5} 24-hour and annual average standards are not presented or discussed. Given the timescale of the Project, these are relevant.
	Appendix-A009 Section 3.1.5	<ul style="list-style-type: none"> Predicted cumulative impacts are assessed in accordance with the SEPP(AQM), Mining PEM and supporting EPA guidance publications regarding use of the regulatory model, AERMOD. Incremental impacts due to Project emissions are modelled for five years in accordance with EPA guidelines. 	<ul style="list-style-type: none"> In the absence of Mining PEM criteria, the assessment has adopted criteria from other jurisdictions. While consultation with EPA is indicated, no further discussion is provided as to why this may be considered appropriate in place of SEPP(AQM) criteria. Predicted cumulative impacts are not presented in the context of the SEPP(AAQ) standards. EPA generally require comparison, if not assessment, against SEPP(AAQ) standards.

		<ul style="list-style-type: none"> Note the Mining PEM, which requires one year of background monitoring was published prior to EPA Victoria introducing AERMOD as the regulatory model and requiring five years to be modelled. In the absence of clear guidance, the assessment methodology incorporating five years of modelling with one year of background monitoring data, is reasonable and appropriate. 	<ul style="list-style-type: none"> The assessment adopts QLD and NSW dust deposition criteria. The Mining PEM provides a criterion for dust deposition monitoring of 4 g/m²/month (2 g/m²/month over background). The Mining PEM does not specifically state that the monitoring criterion should not be used for modelling assessment results. It is convention in Victoria to apply this criterion to monthly averaged modelling results. The modelling predicts concentrations using 200 m spaced gridded receptors – VIC Publication 1551 states that the grid spacing should not be greater than 100 m. No gridded receptor results are presented. Schedule C of the SEPP(AQM) states that design criteria are applicable everywhere expect inside buildings. Scalar surface characteristics for meteorological files correctly use EPA publication 1550 guideline values. Adjusted U* is a default option in the most recent version of AERMOD. Preference would therefore be to use adjusted U* and do not use sigma-theta, however the opposite has been done here. Square of wind speed conservatively used to calculate windspeed dependent wind erosion. No issue identified. RCS has been modelled as a conservative fraction PM2.5 providing a conservative impact assessment. No issue identified. Model sources (volume, line volume, area etc) representing mining activities, including layout(s) are not presented or discussed. Providing predicted ground level PM10 and PM2.5 concentrations to three significant figures presents a level of precision in the results that does not reflect the various uncertainties in the assessment.
Has the EES assessed the effects of dust emissions on Lindenow Valley Primary industry and local water supplies?	Appendix-A005 Section 7.2	<ul style="list-style-type: none"> Potential impacts are discussed in the Detailed Ecological Investigations appendix. 	<ul style="list-style-type: none"> Results from Appendix-A009 are referenced, however no conclusion is offered with respect to local primary industry and water supplies other than to state dust emissions will be managed.
Key Concerns for Council			
What are the key risk issues?		<ul style="list-style-type: none"> Compliance with relevant assessment criteria is predicted for all key indicators of air quality, with the exception of PM10 for which there is the potential for non-compliance with the 24-hour criterion at nearby sensitive receptors during abnormal meteorological conditions (up to four days per year). 	<ul style="list-style-type: none"> The assessment finds that substantial mitigation measures (e.g. ceasing some operations) may be required to avoid exceedances of the 24-hour PM10 air quality criterion under certain meteorological conditions. These mitigation measures should be documented as part of the management plan along with the trigger for their application (e.g. forecast high winds from directions that would increase the risk of impacts at identified receptors).
Are the proposed EPRs adequate?	EES Chapter 12	<ul style="list-style-type: none"> Key indicators of air quality against the EES scoping requirements draft evaluation criteria are considered adequate. The development of subplans including an airborne and deposited dust risk treatment plan, general and specific monitoring requirements, mine closure targets and criteria and ongoing monitoring and review of mine closure activities are all considered adequate with regard to air quality. 	<ul style="list-style-type: none"> No gaps/issues identified

Table 12 Greenhouse Gas Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Have all significant Scope 1, 2 and 3 greenhouse gas emission sources associated with the Project been included in the emission inventories?	Appendix-A009 Section 4.3.1	<ul style="list-style-type: none"> GHG sources included in the inventory were: <ul style="list-style-type: none"> Diesel combustion (heavy machinery, site vehicles, processing plant, diesel generators, and haulage vehicles used to transport of HMC offsite to the first delivery point) Land clearing Electricity usage Scope 3 emissions were limited to the off-site transport of the HMC to the first delivery point, with three options assessed. Emissions associated with employee travel to and from site, international delivery of plant, equipment and materials, and disposal of site waste, were deemed to be immaterial and not included. 	<ul style="list-style-type: none"> No gaps/issues identified
Have appropriate emission factors and activity data used in the compiling the greenhouse gas emission inventories?	Appendix-A005 Section 4.1	<ul style="list-style-type: none"> The assessment quotes Global Warming Potentials (GWPs) of 21 for CH₄ and 310 for N₂O. NGER Regulations were amended in 2016 to update these GWPs to 25 and 298 respectively for use in reporting from 2015/16 onwards. 	<ul style="list-style-type: none"> The GHG emission inventory uses the latest National Greenhouse Accounts Factors (2019) so the appropriate GWPs have been incorporated into the calculations. Appears to just be a typographical error.

	Appendix-A005 Section 4.3.1 & Appendix H	<ul style="list-style-type: none"> Annual diesel consumption was estimated based on fuel consumption rates for individual plant and equipment, multiplied by assumed operating hours per year. Projected annual electricity consumption was provided by the proponent. Land clearing and rehabilitation areas were estimated for each year of the project from the mine plan. 	<ul style="list-style-type: none"> No gaps/issues identified
	Appendix-A005 Section 4.3.2 & Appendix H	<ul style="list-style-type: none"> GHG emissions from fuel use and electricity use were calculated based on appropriate emission factors for the latest version of the National Greenhouse Accounts Factors (2019). GHG emissions and sequestration due to land use change were estimated using the DEE's Full Carbon Accounting Model (FullCAM) based on carbon contained in grazing land/grassland and plantation forest. 	<ul style="list-style-type: none"> No gaps/issues identified
	Appendix-A005 Section 4.4	<ul style="list-style-type: none"> GHG emissions associated with product transport by rail/road are presented but the emission factors used in the calculations, or where they were sourced from, is not documented 	<ul style="list-style-type: none"> To be transparent, the emission factors used to estimate the Scope 3 road/rail GHG emissions associated with product transport should be documented in the report.
Are the proposed air quality and greenhouse gas management measures and EPRs reasonable and appropriate	Appendix-A005 Section 4.4	<ul style="list-style-type: none"> The maximum annual GHG emissions (Scope 1 + Scope 2, i.e. excluding product transport) were estimated to represent 0.01% and 0.07% of national and state emissions respectively. Based on the current NGER thresholds Kalbar would have NGER reporting obligations for the Project commencing in 2020. However, annual Scope 1 GHG emissions associated with the Project are estimated to be well below the Safeguard Mechanism threshold for Scope 1 emissions and would not be subject to the Safeguard Mechanism. Relatively standard GHG mitigation measures are proposed. This is appropriate given the relatively small contribution of the project to state and national emissions. 	<ul style="list-style-type: none"> No gaps/issues identified
Key Concerns for Council			
What are the key risk issues?		<ul style="list-style-type: none"> This project is expected to be a relatively minor contributor the state and national GHG inventories when considering the direct (Scope 1) emissions only. GHG emissions associated with road/rail transport are estimated to be a relatively minor contributor to the total Scope 1,2 & 3 emissions from the Project, but the emission factors used in the calculations, or where they were sourced from, is not documented 	<ul style="list-style-type: none"> The emission factors used to estimate the road/rail GHG emissions associated with product transport should be documented in the report to give confidence in the reported Scope 3 emissions.
Are the proposed EPRs adequate?	EES Chapter 12, page 34	<ul style="list-style-type: none"> Commitment to "record fuel and energy consumption and estimate greenhouse gas emissions throughout the project phases (and identify opportunities to reduce energy consumption and greenhouse gas emissions)" 	<ul style="list-style-type: none"> There is no sustainability or energy efficiency sub plan proposed that would address and support the mitigation and management of GHG emissions

3.12 Rehabilitation

Relevant documentation considered as part of this review included:

- Mineral Resources (Sustainable Development) Act 1990;
- Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019;
- Catchment and Land Protection Act 1994; and
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Attachment B – Draft Work Plan;
 - Attachment D – Approval Application;
 - Attachment F – Risk Report;
 - Attachment G – Consultation and Stakeholder Engagement Report;
 - Attachment H – Mitigation Register;
 - Attachment K – Rehab Independent Peer Review Report;
 - Appendix A020 – Rehabilitation; and
 - Appendix A023 – Proposed Tailings Mgt Strategy on Post Closure Settlement.

The review will also consider the following rehabilitation guidelines:

- Preparation of Rehabilitation Plans: Guidelines for Mining and Prospecting Projects (DEDJTR, 2020);
- Guidance Materials for the Assessment of Geotechnical Risks in Open Pit Mines and Quarries (DEDJTR, 2015); and
- Technical Guideline – Design and Management of Tailings Storage Facilities (DEDJTR, 2017).

Table 13 Rehabilitation Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES reasonably described the existing topography, soil profiles, drainage, plant-soil-water interactions and vegetation (within the project area, in particular the proposed mine footprint over the proposed mine life)? Yes	Appendix A020 Section 5 Existing environment	Section 5.2 Geomorphology addresses topography with landforms such as plateaus, valley slopes and swales shown in Figure 5. Section 5.3 Soils discusses soil profiles and horizons for the predominant soil types Sodosols (texture contrast soils with acidic, sandy, surface horizons overlying sodic, higher-clay subsoils) and Podisols (sandy soils of reasonably uniform texture throughout the profile, acid pH, and almost all non-sodic, overlying gravel, with soil depth to gravel varying from shallow to deep). The surface soil (A horizon) was broadly consistent in texture and chemical fertility across both soil forms, and would be stripped to either 300 mm or to the depth of either gravel or heavy clay B horizon, which ever was encountered first. Section 5.5 Vegetation identifies 90% of the study area as modified and disturbed. Patches of Plains Grassy Forest (EVC 151) and Plains Grassy Woodland (EVC 55) are present in road reserves, with gullies on the eastern side of the study area supporting Plains Grassy Forest and Valley Grassy Forest (EVC 47) communities. Remnant trees scattered through the area are predominantly Gippsland Red Gums (Eucalyptus tereticornis subsp. mediana), Red Box (E. polyanthus), and White Stringybarks (E. globoidea) (EHP 2020). Section 5.6 Soil and Site Hydrology covers plant-soil-interactions with surface water and runoff, noting GW table depth. It relates relatively low water storage capacity of the soil means that potential for exceedance of water storage capacity and resultant drainage to depth below the root zone could be relatively high unless deep rooted vegetation is present (extracting at depths).	Nil.
	EES Chapter 8 Section 8.1 (Geology, landforms and soils)	Section 8.1 of the EES provided information on the following landform units where considered in rehabilitation planning: plateaus, swales, valley slopes and flow channels (ephemeral creeks) draining the area.	Nil.
	Appendix A001: Landform, Geology and Soil Investigation Section 5.3	Two soils types were found in the project area sodosols and podisols.	Nil.
	EES Chapter 8 Section 8.2.3.2 Appendix A002: Ecology Investigations Report	This section provides a description of the existing vegetation found throughout the project area. The vegetation is dominated by Lowland Forest with Damp Forest and Shrubby Dry Forest ecosystems interspersed throughout the foothills. This bioregion is moderately cleared with more than half of the native vegetation remaining in a fragmented landscape.	Nil.
	EES Chapter 8 Section 8.3 (Groundwater) Appendix A003: Groundwater and surface water impact assessment)	Groundwater and surface water interactions within the project area are limited only to groundwater recharge. GDE's are likely to be limited within the immediate project area due to the elevated topography and significant depth to water. However, GDEs do exist further away from the project area in lower-lying areas where groundwater supports surface ecosystems.	Impacts on Groundwater in the Environmental and Social Impact Assessment Chapter (Section 9.2.5.3) notes drawdown impacts of groundwater extraction and altered topography are not predicted to limit the availability of groundwater for licenced users or GDEs.
Describe current agricultural and horticultural practices in the project area, including key factors influencing sustainable cropping and outputs. Yes	EES Chapter 8 Section 8.11 (Agriculture and horticulture) Appendix A015 Agriculture Impact Assessment	The baseline agricultural and horticultural assessments involved a desktop review and consultation with stakeholders and desktop resources and secondary data were reviewed to understand the type and value of existing agricultural production within the project area and surrounds. An average of 443 hectares will be removed from agricultural production during the Project and the rehabilitated. Land use in the Local Agriculture Region includes agriculture, plantation forestry and native forests. Agricultural enterprises include wool and meat sheep, beef, dairy, vegetable production and broadacre cropping. The specific Project Area comprises dryland agricultural grazing land (sheep and beef) and forestry plantations (blue gum and radiata pine) on freehold land, although traditionally it was a wool producing area. There are also areas of remnant native vegetation along gullies, creeks and roadside reserves.	The Assessment was a review of available desktop information and stakeholder consultation. No ground truthing of horticultural and agricultural data has occurred, rather the land use in the Project area is an estimation based on consultation and review of aerial imagery. Additionally, the reports do not give an indication if all relevant/affected landholders attended the interviews (to ensure representativeness).
	Appendix A015 Agriculture Impact Assessment	There are 19 landholders in the Project area and some Project Area land is operated as agricultural enterprises on a full-time basis by owner-occupiers while other land is used for part-time agricultural operations and lifestyle properties. Section 2.5 Agriculture in the Project Area describes agricultural practices and operations in the Project area. Grazing is the predominant primary land use (58%) followed by Blue Gum plantation and Pine plantation. Agricultural enterprises on the Project Area are undertaken nearly exclusively with owner-operator labour. Producers reported using contractors for silage/hay making, fencing, farm dam earthworks, fertiliser spreading and weed control. Based on consultation, contractors are required for a few weeks a year for each of the larger Project Area landholdings. Landholders interviewed advised that there is little roadside movement of livestock and only infrequent transport of farm machinery across the Project Area.	Nil.

		On-farm infrastructure and services are described. Key challenges/factors influencing sustainable cropping and outputs on the project area include management of soil health and substantial work required for weed control and associated with neighbouring areas relates to dust and radionuclides.	
	Appendix A016 Horticulture Impact Assessment	This report considers in depth the horticultural production, specifically fresh market vegetable production enterprises within the Lindenow Valley. Landholders in the Lindenow Valley are generally producers certified under the EnviroVeg or Freshcare Environmental schemes can provide proof of their responsible environmental management practices. The report indicates that sustainable production practices are becoming more important to consumers. The key concern for farmers is it is not clear whether consumers would assume that a sand mine would influence sustainable practices on farms. No land suitable for horticulture including vegetable production is present on the Project Area; however, 4,700 ha of suitable area is present in the Lindenow Valley. Key factors influencing sustainable cropping and outputs (outside of the project area) include quality rich alluvial free draining soils, suitable topography for intensive production, reliable rainfall and accessible irrigation. Section 5.3 outlines horticultural practices in the project area (neighbouring areas).	EnviroVeg is used to track industry progress regarding sustainable farming practices and assist farmer management. Membership requires annual completion of an internal self-assessment and continual improvement in sustainable practices. Freshcare operates as an industry benefit organisation, providing assurance standards for the Australian fresh produce industry. Mitigation to concerns includes a community engagement plan to actively manage issues with public perception; a working group with growers to discuss specific issues of concern and potential responses, encouragement to obtain EnviroVeg or Freshcare environmental certification and an annual local community event to attract visitors to the region.
	EES Summary Report Agriculture and horticulture	The land within the project area is used for dryland agriculture and to a lesser extent forestry and residential dwellings as well as public roads. The land is not identified as of strategic significance for agriculture or forestry. High quality horticultural production occurs within the Lindenow Valley northeast of the project area. Concerns have been raised by local residents and horticultural producers that excessive levels of dust generated by the project would reduce vegetable growth and yield and may lead to produce being rejected by large-scale buyers and lost revenue. Dust deposition modelling indicated no exceedances of air quality criteria at any sensitive receptors within one kilometre of the project area during construction. Air dispersion modelling during operations predicted dust deposition rates and concentrations of PM2.5 (very small particles less than 2.5 microns in diameter) would be below relevant air quality criteria at all sensitive receptors. Exceedances of PM10 (particulates less than 10 microns in diameter) were predicted during operations at up to 23 receptors for a maximum of four days of the year. Once mitigation measures were accounted for, these modelled exceedances were avoided.	A regulatory standard for dust deposition levels on vegetables does not currently exist. Mitigation measures to be applied and modelling conclusions.
	EES Summary Report Socioeconomic	The loss of land from agricultural and horticultural production represents an average annual gross margin loss of \$57,750 to \$83,000 per annum which equates to a lost value of production of approximately \$87,250 to \$125,250 per annum. This loss will directly impact 19 landholders with agricultural and forestry operations within the project area who will be compensated. Progressive rehabilitation will aim to return land to its former agricultural land use.	Nil.
	Appendix 020 Section 5	Section 5.4 Land Use in the project area is predominantly low-intensity grazing, with some forestry (exotic Pinus species and Tasmanian blue gum) in the south-western corner. East Gippsland lowlands, which represent the majority of freehold land in the region, are mainly used for broad scale grazing of sheep and cattle, with intensive horticulture and cropping being limited to the more fertile soils found in the river valleys and on the Redgum Plains. Intensive agriculture/horticulture is present to the north-east of the project area, on the deeper and more fertile soils of the floodplain of the Mitchell River, but not within the project area. In the general area of the Fingerboards plateau, there are areas that have visibly been tilled for cropping in the past, but – as would be expected for sandy soils of low chemical and physical fertility – cropping is not a significant or sustainable component of land use on the plateau area.	Soil physical and chemical characteristics on the proposed project area would limit sustainable cropping and outputs.
Has the EES characterised the relevant physical and chemical properties of overburden and topsoil materials to be used in rehabilitation? Yes	Appendix A001: Landform, Geology and Soil Investigation Section 4.2	Physical and chemical properties of overburden is provided in this Appendix and listed out within Table 4.	Nil.
	Appendix A001: Landform, Geology and Soil Investigation Section 7, 8 and 9	A total of 126 assays of topsoil samples from the project area, collected from previously drilled cores and the recent sonic drill holes, were collated. These samples were used provide a description of the physical and chemical properties for topsoil including description of: texture, pH, exchangeable Aluminium, exchangeable sodium, Electrochemical stability index, etc. Section 8 notes there may be potential to identify zones of similar characteristics, e.g. high and low aluminium, low and lower pH, and of higher ESP.	Nil.
	Appendix A001: Landform, Geology and Soil Investigation Section 10.6	This section provides a summary of topsoil and subsoils physical and chemical properties and the surrounding ecosystem function. Including the following components: soil capacity to store water, drought stress, deficiencies in P and K, acidic, hard setting when dry, dispersive and of low permeability when wet. These things produce very hard growing conditions for vegetation growth.	Nil.
	Appendix 020 Section 5	Section 5.7 Limiting Soil Factors for Site Rehabilitation notes that preliminary soil analysis [topsoil] shows despite considerable variation in properties, there are a number of inherent constraints to plant growth that occur sufficiently consistently to be considered characteristic of the site.	Research will be needed to identify appropriate materials for subsoil replacement, and to identify amelioration requirements and practices to ensure suitable "subsoil" performance.

		<p>Currently the reports indicate that there are widespread physical limitations associated with subsoils and the best management approach is replacing the existing subsoils with a layer of alternative material that will be more physically and chemically productive. Key limitations listed: acidity, sodicity (stability), subsoil clays (limitation to productivity), low water holding capacity (sandy textured soils surface and some subsoils), spatially variable deficiencies in P and K, and trace element (B, Cu) deficiencies.</p> <p>Section 5.8 Geology and Properties of Excavated Materials identifies materials as topsoil, overburden (including subsoil and ore materials) and [coarse] sand tailings and fine tailings.</p> <p>Material properties of concern due to clay dispersion were identified as exchangeable Magnesium, exchangeable Sodium and Calcium/Magnesium ratio for sand/clay and gravel overburden and exchangeable Sodium for coarse and fine tailings.</p> <p>Waste areas will not generate significant saline seepage or leachate. The potential for Acid mine Drainage (AMD) was concluded to be not of concern with no coastal Acid Sulphate Soils, overburden subjected to unsaturated/oxidised conditions long-term previously and low sulphate content and absence of pyrite in overburden and ore zones.</p> <p>Gypsum addition is required if overburden or tailings materials are placed within the surface metre of rehabilitated profile.</p>	<p>Continued monitoring of HHF waste properties will be a necessary part of mine/rehabilitation management.</p> <p>Section 6.2.1 identifies manufactured subsoil to comprise fine + coarse tailings (proven) or overburden + coarse tailings of 0.6-0.8 m thick with amendments of gypsum, fertiliser and organic material from within the planned disturbance footprint.</p>
<p>Are best practice methods proposed for storage and management of stockpiled topsoil and subsoils, restoring soil profiles, drainage and productivity, as well as landscape rehabilitation in the context of back-filling of the mine voids and decommissioning of other earth structures? (Assess levels of certainty of successful outcomes from the proposed design and mitigation measures and consequential performance management measures) Yes</p>	<p>Appendix A001: Landform, Geology and Soil Investigation Section 11.3</p>	<p>Section 11.3 provides detailed management recommendations for the project area the key findings include:</p> <ul style="list-style-type: none"> • Soil stripping to a depth of 300mm; • Prior to stripping vegetation to be cleared and grass to be retained and mixed into topsoil; and • Lime to be spread prior to stripping to increase pH to 5.5 (likely application rate of 2-6t/ha per 100 mm of topsoil). <p>Topsoils will be stripped prior to mining and either stockpiled or transferred directly to nearby rehabilitation areas. A Topsoil Management Plan will be developed and implemented to document topsoil management practices, including a topsoil balance to track available and required volumes. Specific topsoil rates to be applied could vary greatly depending on the subsoil mixtures that are recommended from initial trials, and on the results of regular analyses of the materials used to construct the subsoils.</p> <p>Best practice for topsoil stockpiling planned to include a Topsoil Management Plan, topsoil balance (available and required). Progressive rehabilitation of the void is planned with replacement of topsoil and overburden in the vertical order removed to re-establish soil profiles.</p>	<p>The report states no requirement for restriction of stockpile height when retained for less than 4 months; however, the Guidelines for environmental management in exploration and mining Section 3.2.6 notes stockpiles "...should be low (generally less than 2m in height), gently battered and located away from drainage lines."</p>
	<p>Appendix A001: Landform, Geology and Soil Investigation Section 11.4</p>	<p>This section indicates that soil profile reconstruction should be planned prior to disturbance building from the bottom up using bulk shaping, placing subsoil material, amending the subsoil, ripping, topsoil spreading, topsoil amendment and fertilisation, scarification and seeding (and planting where required).</p>	<p>Best practice restoration of soil profiles put forward; and further works required in terms of both materials used and methods for efficient and effective construction (would include typical optimisation based on site experience). Successful outcomes likely based on these practices, EPRs and mitigation.</p>
	<p>Appendix A020 Rehabilitation Section 5.7</p>	<p>For most native grass woodland areas, a manufactured subsoil will be used to provide a more productive medium for plant growth than the existing subsoils (trials underway).</p> <p>In valley slope areas where surface and tunnel erosion risk is higher than on the rest of the site, a gravelly clay overburden will be used as a subsoil to reduce erosion potential based on soil profile trial outcomes.</p> <p>For the areas with higher gradients or erosion potential – swales and plateau edges, valley side slopes, and channels – tree and shrub densities will be increased to lesser or greater degrees to reduce lateral seepage and to restore riparian ecosystems.</p>	<p>Good practice for resilience to erosion and protection.</p>
	<p>Appendix A020 Section 6</p>	<p>Fine tailings should be placed at a minimum depth of 3 metres in the re-constructed profile so that any restrictions to drainage are not so close to the soil surface as to affect growth of grass or trees (unless mixed with other appropriately permeable materials).</p> <p>Fine tailings will be placed a minimum of 40 m from the pit slope and are protected by a substantial perimeter wall and the pit perimeter bund. Operations methodology will also decrease any risk of spillage.</p> <p>Post-placement settlement assessed with a maximum potential total depth change of -1.4 m and the expectation based on scheduling that the majority of fine tailings settlement will have occurred by the time rehabilitation works are carried out without subsequent large settlement. Adding surcharge material to areas over fine tailings is planned along with monitoring and provision for placing additional material if required.</p>	<p>Good practice based on fine tailings characteristics and identified potential risks – drainage and settlement.</p>
	<p>Appendix A020 Section 7.3</p>	<p>The valley of Honeysuckle Creek at the end of the mine path has been broadened to reduce the overburden required to backfill the area. This allows the final mining void to be filled.</p> <p>A large stockpile at the end of mine life will be recovered north-west of the WCP and the sand and overburden used to backfill the mining void and the freshwater dam so no above ground storages or structures remain at the completion of rehabilitation.</p>	<p>Good practice to manage material and backfill final void reducing environment impacts and reducing risk post closure and rehabilitation.</p>
	<p>Appendix A020 Rehabilitation Section 7.5.6</p>	<p>Flow line paths have been designed to be returned to their original location with the exception of:</p> <ul style="list-style-type: none"> • Perry Gully, where the valley is planned to be filled to a gentle hill extending and lowering in height from the existing hill on the south side of the valley. • The Perry Valley in the west, where a temporary or permanent diversion within the broader designed valley will be investigated as an alternative to a large 'mine contacted' water dam. <p>The fundamental aim of rehabilitation works is to increase water storage in the soils, thereby maximising potential water use by grass and trees, and reducing both surface runoff and deep drainage.</p>	<p>Nil.</p>

	Appendix A020 Rehabilitation Section 7.5 Appendix 4: Estimates of Planting Rates and Densities	The first priority for all rehabilitation will be erosional stability, achieved principally by maximising vegetative groundcover. The overall revegetation strategy is to implement rehabilitation zones on the basis of landform, intended final land use, and perceived interactions between land use, vegetation, and landform. To return a significant proportion of land to its original land use an estimated percentage of final rehabilitation zones across the project area include: <ul style="list-style-type: none"> • 54.3% Plateau grazing • 9% Swales and plateau edges • 5.6% Valley slopes • 2.5% Channels • 16% Native grass woodland • 2.6% Road verge 	Nil.
	Attachment B Draft Work Plan	Section 4.2 Land Access and clearing notes that where possible, ameliorants such as lime, organic mulches, and fertilisers will be spread on in-situ topsoils prior to stripping which provides effective mixing and allows ameliorants to take effect more rapidly and more effectively. Where topsoil stockpiling is required for periods of over 4 months, the stockpile depth will be a maximum of two metres. Section 8.2 notes that prior to stripping, topsoils destined for areas to be rehabilitated to pasture or other agricultural land uses will be treated with soil conditioners, if required to maintain soil fertility and structure during stockpiling. Topsoil and overburden (which includes subsoil) will be stockpiled separately, adjacent to the active mine void within the disturbed area. Topsoil will be stockpiled to a maximum height of 2 m. If temporary overburden stockpiles are necessary, these will be constructed to a maximum height of 15 m. Long term stockpiles and bund walls (those to be retained for more than 18 months) will be revegetated with crops and grasses to stabilise and prevent erosion by wind and water	Good practice, meets requirements of Guidelines for environmental management in exploration and mining principles for soil stockpiling <2 m height.
	Attachment B Draft Work Plan	Section 8 notes dewatered / thickened tailings to be used in void backfill with rehabilitation treatments as summarised based on tailings fines content. Seepage recovery until tailings dewatered is planned. The ground underlying the original TSF location will be eventually mined for the underlying ore leaving no long-term legacy.	Good practice RE: drainage.
	Attachment B Draft Work Plan, Appendix C	Section 9.3 Rehabilitation Process notes that pre-mining soil seedbank sampling across all rehabilitation domains will help to characterise existing weed loads and inform soil management for rehabilitation. The section on subsoils outlines the manufactured subsoil composition and generation. The section on materials balance notes a shortfall in availability of bulk materials to be unlikely. Table 4-2 in the Work Plan and rehab strategies identify 'manufactured' subsoil combination of fine tailings and overburden. This and other materials are identified in a Life-of-Mine materials balance Table 9-1. Section 9.4 discusses landform design. Figure 9-3 shows pre-mining topography and post mining landform comparison considering the commitment for rehabilitation to similar to pre-mining conditions. Quite similar with consideration of an additional 1.3 m average height due to swell factors. Section 9.5 notes rehabilitation will be implemented progressively, to follow the mine path. Section 9.5 of the Draft Mine Rehabilitation Plan includes images of the planned rehabilitation schedule, showing cleared areas, active mining areas and areas under rehabilitation in the 1 year, 5-year, 8-year, 12-year, 15 year and 19 year horizons. Table 9-4 identifies knowledge gaps and proposed activities to address.	As required in the Preparation of Rehabilitation Plans: Guideline for Mining and Prospecting Projects (Earth Resources Regulation Victoria, 2020) Section 7.6 Rehabilitation Domains for each rehabilitation domain "A description of the availability and volumes of key materials required for rehabilitation (e.g. competent waste rock, subsoil topsoil, alternative growth media, capping materials, and materials characterisation for these materials)". The overall materials balance is provided, but not by domains as required under this guideline Section 7.6; to be undertaken on completion of mine design.
	Appendix A020 Rehabilitation Section 7.7	It is assumed that all fixed plant, buildings, and infrastructure will be completely decommissioned and removed prior to, or during the mine closure process. A decommissioning and demolition plan will be developed as part of the closure plan.	Nil.
	Attachment B Draft Work Plan, Appendix C	Section 9.4.3 Decommissioning outlines decontamination of plant and equipment, management of chemicals and hazardous substance stocks, scrap metal management and recyclables, etc.	Nil.
Are there design criteria in the EES to indicate the site will be suitable for the intended end land-use (agricultural and native areas) and does not result in long term degradation?	Appendix A020 Rehabilitation Section 9.4	Section 9.4 describes the Final Mine Closure design criteria and describes the return to primarily grazing land with limited long-term environmental alteration/degradation. The post-mining topography in the project area will be integrated with existing land surfaces and contours and will generally be similar to the pre-mining topography (except for Perry Gully and Honeysuckle Creek). Flow paths in the final post-mining landform will generally be returned to their current location.	Design criteria mainly relates to slope and depth of relevant layers in soil profile; these are the main considerations for environmental degradation.
Outline the proposed agreements with landholders with respect to the proposed changes to land use over the period of mine construction, operation, rehabilitation, decommissioning and post-closure.	Appendix A020 Rehabilitation Section 3	Agreements for land located within the mining licence are proposed to be individually negotiated with landowners in accordance with the requirements of the Mineral Resources (Sustainable Development) Act 1990 (Sections 85 and 87).	Proposed agreements not provided but content identified.

		<p>Kalbar will be required to lodge a rehabilitation bond and to enter into compensation agreements with owners and occupiers of the land affected by the project.</p> <p>Agreements for land located within the mining licence are proposed to be individually negotiated with landowners in accordance with the requirements of the <i>Mineral Resources (Sustainable Development) Act 1990</i> (Sections 85 and 87). The act sets statutory compensation requirements and will take into account (but not be limited to) the following:</p> <ul style="list-style-type: none"> • Land-use post mining (in most cases this is expected to reflect the pre-mining land-use); • Changes to landform (eg slope contours) aligned with the post mining land-use; • Agreed vegetation planting aligned with the post mining land-use; • Hand-back criteria (eg, productivity, weed density, soil condition) aligned with the post mining land-use; • Replacement or repair/maintenance of any infrastructure (eg, roads, fences, dams) located on the leased land; • Changes to land access (eg, access roads, gates) post mining; • Possible adjustment of livestock on alternative properties during the leasing period; • Ongoing compensation or rehabilitation obligations if land does not meet agreed hand-back criteria. 	
Has consideration been given to soil profile characteristics (physical/chemical), horizon depths, maximum slope geometry, factor of safety, plant-soil-water interactions for targeted vegetation communities? Yes (many in previous sections).	Appendix A020 Rehabilitation Section 7.4	Section 7.4 addresses the soil management requirements for rehabilitation, it takes into consideration the chemical and physical properties of the soil found in the region.	Nil. Discussed above in depth.
	Attachment B Draft Work Plan, Appendix C	Section 6 Post Closure Land Uses and Objectives identified typical gradients for post closure land use zones based on use e.g. plateau grazing, valley slopes, etc.	Nil.
	Appendix A020 Rehabilitation	<p>Section 6.2 identified horizon depths based on materials to be used and landform position for placement e.g. 0.5 m overburden treated with amendments below topsoil 300 mm.</p> <p>Section 6.3 Progression of mining and material placement identified stability linkages to maximum slope geometry:</p> <ul style="list-style-type: none"> • Re-creating slopes of similar or lower gradient – in particular for areas of higher gradient (>10%) which represent greatest erosion risk. Some slight increase in gradient may occur in areas where gradient is low (generally <5%); • Ensuring that flow concentration at points on the landform is no greater than currently occurs; • Maximising surface vegetative cover; and • Reducing surface runoff and deep drainage by maximising water use by vegetation. <p>There will be no tailings structures or other above ground structures retained; no factor of safety (FoS) relevant to rehabilitation. FoS considerations in geotechnical assessment was applied to the pit and relevant geotechnical risk zones. This is another consideration relevant to unplanned closure.</p> <p>Plant-soil-water interactions relate to tailings placement and were not identified as particular to any targeted vegetation communities, but instead relevant to tree root depth.</p>	Nil.
Are the performance requirements for the rehabilitation, including monitoring and auditing reasonable? Yes	Attachment B Draft Work Plan, Appendix C Section 7 Table 7-1	<p>The provisional rehabilitation and closure criteria are aimed to meet the ESS Rehabilitation objects. There will be auditing and reporting during operations and after completion including the following:</p> <ul style="list-style-type: none"> • Annual surveys of rehabilitated areas from commencement of mining operations to assess progress against criteria. • Compliance audits conducted with five years after completion of rehabilitation activities. • Internal compliance / performance reviews will be conducted annually. • Monitoring to continue until closure criteria met and land returned to landowners. • Twice yearly surveys of rehabilitated areas from commencement of mining operations to assess soil macronutrients in soils. • Ongoing monthly monitoring from EES approval, etc. <p>An independent audit of rehabilitation and closure activities will be conducted every 3 years to measure performance against the monitoring schedule and standards shown in Table 10-1 of the Draft Work Plan.</p>	These appear reasonable with the exception of gaps/comments in red raised some rows below.
Are the draft mine rehabilitation and closure plan, strategies for progressive rehabilitation, design criteria, completion criteria, monitoring provisions and contingency measures for un-planned closure reasonable and do they address potential risks including radiation, biodiversity and human health?	Attachment B Draft Work Plan	<p>Section 9 notes a plan for progressive rehabilitation includes:</p> <ul style="list-style-type: none"> • Allowing the disposed tailings and overburden material to settle and dry sufficiently to support earthmoving machinery. • Profiling to landforms designed for productivity, and long-term stability. • Placement and preparation of formulated subsoil mixes. • Applying and replacing topsoil stripped from the area. • Applying gypsum and other required soil conditioners. • Applying cover crop/pasture or native vegetation, where required. <p>A significant, contiguous block of land has been identified for the establishment of a native ecosystem similar to the endangered 'Plains Grassy Woodland' vegetation unit (EVC55).</p>	Nil.

		Adaptive management to include updating progressive rehabilitation strategies to reflect updated life-of-mine planning and rehabilitation performance and incorporate research and monitoring results into rehabilitation procedures.	
Attachment B Draft Work Plan, Appendix C	Section 6 Post Closure Land Uses and Objectives The most significant proposed change in land use is the removal of blue gum and pine plantations in the southwestern portion of the project area and their replacement with approximately 200 ha of native grassy woodland with a focus on 'Gippsland Red Gum Grassy Woodland and Associated Native Grassland' threatened ecological community.		Post mining land use determinations based on stakeholder and landholder consultation.
Attachment B Draft Work Plan, Appendix C	Section 7 Closure Criteria and associated monitoring includes <ul style="list-style-type: none"> Land capability equivalent or better than pre-mining condition (measuring pasture conditions e.g. biomass, dry matter productivity) Compliance with agreed post mining land use plan (audits within 5 years of completing activities) Species richness / diversity at 70% or more of reference sites with annual surveys Areas rehabilitated to a grazing land use are resilient, self-sustaining, and comparable to the surrounding undisturbed area (pasture biomass / dry matter productivity equal to or greater than reference sites via annual surveys). Major macronutrient (N, P, K, and organic C) concentrations in root zone (0 to 600 mm) are equal to, or greater than, those measured at comparable reference sites, and indicate that the soil is capable of sustaining required groundcover levels (soil monitoring twice yearly in rehabilitated areas). Other criteria relate to weed diversity (annual monitoring), air quality (dust – silica and heavy metals monthly monitoring), surface water and groundwater quality (quarterly monitoring against baseline), tailings dewatering (three monthly monitoring of consolidation during operations), landform designs achieve appropriate erosion rates (no subsidence or displacement of surfaces, voids or engineered slopes to comply with static and dynamic stability criteria defined in the project's Ground Control Management Plan (slope displacement and road pillar deformation monitoring during and after backfilling), geotechnical monitoring of landform and structures from completion of formation using drone aerial photos and Lidar data, Average surface radiation levels across site do not exceed background (baseline) for surface radiation levels, radon levels or activity levels with water (radiation surveys at project completion - annually for first two years...) etc.		Criteria provided is generally considered typical and reasonable. The following is also noted: Carrying capacity measurement should be considered for grazing land. Confirm auditing for post mining land use compliance will apply to progressive rehabilitation and not just at end of mine life. Confirm comparison to pre-mining information for land capability and not just reference sites. Confirm radiation surveys will be taken on rehabilitated areas during progressive rehabilitation and not just at project completion. Site contamination assessment should be undertaken during progressive rehabilitation if required based on incidents, historic or recent land use etc. prior to undertaking progressive rehabilitation of relevant areas. Specific criteria around human health relates to radiation and hazardous materials.
Attachment B Draft Work Plan, Appendix C	Chapter 9 of the Fingerboards Mine Draft Rehabilitation Plan provides the detail of how the project plans to incorporate adaptive management into progressive rehabilitation of the site. Progressive rehabilitation will begin from year 1 of mine operations with an area of approximately 80 ha to be rehabilitated each year of mine life.		The plan does not include detailed procedures for various components of the mine rehabilitation program.
Appendix A020 Section 6	Section 6.1 Mining Sequence identifies a rehabilitation and mine scheduling combination to allow sufficient void space for all mining activity, reduces stockpiling to a practicable limit, backfills final voids and allows void space and time for road construction and relocation. The mine schedule allows sufficient overburden to fill the final cells and restore surface contours at the end of mining. At that time, the majority of the project area will have been progressively rehabilitated, with closure involving rehabilitation of 360 ha of final pits and removal of infrastructure.		Nil.
Appendix A020 Exec Summary	Pasture productivity measured using harvests from enclosures will be compared against growth on comparable undisturbed areas, preferably using remote sensing to assess reasonably wide areas – provided suitable techniques can be validated.		Nil.
Attachment B Draft Work Plan, Appendix C	Section 5.1.10 Radiation Monitoring and Assessment notes "radionuclide content of surface soils in the project area and south of Bairnsdale–Dargo Road was found to fall within or below the global average radionuclide content of surface soils for uranium, thorium and potassium (K) 40... radionuclide content of surface soils in the project area north of Bairnsdale–Dargo Road is substantially elevated compared to the global average radionuclide content of surface soils for both uranium and thorium... due to the orebody occurring at, or closer to, the ground surface." Rehabilitation of the pit area after tailings disposal (containing trace amounts after ore processing but not constituting radioactive waste material) will mean that the overburden and subsoil cover will lead to further attenuation of the gamma radiation field. As a consequence, the external radiation dose at the surface will not be significantly different to the ambient background radiation levels in the region. SGS (2020) concluded that there will not be any significant long-term impact on radioactivity levels in groundwater arising from mining, mineral processing and the disposal of tailings and other waste. Radiation monitoring will continue prior to, during and post operations to determine that post mining radiation levels are lower than or match the pre-mining baseline levels.		Mitigations considered appropriate for risk profile.
Attachment B Draft Work Plan, Appendix C Section 7	The closure criteria information is tabled in Table 7-1 of the Draft Mine Rehabilitation Plan along with the measurement tool and timeframe that will be the method to indicate satisfaction of closure objectives. Post closure performance monitoring will continue until such time as all completion criteria are met and final lease relinquishment achieved.		Nil.

	Attachment B Draft Work Plan, Appendix C Section 9.4.5	In the event of a temporary suspension of operational activities, the Mineral Resources (Sustainable Development) Act 1990 and relevant occupational health and safety legislation would be used to guide development of a Suspension Plan. In the event of sudden, unanticipated permanent cessation of mining operations, a final closure report would be immediately prepared and, if necessary, a post-closure monitoring schedule would be developed.	Nil.
	Attachment B Draft Work Plan, Appendix C Section 8	Section 8 of the Mine Rehabilitation Plan identifies and addresses the key project rehabilitation and closure risks and mitigation measures for these risks. Appendix A of this document provides a summary of risks and mitigation measures relevant to mine rehabilitation.	Inadequate information provided relevant to unplanned closure. Additional consideration of the void – stability, erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided.
Does the EES demonstrate that the final landform will be stable from erosion and minimise the potential for sediment transport? Yes (addressed prior)	Attachment B Draft Work Plan, Appendix C Section 8.2	Section 8.2 indicated the mitigation measures to be undertaken to ensure that the final landform design does not contribute to local erosion or sedimentation issues.	Nil.
Key Concerns for Council			
Is there consistency between technical reports?	Rehabilitation strategies, considerations, etc. were consistent between reports. The Mine Closure and Rehabilitation Plan provides the most overarching information read in context with the Work Plan and specifically provided clarity about the pre-mining land use of plantations being modified to replace with threatened community vegetation and a high-level linkage to stakeholder consultation which was absent from much of the other documentation.		
What are the key risk issues?	<p>The key risk issues based on the report and review of identified mitigations, management etc. relate to:</p> <ul style="list-style-type: none"> • Closure criteria – Based on review, the following feedback and/or checks are considered relevant to the proposed performance criteria and associated monitoring/measurement: <ul style="list-style-type: none"> - Carrying capacity measurement is not included for grazing land. - Auditing for post mining land use compliance is applicable to progressive rehabilitation and not just at end of mine life. - Comparison to pre-mining information for land capability etc. is not identified while the pre-mining or better condition is the target. - Radiation surveys and monitoring should be undertaken on rehabilitated areas during progressive rehabilitation and not just at project completion. - Site contamination assessment is not considered or related to progressive rehabilitation <u>should it be required</u> based on incidents, historic or recent land use impacts etc. prior to undertaking progressive rehabilitation of relevant areas. • Unplanned closure – in our opinion inadequate information is provided about specific risks associated with unplanned closure and how they would be considered to meet the rehabilitation success and performance. Specifically, additional consideration of the void (stability), erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided in context of unplanned temporary (care and maintenance) or permanent closure. • Proposed agreements with landholders – while this has been identified as a requirement in the rehabilitation planning, considerations and content are outlined without definition of proposed changes to land use through construction, operations, etc. to closure. 		
Are the proposed EPRs adequate?	The proposed environmental performance requirements are generally considered adequate and management and processes meet and sometimes exceed good industry practice aside from the key risk issues raised.		
Other	<p>Other observations from the review included:</p> <ol style="list-style-type: none"> 1. When the risk assessment of closure is undertaken across the disciplines, this appears to only look at the closure process i.e. during closure, and not necessarily post-closure. Poor quality runoff impacts surface water quality (outside of sediment dams spillway discharge) but does not appear to be addressed in the surface water environmental impacts assessment chapter for surface water impacts at closure; however, Section 7.3 of the Work Plan has a target "Concentration of soluble contaminants and suspended sediment / turbidity in runoff water from rehabilitated areas does not exceed that present pre-mining runoff or (if insufficient data available for pre-mining runoff) does not exceed concentrations in runoff from agreed analogue areas." There are however a range of relevant criteria in the closure plan that address these aspects despite this. 2. While Council may not see or approve the bond; it is worth noting that the bond estimate should reflect the rehabilitation strategies outlined in these documents including amelioration rates of 50% of areas with lime treatment; 20% minimum or 30-50% with additional fertiliser application and gypsum addition to valley slopes over gravelly overburden with topsoil ripped/mixed in. 3. Material volumes were not addressed by domain; however, this is not significantly impactful from a rehabilitation and closure planning view given there is a high-level site wide materials balance provided, it is more relevant to compliance with the relevant guideline. 		

3.13 Social Impact Assessment

Relevant documentation considered as part of this review includes:

- Scoping Requirements for Fingerboards Mineral Sands Project Environmental Effects Statement March 2018;
- Environment Effects Act 1978;
- Mineral Resources (Sustainable Development) Act 1990;
- Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019; and
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Attachment A018 – Socioeconomic Impact Assessment, August 2020
 - Appendix A015 – Agriculture Impact Assessment, August 2020
 - Appendix A016 – Horticultural Impact Assessment, August 2020
 - Appendix A017 – Cultural Heritage Impact Assessment

The review also considers the following guidelines:

- The Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978,
- Enduring Value – The Australian Minerals Industry framework for sustainable development,
- Community Engagement Guidelines for Mining and Mineral Exploration in Victoria; and
- East Gippsland Social Impact Assessment Guidelines for Development Applications.

Table 14 Social Impact Assessment

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES characterised the social structure of the local communities including population, demographics, employment, infrastructure, community groups, housing/accommodation availability.	Appendix A018 – Social Impact Assessment: Section 5.5 Demographic Profile	This section provides a demographic snapshot of the study area and describes the population size, age profile, education and training, health, cultural diversity and relative advantages/disadvantages within the area.	The demographic profile of the region is considered adequate.
	Section 5.5.1 – Population size and growth	In 2016, the population of East Gippsland Shire was 45,040 and the population of Wellington Shire was 42,983. Both the East Gippsland and Wellington shires experienced population growth between 2011 and 2016.	The population assessment is considered adequate.
	Section 5.5.2 – Age distribution and gender	Age and gender characteristics provide an indication of the general character of a community, as well as its existing and future needs. This section provides a description of the East Gippsland and Wellington shires as well as other surrounding regions age and gender distributions.	Age and gender assessment considered adequate.
	Section 5.5.3 – Family structure and household composition	The way in which households and families are structured can indicate the character of the built environment, along with the social relationships within the community. This section provided a description of these components in relation to the project.	Assessment considered adequate.
	Section 5.5.4 – Education and training	This section provides a snapshot of the educational and training structure and average attainment within the relevant regions.	Assessment considered adequate.
	Section 5.5.5 – Health and public safety	This section provides a description of the region's key health concerns and public safety risk factors. It also provides key health and community wellbeing indicators.	Assessment considered adequate.
	Section 5.5.6 (Special needs) and Section 5.5.7 (Relative socioeconomic advantage and disadvantage)	This section provided an indication of the vulnerable communities found throughout the region and indicated that Gippsland region has a number of areas with a moderate level of socioeconomic disadvantage, characterised by lower levels of income, lower educational attainment, employment in unskilled occupations and dwellings without motor vehicles.	The EES does not provide an indication of how the Project will aim to be sensitive towards or assist these existing vulnerable communities.
	Section 5.5.8 – Housing and accommodation	This section provides a description of the following housing and accommodation statistics property and rental prices, housing availability, short-term accommodation and land values.	Assessment considered adequate.
Does the EES describe community attitudes to the existing environment and the potential changes brought by mining and associated operations.	Appendix A018 – Social Impact Assessment: Section 2 (Methods)	An understanding of community concerns about the project has been informed by comments raised at a community values workshop held in March 2018, a community meeting in July 2018, interviews with landholders adjacent to the project area in 2018, and community surveys conducted by Kalbar in 2017 and 2018. 2017 community survey contacted 500 people from Kalbar's stakeholder email database with 263 responses to provide insight to community perceptions. 2018 independent survey to understand the level of awareness community members has about the Project and ESS process with 150 residents participating (28% response rate). 50 people attended the 2018 community values workshop.	8 out of 11 landholders within 1km of the project area accepted the invitation to participate in an interview with Coffey staff. Five horticultural producers and four nearby grazing and dairy operators along with representatives from the East Gippsland Food Cluster were consulted as part of the agricultural assessment.
	Appendix A018 – Social Impact Assessment: Section 5.9 Socioeconomic values	Members of the local community including landholders adjacent to the project area and community members from surrounding towns were consulted to identify what they value about their area and what appeals to them about living there. Values were then classified into themes and socioeconomic values as indicated by Table 5.23. When asked to choose from a series of statements about what best described their attitude to mining (noting that respondents could choose more than one response), the most commonly selected responses were 'I support mining subject to proper environmental controls' (47%) and 'I support mining that brings regional economic benefits' (35%). Following this, 34% of respondents selected the response 'I support the Fingerboards Mineral Sands Mine' and 33% of respondents selected the response 'I oppose the Fingerboards Mineral Sands Mine'.	Generally, the feedback from stakeholder engagement was mixed with strong opinions in support and opposition of the mining activities. There is also no specific strategy to ensure that the people opposing the development are incorporated into project development and mitigation measures. This should be addressed as concerned members of the local community will cause the most delay and resistance to the project's development.

	<p>Appendix A018 – Social Impact Assessment: Section 6.1.6 Cohesive Community</p>	<p>Concern was also raised over how the project had already affected community cohesion in the area and had the potential to change the ‘general feel of the local area’ due to the movement of heavy vehicles, influx of construction workforce, earthmoving and mining operations.</p> <p>In the mitigations against community cohesion it is stated that a local employment framework will be developed with procedures for achieving transparent recruitment, equal opportunities and equitable employment conditions.</p> <p>Kalbar will also work with the local chamber of commerce to establish incentives for new residents to buy locally and support local community initiatives and events to reduce the potential for community division.</p> <p>Kalbar will conduct ongoing monitoring of the origin of employees and contractors and the origin of employees to receive formal training by Kalbar and review this on an annual basis.</p>	<p>As mentioned, there is no recognised implementation plan for these mitigation measures, Kalbar has not provided an example local employment framework, or information on how they will practically implement an incentive program for new residents to buy locally.</p> <p>Kalbar’s Local Content Guidelines discussed in section 6.3.2 could be explored further to deliver this local employment framework. It doesn’t address these matters directly but seems to have other relevant considerations. Also See table 6.12 makes some broad commitments on employment. The ideas of how to deliver a local employment and procurement guideline have been discussed and overarching commitments made (refer section 6.4.3) but, the implementation strategy/social management plan has not been prepared.</p>
	<p>Appendix A015 – Agricultural Impact Assessment</p>	<p>In consultation conducted as a part of this assessment in one-on-one meetings with Kalbar, landholders within the project area also raised concerns about the effectiveness of the final rehabilitation process and their ability to return the land to its former agricultural land use and productivity levels.</p>	<p>Section 6.9.1 confirms that Kalbar will be required to produce a rehab plan which is approved by the Minister prior to construction. Section 6.9 states there is a Rehab and Closure plan with overarching goals that include being able to sustain post mining land uses agreed with stakeholders. The plan may have more detail on how this is to be achieved and whether it includes the potential improvement procedures raised in the Agricultural Impact Assessment. In comparison recommendations from the Horticultural Impact Assessment are found as mitigation measures in table 6.13.</p>
	<p>Appendix A018 – Social Impact Assessment: Section 4 Community Response to the project</p>	<p>This chapter summarises key feedback and concerns raised by the Gunaikurnai, adjacent landholders and other members of the broader community in relation to the project. The chapter outlines how key areas of community concern have assisted in informing the preparation of the SEIA report. Information is also summarised on how queries and concerns raised by the community and other stakeholders in relation to the SEIA have been responded to.</p> <p>Table 4.2 of section 4.3.3 provides a summary of concerns raised during community engagement for the EES more broadly as well as the SEIA, and where they have been addressed as a part of the SEIA.</p>	<p>Key community concerns have been grouped into the following themes:</p> <ul style="list-style-type: none"> • Health, public safety and wellbeing. • Economic. • Community wellbeing and connection to the land. • Water. • Biodiversity. • Other concerns.
	<p>Appendix A018 – Social Impact Assessment: Section 5.10 Cultural values Appendix A017 – Cultural Heritage Impact Assessment:</p>	<p>This section additionally identifies the cultural heritage values for the areas. Potential impacts to known and presently unknown tangible and intangible cultural heritage values resulting from project-related activities are those typically associated with the physical activity of mineral extraction. Physical disturbance of the ground surface through vegetation clearance, topsoil stripping, subsoil excavation, the creation of tailings storage facilities, borrow pits, spoil dumps, and ore extraction itself all have the potential to cause high levels of disturbance to cultural heritage values.</p> <p>At the time of writing the cultural heritage impact assessment, no formal statement had been received in relation to the cultural values reflecting the cultural, emotional and spiritual attachments that Gunaikurnai Traditional Owners may have to the activity area.</p>	<p>To better understand cultural values, a Cultural Values Workshop was held in December 2018 for the EES. It was noted that the Traditional Owner representatives were absent at this workshop. Section 2.5.3 of the SIA states there was a March 2019 meeting with the traditional owner group represented by GLaWAC where key areas of concern were raised as stated in Section 4.1. Section 5.10 comments that there is no statement of cultural values provided. Further consultation in the form of a Cultural Values Workshop, or a direct method of engaging with the Traditional owners should they prefer, to ascertain their concerns over specific intangible heritage values is required. Traditional owner engagement should be undertaken and incorporated into the findings of the EES before the Project is finalised.</p> <p>Access to economic opportunities if the mine proceeds: included queries relating to what training and employment opportunities will be available for Aboriginal people on the project.</p>
	<p>Appendix A018 – Social Impact Assessment: Section 6 Impact assessment and mitigation</p>	<p>An assessment was then conducted on potential project impacts on the identified socioeconomic values and community concerns. This considered the likelihood of harm to the socioeconomic values and consequence if harm was to occur and how mitigation procedures will be produces.</p> <p>This section also provides a sweet of risk assessment summary tables for all identified socioeconomic values Table 6.1 – Table 6.16. The tables include identification of the proposed impacts, standard mitigation measures and additional mitigation measures proposed by Kalbar.</p> <p>Table 6.17 provides a summary of the potential impacts on socioeconomic values outlined in Section 6. This includes a summary of the risk assessment and the management measures to be adopted to reduce potential impacts on socioeconomic values and maximise potential opportunities associated with the project.</p>	<p>The process for implementing these mitigation measures will be detailed in the Social Management Plan that will be prepared for the project prior to construction commencing in consultation with key stakeholders such as East Gippsland and Wellington Shire Councils and Earth Resources.</p> <p>This management plan and associated sub plans need to be prepared prior to the finalisation of the EES. This will provide an opportunity for Council’s, other relevant stakeholders and the regulator to assess these mitigation strategies and provide input.</p> <p>A community fund is highlighted as one of the additional mitigation measures to be provided by Kalbar. However, there is no implementation plan or objectives/goals demonstrated in the EES documentation for this community fund.</p> <p>A community reference group will be established to provide a point of liaison and communication with the local community during project construction and operations.</p> <p>An environmental review committee will also be established to involve the community in reviewing the environmental performance of the project throughout LOM.</p>

Does the EES adequately define the industry and business (including agriculture, dairy, horticulture, forestry and tourism) at the project site and adjacent region.	Appendix A018 – Social Impact Assessment: Section 5.6 Economic Profile	Economic profile focuses on the Regional Economy (overall) and the key sectors of Tourism, Agribusiness, Seafood and Mining. The definition of business and industry included in the EES can be considered high-level, generally focusing on output and export indicators. Unemployment rates at a local, regional and state level and skills and commentary on labour shortages for key industry sectors are described. Income levels are briefly described. Definition/description of local businesses structure is very brief and anecdotal, no statistics provided. Source of employment describes the main employing sectors and specific employing businesses in the study area using a range of different references (some quite dated). Local and regional short-term accommodation businesses are identified in terms of establishments, rooms, beds, occupancy rates etc.	Industry and business definitions are generally adequate at a high-level; however, detailed analysis of local/regional industry, business, and workforce is lacking. More detailed information of the following would enhance definitions: <ul style="list-style-type: none"> • Industry structure (e.g. number and share of resident workers by industry sector at a local & regional level) • Business counts by sector (e.g. number and types of businesses located locally/regionally by industry sector) • Occupational structure (e.g. number and share of resident workers by occupation at a local & regional level).
	Appendix A015 – Agricultural Impact Assessment Section 2	This section provides a breakdown of the regional agricultural business found throughout the local agriculture region. Agriculture structure, land use activities and capacity, and output are defined in this report. Table 1 provides estimated value breakdowns across all the local industry markets.	Given that ABS data is self-reported by agricultural producers there is some potential for inaccuracy in aggregated data, the total production values are predicted to be greater than determined in the report. The ABS data utilised in forming the descriptions of agricultural production values is from 2016 and earlier. This could also lead to on ground inconsistencies as the data is outdated.
	Appendix A015 – Agricultural Impact Assessment Section 2.5 Agriculture in the Project Area	This section provides a breakdown of the agricultural enterprises occurring within the project area. Including dairy, horticulture, and forestry, land use activities and capacity, and economic output. The analysis identifies 19 land holders who are primarily grazing operations.	Agricultural definitions are generally adequate, but could be enhanced by the following: <ul style="list-style-type: none"> • Specific details on number of enterprises and employment for each agricultural sub-sector.
	Appendix A015 – Agricultural Impact Assessment Section 5.1.2 Impact on the Neighbouring Vegetable Industry	This section provides a summary of potential impacts on vegetable growers in close proximity to the Project area. It discusses potential impacts from dust and competition with the mine for laborers and machinery operators.	The agricultural impact assessment makes note that the technical studies are being undertaken to determine the level of impact from the mine to the local vegetable industry, this will need to be updated to include the latest results and actual impacts to local farmers. Section 5.1.2 also refers to current technical studies and a subsequent project EMP, we're not sure of the status of these documents. Table 6.13 also discusses specific horticulture and agriculture mitigation measures and references further detail in the horticultural impact assessment.
	Appendix A016 – Horticultural Impact Assessment	The objective of the horticulture impact assessment is to assess the potential impact of the proposed mining operation on nearby horticultural businesses within the Lindenow Valley. Horticultural land use, crops, seasonality, businesses, revenue and value adding are defined in this report.	The assessment identified key values, risks and mitigation of horticulture production within the Lindenow Valley. The horticultural definition is considered adequate.
Has the EES identified opportunities and potential benefits to local workers, businesses and suppliers of goods and services that could support the project.	Appendix A018 – Social Impact Assessment: Section 3.5 (Workforce Requirements)	Indirect employment is generated through demand for goods and services that is produced in other sectors from the demand generated by the mining activity. Its estimated that the project will indirectly create a further 200 jobs during operation of the project through the supply of goods and services to the project. Kalbar has conducted a review of local services and supplies available to support the construction, operation, and closure of the project. Table 3.3 of Section 3.5 displays the services and supplies required by the project that can be sourced from the Gippsland region, from towns such as Bairnsdale, Sale and Traralgon. The only key services not able to be sourced in the region include drilling and port services.	The EES satisfactorily identifies potential benefits to workers, businesses, and suppliers, with the following caveats: <ul style="list-style-type: none"> • While direct construction jobs have been estimated, indirect jobs for the construction phase have not been calculated. This gap understates the employment benefit of the construction phase of the project. While indirect job creation generally benefits the wider national and state economies, some indirect employment benefits are likely to accrue at a local/regional level. • The term 'jobs' needs to be expressed consistently throughout the EES. At present the term employment is expressed interchangeably between jobs/people employed and Full Time Equivalent (FTE) positions.
	Appendix A018 – Social Impact Assessment: Appendix D: Economic Impact Assessment Section 1.9 Indirect benefits	On average, those workers directly employed by Kalbar earn \$101,882 per annum while contractors earn \$76,952.9 For those directly employed by the mine, when compared to the average wage in the region of \$49,54310, the net economic benefit for each direct employee is \$52,339.	Cumulative impacts-effects associated with known/planned and potentially concurrent regional infrastructure projects are not considered. Concurrent projects might create competition and associated impacts for labour/skills supply/availability in local and regional communities. Competing projects (depending on planning approvals, financing and construction timing), might include road, rail, renewable energy – including the Star of the South Offshore Wind Farm, hospital, education, tourism, irrigation projects, bushfire recovery projects etc which could commence across Gippsland over the coming years.
	Appendix A018 – Social Impact Assessment: Appendix D: Economic Impact Assessment Section 1.11 Results of the Cost Benefit Analysis	The indirect benefit includes \$50.0 million (in NPV terms) of net economic benefits to Victorian workers (excluding contractors). As outlined above, the benefit is derived from the increased wages earned at the project, when compared to alternative employment. The indirect benefit also includes \$209.4 million (in NPV terms) of net economic benefit to local Victorian suppliers (excluding suppliers to contractors). Table 1-10 provides a breakdown of the monetary benefits and costs associated with the project.	

Has the EES reasonably defined the existing infrastructure in the project area and adjacent region (including water supply, irrigation works, power transmission lines, local and regional roads and rail).	Appendix A018 – Social Impact Assessment: Section 5.7 Social and community infrastructure	This section incorporates information of the following types of infrastructure located within and surrounding the project area educational infrastructure and services, healthcare infrastructure and services, emergency services, community facilities and groups and utilities and services.	The EES generally provides a reasonable definition of infrastructure in the project area and the assessment is considered adequate. There is a need for Kalbar to provide greater detail around mitigation measures and potential community benefits of the Project. There is limited indication as to whether the project will provide the local community with any new infrastructure or investment. This information should be documented in detail in the Project's Social Management Plan.
	Appendix A018 – Social Impact Assessment: Section 5.8 Transport and access	This section includes a description of the existing roads, rail and public transport facilities surrounding the project area.	
Does the EES assess the effects (extent, duration, likelihood and implications of the effects) on communities living within or near the project area in terms of dislocation, severance or disrupted access to social networks, community facilities and valued places such as Mitchell River National Park	Appendix A018 – Social Impact Assessment: Section 6.1.5 Access and connectivity	This section provides an overview of connectivity issues and disruptions to be experienced by the surrounding community as a consequence of the project. This section refers to primarily structural connectivity issues relating to road blockages or stock route changes for local farmers.	The assessment of effects on communities is generally considered adequate. The SIA identifies the likelihood of key risks to community connection and addresses the implications of this disruption.
	Appendix A018 – Social Impact Assessment: Section 6.1.6 Cohesive community	The project has the potential to create divisions in the community between those who support it and those who oppose it. These divisions have the potential to impact on community cohesion. The influx of workers from outside the project area and surrounds during construction and operations also has the potential to alter how community members interact with each other. This section provides an overview to the risks the project could cast over community cohesion and social interaction.	
	Appendix A018 – Social Impact Assessment: Section 6.2 Connection to and use of the land	The temporary change in land use from agriculture to mining and the physical disturbance of land could alter the way in which people interact with and connect with their local environment including recreational areas and places of cultural heritage and historic heritage significance this section provides potential impacts to the communities connections to land.	
	Appendix A018 – Social Impact Assessment: Section 6.2.4 Recreation	While the project will alter the local road network that provides access to protected natural environments such as the Mitchell River National Park, access to these areas will be maintained during the construction and operations phases. No road works will occur on roads used to access areas such Den of Nargun and Dargo including Wy Yung Calulu Road and Friday Creek Road.	The EES does not include a detailed description of the disruption's communities will face in relation to the valued places such as Mitchell River National Park. There is also limited assessment of how the project will impact local tourism and in turn the local economy.
Has the EES adequately assessed the potential effects on workforce development opportunities in the local and wider region as a result of the project.	Appendix A018 – Social Impact Assessment: Section 3.5 (Workforce Requirements)	Estimations of the workforce requirements are provided. The on-site and off-site construction workforce is estimated to be up to 200 people and will include approximately 10 Kalbar staff. Where possible, construction workers will be employed from the local area. The operations workforce is likely to consist of about 200 people. Kalbar expects to source most of the workforce locally, with the opportunity to train personnel once the mine is operational. No construction camp will be required. Contractors and employees may be transported by bus from neighbouring towns to the mine site, which will reduce road traffic and the area required for vehicle parking. The project will not rely on fly-in-fly-out workers.	The focus of workforce is on local and sub-regional employment scale and the potential effects and opportunities associated with the project are not supported in detail by a management plan or implementation plan.
	Appendix A018 – Social Impact Assessment: Appendix D: Economic Impact Assessment Section 1.7 Opportunity for Skills development	The mine development offers an opportunity for those in East Gippsland to enhance the skill base of the region. The skills profile of minerals sand mining does require a relatively high proportion of those educated to Year 10 and above, these operations also require a higher proportion of those with Certificate III and IV education (as well as bachelor's degrees and post graduate qualifications). The mine therefore offers an opportunity, indeed the incentive, for that proportion of residents in East Gippsland to attain further education, notably Certificate III and IV qualifications to gain employment in the mine.	This assumes that people have the desire or capability to put themselves through higher education training. Many people cannot simply afford gaining qualifications and these people are usually to most vulnerable within the community.
Key Concerns for Council			
What are the key risk issues?	Appendix A018 – Social Impact Assessment: Section 5.10 Cultural values Appendix A017 – Cultural Heritage Impact Assessment:	At the time of writing the cultural heritage impact assessment, no formal statement had been received in relation to the cultural values reflecting the cultural, emotional and spiritual attachments that Gunaikurnai Traditional Owners may have to the activity area.	Further consultation in the form of a Cultural Values Workshop, or a direct method of engaging with the Traditional owners should they prefer, to ascertain their concerns over specific intangible heritage values is required.

	Appendix A018 – Social Impact Assessment: Section 5.9 Socioeconomic values	Generally, the feedback from stakeholder engagement was mixed with strong opinions in support and opposition of the mining activities. A key concern for some stakeholders is the proponent (Kalbar) and how it conducts its engagement activities. There was a feeling from some members of the community that Kalbar does not respect the landowners or the local community;	There is also no specific strategy to ensure that the people opposing the development are incorporated into project development and mitigation measures. This should be addressed as concerned members of the local community will cause the most delay and resistance to the project's development.
	Appendix A018 – Social Impact Assessment: Section 6 Impact assessment and mitigation	The implementation strategy/social management plan for proposed mitigation measures throughout the SIA has not been prepared.	Whilst the Risk Assessment and proposed Mitigation Measures under Table 6.1 of the Socioeconomic Assessment are generally clearly outlined. The process for implementing these mitigation measures is a Social Management Plan that will be prepared for the project prior to construction commencing in consultation with key stakeholders including, East Gippsland Shire. The absence of a Draft Implementation Strategy/Social Management Plan as part of the Draft EES is a concern, the key stakeholders and the broader community, including traditional owners, should have the opportunity to review and comment on the proposed implementation strategies that will mitigate and/or compensate for projects impacts as well as those strategies that will provide future community and regional benefits (directly & indirectly).
		Cumulative Impact (Effects) Assessment has not been undertaken for the EES. If cumulative impacts were subsequently assessed, this might result in a need adjust/ add to these mitigation measures depending on risk levels identified.	Because there is no 'cumulative impacts assessment' as part of the EES (also noted in the Economics Peer Review), this limits the proponents/projects ability to understand the impacts of the competing interests of other regional and sub-regional projects on the labour market, the vulnerable members of the community, businesses, Council's, NGO's, community groups and sporting groups etc. The combination of no cumulative impacts assessment and no implementation strategy makes it difficult for key stakeholders and the broader community, including traditional owners, to quantify the impacts and expected benefits of the proposed project.
Are the proposed EPRs adequate?		The proposed environmental performance requirements are generally considered adequate other than the key risk issues raised, and the gaps identified in this review.	As indicated in the key risk issues.
Is there consistency between technical reports		Yes, in the technical studies that were directly relevant to the Socioeconomic Impact Assessment.	N/A

3.14 Economic Impact Assessment

Relevant documentation considered as part of this review includes:

- Fingerboards Mineral Sands Project Environmental Effects Statement Summary Report, August 2020
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Appendix A015 – Agricultural Impact Assessment, August 2020
 - Appendix A016 – Horticultural Impact Assessment, August 2020
 - Appendix A018 – Socioeconomic Impact Assessment, August 2020
- The review with also considers the following relevant scoping and impact assessment requirements:
- Scoping requirement: To minimise potential adverse social and land use effects, including on agriculture, dairy, irrigated horticulture, tourism industries and transport infrastructure
- Assessment and mitigation requirements:
 - Assess the potential economic effects (beneficial and adverse) which could result from the project, including opportunities for business and for existing businesses.
 - Assess the potential effects on workforce development opportunities in the local and wider region as a result of the project.
 - Outline measures to minimise potential adverse effects to local businesses and to enhance potential benefits to local and regional businesses.

Table 15 Economic Impact Assessment Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the EES adequately defined industry and business (including agriculture, dairy, horticulture, forestry and tourism) at the project site and adjacent region?	Section 5.6 Appendix A018 - Socioeconomic Impact Assessment	<p>Economic profile focuses on the Regional Economy (overall) and the key sectors of Tourism, Agribusiness, Seafood and Mining. The definition of business and industry included in the EES can be considered high-level, generally focusing on output and export indicators.</p> <p>Unemployment rates at a local, regional and state level and skills and commentary on labour shortages for key industry sectors are described. Income levels are briefly described.</p> <p>Definition/description of local businesses structure is very brief and anecdotal, no statistics provided.</p> <p>Source of employment describes the main employing sectors and specific employing businesses in the study area using a range of different references (some quite dated).</p> <p>Local and regional short-term accommodation businesses are identified in terms of establishments, rooms, beds, occupancy rates etc.</p>	<p>Industry and business definition generally adequate at a high-level; however, detailed analysis of local/regional industry, business, and workforce is lacking. More detailed information of the following would enhance definitions:</p> <ul style="list-style-type: none"> • Industry structure (e.g. number and share of resident workers by industry sector at a local & regional level) • Business counts by sector (e.g. number and types of businesses located locally/regionally by industry sector) • Occupational structure (e.g. number and share of resident workers by occupation at a local & regional level)
	Chapter 2 Appendix A015 - Agriculture Impact Assessment	Agriculture structure (including dairy, horticulture, and forestry), land use activities and capacity, and output are defined in this report.	Agricultural definition generally adequate, but could be enhanced by the following: <ul style="list-style-type: none"> • Specific details on number of enterprises and employment for each agricultural sub-sector.
	Chapter 5 Appendix A016 - Horticultural Impact Assessment	Horticultural land use, crops, seasonality, enterprises, output, value adding are defined in this report.,	Horticultural definition considered adequate.
Has the EES identified opportunities and potential benefits to local workers, businesses and suppliers of goods and services that could support the project?	Section 5.6 Appendix A018- Socioeconomic Assessment	<p>Direct construction project jobs (200) and services are identified to include activities such as project management, engineers, supervisors and planners, mining contractors, electricians, mechanical fitters, instrumentation and IT, general construction labourers (construction).</p> <p>Operational jobs (193) comprise permanent Kalbar employees 63 jobs and contractors 130 jobs (e.g. truck drivers, equipment operators).</p> <p>Table 3.3 presents a high-level audit of business services currently available in the Gippsland Region that could potentially supply services for each phase of the project. These services are principally located in Bairnsdale, Sale and Traralgon.</p>	<p>The EES satisfactorily identifies potential benefits to workers, businesses and suppliers, with the following caveats:</p> <ul style="list-style-type: none"> • While direct construction jobs have been estimated, indirect jobs for the construction phase have not been calculated. This gap understates the employment benefit of the construction phase of the project. While indirect job creation generally benefits the wider national and state economies, some indirect employment benefits are likely to accrue at a local/regional level. • The term 'jobs' needs to be expressed consistently throughout the EES. At present the term employment is expressed interchangeably between jobs/people employed and Full Time Equivalent (FTE) positions.
Has the EES adequately assessed the potential effects on workforce development opportunities in the local and wider region as a result of the project?	Section 3.5 Appendix A018- Socioeconomic Assessment	<p>Estimates of workforce requirements for each phase of the project are provided.</p> <p>The construction workforce (200 direct jobs) will include a mix of local/regional workers and workers from outside the region.</p> <p>The operations workforce is likely to consist of approximately 200 people (direct jobs). Kalbar expects to source most of their workforce locally/regionally (including contractors), with the opportunity to train personnel once the mine is operational. Some specialist roles will need to be sourced from outside the region.</p> <p>Kalbar's People Policy (2019b) commits the company to attracting, recruiting, developing and retaining staff who demonstrate their shared values and have or can develop the skills required. Kalbar's Stakeholder Relations Policy (2019c) commits to recruit locally where possible and work in partnership with communities to foster local economic development. The EES specifically identifies the Industry Capability Network (ICN) and Growing Regional Opportunities for Work Gippsland (GROW) as potential industry partners in sourcing local content; while Kalbar state they will work collaboratively with education and training providers and employment and apprenticeship support networks that operate in the Gippsland region to support and promote local employment. Kalbar will also continue to engage with organisations such as the Gunaikurnai Land and Waters Aboriginal Corporation and GEGAC on opportunities to encourage local Indigenous youth to conduct training and / or apprenticeships on the project</p>	<p>The EES adequately identifies potential effects on local and regional workforce opportunities. However, the following gap in the analysis is noted:</p> <ul style="list-style-type: none"> • Cumulative impacts associated with known/planned and potentially concurrent regional infrastructure projects are not considered. Concurrent projects might create competition and associated impacts for labour/skills supply/availability in local and regional communities. Competing projects (depending planning approvals, financing and construction timing), might include road, rail, renewable energy – including the Star of the South Offshore Wind Farm, hospital, education, tourism, irrigation projects, bushfire recovery projects etc which could commence across Gippsland over the coming years.
Has the EES adequately described the design and mitigation measures to offset or manage social, land use and economic outcomes for communities living within or in the vicinity of the project area, as well as proposed measures to enhance beneficial outcomes?	Section 6.3.2, 6.3.2, and 6.3.3. Appendix A018- Socioeconomic Assessment Tables 6.11 and 6.13.	<p><u>Economy and Local Business</u></p> <p>Potential Impact: <u>Loss of production</u>. Standard Mitigation: Compensation for agricultural/horticultural/forestry enterprises for loss of land/production due to the project. Mineral Resources (Sustainable Development) Act 1990 (Vic) and the Land Acquisition and Compensation Act 1986 (Vic)</p> <p>Potential Impact: <u>Increased employment and business opportunity generated by the project leads to local and regional economic growth</u>. Standard Mitigation: Partnership with ICN, GROW to maximise local content. Local employment and procurement guidelines to be developed which give preference to local residents and businesses.</p>	<p>The standard and additional mitigation measures proposed for the economy and local businesses, are considered appropriate to manage potential impacts and associated risks. This assessment is based on information currently contained in the EES.</p> <p>As noted, no Cumulative Impact Assessment has been undertaken for the EES. If cumulative impacts were subsequently assessed, this might result in a need adjust/ add to these mitigation measures depending on risk levels identified.</p>

		<p>Potential Impact: <u>Diminished value of businesses within 10km of the project area and broader region that are reliant on tourists, due to sustained impacts on amenity and/or short-term increased demand for the project.</u></p> <p>Standard Mitigation: Consultation with tourism organisations (Business & Tourism East Gippsland, East Gippsland Marketing Inc) to identify economic and business opportunities for the region. Local employment and procurement guidelines to be developed which give preference to local residents and businesses.</p> <p>Implement management measures to minimise potential noise and dust emissions. Additional Mitigation: Current levels of access to national parks and other natural assets will be maintained. Local businesses providing short term accommodation will be engaged to discuss the timing of project works and potential peak periods.</p>	
<p>Has the EES adequately assessed the project feasibility including the predicted economic costs and benefits, including capital investment, operating expenditure, employment and business opportunities, taxes and royalties to the regional, state and national economies, and the temporary and permanent impacts on agriculture, forest resources, tourism and businesses?</p>	<p>Fingerboards Mineral Sands Project Environmental Effects Statement Summary Report, August 2020; Executive Summary -Appendix A018- Socioeconomic Assessment.</p> <p>Chapter 5 Appendix A015 - Agriculture Impact Assessment</p> <p>Executive Summary -Appendix A018- Socioeconomic Assessment; section 6.2.3</p>	<p><u>Economic benefits summary</u> Capital investment of \$190 million (construction phase), operational expenditure of \$2.4 billion, State royalties of \$115 million, and total taxes of \$650 million (operational phase) are estimated. Construction (up to 200 jobs) and operational employment (400 jobs) generation associated with the project (direct and indirect) are identified. Gippsland Gross Regional Product to increase by \$1.4 billion over the project lifetime, compared to the 'no project' case.</p> <p><u>Net economic benefit</u> \$392 million in Net Present Value terms, over the lifetime of the project is estimated.</p> <p><u>Economic costs</u> Lost value of production (agriculture, horticulture and forestry) of approximately \$87,250 to \$125,250 per annum impacting 19 enterprises is estimated. Total job losses are estimated to be minimal (less than 1 FTE job).</p> <p>Potential impacts on tourism are assumed to be low, due to low impacts on tourism and accommodation land users. This assessment is based on results of the visual and landscape impact assessment (Urbis) and case studies of mining projects in other regions, undertaken for the EES. No specific tourism impact assessment has been undertaken for the EES.</p>	<p>An acceptable and generally robust methodology has been used in the EES to determine project feasibility. Specifically, Cost Benefit Analysis and Computable General Equilibrium Modelling has been used to underpin the analysis. A 'no project case' has been used to compare project impacts and sensitivity analysis has been undertaken. Net Present Value (NPV) results are expressed in 2018 real Australian dollars using a 7% discount rate.</p> <p>However, impacts on the tourism sector are based primarily on visual, landscape analysis and case studies and not a specific Tourism Impact Assessment. Detailed analysis of factors such as potential impacts on accommodation availability during peak tourism periods for specific establishments (likely to have the highest project demand), impacts of construction and operational traffic on tourist routes and visitation patterns etc should also be factored into potential industry costs. Cumulative impacts of multiple concurrent regional infrastructure projects on the tourism sector / visitor economy have not been assessed.</p> <p>The following minor issues have also been identified:</p> <ul style="list-style-type: none"> • Terminology relating to financial estimates needs to be consistent throughout the EES documentation If financial outputs are calculated as Net Present Value (NPV) this needs to be clearly stated throughout the EES (i.e. The EES summary Report Executive Summary does not refer to NPV) • As noted above, the term 'jobs' needs to be expressed consistently throughout the EES. At present the term employment is expressed interchangeably between jobs /people employed) and Full Time Equivalent (FTE) positions.
Key Concerns for Council			
<p>What are the key risk issues?</p>		<p>No Cumulative Impact Assessment has been undertaken for the EES. A Cumulative Impact Assessment is required to identify to potential economic impacts associated with other regional infrastructure projects being constructed concurrently with the Fingerboards project.</p> <p>Tourism analysis included in the EES is not sufficiently detailed to confirm impacts of the project on the tourism sector. Cumulative impacts on the tourism sector from concurrent regional infrastructure projects also needs to be explored.</p>	<p>Gaps:</p> <ul style="list-style-type: none"> • Cumulative Impact Assessment • Tourism Impact Assessment
<p>Are the proposed EPRs adequate?</p>	N/A	N/A	N/A
<p>Is there consistency between technical reports</p>	N/A	N/A	N/A

3.15 Draft Work Plan

An approved work plan is required to be prepared in accordance with the document Preparation of Work Plans and Work Plan Variations - Guideline for Mining Projects September 2019 to meet the requirements of the Mineral Resources (Sustainable Development) Act 1990 and associated regulations.

A work plan is required to provide information on the following:

- describe the nature and scale of the proposed mining activities, including
 - mine setting and location of work within the licence boundary
 - location of sensitive receptor
 - nature of proposed mining works
 - nature of any auxiliary works (dewatering bore, water treatment plants)
- identify and assess all risks the works may pose to the environment, to the public, or to nearby land, property or infrastructure (known as 'mining hazard');
- include a risk management plan that specifies the measures the licence holder will use to eliminate or minimise identified risks and monitor performance;
- include a community engagement plan; and
- include a rehabilitation plan

A review of the draft Works Plan indicated that the document generally meets the Preparation of Work Plans and Work Plan Variations - Guideline for Mining Projects September 2019.

The following are key issues identified by SLR, with additional comments on the Work Plan included in the following table.

- An initial comparison of documents referred to in the Work Plan and included in the EES was undertaken and indicates different dates:
 - The Air Quality and Greenhouse Impact Assessment in the Work Plan is dated April 2020 whereas the document in the EES is dated August 2020
 - The Surface Water Impact Assessment in the Work Plan is dated 9 May 2019 whereas the document in the EES is dated August 2020
 - The Detailed Ecological Investigation in the Work Plan is dated April 2020 whereas in the EES is dated August 2020
 - The Water Supply Options Study – Technical Groundwater Assessment in the Work Plan is dated July 2018 whereas in the EES is dated April 2020
 - The Agricultural Impact Assessment in the Work Plan is dated April 2020 whereas in the EES is dated July 2020
 - The Land Use and Planning Impact Assessment in the Work Plan is dated April 2020 whereas in the EES is dated August 2020

- Section 1.1 – Kalbar indicates that the work plan does not address project-related activities outside the mining lease area, including modifications to roads infrastructure, groundwater extraction from bores, rail sidings, pipelines, power transmission infrastructure. It is noted that Appendix B 42 (a) of the Guidelines indicate “A description of sensitive receptors in relation to the environment, any member of the public, or land, property or infrastructure in the vicinity of the work” are a required item.
- Section 8.5.2 Tailings storage facility (TSF). The concept design has been based on material properties interpreted from classification tests. It would be expected that specific geotechnical shear strength testing and more detailed laboratory analysis would have been undertaken to support the tailings storage design, in particular shear strength testing. The assessment does not appear to be as detailed as for the pit stability assessment in Appendix -003 Geotechnical Assessment.
- Section 8.5.3 of the Work Plan. The design allows for stage construction of the TSF . However, it is not clear how this is done and whether part or all of the TSF wall when raised will be placed directly on the tailings surface. The general region has experienced earthquake magnitudes of 5.4. This section should be revised to include information on the potential for earthquakes to impact slope stability. The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings.

Table 16 Draft Work Plan Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Describe the nature and scale of the proposed mining activities	All Figures	The Guidelines require figures to be at scales varying from 1:1000 to 1:2500. The plans provided in the Draft Work Plan are at varying scales that are not consistent with the guidelines.	Figures should be consistent with the requirement of the guideline.
	Section 2.2 Land tenure and use	Figure 2.2 defines areas of crown land but no indication of categories of crown land as required by the guideline.	Amend figure to contain specific category of crown land.
	Section 2.7.1 Vegetation and flora	The tree removal area in the Work Plan relate to mining lease area. The EES relates to mining area and infrastructure. While this assessment relates to the mining lease it is difficult to compare the data in the EES (Section 9.1.3.1) in terms of clearance of the mine lease area and specific tree removal.	Clarification required of the clearance areas, and tree removal should be provided.
		Refers to offset required for the removal of 1.74 hectares. The EES includes an estimate of 8-10 ha (5:1 off-set).	An explanation required of the difference and amended in the Work Plan if relevant.
	Section 2.8.1 Aboriginal cultural heritage	There is inconsistency in the number aboriginal heritage listed sites in the general project area, 43 in the Work Plan and 47 sites in the EES.	The Work Plan should be updated with to incorporate the additional information in the EES or an explanation provided.
	Section 3.2.2 Fingerboards resource	The thicknesses of geological units in Table 3-1 in this section of the Work Plan are not consistent with Table 8.2 in the EES.	The Work Plan should be updated with to incorporate the additional information in the EES or an explanation provided.
	Section 3.3 Resource assessment	The mineral resource and reserve estimates and mineral components in the Work Plan are not consistent with those in Section 3.2 of the EES.	The Work Plan should be updated with to incorporate the additional information in the EES or an explanation provided.
	Section 4.3 Overview of mining method	It is suggested that Section 4.3 include the equivalent of Figure 3.7 of the EES as it provides a descriptive cross section of the mining sequence.	Add Figure 3.7 from EES.
	Section 4.4 Types of equipment	The types of equipment in Table 4-3 of the Work Plan are not consistent with the equipment indicated in Table 3-5 of the EES.	Amend Table 4-3.
	Section 4.6 Open pit design	Factors of safety have been calculated for the indicative pit slopes and geotechnical risks associated with ground movement. As indicated in the EES the general region has experienced earthquake magnitudes of 5.4. In addition, it is proposed to place tailings in the completed open pits as mining progresses. There is no slope stability assessment associated with earthquake loading in this section. It is noted that an assessment has been provided in Appendix -003 of the EES.	This section should be revised to include information on the potential for earthquakes to impact slope stability and tailings liquefaction by incorporating information that has been included in Appendix -003 of the EES. Before full approval of the project It is recommended that a trial open pit be developed to confirm design slopes, and this be followed by a field trial of the proposed backfilling method.
	Section 5.2.1 Mining unit plants	This section indicates that a mining rate of 1500 m3/hr whereas Section 3.5.1 of the EES indicates a rate of 1000 m3/hr	The information should be made consistent.
	Section 5.6.1 Tailings production	This section indicates 1.62-2.68 Mt fine tailings and 5.05-8.86 Mt Coarse tailings. Section 3.6.1 indicates the TSF has a capacity of 6.6 million m3.	Clarification should be provided, or consistent nomenclature should be used.
	Section 6.1.1 Process water	This section indicates that 5,200 to 5,500 ML of water is required for processing, of which 2,700-3,000 ML make water is required. The EES indicates 3GL of water will be required annually, which appears to correlate with the 3,000 ML of make water in the Work Plan.	It is recommended that the water usage be confirmed, and a table provided with the project water need.
	Section 6.3 Access and haul roads	This section refers to site access occurring at the intersection of Limpyers Road and Fernbank-Glenaladale Road intersection. This differs from the information in Section 3.9.2 of the EES which indicates access by Chettles and Fenbank-Glenaladale Road intersection. In addition, the Work Plan indicates that Kalbar's preference is for the diversions to be permanent. This statement is not replicated in Section 3.9.3 of the EES.	It is recommended that this section be amended.
	Section 6.6 Laydown area	This section refers to the laydown areas. The information provide in the EES is not consistent with the information in the Work Plan in relation to surfacing of the roads and locations of laydown areas.	It is recommended that this section be amended.
Section 6.8 Chemical and fuel storage	This section indicates that bunding for the fuel storage area will be undertaken in accordance with AS 1940:2017 which is not consistent with EES which indicates AS 1940:2004.	It is recommended that this section be amended	
	This section indicates use of flocculants Nalco Optimer 83384 and BASF Magnafloc, 5250 which are indicted as non-toxic to fauna and people and not expected to bioaccumulate. The Works Approval Application refers to possible use of hydrobond and hydraprime products which are indicated as being toxic to aquatic biota. Clarification and consistency in the proposed products and toxicity is required.	It is recommended that consistency be maintained and include reference to potential toxicity in the water treatment section (3.7.4.3) of the EES.	
Section 6.12 Sanitation and waste management	This section indicates that waste will be removed for recycling or disposal it is considered that there should be specific commitment to EPA waste management principles of avoid, reduce, reuse, recycle and proper disposal as indicated in Section 3.10.1 of the EES and Section 8.7 of the Work Plan.	It is recommended that the information be updated.	
	Information on sewage treat in this section is different the details in Section 3.7.5 of the EES and Section 8.7 of the Work Plan.	It is recommended that the information be updated.	
Section 8.2 Topsoil and overburden management	Technical review of this issue is provided in Table 3		

	Section 8.4 Surface water and drainage management	Technical review of this issue is provided in Table 4	
	Section 8.5.2 TSF design	The concept design appears to be appropriate as it incorporates placement on material that is considered by Kalbar to be of low permeability, has appropriate slopes, incorporates an upstream low permeability liner and contains a downstream drainage layer to capture shallow seepage through the foundation and embankment. However, the design has been based on material properties interpreted from classification tests. It would be expected that specific geotechnical shear strength testing would have been undertaken to support of the TSF, in particular shear strength testing. The assessment does not appear to be as detailed as for the pit stability assessment in Appendix -003 Geotechnical Assessment.	It is recommended that investigations are indicated prior to a decision been made on the project to justify that proposed design.
	Section 8.5.3 Staged construction	This section indicates a total storage volume of 6.8 Mm ³ , which is inconsistent with the 6.6 Mm ³ indicated in Section 3.6.1 of the EES. A staged construction of the TSF is proposed. Generally staged construction can include three options, downstream construction, centreline construction and upstream construction either fully or partially on tailings. Kalbar should provide additional information on the type of raising and confirmation of stability, particularly if upstream construction on the tailings. As indicated in the EES and above for the pit stability assessment the general region has experienced earthquake magnitudes of 5.4. This section should be revised to include information on the potential for earthquakes to impact slope stability and tailings liquefaction. The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings. As indicated above this was done for the open pit.	It is recommended that the information be updated.
	Section 8.6 Radiation management	Technical review of this issue is provided in Table 10	
	Section 8.8 Traffic management	Technical review of this issue is provided in Table 7 This section indicates that speed limits on unsealed roads will be set to minimise dust generation.	The Work Plan should specify site vehicle speeds.
Include a risk management plan	Section 7 Risk management	It is difficult to easily compare the information in the risk management table at the end of the Risk Management Plan with the information in Chapter 9 Environmental and Socio-economic Impact Assessment in the EES due to the different format, with Chapter 9 being written.	The EES should include a summary table of the risks as indicated in the Risk Management Plan.
		<p>Table 7-2 in the Work Plan contains essentially the same environmental aspects and objectives as in Table 12.6 in the EES. The Work Plan has separate columns for Indicators and Targets, whereas the EES only has indicators (which incorporate some target element). Most of the Indicators are not consistent between the two documents.</p> <p>The following specific comments are also provided in relation to Table 7-2:</p> <ul style="list-style-type: none"> - Social issues – should include a specific timeframe for response to complaints - Groundwater - monitoring levels should not exceed baseline water quality - Geotechnical – the basis for a risk level of 10⁻⁶ has not been adequately provided as opposed to 10⁻⁶ - Solid and liquid wastes – in relation to spills should specify clean-up timeframe and standard - Traffic – should include that traffic incident will be independently investigated within 2 weeks and complaints addressed within a specific time frame - Infrastructure – should include a specific timeframe for response to complaints <p>Environmental Management Framework – Chapter 12 of EES, Monitoring Program</p> <ul style="list-style-type: none"> - Surface water - Apart from hydrocarbons no other chemical parameters specified. In addition, should include visual observation of embankment seepage from water storages and temporary TSF and sediment traps, surface water diversion structures - Air quality – should also analyse for radionuclides in rainwater tanks - Noise and vibration – one attended noise monitoring event per year appears limited - Radiation – definition of fine grid required - Traffic and transport – should have specific detail of requirement for repair of roads, need for restoring roads to original alignment and standard, if applicable 	
Include a community engagement plan	Section 3.2 Community Engagement Plan and Chapter 6 EES Chapter 6 EES	<p>This section indicates that the plan “takes the community engagement beyond the EES process into the operation, rehabilitation and closure of the mine”. This appears different to the objective for the EES indicated below:</p> <ul style="list-style-type: none"> - Stakeholders identified and consulted during the engagement process - The methods and tools used during the EES process to engage stakeholders - The ongoing process with stakeholders should the project be approved <p>The EES and Work Plan appear to define appropriate stakeholders. Key issues are summarised in Section 6.2 Table 4 of the W which are not consistent with those in Table 6.2 of the EES. The proposed engagement methods are reasonable.</p>	
		A Technical Review is included in Section 2.11	

Include a rehabilitation plan	Section 9 Rehabilitation and closure	Rehabilitation will be progressive as mining continues along the mineral sand layer. It is proposed to place the tailings back into the pit following the initial 5-year mining period. Successful conclusion of rehabilitation is dependent on the methods of placement of tailings (both fine and coarse) and overburden. Mineral sand mines have had difficulties in achieving this.	It is recommended/suggested that a trial be undertaken. This could also serve as an opportunity to assess slope angles for the open pit. Approval for the full mining operation should not be granted until the results of the trial. This approach has been adopted for many sensitive projects, e.g. in-situ uranium leach mining, in-situ coal gasification
		Refers to a Draft Rehabilitation and Closure Plan in Appendix C. However, Appendix C report is titled Draft Mine Rehabilitation Plan.	The information should be consistent.
		Table 6-1 Post-closure land use in Work Plan is generally the same as Chapter 11 of EES and Appendix-A20, there are differences in some descriptions, areas and percentages in Table 9-1 in the Work Plan, Table 6-1 in Appendix C of the Work Plan and Table in the EES.	The information should be consistent.
		Appendix C of the Work Plan – Section 11 indicates that “Kalbar has used the Department of Economic Development, Jobs, Transport and Resources” bond as the basis for preparing a preliminary rehabilitation and closure estimate.” Kalbar has not included the cost assessment in the Work Plan to enable initial public review. It is also noted that costings have not been provided in the EES. The Department calculator provides summary table outputs for the various segments of the project requiring rehabilitation and these should be provided to enable a review to be undertaken.	
Key Concerns for Council			
What are the key risk issues?		<p>Key risk issues are indicated in paragraph 4 at the beginning of Section 2.13, and include:</p> <ul style="list-style-type: none"> • Different dates in documents referenced in the Work Plan and EES and no details of the changes. • The work plan does not address project-related activities outside the mining lease area, including modifications to roads infrastructure, groundwater extraction from bores, rail sidings, pipelines, power transmission infrastructure, as required by the guidelines. • The design of the TSF is based on limited geotechnical information and has not assessed potential impact of earthquakes. The assessment does not appear to be as detailed as for the pit stability assessment in Appendix -003 Geotechnical Assessment. • The TSF design allows for stage construction of the TSF . However, it is not clear how this is done and whether part or all of the TSF wall when raised will be placed directly on the tailings surface. 	<p>Additional information should be included in the Work Plan to address those issue required by the Guidelines.</p> <p>Site specific geotechnical investigations should be undertaken to inform the design.</p> <p>The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings.</p>
Are the proposed EPRs adequate?		Not included in the Work Plan	

3.16 Draft EPA Works Approval

A review of the Draft Works Approval Application (WAA) for a water treatment and discharge system included within the EES documentation as Attachment D dated July 2020 considers the treatment of up to 24 ML/day of mine contact water and controlled discharge of up to 630 ML/year of treated water to the Mitchell River. The WAA does not consider redirected undisturbed water which may be temporarily detained in catchment dams and re-released to the receiving environment. The construction, installation, operation and maintenance of mine water dams, the Mitchell River pipeline and pumping station and sump pumps are all being assessed under the EES and MRSDA work Plan and resultantly are excluded from the scope of the WAA. Key fixed components which are considered in the WAA included the water treatment plant, freshwater dam and proposed treated water release point at the Mitchell River. It is proposed that following the effective and reliable operation of the water treatment system over the first three years of mining, the proponent would seek approval for a second licensed discharge point into the Perry River.

A review of the draft WAA indicated that the document generally meets the applicable EPA Works Approval Publication 1658 June 2017 requirements with the following information tabulated for further consideration.

Table 17 Draft Works Approval Application Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Best Practice- surface water emissions	5.4.4	Kalbar have not clearly demonstrated they meet best practice with regard to surface water emissions in accordance with EPA Publication 1517.1 October 2017 three step methodology.	Further detail should be provided or referenced that outlines a stepwise approach demonstrating best practice as illustrated in Table 2 of EPA publication 1517.1
Greenhouse gas emissions	6	Kalbar have not presented how they have considered avoiding and/or minimising GHG emissions in accordance with "Best practice energy and greenhouse gas management" as outlined in section 6.2.3 of the WAA Guidelines. Further no discussion of the proposed contribution to regional GHG emissions is presented.	Further discussion should be provided on avoidance and/or minimising GHG emissions.
Section 1- General information		The Exemption for water treatment and discharge system from the requirement for a planning permit under 52.17 of the East Gippsland Planning Scheme is based on its association with a proposed ongoing mining operation and that it will involve no additional vegetation clearing.	What assurance is there that this condition of no additional vegetation clearance is both currently applicable and will be adhered to into the future?
	4	summaries that no further targeted engagement has been undertaken with the community since lodgement of the Approvals Proposal Pathway Application and that no new concerns have been raised with respect to the proposed water treatment and discharge facility.	The basis of this statement is not supported by any reference.
	5.2	"Water Management Plan" describes Mine contact water as having the potential to contain suspended solids, nutrients and elements.	Consideration should also be given to the potential for mine contact water to contain radionuclides. This is not considered throughout the draft WAA.
	5.2	site water management modelling indicates that there will be a very low likelihood of spillway discharge from mine contact dams (EMM, 2020). It is predicted that there would be three(3) years over the 117 years modelled where spillway discharge would occur.	Is this likelihood considered acceptable as spillway discharge would initiatively lead to significant sediment releases into Mitchell and Perry River catchments?
	5.2.5	Kalbar have indicated that they will not discharge treated water into the Mitchell River during period of flow less than 50 ML/day. This was recommended by the EPA and will limit the risk of impacts due to nitrogen and phosphorus loading in discharge water. Kalbar have indicated this will be incorporated as a rule within its water management system.	How will other weather conditions be considered in this management strategy related to the discharge of treated water?
	5.3.3	Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment systems. MSDS information in appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota	Discussion of the MSDS information should be included in the body of the report and include consideration of the following; toxicity of proposed flocculant products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.
	Table 5.4	options considered to reduce need to discharge to treated water to inland waters- Dispose of surplus water via managed aquifer recharge assigned risk- Unproven technique	Aquifer recharge is a proven technology and should be duly considered as an option in the absence of a valid argument to the contrary.
	5.6	Integrated Environmental Assessment. Predicted annual volume of water flowing in the Mitchell River may be reduced by 130-270 ML/year (0.02% of annual flow volume) and flows to Perrys River System could be reduced by between 0.05% and 1.05% depending on mine operational conditions. This impact is considered by Kalbar as less likely to result in adverse environmental outcomes than allowing the uncontrolled release of mine contact water to inland waters. Periodic releases of suitable quality water back to the Mitchell River are proposed by Kalbar to be undertaken as much as possible during period of low environmental flows to assist in mitigating impacts on environmental water demand. Is it considered that the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweighs the reduction in water flowing to each system?	Do the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweigh the reduction in water flowing to each system.
9	Refers to noise assessment for the wet concentrator plant and that pumps are not an issue. The noise technical assessment does not appear to have included noise from the wastewater treatment plant.	The assessment of potential noise impacts from the wet concentrator plant should be further considered.	
Section 2- Environmental information	10.4.2	Suggested once treatment storage and discharge has been demonstrated to work effectively during first three years of mining operations, Kalbar will seek a licence amendment to allow a second licenced discharge point to the Perry River System.	This licence amendment process requires clarification for if undertaken through an EPA licence amendment what consultation will be undertaken with Council and other stakeholder and community groups during this process. Consideration should be given as to a shorter period to determine effectiveness. What is the proposed fall-back position/contingency should the wastewater treatment system prove ineffective upon commissioning?
	10.4.3	- Proposed collection and treatment of mine contact water, the subject of the WAA, will lead to lower levels of Phosphorus (97% reduction) within water discharged back into the Mitchell River. Treatment with Dissolved Air Flotation (DAF) has not however been shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment. Kalbar proposed to overcome this by pumping treated water to the freshwater dam for storage where it will be mixed with large volumes of water (up to 2GL) drawn from the Mitchell River. This will dilute treated water and thereby reduce contaminant levels to ensure water released to Mitchell River is within water quality objective limits. It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system.	It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. Consideration of the inclusion of additional treatment modules within the water treatment facility which can reduce levels of these constituents to within water quality objectives should be discussed.
	10.4.5	Kalbar indicates that treated water will meet target SEPP/ANZECC water quality objectives with the possible exception of concentrations of dissolved aluminium and total nitrogen however do not mention possible exceedances for copper identified in other sections.	Further discussion of exceedance of water quality objectives for copper requires further discussion.
	12	Kalbar indicate waste produced by wastewater treatment (solids) is predicted to meet EPA Clean Fill Guidelines however until such time as a residue sample is available the waste has been classified as "Category C" waste under the IWR regulations.	If waste is classified as Category C waste is comingling with tailings fines and disposal in on site Tailings Storage Facility considered appropriate disposal in accordance with IWR regulations and the principles of the waste hierarchy?

	13.3	The water risk management plan and its associated procedures does not include contingencies for failure of the water treatment system. As outlined in Appendix J section 1- scope for this plan does not consider operating, maintenance or monitoring requirements for engineered water storages or tailing storage structures.	The risk management plan should be revised to include contingencies for failure of the water treatment system. The Risk management plan should also consider risks associated with the storage and use of chemicals (spills, runoff). Of specific consideration should be the storage in concentrated form of hydrobond with a biodegradation of greater than 28 days and its toxicity to aquatic biota.
	Figure 13.2	Water Treatment Plan: water quality and hydrology is not included within EMF outlined in figure 13.2	Consideration of water quality and hydrology should be included within the EMF.
	13.4	Construction impact management should also consider impacts during the establishment and commissioning of the DAF referring to EPA Publications 275, 480 and 1254.	Construction impacts during establishment and commissioning of the DAF should be included in any construction impact management
Section 3- other approvals	14.5	Water Treatment Management Plan is not incorporated into EMF outlined in Figure 13.2- Environmental Management Framework.	How will this plan be implemented?
		Protocol to be used to undertake in stream monitoring and assessment is not included	Protocol to be used to undertake in stream monitoring and assessment should be included.
	Table 14.1	Continuous environmental monitoring during construction, operation and rehabilitation is proposed onsite for the treated mine water during any discharge into or out of the freshwater dam and includes; turbidity, metals, pH and EC, DO.	It is not clear how continuous monitoring will be undertaken for metals, this is considered particularly important given identified elevated aluminium and copper levels in treated water.
		How with Total Nitrogen inputs into freshwater dam be quantified given identified levels in treated water?	Details on quantification of nitrogen inputs into freshwater dam from treated water is required.
		Frequency of water quality sampling during construction, operation and rehabilitation is proposed to occur every two months initially and then quarterly thereafter with the agreement of the regulator.	After an initial period of how long will agreement from the regulator be sought to reduce bimonthly monitoring?
Table 14.6	In addition to requirements for the submission of annual performance statements to EPA Victoria does Kalbar propose to provide the community and other stakeholder groups with regular updates on performance tracking against EPA licence requirements inclusive of responses to any non-compliance incidents?	Reference to proposed methods for dissemination of annual performance statements and reporting to community and stakeholder groups is required.	
Key Concerns for Council			
What are the key risk issues?		The Exemption for water treatment and discharge system from the requirement for a planning permit under 52.17 of the East Gippsland Planning Scheme is based on its association with a proposed ongoing mining operation and that it will involve no additional vegetation clearing.	What assurance is there that this condition of no additional vegetation clearance is both currently applicable and will be adhered to into the future?
		"Water Management Plan" describes Mine contact water as having the potential to contain suspended solids, nutrients and elements.	Consideration should also be given to the potential for mine contact water to contain radionuclides. This is not considered throughout the draft WAA.
		site water management modelling indicates that there will be a very low likelihood of spillway discharge from mine contact dams (EMM, 2020). It is predicted that there would be three(3) years over the 117 years modelled where spillway discharge would occur.	SLR does not consider this as acceptable as spillway discharge would initiatively lead to significant sediment releases into Mitchell and Perry River catchments?
		Reference is provided to MSDS information included in Appendix G for several flocculants proposed to be used in the wastewater treatment systems. MSDS information in appendix G indicate hydrobond and hydraprime products are toxic to aquatic biota	Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.
		Predicted annual volume of water flowing in the Mitchell River may be reduced by 130-270 ML/year (0.02% of annual flow volume) and flows to Perrys River System could be reduced by between 0.05% and 1.05% depending on mine operational conditions.	Do the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweigh the reduction in water flowing to each system.
		Suggested once treatment storage and discharge has been demonstrated to work effectively during first three years of mining operations, Kalbar will seek a licence amendment to allow a second licenced discharge point to the Perry River System.	This licence amendment process requires clarification for if undertaken through an EPA licence amendment what consultation will be undertaken with Council and other stakeholder and community groups during this process. Consideration should be given as to a shorter period to determine effectiveness. What is the proposed fall-back position/contingency should the wastewater treatment system prove ineffective upon commissioning?
		Treatment with Dissolved Air Flotation (DAF) has not however been shown to reduce nitrogen or copper levels. Treated water will not meet water quality objectives for nitrogen or copper in freshwater ecosystems directly following treatment.	It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system.
		How with Total Nitrogen inputs into freshwater dam be quantified given identified levels in treated water?	Details on quantification of nitrogen inputs into freshwater dam from treated water is required.
		Frequency of water quality sampling during construction, operation and rehabilitation is proposed to occur every two months initially and then quarterly thereafter with the agreement of the regulator.	After an initial period of how long will agreement from the regulator be sought to reduce bimonthly monitoring?
	In addition to requirements for the submission of annual performance statements to EPA Victoria does Kalbar propose to provide the community and other stakeholder groups with regular updates on performance tracking against EPA licence requirements inclusive of responses to any non-compliance incidents?	Proposed methods for dissemination of annual performance statements and reporting to community and stakeholder groups is required.	
Are the proposed EPRs adequate?			Not applicable

APPENDIX A

EES Scoping Requirements release by DELWP March 2018

Environment Effects Act 1978

SCOPING REQUIREMENTS

For

FINGERBOARDS MINERAL SANDS PROJECT ENVIRONMENT EFFECTS STATEMENT

March 2018



Queries about the Fingerboards Mineral Sands project itself should be directed to the proponent:

Kalbar Resources Ltd

Telephone: 1800 791 396

Email: contactus@fingerboards.com.au

Website: <http://kalbarresources.com.au>

Queries about the EES process and Scoping Requirements should be directed to the department:

Impact Assessment Unit

Telephone: 03 8392 5477

Email: environment.assessment@delwp.vic.gov.au

List of Abbreviations

Kalbar Resources Ltd	the proponent
AH Act	Aboriginal Heritage Act 2006
CHMP	Cultural Heritage Management Plan
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
EE Act	Environment Effects Act 1978
EES	Environment Effects Statement
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMS	Environmental Management System
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFG Act	Flora and Fauna Guarantee Act 1988
IAU	Impact Assessment Unit (within DELWP)
km	kilometre
MRSD Act	Mineral Resources (Sustainable Development) Act 1990
MNES	Matters of national environmental significance
RAP	Registered Aboriginal Party
SEPP	State Environment Protection Policy
TRG	Technical Reference Group

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1 Introduction

In light of the potential for significant environmental effects, on 18 December 2016 the Victorian Minister for Planning (the Minister) determined under the Environment Effects Act 1978 (EE Act) that Kalbar Resources Ltd (the proponent) should prepare an environment effects statement (EES) for the Fingerboards Mineral Sands Project (the project¹). The purpose of the EES is to provide a sufficiently detailed description of the proposed project, assess its potential effects on the environment² and assess alternative project layouts, designs and approaches to avoid and mitigate effects. The EES will inform and seek feedback from the public and stakeholders and enable the Minister to issue an assessment of the project under the EE Act at the conclusion of the process. The Minister's assessment will then inform statutory decision-makers responsible for the project's approvals.

The Scoping Requirements for the Fingerboards Mineral Sands Project EES (scoping requirements) set out the specific matters to be investigated and documented in Kalbar's EES.

While the scoping requirements are intended to cover all significant matters the EES will need to address any others that emerge during the EES investigations, as well as address other issues relevant to key statutory decisions such as the mining approvals under the Mineral Resources (Sustainable Development) Act 1990.

1.1 The project and setting

The proponent proposes to develop the project on an approximate area of 1,675 hectares within the eastern part of the Glenaladale mineral sands deposit in East Gippsland (Figure 1). The site is located near the Mitchell River and approximately two kilometres (km) south of Glenaladale, 4 km south-west of Mitchell River National Park and 20 km north-west of Bairnsdale, Victoria (Figure 2).

The proposal includes the development of an open pit mineral sands mine, two mining unit plants, wet concentrator plant (comprising mineral separation processing and tailings thickening and disposal plant), water supply infrastructure, tailings storage dam and additional site facilities (i.e. site office, warehouse, workshop, loading facilities and fuel storage). The proposed mining methods involve open pit mining to extract approximately 170 million tonnes of ore over a projected mine life of 20 years to produce 6 Mt of mineral concentrate. Heavy mineral concentrate, separated into magnetic and non-magnetic concentrates, are proposed to be transported via road, rail or a combination of both for export overseas.

The power demand for the mining unit plants and wet concentrator plant is estimated at 3,600 kVA, likely to be supplied from the electricity grid (with some upgrades likely required) and up to 3 gigalitres of water per annum.

1.2 Minister's requirements for this EES

The Minister's decision to require an EES included the procedures and requirements applicable to its preparation, in accordance with section 8B(5) of the EE Act. These requirements included the following matters for the EES to examine:

- effects on biodiversity and ecological values within and near the site, and associated with adjacent road reserves and riparian areas, including native vegetation, listed ecological communities and species of flora and fauna under the Flora and Fauna Guarantee Act 1988 and other habitats and vulnerable and protected species;
- effects on surface water and groundwater hydrology, quality, availability for other uses and the aquatic ecology of water environments;

¹ Under the EPBC Act, projects are considered as "actions". For the purposes of this document the term "project" also means "the action".

² For the purpose of assessment of environmental effects under the EE Act, the meaning of 'environment' includes physical, biological, heritage, cultural, social, health, safety and economic aspects (Ministerial Guidelines, p. 2).

- effects on the land uses and landscape values of the site and surrounding areas, including the implications with respect to the Mitchell River National Park;
- effects on land stability, erosion and soil productivity associated with the construction and operation of the project, including rehabilitation works;
- effects on Aboriginal and non-Aboriginal cultural heritage values in the vicinity of the project site;
- potential effects of project construction and operation on air quality and noise on nearby sensitive receptors (especially residents);
- both positive and adverse socio-economic effects, at local and regional scales, potentially generated by the project, including indirect effects of the project construction workforce on the capacity of local community infrastructure; and
- solid and liquid waste that might be generated by the project during construction and operation.

These scoping requirements provide further detail on the specific matters to be investigated in the EES in the context of Ministerial guidelines for assessment of environmental effects under the EE Act 1978 (Ministerial Guidelines).

Fingerboards Mineral Sands Project – EES Scoping Requirements

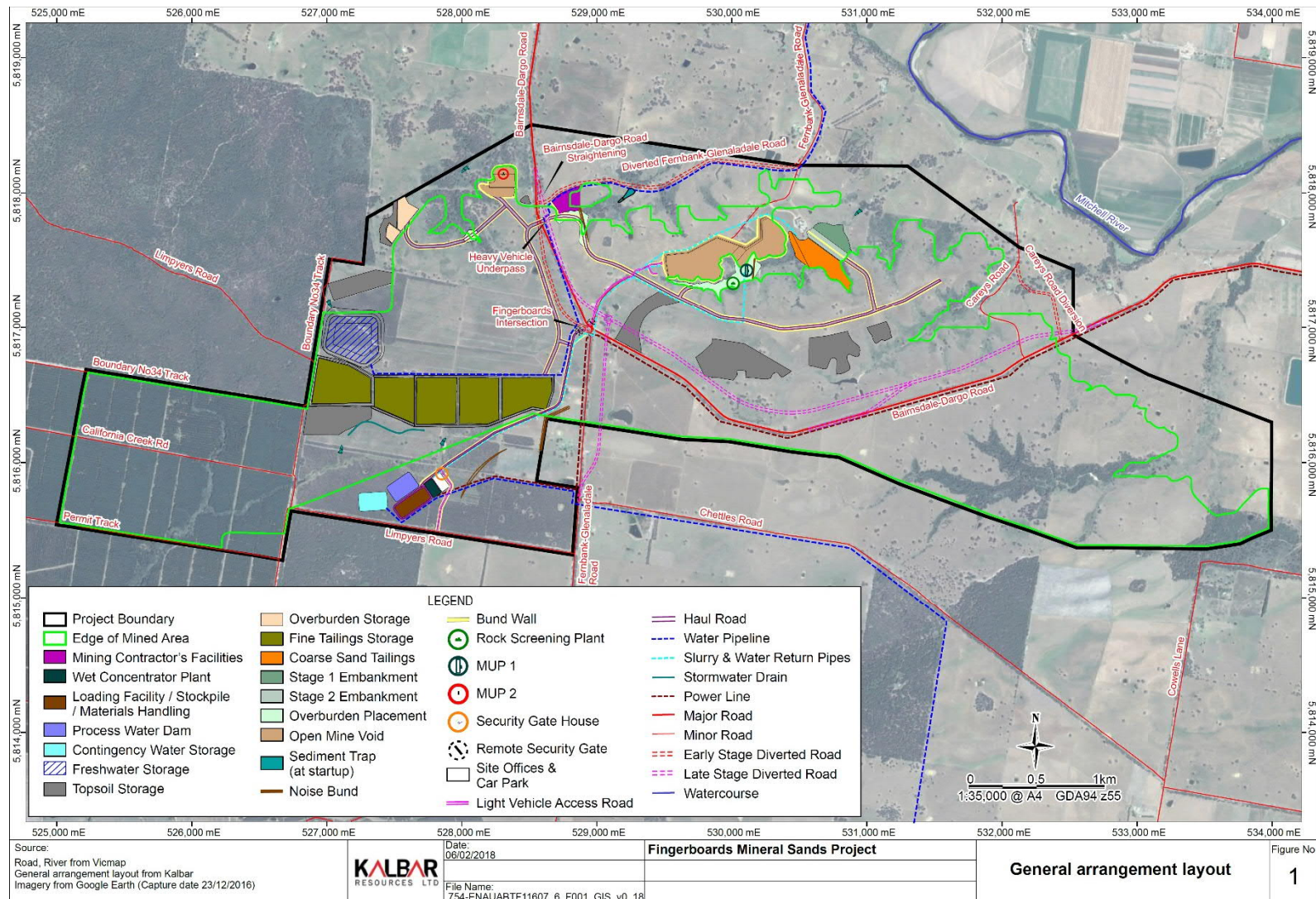


Figure 1: Project site and updated arrangement layout (source: Kalbar Resources, 2018).

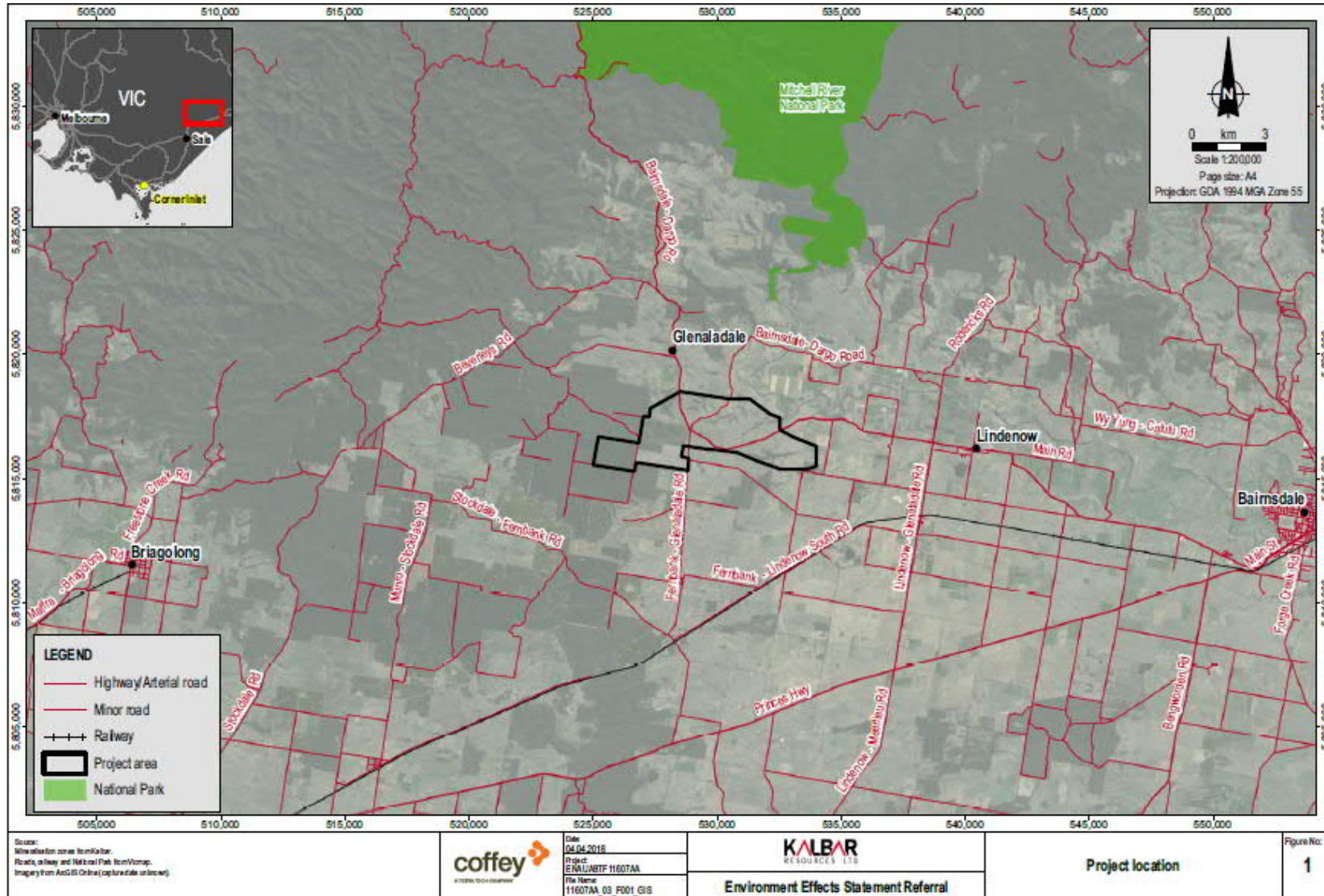


Figure 2: Project location and setting (source: Kalbar Resources, 2018).

2 Assessment process and required approvals

2.1 What is an EES?

An EES is prepared by the project's proponent to describe the project and its potential environmental effects. An EES should enable stakeholders and decision-makers to understand how the project is proposed to be implemented and the likely environmental effects of doing so. An EES has two main components.

1. The EES main report – An integrated, plain English document that sets out an analysis of the potential impacts of the project. The main report draws on technical studies, data and statutory requirements such as specific limits for surface water and groundwater quality and waste discharge to the environment, and should clearly identify which components of the scope are being addressed throughout.
2. The studies that inform the EES – Technical reports on expert investigations and analyses that provide the basis for the EES main report. They will be exhibited in full, as appendices to the main report.

The potential impacts that require technical studies are set out in Section 4 of this document.

2.2 The EES process

The proponent is responsible for preparing the EES, including conducting technical studies and undertaking stakeholder consultation. The Department of Environment, Land, Water and Planning (DELWP) is responsible for managing the EES process. This EES process has the following steps:

- preparation of a draft study program and draft schedule by the proponent (completed);
- preparation and exhibition of draft scoping requirements by DELWP on behalf of the Minister (completed) with public comments received during the advertised exhibition period;
- finalisation and issuing of scoping requirements by the Minister (current step);
- review of the proponent's EES studies and draft documentation by DELWP and a technical reference group (TRG) as well as peer review for key EES studies³;
- completion of the EES by the proponent;
- review of the complete EES by DELWP to establish its adequacy for public exhibition;
- exhibition of the proponent's EES and invitation for public comment by DELWP on behalf of the Minister;
- appointment of an inquiry by the Minister to review the EES and public submissions received, conduct public hearings and provide a report to the Minister; and finally
- following receipt of the inquiry report, the Minister provides an assessment of the project inform for decision-makers.

Further information on the EES process can be found on the department's website⁴.

Technical reference group

DELWP has convened a TRG, comprised of representatives of relevant state government agencies and departments and relevant local councils to advise it and the proponent on:

- applicable policies, strategies and statutory provisions;
- the scoping requirements for the EES;
- the design and adequacy of technical studies for the EES;
- the proponent's public information and stakeholder consultation program for the EES;
- responses to issues arising from the EES investigations;
- the technical adequacy of draft EES documentation; and
- coordination of statutory processes.

Consultation

³ For critical EES studies peer review by an external, independent expert may be deemed appropriate (by DELWP in consultation with the TRG).

⁴ www.delwp.vic.gov.au/environmental-assessment.

The proponent is responsible for informing and engaging the public and stakeholders to identify and respond to their issues in conjunction with the EES studies. Stakeholders include potentially affected parties, the local community and interested organisations and individuals, as well as government bodies. Under its EES consultation plan the proponent informs the public and stakeholders about the EES process and associated investigations and provides opportunities for input and engagement during the EES investigations. The consultation plan is reviewed and amended in consultation with DELWP and the TRG before it is published on the DELWP website. The final plan will:

- identify stakeholders;
- characterise public and stakeholders’ interests, concerns and consultation needs and potential to provide local knowledge and inputs;
- describe consultation methods and schedule; and
- outline how public and stakeholder inputs will be recorded, considered and/or addressed in the preparation of the EES.

Approvals coordination with the EES process

The project may require a range of approvals under Victorian legislation. DELWP coordinates the EES process as closely as practicable with the approvals procedures, consultation and public notice requirements. Figure 3 outlined the steps in the EES process and the parallel coordination of statutory processes.

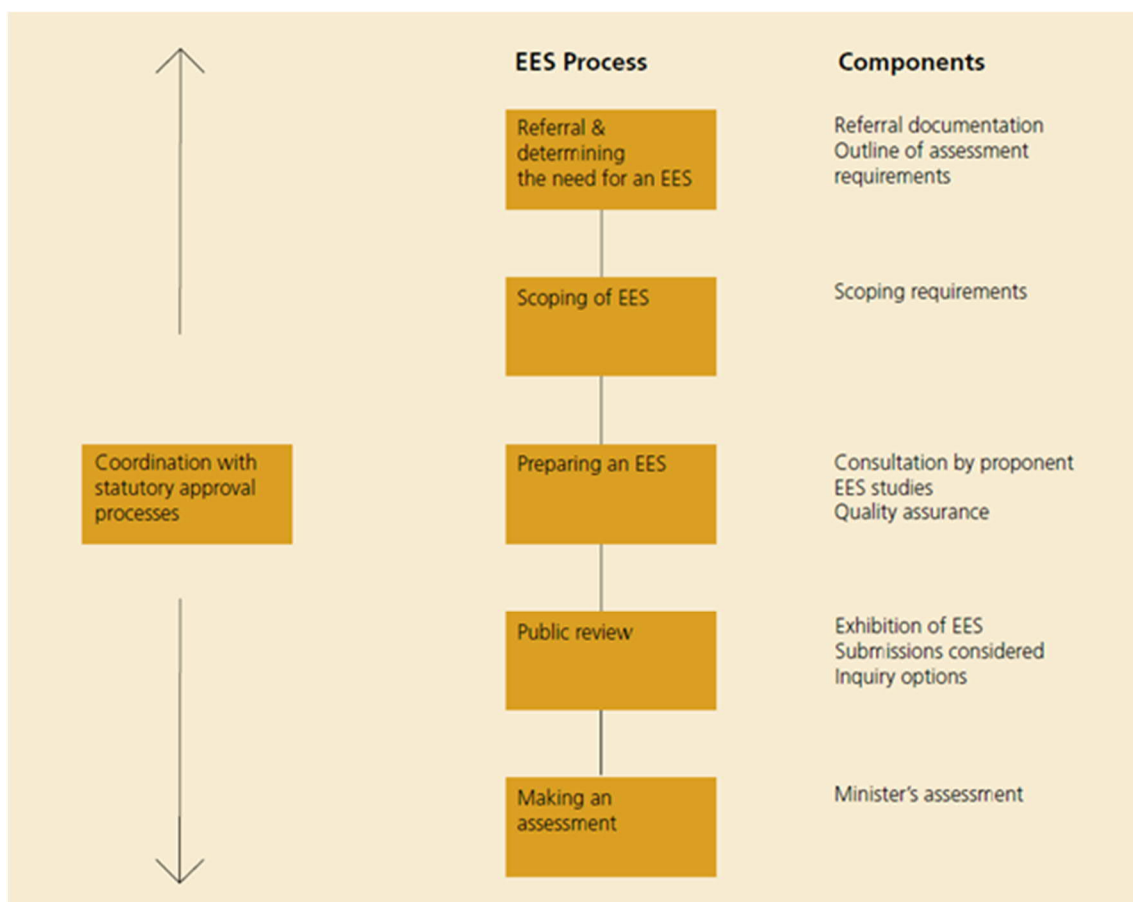


Figure 3: Coordination of statutory assessment and approvals processes.

Building, works and development of land associated with a mining project (within the Mining Licence area) are exempt from the permit requirements under the local planning scheme (i.e. the East Gippsland and Wellington Planning Schemes), providing the project is assessed via an EES and Minister's Assessment under the EE Act prior to statutory decisions being made under the Mineral Resources (Sustainable Development) Act 1990 (MRDS Act).

To facilitate the integrated consideration of issues and the timely completion of required approval processes, it is recommended that the EES include a draft work plan prepared in-line with requirements under the MRSD Act.

The EES will not address any approvals which may be required for specific uses of the rehabilitated land that might be proposed following conclusion of mining.

2.3 Accreditation of the EES process under the EPBC Act

The project was also referred to the Australian Government under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The delegate for the Commonwealth Minister for the Environment and Energy determined on 6 July 2017 that the project is a 'controlled action', as it is likely to have a significant effect on the following matters of national environmental significance (MNES), which are protected under Part 3 of the EPBC Act:

- Ramsar wetlands (sections 16 and 17B);
- listed threatened species and communities (sections 18 and 18A);
- listed migratory species (sections 20 and 20A); and
- nuclear actions (sections 21 and 22A).

The EES is an accredited assessment process under the EPBC Act through a Bilateral Assessment Agreement that exists between the Commonwealth and State of Victoria. The Commonwealth Minister or delegate will decide whether the project is approved, approved with conditions or refused under the EPBC Act, after having considered the Minister for Planning's assessment under the EE Act. Note that what are generally termed 'effects' in the EES process corresponds to 'impacts' defined in section 82 of the EPBC Act.

3 Matters to be addressed in the EES

3.1 General approach

The EES should assess the environmental effects⁵ arising from all components and stages of the project. The assessment should include:

- the potential effects on individual environmental assets – magnitude, extent and duration of change in the values of each asset – having regard to intended avoidance and mitigation measures;
- the likelihood of adverse effects and associated uncertainty of available predictions or estimates;
- further management measures that are proposed where avoidance and mitigation measures do not adequately address effects on environmental assets, including specific details of how the measures address relevant policies; and
- the likely residual effects, including on relevant MNES, that are likely to occur after all proposed measures to avoid and mitigate environmental effects are implemented.
- An analysis on the acceptability of effects on all MNES.

Further advice on the approach to be adopted in preparing the EES is provided in Section 4.

3.2 General content and style of the EES

The content of the EES and related investigations is to be guided by these scoping requirements and the Ministerial Guidelines. To facilitate decisions on required approvals, the EES should address statutory requirements associated with approvals that will be informed by the Minister's Assessment, including relevant decision-making under the EPBC Act. The EES should also address any other significant issues that emerge during the investigations.

Ultimately it is the proponent's responsibility to ensure that adequate studies are undertaken and reported to support the assessment of environmental effects and that the EES has effective internal quality assurance in place. Close consultation with DELWP and the TRG during the investigations and preparation of the EES will be necessary to minimise the need for revisions prior to authorisation of the EES for public exhibition.

The main EES report should provide a clear, well-integrated analysis of the potential effects of the proposed project, including proposed avoidance, mitigation and management measures, as well as relevant alternatives. Overall, the main report should include the following:

- an executive summary of the potential environmental effects of the project, including potential effects on identified MNES outlined in section 4;
- a description of the entire project, including its objectives, rationale, key elements, associated requirements for new infrastructure and use of existing infrastructure;
- a description of the approvals required for the project to proceed, and its relationship to relevant policies, strategies, guidelines and standards;
- a description of relevant alternatives capable of substantially meeting the project's objectives that may also offer environmental or other benefits (as well as the basis for the choice where a preferred alternative is nominated);
- descriptions of the existing environment, where this is relevant to the assessment of potential effects;
- appropriately detailed assessments of potential effects of the project (and relevant alternatives) on environmental assets and values, relative to the "no project" scenario, together with an estimation of likelihood and degree of uncertainty associated with predictions;

⁵Effects include direct, indirect, combined, consequential, short and long-term, beneficial and adverse effects.

- intended measures for avoiding, minimising, managing and monitoring effects, including a statement of commitment to implement these measures;
- predictions of residual effects of the project assuming implementation of proposed environmental management measures;
- any proposed offset measures where avoidance and mitigation measures will not adequately address effects on environmental values, including the identified MNES, and discussion of how any offset package proposed meets the requirements of the EPBC Act Environmental Offsets Policy as it relates to MNES;
- responses to issues raised through public and stakeholder consultation;
- evaluation of the implications of the project and relevant alternatives for the implementation of applicable legislation and policy, including the principles and objectives of ecologically sustainable development and environmental protection; and
- a description of the environmental performance regime and track record of the proponent, including relevant experience in delivering and operating similar projects, as well as the organisation's health, safety and environmental policies.

The proponent must also prepare a concise non-technical summary document (hard copy A4) for free distribution to interested parties. The EES summary document should include details of the EES exhibition, public submission process and availability of the EES documentation.

3.3 Project description

The EES is to describe the project in sufficient detail both to allow an understanding of all components, processes and development stages, and to enable assessment of their likely potential environmental effects.

The project description should canvass the following:

- Contextual information on the project, including its objectives and rationale, its relationship to relevant statutory policies, plans and strategies (if relevant), including the basis for selecting the area proposed to be mined within the broader mineral sands deposit and implications of the project not proceeding.
- Land use activities (including beneficial and sensitive uses) in the project area and vicinity, supported by plans and maps where applicable.
- Details of all the project components, to the extent practicable, including:
 - location, footprint, layout and access arrangements during site establishment, construction and operation;
 - design, methods, staging and scheduling of the proposed mining, including direction and timing of mining across the site and its operational life, volumes to be mined (overburden and ore), total production and production rate and timing of expected decommissioning, closure and rehabilitation;
 - function and design principles and capacity of main components of works, including overburden handling, ore extraction (including reagents to be used), mineral separation, tailings management and electricity supply and use;
 - water resources for operational use, including details on storage provisions, daily and annual use (including an operation and post-closure water balance);
 - necessary works directly associated with the project, such as an infrastructure and services upgrade and relocation, or augmentation of existing plant and facilities, including potential construction of roads and other linear services required for transporting ore and heavy mineral concentrate on and off-site;
 - proposed construction techniques and extent of areas to be disturbed during site establishment and construction, including total area expected to be cleared, particular requirements for traffic and floodwater management, dust and noise management, as well as for sensitive environmental locations;
 - solid waste, wastewater and hazardous material generation and management during operation, including transportation and storage of hazardous material on-site and off-site;
 - lighting, safety and security requirements during site establishment, construction, operation, decommissioning and site rehabilitation;

- hours of operation, workforce requirements (total work force) and recruitment policies during construction, operation, decommissioning and site rehabilitation; and
- approach to be taken regarding mine site rehabilitation, including progressive rehabilitation and mine-closure.

3.4 Project alternatives

The EES should document the proponent's consideration of relevant alternatives, including the "no project" scenario, and include an explanation of how specific alternatives were shortlisted for evaluation within the EES. The EES should investigate and document the likely environmental, social and economic effects of the alternatives, particularly where these offer a potential to achieve beneficial environmental, social and economic outcomes and are capable of meeting the objectives of the project. The discussion of relevant alternatives should include:

- the basis for selecting the area proposed to be mined within the broader boundaries of the exploration licence, in the context of the concept mine plan, including alternatives for the layout and staging of the mine;
- the site selection process for any ancillary infrastructure/facilities, including the processing facilities;
- the technical feasibility and environmental implications of alternative construction, mining, ore processing, tailings management and site rehabilitation methods; and
- relevant alternatives for electricity, water, gas and fuel supply, transport of products and workers and solid and liquid waste disposal.

Where appropriate, the assessment of environmental effects of relevant alternatives is to address the matters set out in the subsequent sections of this document. The depth of investigation of alternatives should be proportionate to their potential to minimise potential adverse effects as well as meet project objectives.

3.5 Applicable legislation, policies and strategies

The EES will need to identify relevant legislation, policies, guidelines and standards, and assess their specific requirements or implications for the project, particularly in relation to required approvals, including (but not limited to):

- Environment Effects Act 1978;
- Environment and Protection Biodiversity Conservation Act 1999 (Cth);
- Mineral Resources (Sustainable Development) Act 1990 (MRSD Act) and associated regulations and guidelines⁶;
- Environment Protection Act 1970 (EP Act), Environment Protection (Industrial Waste Resource) Regulations 2009, as well as relevant State Environment Protection Policies (SEPPs) and related documents including SEPP (Groundwaters of Victoria) and SEPP (Waters of Victoria)⁷, SEPP (Prevention and Management of Contamination of Land), SEPP (Ambient Air Quality), SEPP (Air Quality Management) and Environment Protection (Industrial Waste Resource) Regulations;
- Public Health and Wellbeing Act 2008 (PHW Act);
- Noise from Industry in Regional Victoria (NIRV) 2011, EPA Publication No. 1411 and Applying NIRV to the proposed and existing industry EPA Publication No. 1413;
- Protocol for Environmental Management: Mining and extractive industries, EPA Publication No. 1191, December 2007 (PEM);
- Planning and Environment Act 1987 (P&E Act), and relevant provisions in the East Gippsland and Wellington Planning Schemes;

⁶As noted in Section 2.2, the project does not require permits under the East Gippsland and Wellington Planning Schemes because of an exemption provided under the MRSD Act. Notwithstanding this, in preparing the EES the proponent should have regard to relevant elements of the planning scheme that relate to the draft evaluation objectives.

⁷New SEPP (Waters) may be the relevant policy. This is due for finalisation in mid-2018. It will incorporate and include SEPPs Groundwater of Victoria and Waters of Victoria.

- Water Act 1989;
- Catchment and Land Protection Act 1994 (C&LP Act);
- Conservation, Forests and Land Act 1987 (CF&L Act);
- Crown Land (Reserves) Act 1978;
- Climate Change Act 2017;
- Land Act 1958;
- Flora and Fauna Guarantee Act 1988 (FFG Act);
- Wildlife Act 1975;
- Forests Act 1958;
- National Parks Act 1975;
- Radiation Act 2005 and relevant regulations;
- Road Management Act 2004;
- Aboriginal Heritage Act 2006 (amended 2016) and Aboriginal Heritage Regulations 2007;
- Traditional Owners Settlement Act 2010;
- Heritage Act 1995;
- Heritage Rivers Act 1992; and
- Native Title Act 1993 (Cth).

The proponent will also need to identify and address other relevant policies, strategies, subordinate legislation and related management or planning processes that may be relevant to the assessment of the project and relevant roadside management strategies under the East Gippsland and Wellington Planning Schemes. These include, but are not limited to:

- Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines (2013);
- Preparation of Work Plans and Work Plan Variations using RRAM – Guidelines for Mining Projects (2017);
- Guidance Material for the Assessment of Geotechnical Risks in Open Pit Mines and Quarries;
- Management of Water in Mines and Quarries;
- Management of Tailings Storage Facilities;
- Community Engagement Guideline for Mining and Mineral Exploration;
- Rehabilitation and Environmental Aspects of Mining and Extractive Work Plans;
- ANZMEC/MCA Strategic Framework for Mine Closure (2000);
- Mine Rehabilitation Leading Practice Sustainable Development Program for the Mining Industry (2016);
- Mine Closure Leading Practice Sustainable Development Program for the Mining Industry (2016);
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Radiation Protection Series;
- DEDJTR Rehabilitation Plans and Other Environmental Aspects of Work Plans (2004);
- CSIRO Guidelines for Open Pit Slope Design (2009);
- Australian Groundwater Modelling Guidelines (2012);
- ARPANSA Radiation Protection of the Environment Guide G-1 (2015);
- East Gippsland Regional Catchment Strategy (2013);
- West Gippsland Regional Catchment Management Strategy;
- East Gippsland Waterway Strategy (2013);
- West Gippsland Waterway Strategy (2014);
- Gippsland Lakes Ramsar Site Management Plan (2015);
- Gippsland Regional Forest Agreement (2000);
- Protecting Victoria's Environment – Biodiversity (2037); and
- EPBC Act policy statements, conservation advices, threat abatement plans and recovery plans for nationally listed threatened species and ecological communities and nationally listed migratory species.

3.6 Consultation

The proponent is responsible for informing and consulting with the public and stakeholders throughout the preparation and exhibition of the EES, in accordance with a suitable EES consultation plan (Section 2.2). The

EES should document the process and results of the consultation undertaken by the proponent during the preparation of the EES, including:

- issues raised and suggestions made by stakeholders or members of the public; and
- the proponent’s responses to these issues, in the context of the EES studies and the associated consideration of mitigation measures.

The EES should also provide an outline of a program for community consultation, stakeholder engagement and communications proposed for implementation of the project, including opportunities for local stakeholders to engage with the proponent to seek responses to issues that might arise during project implementation.

3.7 Draft evaluation objectives

The project will need to consider a balance of economic, social and environmental outcomes that contribute to ecologically sustainable development and provide a net community benefit over the short and long-term through its assessment of the project against the evaluation objectives.

Table 1 includes draft evaluation objectives that identify desired outcomes in the context of potential project effects and relevant legislation. During the development of the EES the proponent can consider refining the objectives and proposed evaluation framework, as well as develop specific assessment criteria to assist the evaluation of effects.

The framing of the draft objectives reflects the key subject matters to be investigated for the EES, relevant legislation and policies (Section 3.5), the objectives and principles of ecologically sustainable development and environmental protection, as well as environmental issues identified by the proponent in the referral documentation.

The level of effort applied to the investigation, management and mitigation of issues in the context of the draft evaluation objectives should be proportionate to the significance of potential adverse effects (Section 4). The proponent should consult closely with DELWP Impact Assessment Unit and the TRG throughout the preparation of the EES to ensure that the investigation of issues is undertaken soundly and appropriately targeted.

Table 1: Draft evaluation objectives.

Draft evaluation objective	Key legislation
Resource development – To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of other local industries.	MRSD Act
Biodiversity – To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and Commonwealth policies.	MRSD Act, FFG Act, P&E Act, Wildlife Act, CF&L Act, Radiation Act, EPBC Act
Water, catchment values and hydrology – To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Gippsland Lakes Ramsar site) over the short and long-term.	MRSD Act, EP Act, C&LP Act, Radiation Act, SEPPs, Water Act, EPBC Act
Amenity and environmental quality – To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.	MRSD Act, EP Act, SEPPs, PEM, P&E Act, Road Management Act, Radiation Act, PHW Act, EPBC Act

Draft evaluation objective	Key legislation
<p>Social, land use and infrastructure – To minimise potential adverse social and land use effects, including on, agriculture (such as dairy irrigated horticulture and grazing), forestry, tourism industries and transport infrastructure.</p>	<p>MRSD Act, P&E Act, CF&L Act, Forests Act, PHW Act, EPBC Act</p>
<p>Landscape and visual – To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.</p>	<p>MRSD Act, P&E Act, National Parks Act, EPBC Act</p>
<p>Cultural heritage – To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage.</p>	<p>AH Act, Heritage Act, P&E Act, Heritage Rivers Act, Traditional Owners Settlement Act, Native Title Act, EPBC Act.</p>
<p>Rehabilitation – To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.</p>	<p>MRSD Act, C&LP Act, Radiation Act, Water Act, EPBC Act.</p>

3.8 Environmental Management Framework

The EES will need to outline a transparent framework with clear accountabilities for managing and monitoring environmental effects and hazards associated with construction, operation, decommissioning, rehabilitation and post-closure phases of the project in order to achieve acceptable environmental outcomes (Section 5).

4 Assessment of specific environmental effects

Preparation of the EES document and the necessary investigation of effects should be consistent with the principles of a systems approach and proportionality to risk, as outlined in the Ministerial Guidelines (p. 14). A risk-based approach should be adopted during the EES studies, so that a greater level of effort is directed at investigating and managing those matters that pose relatively higher risk of adverse effects. The following sections set out specific requirements for the assessment of effects, using the following structure for each draft evaluation objective.

Effects must include discussion of all potential direct, indirect, on-site and off-site effects as result of the proposed action. The description and assessment of effects must not be confined to the immediate area of the proposed action but must also consider the potential of the proposed action to impact on adjacent areas that are likely to contain habitat for MNES, including conservation reserves, and along proposed transportation routes and facilities used for off-site storage of heavy mineral concentrate.

Key issues or risks that the project poses to the achievement of the draft evaluation objective. In addition to addressing the highlighted issues, the proponent might undertake an appropriate environmental risk assessment.

Priorities for characterising the existing environment to underpin predictive impact assessments having regard to the level of risk. Any risk assessment by the proponent could guide the necessary data gathering.

Design and mitigation measures that could substantially reduce and/or mitigate the risk of significant effects.

Assessment of likely effects through predictive studies or estimates of effects that are reasonably likely, as well as evaluation of their significance, having regard to their likelihood.

Approach to manage performance measures that are proposed to manage risks of effects, assuming that identified design and mitigation measures are applied, to achieve appropriate outcomes. This should inform the assessment of likely residual effects (assuming proposed measures are implemented) and consideration of relevant environmental offsets where applicable.

4.1 Resource development

Draft evaluation objective

To achieve the best use of available mineral sands resources, in an economic and environmentally sustainable way, including while maintaining viability of other local industries.

Key issues

- Opportunity for development of a known mineral sands resource.
- Efficient and environmentally sustainable mining of available resources.
- Best use of land's resources considering environmental, agricultural and forest values.
- Potential impacts on the existing local industries, businesses and landholders.
- Impact of commodity price fluctuation on project sustainability.

Priorities for characterising the existing environment

- Identify the extent, nature and development potential of the ore body, and composition of heavy mineral concentrate, including radiological content and activity levels.
- Identify the composition of tailings and waste material, including radiological content and activity levels.
- Identify opportunities for local workers and suppliers of goods and services that could support the project.
- Describe local industries in the vicinity of the project which could be affected by the construction, operation, decommissioning and rehabilitation of the project, including agriculture and forestry.

Design and mitigation measures

- Describe alternative mine configurations to access mineral sands reserves (including location of the project's infrastructure) and strategies for management and disposal of tailings and waste material to avoid and minimise impacts and potential sterilisation of future reserves.
- Describe off-site activities including transportation and storage of heavy mineral concentrate;
- Describe methods and strategies to demonstrate the radioactivity of tailings and waste materials stays within environmentally acceptable exposure levels.
- Describe alternative methods of site preparation which could optimise site rehabilitation, including potential for future productive land uses.
- Outline measures to enhance potential benefits to local and regional businesses and minimise potential adverse effects to local land-uses and businesses.

Assessment of likely effects

- Assess the project feasibility including the predicted economic costs and benefits from construction and operation of the project, including capital investment, operating expenditure, employment and business opportunities, taxes and royalties to the regional, state and national economies, and the temporary and permanent impacts on agriculture, forest resources, tourism and businesses.

Approach to manage performance

- Describe key elements of the proposed mine work plan to enable monitoring of efficient resource recovery.

4.2 Biodiversity

Draft evaluation objective

To avoid or minimise potential adverse effects on native vegetation, listed threatened and migratory species and ecological communities, and habitat for these species, as well as address offset requirements for residual environmental effects consistent with state and Commonwealth policies.

Key issues

- Direct loss of native vegetation and any associated listed threatened flora and fauna species and communities known or likely to occur in the project site, such as Herb-rich Forest, Plains Grassy Forest, Plains Grassy Woodland, Valley Grassy Forest, Plains Grassy Wetlands and Aquatic Herbland.
- Loss of, degradation, modification or hydrological alteration to any associated ecological communities listed as threatened under the EPBC Act, including but not limited to: Gippsland red gum (*Eucalyptus tereticornis* subsp. *mediana*) grassy woodland and associated native grassland; Seasonal herbaceous wetlands (freshwater) of the temperate lowland plains
- Loss of, or degradation to habitat for flora and fauna species listed as threatened under the EPBC Act, the FFG Act and/or DSE Advisory List, including but not limited to: Giant burrowing frog (*Heleioporus australiacus*), New Holland mouse (*Pseudomys novaehollandiae*), Long-nosed potoroo (*Potorous tridactylus tridactylus*), Regent honeyeater (*Anthochaera phrygia*), Dwarf kerrawang (*Commersonia prostrata*), Gaping leek-orchid (*Prasophyllum correctum*), Swamp everlasting (*Xerochrysum palustre*), Dwarf galaxias (*Galaxiella pusilla*), Australian grayling (*Prototroctes maraena*), Australian painted snipe (*Rostratula australis*), Growling grass frog (*Litoria raniformis*), Green and golden bell frog (*Litoria aurea*), Australasian bittern (*Botaurus poiciloptilus*); and any other protected species.
- Indirect loss of vegetation or habitat quality resulting from hydrological change, edge effects, habitat fragmentation or other disturbance impacts, that may support any listed species or other protected fauna, including those specified above.
- Direct loss or degradation of habitat for fauna listed as migratory under the EPBC Act including but not limited to little tern (*Sterna albifrons*), red-necked stint (*Calidris ruficollis*) and the sharp-tailed sandpiper (*Calidris acuminata*).

- The potential for adverse effects on biodiversity values of the Gippsland Lakes Ramsar wetland of international importance including, but not limited to: Green and golden bell frog (*Litoria aurea*), Growling grass frog (*Litoria raniformis*), Australian painted snipe (*Rostratula australis*), Australian grayling (*Prototroctes maraena*), Dwarf kerrawang (*Commersonia prostrata*), Swamp everlasting (*Xerochrysum palustre*), Metallic sun-orchid (*Thelmyitra epipactoides*), Red-necked stint (*Calidris ruficollis*), Black swan (*Cygnus altratus*), Sharp-tailed sandpiper (*Calidris acuminata*), Chestnut teal (*Anas castanea*), Musk duck (*Biziura lobata*), Fairy tern (*Sterna nereis*), Little tern (*Sterna albifrons*).
- Potential for other indirect significant effects on biodiversity values including but not limited to these effects associated with changes in hydrology (including surface and ground water changes), hydrogeology, water quality (i.e. on water dependent ecosystems), contaminants and pollutants (including nuclides), dust emissions, weed, pathogen and pest animal, and risk of significantly increasing mortality of FFG and EPBC Acts listed species resulting from mine-related activities (e.g. road traffic).
- Potential for indirect significant effects on biodiversity values as a result of off-site activities including transportation and storage of heavy mineral concentrate;
- The availability of suitable offsets for the loss of native vegetation and habitat for relevant listed threatened species, ecological communities and migratory species under the EPBC Act and /or FFG Act.

Priorities for characterising the existing environment

- Characterise the distribution and quality of native vegetation, terrestrial and aquatic habitat and any wildlife movement in the area, taking into account the potential changes in composition due to recent bushfires, that could be impacted by the project.
- Identify the existing or likely presence of any species listed under the EPBC Act, FFG Act and DELWP Advisory List, as well as declared weeds, pathogens and pest animals⁸.
- Identify and characterise any groundwater dependant ecosystems that may be affected, in particular by mine dewatering. This characterisation is to be informed by relevant data, literature and appropriate seasonal or targeted surveys.
- Describe the biodiversity values that could be affected by the project, including:
 - native vegetation and any ecological communities listed under the EPBC Act and FFG Act;
 - presence of, or suitable habitats for, native flora and fauna species, in particular species listed under the EPBC Act, FFG Act, and DELWP Advisory List; and
 - use of the site and its environs for movement by the EPBC Act, FFG Act, and DELWP Advisory List listed fauna species.
- Describe the existing threats present to biodiversity values, including:
 - direct removal of individuals or destruction of habitat;
 - disturbance or alteration of habitat conditions (e.g. habitat fragmentation, changes to water quantity or quality, fire hazards, etc.);
 - threats to mortality of listed threatened fauna; and
 - the presence of any declared weeds, pathogens and pest animals within and in the vicinity of the project area.

Design and mitigation measures

- Identify potential and proposed design options and measures which avoid or minimise significant effects on native vegetation and any listed ecological communities or flora and fauna species and their habitat.
- Describe further potential and proposed design options and measures which could avoid or minimise the risk of spills or failure of the mine infrastructure (i.e. transportation spills, tailing storage facility, pipe and pump network).

⁸ Note that targeted surveys for MNES must be undertaken in accordance with current Departmental guidelines and policy statements.

Assessment of likely effects

- Identify and assess likely direct and indirect effects of the project and relevant alternatives on native vegetation, ecological communities and flora species, in particular any species listed under the FFG Act.
- Identify and assess likely direct and indirect effects of the project and relevant alternatives on native fauna and their habitat, including listed (FFG Act/EPBC Act) threatened and migratory species and communities, relative to existing hazards and risks where relevant.
- Identify and assess likely effects of the project and relevant alternatives on any groundwater dependant ecosystems and EPBC Act listed ecological communities, in particular due to mine dewatering.

Approach to manage performance

- Describe and evaluate proposed measures to further mitigate and manage residual effects of the project on biodiversity values, including a proposed offset strategy that sets out and includes evidence of the offsets that have been secured or are proposed to satisfy Victorian offset requirements.
- Describe and evaluate the approach to develop contingency measures to be implemented in the event of adverse residual effects (direct and indirect) on flora, fauna and ecological community values requiring further management.
- Identify any further methods proposed to manage risks and effects on other biodiversity values and native vegetation, including as part of the EMF (see section 4.9)

Commonwealth offsets

- Describe and evaluate proposed measures to manage and offset predicted residual effects of the project on biodiversity values (MNES) protected under the EPBC Act.
- Include a proposed offset package and an Offset Management Plan (OMP) that sets out proposed environmental offsets to compensate for predicted residual impacts on MNES, ensuring they meet Commonwealth requirements.
- Describe how the offset will be secured, managed and monitored, including management actions, responsibility, timing, performance measures and the specific environmental outcomes to be achieved.
- Outline the key commitments and management actions for delivering and implementing a proposed offset package through the OMP.

4.3 Catchment values

Draft evaluation objective

To minimise effects on water resources and on beneficial and licensed uses of surface water, groundwater and related catchment values (including the Gippsland Lakes Ramsar site) over the short and long-term.

Key issues

- The potential for adverse effects on the functions, values, beneficial and licensed uses of surface water due to the project's activities, including water extraction, interception or diversion of flows, discharges from operational areas or saline water intrusion.
- The potential for adverse effects on the functions, values and beneficial uses of groundwater due to the project's activities, including water extraction, interception or diversion of flows, discharges from mining and other operational areas or saline water intrusion.
- The potential for adverse effects on nearby and downstream water environments (including the Mitchell and Perry Rivers, King and Wellington Lakes, and Gippsland Lakes Ramsar wetland of international importance overall) due to changed water quality, flow regimes or waterway conditions during construction, operations, rehabilitation, decommissioning and post-closure.
- Ore, product, overburden, tailings and mining by-products management, in the context of potential water quality impacts including those arising from sedimentation, release of radionuclides, other contaminants and pollutants, tunnel erosion, acid sulphate soils, acid/metalliferous drainage formation, and salinity.
- Potential erosion, sedimentation and landform stability effects during construction, operations, rehabilitation, decommissioning and post-closure.

Priorities for characterising the existing environment

- Identify and characterise the relevant groundwater and surface water environments, including the protected beneficial uses and values, existing drainage functions and behaviours and catchments, including that of the Gippsland Lakes Ramsar site.
- Characterise existing sedimentation within the Mitchell and Perry River systems including the physical and chemical properties of river bed sediments.
- Identify existing groundwater and surface water users and allocations in the broader area, including downstream of the site.
- Characterise the interaction between surface water and groundwater within the project site and the broader area.
- Provide a sufficient hydrogeological characterisation (e.g. a model) of the current allocations, extractions and uses of groundwater or surface water (e.g. town drinking water supply, irrigation use, stock and domestic use and environmental flows) in the broader area, including downstream of the site.
- Characterise the physical and chemical properties of the project area soils including the potential environmental risks (e.g. potential for erosion, salinity, nutrients and acidification).

Design and mitigation measures

- Identify and evaluate configuration of mining activities and related landforms, which could avoid or minimise significant effects on water environments, including the Mitchell and Perry Rivers and King and Wellington Lakes, and the Gippsland Lakes Ramsar site.
- Describe further potential and proposed design options and measures which could avoid or minimise significant effects on beneficial uses of surface water, groundwater and downstream water environments, accounting for climate risks and the potential effects of climate change, during the project construction, operations, rehabilitation, decommissioning and post-closure.
- Outline and assess measures for the management of soils to minimise potential adverse effects on local hydrology and water quality associated with project area soils.

Assessment of likely effects

- Develop a water balance model to quantify the project's demand (both quantity and quality) on groundwater and/or surface water resources, including volume to be extracted, stored and released during the construction, operations, rehabilitation, decommissioning and post-closure phases of the project.
- Use appropriate methods, including modelling, to identify and evaluate effects of the project and relevant alternatives on groundwater and adjacent surface water and floodplains environments, including:
 - the likely extent, magnitude and duration of groundwater level drawdown in the vicinity of water supply bores during construction and operation, and the expected timing and scale of recovery of groundwater levels post-closure (spatial and temporal groundwater modelling);
 - the potential for mounding and migration of groundwater from the backfilled tailings material along the mine path during operations, decommissioning and post-closure (including predicted volume, timing and water characteristics, where relevant);
 - changes to groundwater and surface water quality at all project phases, including effects from drawdown and rebound of groundwater levels in the vicinity of water supply bores, present contaminants (including radionuclides), as well as downstream and upstream effects on ecological values (e.g. groundwater dependent ecosystems, EPBC Act listed communities and the Gippsland Lakes Ramsar site);
 - changes to availability of surface water and groundwater for beneficial and licenced users in the immediate and wider vicinity of the project due to predicted extraction groundwater or surface water for operational use accounting for climate risks and the potential effects of climate change;
 - potential erosion, sedimentation and landform stability effects of the project including the direct impact of mining on waterways and their subsequent rehabilitation; and

- risks associated with potential acid forming materials (soil and rock) which may be disturbed or exposed by mining activities.

Approach to manage performance

- Describe any further methods that are proposed to manage risks of effects on groundwater and surface water environments and catchment values, including as part of the EMF (see section 5).

4.4 Amenity and environmental quality

Draft evaluation objective

To protect the health and wellbeing of residents and local communities, and minimise effects on air quality, noise and the social amenity of the area, having regard to relevant limits, targets or standards.

Key issues

- The potential for diminished social wellbeing due to exposure to dust, air pollution, noise, vibration, lighting, radiation, hazardous materials and public safety (including fire) and transport hazards during construction, operation, decommissioning and rehabilitation of the project.
- The potential for public health risks that could arise from elevated levels of airborne pollutants and noise during construction, operation, decommissioning and rehabilitation of the project.

Priorities for characterising the existing environment

- Describe the physical and chemical characteristics of overburden, ore, product, tailings and mining by-products to be removed during mine development and operations including specific aspects relevant to air quality.
- Identify dwellings and any other potentially sensitive receptors (e.g. community centres, schools, recreation facilities, agricultural and tourism businesses, etc.) that could be affected by the project potential effects on air quality, noise or vibration levels.
- Identify flora and fauna that could be affected by the project potential effects on air quality, noise or vibration levels.
- Monitor and characterise background levels of air quality in accordance with PEM requirements, including air pollution indicators (dust, PM₁₀, PM_{2.5}, crystalline silica, metals, and greenhouse gas emissions from equipment) in the context of the dispersive soils within the project area, noise and vibration in the vicinity of the project, including adjacent sensitive receptors and along potential transport routes.
- Characterise background radiation levels within the project site and the broader project area.
- Evaluate the existing road/rail conditions and traffic (type, volume and timing) conditions on key proposed transport routes for the project.
- Evaluate the existing port facilities for storage of heavy mineral concentrate.
- Evaluate the existing fire hazards in the vicinity of the project.

Design and mitigation measures

- Identify potential and proposed design responses and/or other mitigation measures to avoid, reduce and/or manage any significant effects for sensitive receptors, during the project construction, operation, rehabilitation, decommissioning and post-closure, arising from:
 - specified air pollution indicators;
 - noise, vibration and lighting;
 - adverse changes to the background radiation levels in the vicinity of the project (including the radionuclide content of vegetation, surface water and groundwater);
 - dislocation due to severance causing reduced access to farm land and/or disruption to social networks and community facilities; and
 - public safety hazards.

Assessment of likely effects

- Predict likely atmospheric concentrations of particulate matter and other relevant Class 1, 2 or 3 indicators in surrounding areas during mine construction, operation and rehabilitation, using an air quality impact assessment undertaken in accordance with the PEM. The air quality impact assessment is to also include an assessment using the SEPP (Ambient Air Quality) environmental objectives.
- Assess any effects of dust emissions on Lindenow Valley primary industry and local water supplies (both water network reservoirs and privately own rain water tanks).
- Assess likely noise increases, vibration and lighting impacts at sensitive receptors in the vicinity of the project and along the proposed transport route.
- Assess likely radiation effects associated with the project during operations, rehabilitation, decommissioning and post-closure.
- Assess likely traffic volume increase in the vicinity of the project and along proposed transport routes.
- Assess likely effects to the social cohesion, health and well-being of the communities in the vicinity of the project.
- Assess potential safety hazards to the public arising from the project.

Approach to manage performance

- Measures to manage other potentially significant effects on amenity, environmental quality, health and social wellbeing (including stability of mining landforms), should also be addressed in the EES, including a framework for identifying and responding to any emerging issues.

4.5 Social, land use and infrastructure

Draft evaluation objective

To minimise potential adverse social and land use effects, including on agriculture, dairy, irrigated horticulture, tourism industries and transport infrastructure.

Key issues

- The potential for dislocation due to severance causing reduced access to farm land, businesses, social networks, community facilities and the Mitchell River National Park.
- Potential for adverse effects on the existing and future land and beneficial uses, including agricultural, dairy, irrigated horticulture, forestry, tourism and local businesses.
- The potential for changes to the existing infrastructure in the project area and in its vicinity, particularly the proposed changes to water supply and irrigation network, power transmission lines and local and regional roads or rail.
- Potential damage to local and regional road surfaces along transport routes and increased risk to road safety on transport routes.

Priorities for characterising the existing environment

- Characterise the existing and planned land use and the existing beneficial uses within and in the vicinity of the proposed project.
- Describe the existing infrastructure for water supply, irrigation, wastewater collection and power supply in the project area and in its vicinity.
- Characterise the current traffic conditions (including site access) and road infrastructure (including arterial and municipal roads) and road users in terms of capacity, condition and structural integrity, travel times, safety and accessibility.
- Describe proposed transport routes and infrastructure, its ability to accommodate traffic generated by the project, as well as other predicted future demands.
- Describe existing emergency response infrastructure and resources.
- Characterise the social structure of the local communities including population, demographics, employment, infrastructure, community groups, housing/accommodation availability, etc.

- Describe community attitudes to the existing environment and the potential changes brought by mining and associated operations.

Design and mitigation measures

- Outline and assess design and mitigation measures that address the potential for adverse land use effects during construction, operations, rehabilitation (including progressive rehabilitation), decommissioning and post-closure, including the proposed principles for sustainable land use set for rehabilitation of soils and landforms post-mining.
- Identify the proposed transport routes' impacts on road safety and operational performance of the existing road infrastructure, considering all project vehicle types, traffic volumes and movements and need for installation of any proposed mine infrastructure along or across the public road network during the project construction and operations.
- Outline the required transport infrastructure upgrades and additional road maintenance regime to address adverse impacts of the project construction and operation (e.g. road, rail and port).
- Describe and evaluate the proposed traffic management and safety principles to address changed traffic conditions during both construction and operation of the project, covering (where appropriate) road safety, temporary or permanent road diversions, different traffic routes, hours of use, vehicle operating speeds, types of vehicles and emergency services provisions.
- Outline measures to minimise potential adverse effects on local communities and infrastructure.
- Outline measures to minimise potential adverse effects to local businesses and to enhance potential benefits to local and regional businesses.

Assessment of likely effects

- Assess the potential effects on communities living within or near the project area in terms of potential for dislocation, severance or disrupted access to social networks, community facilities and valued places.
- Assess the potential effects on the land use in the vicinity of the project, in terms of the extent, duration, likelihood and implications of effects.
- Assess the potential economic effects (beneficial and adverse) which could result from the project, including opportunities for business and for existing businesses.
- Assess the potential effects on workforce development opportunities in the local and wider region as a result of the project.
- Evaluate the consistency of the project with the policies and provisions of the East Gippsland and Wellington planning schemes and other relevant land use planning strategies.

Approach to manage performance

- Describe any further measures that are proposed to mitigate, offset or manage social, land use and economic outcomes for communities living within or in the vicinity of the project area, as well as proposed measures to enhance beneficial outcomes, including in the context of the EMF (see section 4.9) in view of the project's expected long-term operations life.

4.6 Landscape and visual

Draft evaluation objective

To avoid adverse effects on the landscape and recreational values of the Mitchell River National Park and minimise visual effects on the open space areas.

Key issues

- The potential for effects on the landscape and recreational values of the Mitchell River National Park and visual amenity and character of region from the project.

Priorities for characterising the existing environment

- Characterise the visual character and associated landscape values of the project site including in the context of the Mitchell River National Park.
- Describe changes to the landscape (including from vegetation clearance and likely changes to landform) and associated visual effects, as well as public views from roadways used by tourist traffic and other significant vantage points, in particular on the Mitchell River National Park.

Design and mitigation measures

- Outline and evaluate the proposed mine design options, staging of works and management measures that could mitigate project effects on landscape and visual amenity during mining.
- Describe and evaluate the potential and proposed measures to restore and rehabilitate the landscape and visual amenity values of the project site after mining.

Assessment of likely effects

- Assess the effects of the project and relevant alternatives on landscape and visual amenity values of the project site and the Mitchell River National Park, including with respect to views from public vantage points and where possible representative local residences during construction, operation, rehabilitation, decommissioning and post-closure.

Approach to manage performance

- Describe and evaluate plans to monitor effects on landscape and visual amenity values and implement contingency management measures, including in relation to:
 - the configuration and staging of works and rehabilitation; and
 - progressive reinstatement and rehabilitation activities, including a landscape shaping reflective of the pre-mining landscape and preliminary identification of land use options.
- Describe any further measures that are proposed to manage risks to landscape and associated recreational values for communities living in the vicinity of the project that are to be included in the EMF (see section 5).

4.7 Cultural heritage

Draft evaluation objective

To avoid or minimise adverse effects on Aboriginal and non-Aboriginal cultural heritage values.

Key issues

- The potential for adverse effects on known and unknown Aboriginal and non-Aboriginal cultural heritage values, including those of the heritage listed Mitchell River.
- The potential for permanent loss of significant heritage values.

Priorities for characterising the existing environment

- Identify and characterise Aboriginal cultural heritage sites or areas of sensitivity within the project area, particularly in the vicinity of Mitchell River, in accordance with the requirements for the cultural heritage management plan (CHMP) under the AH Act.
- Identify and document known and previously unidentified places and sites of historic and cultural heritage significance within and adjoining the project area, including any areas of significant archaeological interest, in accordance with the Guidelines for Conducting Archaeological Surveys (Heritage Victoria, 2008) as updated in 2013.

Design and mitigation measures

- Describe and evaluate potential and proposed design and construction method mitigation to address effects on Aboriginal and historic cultural heritage, particularly in the vicinity of Mitchell River.

Assessment of likely effects

- Assess potential effects of the project and relevant alternatives on:

- identified sites or places of aboriginal cultural heritage significance; and
- sites and places of historic and cultural heritage significance, having regard to the Guidelines for Investigating Historical Archaeological Artefacts and Sites (Heritage Victoria, 2012).

Approach to manage performance

- Outline and evaluate proposed additional measures to manage risks of effects on:
 - sites and places of Aboriginal cultural heritage significance, within the framework of a draft CHMP⁹; and
 - sites and places of historic and cultural heritage significance, including as part of the EMF (see section 5).

4.8 Rehabilitation

Draft evaluation objective

To establish safe progressive rehabilitation and post-closure stable rehabilitated landforms capable of supporting native ecosystems and/or productive agriculture that will enable long-term sustainable use of the project area.

Key issues

- Mine operation will change topography, soil profiles, surface water flow, hydrology and drainage, as well as changed vegetation cover.
- Long-term mining activities can affect sustainable agriculture, forestry and tourism associated with the Mitchell River National Park.
- Adequate overburden and soil availability for the rehabilitation of the project area to ensure the post-mining topography can be reconfigured to pre-mining topography, or as close as practical to enable productive land-uses to be re-instated.
- Appropriate design criteria required to avoid long term landform degradation. Consideration to be given to slope geometry, upper soil profile characteristics (physical/chemical) and surface drainage and erosion mitigation.
- Intensive management and/or amelioration of dispersive soils may be required to prevent long-term degradation of the rehabilitated landform.

Priorities for characterising the existing environment

- Describe the existing topography, soil profiles, drainage, plant-soil-water interactions and vegetation cover within the project area, in particular in the proposed footprint over the proposed mine life.
- Describe current agricultural and horticultural practices in the project area, including key factors influencing sustainable cropping and outputs.
- Characterise the relevant physical and chemical properties of overburden and topsoil materials to be used in rehabilitation.

Design and mitigation measures

- Provide a draft rehabilitation framework that incorporates:
 - proposed storage and management of stockpiled topsoil and subsoils;
 - representative geotechnical cross-sections of rehabilitated areas;
 - proposed management of surface water and groundwater flows, including flood risks, and consideration of restoring natural drainage and restoration of disturbed waterways;
 - design criteria relating to landform and soil profile reconstruction;
 - principles of establishing sustainable vegetation cover, including consideration of habitat suitable for listed threatened species and communities or potential for productive land uses;
 - propose fire management measures;

⁹Refer to EES Advisory Note: Aboriginal Cultural Heritage and the Environment Effects Process for further advice.

- consideration of landscape and visual values from the Mitchell River National Park vantage points and tourist tracks; and
- a plan for progressive rehabilitation and mine closure.

Assessment of likely effects

- Assess best practice methods for storage and management of stockpiled topsoil and subsoils, restoring soil profiles, drainage and productivity, as well as landscape rehabilitation in the context of back-filling of the mine voids and decommissioning of other earth structures.
- Assess levels of certainty of successful outcomes from the proposed design and mitigation measures and consequential performance management measures.
- Assess potential risks from radiation on the environment, biodiversity values and human health.

Approach to manage performance

- Outline and evaluate the proposed performance requirements for rehabilitation, including monitoring and auditing of performance.
- Design criteria to be developed to ensure rehabilitation is appropriate for the intended end land-use (agricultural and native areas) and does not result in long term degradation. Consideration to be given to soil profile characteristics (physical/chemical), horizon depths, maximum slope geometry, factor of safety, plant-soil-water interactions for targeted vegetation communities.
- Prepare a draft mine rehabilitation and closure plan with strategies for progressive rehabilitation, appropriate design criteria, completion criteria/monitoring methodologies and contingency measures for unplanned/forced closure.
- Outline the proposed agreements with landowners with respect to the proposed changes to land use over the period of mine construction, operation, rehabilitation, decommissioning and post-closure.

5 Environmental management framework

Inadequate management of environmental effects during project construction, operation, decommissioning, rehabilitation and post-closure could result in a failure to meet statutory requirements or sustain stakeholder confidence.

The proponent needs to provide a transparent environmental management framework (EMF) for the project in the EES with clear accountabilities for managing and monitoring environmental effects and hazards associated with construction, operation, decommissioning, rehabilitation and post-closure phases of the project in order to achieve acceptable environmental outcomes.

The EMF should describe the baseline environmental conditions to be used to monitor and evaluate the residual environmental effects of the project, as well as the efficacy of applied environmental management and contingency measures. The framework should include:

- the context of required approvals and consents, in particular requirements for the mine work plan;
- any existing or proposed environmental management system to be adopted;
- organisational responsibilities and accountabilities for environmental management;
- a register of environmental risks associated with the project which is to be maintained during project implementation (including matters identified in preceding sections in these directions as well as other pertinent risks);
- the environmental management measures proposed in the EES to address specific issues, including commitments to mitigate adverse effects and enhance environmental outcomes;
- the proposed objectives, indicators and monitoring requirements, including for managing or addressing:
 - social, health and wellbeing outcomes and community engagement
 - biodiversity values, including offsets and establishing a sustainable vegetation cover
 - maintenance of the ecological character of the Gippsland Lakes Ramsar site
 - groundwater and/or surface water resources usage and stormwater runoff
 - geotechnical and geochemical landform stability, including potential erosion and sedimentation
 - solid and liquid waste, including recycling and handling of potentially hazardous or contaminated waste, including radioactive materials
 - noise, vibration, and emissions to air, including dust and greenhouse gases
 - aboriginal and cultural heritage values
 - traffic during construction and operation
 - disruption of and hazard to the existing infrastructure
 - requirements for protection of the environment from radiation
 - site rehabilitation, including handling of topsoil, tailings and mining by-products
 - fire management and emergency response;
- arrangements for management of and access to baseline and monitoring data, to ensure the transparency and accountability of environmental management and to contribute to the improvement of environmental knowledge
- the procedures for monitoring or verifying compliance with performance requirements and review of the effectiveness of the environmental management framework for continuous improvement; and
- procedures for auditing and reporting of performance including compliance with relevant statutory conditions and standards.

The EMF should outline:

- the relevant environmental management plans for construction, operation, decommissioning and rehabilitation phases of the project;

- a program for community consultation, stakeholder engagement and communications during the construction, operation, decommissioning and rehabilitation of the project, including opportunities for local stakeholders to engage with the proponent to seek responses to issues that might arise if the project is undertaken.

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Attachment 2 – Table

Key Matters for East Gippsland Shire Council

	Expertise	Key matters for Council	Response
3.1	Planning scheme amendment review	<p>The predominate use surrounding the site is Farming zone. The Planning Scheme Amendment puts pressure on the surrounding land zone and RA.</p> <p>Discuss further, how the proposal gives effect to any relevant state policy, many SPPF's are only briefly touched on.</p> <p>The PSA is to provide further comment on how it aligns with the local planning policy framework which encourages mining but also provide a clearer and more contemporary strategic direction on matters included in the MSS such as;</p> <p>Future agricultural land use</p> <p>Goods and services to facilitate personnel – Economic development and business facilitation</p> <p>Housing to facilitate expected mining personnel</p> <p>This amendment makes a range of changes to provide certainty for the specific project and will ensure a more coordinated planning approval process.</p>	<p>Request for further detail and refinement to the planning amendment documentation.</p> <p>Request for evidence of notification of affected landowners.</p> <p>Request for evidence of agreements and negotiations with affected landowners.</p> <p>Correction of errors and anomalies within the planning scheme amendment documentation.</p> <p>Request for further details within the Incorporated Document.</p>
3.2	Land use planning assessment	<p>Existing State and local planning policy favor new industry and commercial activities, however, further comment is required as the MSS has many components to be addressed.</p> <p>The agglomeration impact section of the report puts responsibility on Council to deal with an unfavorable process. Need further comment around the proposed mitigation.</p>	<p>Request for clarity in relation to uses, development and works within the Special Controls Overlay.</p> <p>Council is generally not supportive of other commercial and industrial uses outside the mining licence area.</p> <p>Provide additional detail in relation to the compliance with the Minerals RSD Act.</p> <p>Provide a succinct summary of post mining rehabilitation commitments.</p> <p>Integrate the objectives of the Erosion Management and Bushfire Management Overlay controls into the preamble and objectives of the Incorporated Document.</p>

	Expertise	Key matters for Council	Response
3.3	Land use, soils, agriculture and horticulture	<p>Provide map of ASC soils types within the project area and also recommended topsoil and subsoil stripping depth.</p> <p>Provide soil stripping maps showing ASC soil types with topsoil and subsoil stripping depths</p>	Provide additional information as stated.
3.4	Surface Water	<p>Provide further clarification / justification for the 3% AEP Mitchell River spillway discharge design criteria and why this is different to the Perry River design criteria of 1% AEP which is a more widely adopted design criteria for mine water runoff.</p> <p>SLR believes that an assessment of the mine water runoff to contain salinity, pH or radionuclides is warranted given the predication that mine water discharges could occur through the dam spillways during the Project life.</p> <p>It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system. As a dilution strategy is proposed to overcome the DAF system shortcomings a robust assessment of increased contaminant loads to the downstream receiving waters is required.</p> <p>Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. What assurance is there that the dam operating rules detailed in the site water will be adhered to during operation?</p> <p>Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation. What assurance is there that the dam operating rules detailed in the site water will be adhered to during operation?</p> <p>The risk management plan should be revised to include contingencies for failure of the water treatment system.</p>	<p>Impact of haul roads need to be detailed with respect to surface water.</p> <p>Increased documentation in relation to diversion and conveyance channels</p> <p>Inclusion of baseline monitoring program.</p> <p>Provide assessment of mine water runoff.</p> <p>Provide further clarification and justification for using 3% AEP Mitchell River spillway discharge design criteria.</p> <p>Further evidence that mine water discharge events will not cause detrimental impacts to the downstream environment.</p> <p>Expand water sensitivity analysis.</p> <p>Refine water balance model.</p> <p>Finalise water licence arrangements with Southern Rural Water.</p> <p>Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime.</p> <p>The impacts of contaminants on water quality including loads (not just concentrations) of Perry and Mitchell Rivers requires further consideration and assessment based on the limited baseline monitoring undertaken to date.</p> <p>Increased frequency in monitoring.</p>

	Expertise	Key matters for Council	Response
		<p>The baseline monitoring program should be continued as stated in the EES. An assessment of risk associated with the existing uncertainty is also recommend. It is noted that the ANZECC guidelines typically require 2 years of monthly sampling to effectively characterise the water quality.</p> <p>Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime</p> <p>Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.</p> <p>Reference to flocculants that are not appropriate for the downstream environment such as alum and hydrated lime</p> <p>Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.</p>	<p>Wastewater treatment not acceptable.</p> <p>Undertake a risk assessment and a strategy for managing 'change' to address the uncertainty associated with all assumptions and limitations of the water balance investigation.</p> <p>Prepare a risk management plan should be revised to include contingencies for failure of the water treatment system.</p>
3.5	Ground water	<p>The Groundwater risk assessment (Appendix A006 Table 8-8) has more detail and identified risks than presented in the Attachment F risk report.</p> <p>The following <u>risks</u> do not appear to have been considered in either Appendix A006 Table 8-8, or Attachment F:</p> <p>Drawdown at the bore field is significantly greater than modelled with implications for groundwater availability, and quality.</p> <p>The bore field is unable to provide the required supply volume and/or a 3 GL/year groundwater licence for Latrobe Group cannot be sourced through trade.</p> <p>Groundwater extraction from shallow aquifer(s) is required to augment supply.</p> <p>Seepage from TSF and/or mine void tailings impacts the beneficial uses of Balook Formation / Latrobe Valley Group groundwater.</p>	<p>Consider all risks appropriately.</p> <p>Request additional information in relation to modelling and implications for groundwater availability and quality.</p> <p>Greater detail required in relation to impact of groundwater on the geothermal properties.</p> <p>The potential impact of an increased introduction of saline intrusion into the Latrobe Group aquifer is required.</p> <p>The EES risk report should contain the same level of detail as the technical report.</p>

	Expertise	Key matters for Council	Response
		<p>Impact of groundwater extraction on the geothermal properties beneficial use, at depths shallower than 2500 m Beneficial Uses (p.63 refers to 2500 m to 4000m depth).</p> <p>Saline intrusion to the Latrobe Group aquifer due to decline in groundwater pressure at coast.</p> <p>The risk assessment would be improved if the following uncertainties are considered more thoroughly:</p> <p>Bore field</p> <p>Identify all potentially impacted groundwater users (including spring-fed dams, domestic and stock groundwater users).</p> <p>The long-term water supply from the Latrobe Group is based on a short term, low yield, aquifer test.</p> <p>Filled voids and mounding</p> <p>Layering in the Coongulmerang Fm impedes the downward drainage from filled voids</p> <p>The use of groundwater for processing and implications for mine void seepage water chemistry</p> <p>Increased discharged to GDE and Mitchell River of groundwater with natural concentrations above criteria</p> <p>Shallow water table activates discharge to drainage lines on-site, land salinisation, impact on site structures and adjoining pit(s)</p> <p>The hydraulic connection between sediments under site, the Mitchell River flats and the Latrobe Valley Group at Woodglen is greater than indicated by the groundwater model.</p> <p>Implication for bore field drawdown if tailings seepage is less than modelled.</p> <p>The risks and response in the Appendix A0006 Table 8-8 appear more comprehensive than those listed in the EES risk report (Attachment F).</p> <p>The additional risks and items requiring more thorough consideration, identified above, should be addressed in the EES risk report, and EPRs developed.</p> <p>Groundwater Monitoring Program (proposed management measure 013).</p>	<p>It is necessary to identify all potentially impacted groundwater users upfront as part of the assessment process.</p>

	Expertise	Key matters for Council	Response
		<p>The groundwater bore locations and monitoring program should:</p> <ul style="list-style-type: none"> reflect the location of potentially impacted GDE and groundwater users address gaps in the understanding of groundwater flow at the site address uncertainties in connections and impacts on groundwater and surface water north of the site include monitoring of impact on groundwater level and quality nearby groundwater users of shallow and deep groundwater <p>The program should encompass operation and post-closure and include monitoring for shallow perching (waterlogging / land salinisation) and groundwater discharge to ground surface.</p>	
3.6	Noise and Vibration	<p>The report's approach is to wait for the project to commence and subsequent monitoring results to trigger further mitigation. This is not a common approach, usually mitigation is triggered on the predicted levels.</p> <p>If the report's author, does not consider mitigation is warranted, for example, as impacts would be low (or significantly lower level but of the same character as future operational noise), it should clearly state that in the report.</p>	Detailed information is required upfront to form part of the assessment and to include suitable mitigation measures.
3.7	Traffic & Transport	<p>Sufficient geometric details have not been provided to substantiate that the proposed road realignments which EGSC would assume control of will readily conform with relevant design requirements. Whilst basic cross-sectional details have been provided the practicality of the proposed alignments should be substantiated through the provision of more advanced engineering drawings including for instance long-sections. The proposed alignment of Fernbank Glenaladale Road would for instance result in the need to negotiate challenging topography which may in turn limit in practice the ability to meet various design requirements such as sight distance requirements.</p> <p>It is uncertain from the road authority consultation outcomes documented in the Technical Report if the proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is consistent with EGSC's planning intent for this road. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road. It is unclear from the documents sighted by SLR if Council has formed a final view in this regard.</p>	<p>The section on transport and traffic is not well resolved, with key omissions and salient details missing, together with uncertainty associated with presentation of options. There is no threshold or justifications around when option 1 or option 2 will be pursued.</p> <p>The following elements require clarification and further detailed assessment.</p> <p>Detailed design and engineering detailed plans for all proposed road upgrades, diversions and intersection details.</p> <p>Proposed use of Racecourse Road is not supported by the Bairnsdale Growth Strategy and requires further decision making by Council with respect to preferred heavy vehicle bypass routes within the township.</p> <p>Further details in relation to the planning scheme amendment are required with respect to subdivision and acquisition of land for road purposes.</p>

	Expertise	Key matters for Council	Response
		<p>Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options considered. It is therefore not possible to confirm for instance if the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service. Given that additional lands are proposed to be secured through a Scheme Amendment to facilitate this conversion it would be appropriate for the technical assessment informing the amendment to ensure that the upgraded intersection forms will accommodate not only project related traffic demands but also demands potentially associated with the rerouting of heavy vehicles associated with any bypass that might be provided in time.</p> <p>It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available. Adoption of the Post-Avon River Bridge - Option 1 routing scenario would be preferable (from a traffic and transport perspective) given that it minimises impacts to the EGSC road network.</p> <p>Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm indication of the specific mechanism to manage these impacts is however identified beyond broadly describing a "make-good" type mechanism. Such a mechanism is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration to haulage activity that occurs remote from the project.</p> <p>Insufficient geometric details have been provided to independently verify that the proposed road realignments that EGSC would assume control of will readily conform with relevant design requirements. This information is needed to fully address the ESS Scoping Requirements. Whilst basic cross-sectional details have been provided the practicality</p>	<p>Further baseline and existing conditions are required to document the current standard of roads to be utilised and provide a performance standard for proposed truck movements.</p> <p>Clarity is required as to on what basis option 2 would be pursued.</p> <p>Council does not support option 2.</p> <p>Amenity impacts for use of local road networks is an important consideration and requires further consideration.</p> <p>Environmental management plan and practices are required to be further documented to Council satisfaction.</p>

	Expertise	Key matters for Council	Response
		<p>of the proposed alignments should be substantiated through the provision of more advanced engineering drawings including for instance long-sections. The proposed alignment of Fernbank Glenaladale Road would for instance result in the need to negotiate challenging topography which may in turn limit in practice the ability to meet various design requirements such as sight distance requirements.</p> <p>The proposed use of Racecourse Road under the Post-Avon River Bridge - Option 2 routing scenario is inconsistent with EGSC's planning intent for the road network. The Bairnsdale Growth Strategy identifies that a heavy vehicle bypass of Main Street (Princess Highway) might be facilitated by either Racecourse Road or Bosworth Road however EGSC's subsequent planning (i.e. Bairnsdale Southern Alternative Freight Route) establishes that the intent is for freight movement to be facilitated by Collins Street/Bosworth Road, not Racecourse Road.</p> <p>Whilst intersection performance analysis is presented for the Pre-Avon River Bridge routing option, no detailed intersection performance analysis is presented for the two Post-Avon River bridge routing options considered. It is therefore not possible to confirm based on the material contained within the Technical Report if for instance the proposed conversion of the existing Princes Highway / Racecourse Road intersection to a roundabout would afford an appropriate level of service as stipulated by the EES Scoping Requirements.</p> <p>It is unclear from the reviewed material the mechanism, if any, proposed to ensure that the Post-Avon River Bridge - Option 2 routing scenario would only be relied upon as an interim measure until such time that the Post-Avon River Bridge - Option 1 routing scenario is available. Adoption of the Post-Avon River Bridge - Option 1 routing scenario would be preferable (from a traffic and transport perspective) given that it minimises impacts to the EGSC road network.</p> <p>Only a basic scoping assessment has been completed to quantify the pavement service life impacts associated with the proposed use of EGSC's controlled road network. The technical assessment for instance identifies that pavement loadings on Racecourse Road would triple under the Post-Avon River bridge - Option 2 routing scenario. No firm</p>	

	Expertise	Key matters for Council	Response
		<p>indication of the specific mechanism to manage these impacts is however identified beyond broadly describing a “make-good” type mechanism. Such a mechanism is not considered overly practical in this instance given the potential long-term use of the roads and the inability to readily attribute the cause of pavement deterioration to haulage activity that occurs remote from the project.</p> <p>Whilst SLR has focused the peer review on the use and mitigation of impacts on the EGSC’s controlled road network, it is noted that amenity impacts to residents of EGSC may arise as a result of the use of Declared Roads. For instance, the use of Lindenow Glenaladale Road, a Declared Road, by project traffic would see a doubling of existing heavy vehicle demands on this road which may result in amenity impacts to residents of Lindenow.</p> <p>The proposed environmental performance requirements in general terms are generally considered adequate however there is broadly a lack of clarity in relation to the intervention mechanisms that might be adopted for instance with the contemplated Asset Protection Plan. Broadly the intervention framework that would be adopted under such plans should be identified through reference to relevant standards.</p> <p>Whilst the conversion of two existing intersections on the Princes Highway to roundabout control has been proposed based on safety considerations limited consideration has been given to the appropriateness of this outcome from a road hierarchy perspective. Whilst this outcome ultimately relates to a Designated Road outside EGSC’s jurisdiction the outcome would result in lower order roads being afforded priority over traffic travelling along the Princess Highway and is therefore subject in SLR’s view to a degree of approval uncertainty.</p>	
3.8	Ecology	<p>Risk Assessment considering loss of aquatic habitat through materials/chemicals spills and further management measures to negate potential impacts developed.</p> <p>The impacts of contaminants including nutrients on water quality of Perry and Mitchell Rivers requires further consideration.</p> <p>The potential impacts of minor changes to groundwater, surface water flows and water chemistry due to the proposed mine and the assertion</p>	<p>Risk management and procedures are required to address any potential impacts on aquatic life in the event of a chemical materials spill.</p> <p>It is necessary for further information to be provided which documents any potential impacts on water quality of the Perry and Mitchell Rivers as a result of any increased release of nutrients and contaminants.</p>

	Expertise	Key matters for Council	Response
		<p>of no effects on the downstream Gippsland Lakes Ramsar site requires further justification.</p> <p>Should populations of Giant Burrowing Frog be identified within or adjacent the project area additional mitigation measures should be developed and included in the EES and incorporated into subsequent Management Plan documentation.</p> <p>There are numerous inconsistencies between the EES and the Detailed Ecological Investigation (Appendix A005) with regard to remnant vegetation to be removed and areas requiring offsets and amount of species habitat units required on a state basis. These require clarification.</p>	<p>It is imperative that the health of the Gippsland Lakes is not compromised by the proposal.</p> <p>Additional details relating to potential impact on the Giant Burrowing Frog must be provided upfront to the satisfaction of the relevant section of DELPW.</p> <p>All identified inconsistencies within documentation as identified within the detailed written report must be resolved.</p>
3.9	Cultural heritage	<p>Aboriginal cultural heritage:</p> <p>The CHMP is still in preparation and has not been approved. An approved CHMP is required to be submitted to Council before any statutory authorisation can be granted.</p> <p>The approved CHMP must not be inconsistent with any statutory authorisation. If the approved CHMP is inconsistent, an amended or new CHMP may be required before the statutory authorisation can be granted.</p> <p>Historic cultural heritage:</p> <p>Due to the lack of an historian's report, historic heritage assessment or Archaeological Management Plan, the potential historic heritage values of the project study area have not been sufficiently investigated.</p> <p>No Historic Heritage Assessment report for the project has been submitted to Heritage Victoria.</p> <p>Aboriginal cultural heritage:</p> <p>EPRs should be adequate because they default to the approved CHMP which is still in preparation and will not be evaluated until the Minister has made a decision in regard to the EES.</p> <p>Historic cultural heritage:</p> <p>EPRs are yet to be sufficiently determined because no historian's report or historic heritage assessment has been prepared for the project study area. These reports would assist in the development of any Archaeological Management Plan to mitigate and manage harm to</p>	<p>Additional consultation is required with GLaWAC to identify cultural values. Ongoing and further consultation with GLaWAC must occur as part of the finalisation of the cultural heritage management Plan (CHMP).</p> <p>There are a series of inconsistencies and inaccuracies within the information which require correction.</p> <p>The assessment is incomplete for the CHMP and is highly likely that additional sites will be discovered.</p> <p>Increased detail relating to the level of risk in the impact of the project section of the documentation. This data will then be used to predict on the likelihood or otherwise of for further stone artefacts particularly with reference to the Mitchell River.</p> <p>There are discrepancies identified in the number of stone artefacts, these are needed to be clarified and resolved.</p> <p>There is no evidence of consultation with any historical society, this should be undertaken. There is little specific history in relation to the project site. The potential historic heritage values of the project study area have not been sufficiently investigated.</p> <p>The preparation of a Historic Heritage Assessment is required.</p>

	Expertise	Key matters for Council	Response
		<p>any historic heritage values that may be present in the project study area.</p> <p>There are some inconsistencies between the main report and the Appendix. For example, the status of the recorded versus registered Aboriginal sites is inconsistently reported (see comments above in relations to Fingerboards LDAD 2). Inconsistency in the reporting of the data for Aboriginal cultural heritage reported in the Cultural Heritage Impact Assessment is not evident in the EES. There are inconsistencies in the reporting of consultation with local council in regards to the management and listing on the Heritage Overlay of 2495 Bairnsdale-Dargo Road structures.</p>	<p>The preparation of a Archaeological Management Plan is required.</p>
3.10	Radiation	<p>It is suggested that the baseline radiation monitoring is incomplete.</p> <p>Additional pre-operational monitoring to include;</p> <ul style="list-style-type: none"> - Radon and thoron, - Radionuclides in flora, - Analyses of specific radionuclides (not covered in monitoring to date), and <p>Airborne dust as total suspended particulate (TSP) concentrations.</p> <p>It is suggested that a draft RMP, RWMP and RTMP be developed. This will provide assurance that the radiation controls are captured and incorporated appropriately.</p> <p>However, it is noted that approval of the final RMP and RWMP documents is part of a secondary approval process and it not necessary for the final RMP or RWMP to be developed at this stage.</p> <p>It is suggested that the Health Risk Assessment rectifies the statement.</p>	<p>The baseline radiation monitoring study is incomplete and requires completion for further assessment.</p> <p>It is recommended that further preparation of Draft RMP, RWMP and RTMP be prepared.</p>
3.11	Air Quality and Greenhouse Gas	<u>Air Quality</u>	<p>Measures for implementation of mitigation measures are required.</p>

	Expertise	Key matters for Council	Response
		<p>The assessment finds that substantial mitigation measures (e.g. ceasing some operations) may be required to avoid exceedances of the 24-hour PM10 air quality criterion under certain meteorological conditions. These mitigation measures should be documented as part of the management plan along with the trigger for their application (e.g. forecast high winds from directions that would increase the risk of impacts at identified receptors).</p> <p><u>Greenhouse Gas</u></p> <p>The emission factors used to estimate the road/rail GHG emissions associated with product transport should be documented in the report to give confidence in the reported Scope 3 emissions.</p>	<p>Predicated cumulative impact assessment is required for further assessment.</p> <p>It is required that a Sustainability and Energy Efficient Management Plan be prepared to address and support the mitigation and management of GHG emissions.</p>
3.12	Rehabilitation	<p>The key risk issues based on the report and review of identified mitigations, management etc. relate to:</p> <p>Closure criteria – Based on review, the following feedback and/or checks are considered relevant to the proposed performance criteria and associated monitoring/measurement:</p> <ul style="list-style-type: none"> - Carrying capacity measurement is not included for grazing land. - Auditing for post mining land use compliance is applicable to progressive rehabilitation and not just at end of mine life. - Comparison to pre-mining information for land capability etc. is not identified while the pre-mining or better condition is the target. - Radiation surveys and monitoring should be undertaken on rehabilitated areas during progressive rehabilitation and not just at project completion. - Site contamination assessment is not considered or related to progressive rehabilitation <u>should it be required</u> based on incidents, historic or recent land use impacts etc. prior to undertaking progressive rehabilitation of relevant areas. 	<p>It is considered imperative that the altered topography and groundwater extraction do not impact on the availability of groundwater for other users.</p> <p>It is necessary to undertake further ground truthing of horticulture and agriculture data. The have reliance on aerial imagery only is insufficient. Evidence should be provided to the effect that affected landowners have been consulted.</p> <p>Preparation of Community Engagement Plan is necessary to manage ongoing perception, including the establishment of a working group with growers and creation of a local community event to attract visitors to the region.</p> <p>There is a need to limit the height of the stockpiles.</p> <p>There is a need to document erosion protection measures.</p> <p>Further details in relation to procedures for progressive rehabilitation is required.</p> <p>There is insufficient information relating to measures and procedures to occur in the event of unplanned closure.</p>

	Expertise	Key matters for Council	Response
		<p>Unplanned closure – in our opinion inadequate information is provided about specific risks associated with unplanned closure and how they would be considered to meet the rehabilitation success and performance. Specifically, additional consideration of the void (stability), erosion and dust (especially tailings), etc. and ramifications of the status and stage of rehabilitation at that time would be important e.g. pumping and recovery of tailings water, seeding, etc. More definition around these considerations linked to operations should be provided in context of unplanned temporary (care and maintenance) or permanent closure.</p> <ul style="list-style-type: none"> Proposed agreements with landholders – while this has been identified as a requirement in the rehabilitation planning, considerations and content are outlined without definition of proposed changes to land use through construction, operations, etc. to closure. <p>Other observations from the review included:</p> <ol style="list-style-type: none"> When the risk assessment of closure is undertaken across the disciplines, this appears to only look at the closure process i.e. during closure, and not necessarily post-closure. Poor quality runoff impacts surface water quality (outside of sediment dams spillway discharge) but does not appear to be addressed in the surface water environmental impacts assessment chapter for surface water impacts at closure; however; Section 7.3 of the Work Plan has a target <i>“Concentration of soluble contaminants and suspended sediment / turbidity in runoff water from rehabilitated areas does not exceed that present pre-mining runoff or (if insufficient data available for pre-mining runoff) does not exceed concentrations in runoff from agreed analogue areas.”</i> There are however a range of relevant criteria in the closure plan that address these aspects despite this. While Council may not see or approve the bond; it is worth noting that the bond estimate should reflect the rehabilitation strategies outlined in these documents including amelioration rates of 50% of areas with lime treatment; 20% minimum or 30-50% with additional fertiliser application and gypsum addition to valley slopes over gravelly overburden with topsoil ripped/mixed in. <p>Material volumes were not addressed by domain; however, this is not significantly impactful from a rehabilitation and closure planning view</p>	<p>Additional information in relation to carrying capacity of agricultural land post rehabilitation is required to be provided.</p> <p>Concept of the progressive rehabilitation is important; it is not appropriate to defer this level of information to post mine closure.</p> <p>Additional testing during post construction to test for site contamination regime should be implementation as part of the rehabilitation program.</p> <p>The Draft Mine Rehabilitation Plan does not contain sufficient detail in relation to detailed procedures for various components of the past mine rehabilitation program.</p> <p>Rehabilitation plans and agreements wit landowners should be transparent for assessment. There needs to be appropriate measures in place to ensure progressive steps for rehabilitation, using land holding specific criteria and timing.</p> <p>The proposed Environment Performance Requirements need to address and provide appropriate risk assessment.</p> <p>Whilst Council does not wish to part of the decision, appropriate bond provisions should be implemented to ensure sufficient progressive rehabilitation.</p>

	Expertise	Key matters for Council	Response
		given there is a high-level site wide materials balance provided, it is more relevant to compliance with the relevant guideline.	
3.13	Social Impact Assessment	<p>Further consultation in the form of a Cultural Values Workshop, or a direct method of engaging with the Traditional Owners should they prefer, to ascertain their concerns over specific intangible heritage values is required.</p> <p>There is also no specific strategy to ensure that the people opposing the development are incorporated into project development and mitigation measures. This should be addressed as concerned members of the local community will cause the most delay and resistance to the project's development.</p> <p>Whilst the Risk Assessment and proposed Mitigation Measures under Table 6.1 of the Socioeconomic Assessment are generally clearly outlined. The process for implementing these mitigation measures is a Social Management Plan that will be prepared for the project prior to construction commencing in consultation with key stakeholders including, East Gippsland Shire. The absence of a Draft Implementation Strategy/Social Management Plan as part of the Draft EES is a concern, the key stakeholders and the broader community, including traditional owners, should have the opportunity to review and comment on the proposed implementation strategies that will mitigate and/or compensate for projects impacts as well as those strategies that will provide future community and regional benefits (directly & indirectly).</p> <p>Because there is no 'cumulative impacts assessment' as part of the EES (also noted in the Economics Peer Review), this limits the proponents/projects ability to understand the impacts of the competing interests of other regional and sub-regional projects on the labour market, the vulnerable members of the community, businesses, Council's, NGO's, community groups and sporting groups etc. The combination of no cumulative impacts assessment and no implementation strategy makes it difficult for key stakeholders and the broader community, including traditional owners, to quantify the impacts and expected benefits of the proposed project.</p>	<p>Increased attention needs to be provided to demonstrate how the project will respond appropriately to vulnerable members of the community.</p> <p>There is a need to provide an ongoing Engagement Strategy, to address ongoing communication with members of the community who are in opposition to the project, including mitigation measures.</p> <p>An Implementation Plan is required.</p> <p>Local Content Guidelines are required to include a local employment plan. This should include procurement and employment factors.</p> <p>A Rehabilitation Plan should be prepared to include details and potential improvement procedures raised in the Agricultural Impact Assessment and the Horticultural Impact Assessment.</p> <p>Undertake a further Cultural Values Workshop.</p> <p>Prepare a Social Management Plan.</p> <p>Creation of a Community Fund is supported.</p> <p>Creation of a Community Reference Group is supported by council.</p> <p>Creation of an Environment Review Committee is supported by Council.</p> <p>Request for additional information in relation industry structure, business and organisation structures.</p> <p>Critical that further technical studies are undertaken to determine the level of impact to the local vegetable industry, to include specific mitigation measures.</p>

	Expertise	Key matters for Council	Response
			<p>Further details required to finalise the Horticultural Impact Assessment.</p> <p>Cumulative impacts effects associated with concurrent regional projects are not addressed and are considered critical.</p> <p>Prepare further details in relation to local community need, to be incorporated into the Social Management Plan.</p>
3.14	Economic Impact Assessment	<p>Gaps:</p> <p>Cumulative Impact Assessment</p> <p>Tourism Impact Assessment</p>	<p>Cumulative Impact Assessment required.</p> <p>Tourism Impact Assessment required.</p> <p>More specific details and break down required for current employment figures and modelling.</p> <p>Need to calculate indirect jobs figures.</p>
3.15	Draft Work Plan	<p>Additional information should be included in the Work Plan to address those issues required by the Guidelines.</p> <p>Site specific geotechnical investigations should be undertaken to inform the design.</p> <p>The stability assessment should include earthquake loading assessment in accordance with the ANCOLD requirements and the potential for liquefaction of tailings, particularly if embankment raising occurs on the tailings.</p>	<p>The Work Plan needs to be updated to provide all the EES relevant details. Multiple sections of the plan need to be updated and aligned with other information in technical reports and documents.</p> <p>Proposed water usage details are required to be confirmed and verified.</p> <p>Before full approval, it is recommended that a trial pit be developed to confirm design slopes and proposed back filling operations.</p> <p>Table of risks required to be detailed in the Risk Management Plan.</p>
3.16	Draft EPA Works Approval	<p>What assurance is there that this condition of no additional vegetation clearance is both currently applicable and will be adhered to into the future?</p>	<p>Further details as documented in written submission required.</p> <p>These include best practice, vegetation clearing details, spillway discharge, sediment releases into the river systems, noise</p>

	Expertise	Key matters for Council	Response
		<p>Consideration should also be given to the potential for mine contact water to contain radionuclides. This is not considered throughout the draft WAA.</p> <p>SLR does not consider this as acceptable as spillway discharge would initiatively lead to significant sediment releases into Mitchell and Perry River catchments?</p> <p>Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.</p> <p>Discussion of the MSDS information for flocculant products should include; toxicity of products to aquatic biota, hydrocarbon content of hydrobond in development of analytical testing suites for treated wastewater, the degradation time for hydrobond of greater than 28 days.</p> <p>Do the positive environmental outcomes of preventing the uncontrolled release of mine contact water to the Mitchell and Perry Rivers outweigh the reduction in water flowing to each system.</p> <p>This licence amendment process requires clarification for if undertaken through an EPA licence amendment what consultation will be undertaken with Council and other stakeholder and community groups during this process.</p> <p>Consideration should be given as to a shorter period to determine effectiveness. What is the proposed fall-back position/contingency should the wastewater treatment system prove ineffective upon commissioning?</p> <p>It is of concern that wastewater treatment can not in itself reduce key contaminants such as nitrogen and copper to levels acceptable for direct discharge to a freshwater receiving system.</p>	<p>impacts, processes associated with modifications to the licence, wastewater treatment processes, waste classification categories, water quality, implementation plan and preparation of annual reporting requirements.</p>

	Expertise	Key matters for Council	Response
		Proposed methods for dissemination of annual performance statements and reporting to community and stakeholder groups is required.	

9 December 2020

640.30078-L01-v1.0 Addendum 1.docx

East Gippsland Shire Council
PO Box 1618
BAIRNSDALE VIC 3875

Attention: Jodie Pitkin

Dear Jodie

Fingerboards Mineral Sands Project
EES Targeted Technical Review- Report Ref: 640.30078.00000-R01-v2.0_Final
Addendum 1- Human Health Risk Assessment Technical Review

1 Introduction

SLR has been engaged along with four specialist subconsultants (Tardis- Cultural Heritage, JHRC- Radiation, KDC Planning- Planning and Ethos Urban- Economics) to undertake a targeted technical review of documents included in the public release package for the Fingerboards Mineral Sands project by Kalbar Resources. Based on a targeted list of technical areas SLR delivered a final report on the 13 November 2020 reference 640.30078.00000-R01-v2.0_Final to East Gippsland Shire Council. To accompany the delivery of this final report SLR presented a visual presentation to newly elected East Gippsland Shire Council members and Executive on the 14 November 2020. Following this presentation Council sought an additional further technical review of the EES documentation with regard to Human Health Risk Assessment provided as Appendix A019 and consideration of Climate Change with regard to the life of the project. This report, as Addendum 1 to SLR final report, presents the findings of a Technical review of the Human Health Risk Assessment presented by Kalbar Resources as Appendix A019 to the EES, undertaken by Tarah Hagen with assistance from Giorgio De Nola of SLR. The Technical review is presented in tabulated format consistent with technical reviews included in Section 3 of the SLR final report. Methodologies adopted in undertaking the technical review of the HHRA are consistent with Section 1.2 and 1.3 of the SLR full report. Areas of key concern for Council and the consistency of Technical Reports and the EES when considering the HHRA technical review are also summarised for consideration in addition to those outlined in the final SLR report.

In performing this technical review, the expert was cognisant of the opinions of experts in other areas (mostly from air quality, groundwater and surface water and radiation assessment reports) that were presented in the final SLR report Ref 640.30078.00000-R01-v2.0 dated 13 November 2020. However, this expert has not been able to confirm whether any of the issues or short comings identified in other reports would have a negative impact on the outcomes of the human health risk assessment findings. For this to occur, the expert for the human health risk assessment would need to review any changes to the adopted dataset and/or site-specific assumptions. Consistency between data presented in the human health risk assessment and other reports was checked (such as air quality data) however there was no attempt to confirm whether data generated in other reports was in fact done appropriately. Instead, the information provided in the human health risk assessment was assumed to be appropriate where there was consistency between reports considered and the human health risk assessment.

2 Human Health Risk Assessment

2.1 Relevant Documentation

Relevant documentation considered as part of this review includes:

- State Environment Protection Policy (Ambient Air Quality), 1999
- State Environment Protection Policy (Ambient Air Quality) Variation, 2016
- Protocol for Environmental Management, Mining and Extractive Industries, 2007
- The Environmental Effects Statement Report and the following attachments/appendices:
 - Appendix A006 - Groundwater and Surface Water Impact Assessment. August 2020
 - Appendix A009 - Stage Two Air Quality and Greenhouse Gas Assessment, August 2020.
 - Appendix A011 - Fingerboards Project Radiation Assessment Report. April 2020.

The review also considers the following guidelines:

- NEPC (1999a). Schedule B4. Guideline on Site-specific Health Risk Assessment Methodology. National Environment Protection (Assessment of Site Contamination) Measure 1999, As amended (Registered 15 May 2013). National Environment Protection Council (NEPC).
- NEPC (1999b) Schedule B1. Guideline on Investigation Levels for Soil and Groundwater. National Environment Protection (Assessment of Site Contamination) Measure 1999, As amended (Registered 15 May 2013). National Environment Protection Council (NEPC).
- enHealth (2012). Environmental Health Risk Assessment. Guidelines for assessing human health risks from environmental hazards. Environmental Health Committee, a sub-committee of the Australian Health Protection Committee. June 2012.

2.2 Expert Review

The expert review is provided below in Table 1.

Table 1- Human Health Risk Assessment Technical Review

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Has the risk assessment in EES reasonably assessed the risks to human health and the environment as a result of exposure to dust, air pollution, noise, vibration, lighting, radiation, hazardous materials, public safety (including fire) and transport hazards?	Appendix A0019	Human health risks are assessed in the HHRA.	An adequate assessment has been undertaken however some issues have been identified. It is unlikely these issues will affect the overall outcome of the HHRA.
Are the proposed management or mitigation measures reasonable to mitigate potential risks to human health and the environment?	Multiple sections throughout the HHRA	There are summaries of proposed management or mitigation measures used to prevent contamination off-site throughout the HHRA.	It has been assumed throughout the HHRA that proposed management or mitigation measures will be adequate to prevent contamination off-site, particularly for direct discharge of water and release of chemical contaminants. An assessment of the adequacy of proposed management measures is not provided in the HHRA.
Is the objective of the HHRA adequately defined?	Section 2, Appendix A019	The purpose and scope of work has been described in this section, i.e. "The HHRA aims to evaluate the baseline and predicted health risks associated with project activities to potential receptor populations located outside the project area (i.e., off-site)".	The objective of the HHRA is adequate however a minor issue identified is that it is not clear from the purpose provided that the assessment is for human health risk only, i.e. that the receptors are in fact people. This has no bearing on the conduct or outcome of the HHRA.
Is the methodology used in the HHRA adequate for conduct of a HHRA?	Section 3 and 4, Appendix A019	The structure of the HHRA was outlined in Section 3 including a summary of the contents of each section contained within the HHRA. The methodology of the HHRA was outlined in Section 4.	An acceptable and generally robust methodology that conforms with relevant guidance (enHealth 2012), NEPC 1999a) has been used in the HHRA for the conduct of the HHRA.

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Does the Conceptual Site Model (CSM) adequately represent the site and relevant "source-pathway-receptor linkages" in the area?	Section 5, Appendix A019	The conceptual site model is described as "the environmental setting of the study area and project area and includes an overview of the geological and hydrogeological aspects". The CSM as provided includes a summary of the following: <ul style="list-style-type: none"> • An overview of contamination. • The environmental setting. • Project description including water management. • Proposed management measures for potential release of contaminants (from Section 12 of the EES). 	The definition of the CSM and information provided in Section 5 on its own would be inadequate and would not fulfil the requirements of a CSM. Instead, this section provides adequate context for preparing a CSM but does not "delineate the exposure sources and potential pathways leading to human exposures" (enHealth 2012). Nevertheless, identification of relevant exposure pathways and preparation of a graphical representation of the CSM is provided in the subsequent section (Section 6) hence this aspect has no bearing on the overall conduct and outcome of the HHRA.
	Section 5.1, Appendix A019		The hydrogeological setting provided appears adequate however it would benefit from an overall figure that shows the following: a hydrogeological cross-section, groundwater contours, location of extraction bores, East Gippsland Water extraction points and groundwater discharge points to the local waterways. Providing the graphical representations would assist the reader of the HHRA to better understand transport pathways from the site (particularly from groundwater) and location of features described in this section.
	Section 5.3.4, Appendix A019	Reference is made to the Latrobe Group Aquifer.	This aquifer is not mentioned in the hydrogeological setting (Section 5.2.1).
Do exposure pathways identified adequately represent those that may potentially be present at the site?	Section 6, Appendix A019	Exposure pathway identification was conducted in a four-step process involving (i) the identification of contaminant sources, ii) how contaminants are transported to other media and locations, iii) which people may be exposed as a result and iv) how these people may be exposed. A graphical representation of the CSM is provided at the end of this section.	Overall, the relevant "source-pathway-receptor-Exposure route linkage process" for the investigation area around the site is adequately described and used to represent the CSM for the site. There are some issues identified that could be addressed in this section for clarity (see below) however none of these issues would affect the outcome of the HHRA.

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
	Section 6.1.1, Appendix A019	Sources of contaminants within the project area are described relevant to naturally occurring materials.	There is no reference to potential for chemical contaminants release because of project related activities. This issue has been outlined in Section 6.2 however simply relies on "routine site management and mitigation measures common to the mining industry" to prevent release of chemicals to the environment.
	Section 6.1.2, Appendix A019	This section identifies that there are potential exposures for people to project related contaminants in groundwater and surface water with a discussion on offtake of water by East Gippsland Water in the Mitchell River. The conclusion of this discussion is that "contaminants metals or radiation associated with project activities to customers via their use of water originating from the Mitchell River aquifer is an incomplete exposure pathway"	There are other beneficial uses of groundwater and surface water that should be discussed in this section (e.g. extraction for irrigation, swimming etc.). Without this context there is an impression that there are no complete exposure pathways in surface waters surrounding the site. Beneficial uses of water are considered in subsequent sections of the HHRA hence this issue does not affect the conduct or outcome of the HHRA but should be clarified in the report.
	Section 6.1.5, Appendix A019	Sources and management of project related water pollution are summarised including potential for direct discharge of mine contact water to surface water during extreme precipitation events.	It is unclear from the information provided in this section whether the proposed management would prevent direct discharge of mine contact water or the effects that such a release could have on the environment and beneficial use of surface waters surrounding the site. It is noted that uncontrolled release of mine water to the environment is not addressed in the HHRA (Section 6.2).
	Section 6.2, Appendix A019	A short summary of the key measures to prevent release of chemical contaminants to the environment is provided.	Links to the relevant documentation describing management measures to be implemented during the project should be provided for clarity and transparency.
	Section 6.5, Appendix A019	Potential exposure pathways are considered for regional residents, horticultural farmers, transport route residents and recreational users.	People considered in off-site areas may all be the same person (e.g. a resident who works on a farm, lives in a house along a transport route and engages in recreational activities). The impact of this on the HHRA should be considered.

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
			<p>In selecting people for baseline / impact evaluation it is not apparent why the following people have not been selected for some COPC sources/transport pathways such as:</p> <ul style="list-style-type: none"> • Air emissions: Recreational users may be on a roadside (e.g. cyclist) hence may be exposed to volatiles and particulates in air. • Air particle emissions: Transport route residents may be exposed to particulates in air. • Water: Horticultural users may be exposed to surface water or groundwater during irrigation. • Surface water: Ingestion of freshwater biota. <p>Adequate justification why they are not selected should be provided.</p>
<p>Has contaminant toxicity been adequately described?</p>	<p>Section 7, Appendix A019</p>	<p>A general overview of human health effects from exposure to radiation, particulate material and metals is provided.</p>	<p>A basic overview of health effects is provided with no attempt made to establish dose response relationships. This is adequate for a Tier 1/Screening Risk Assessment. No gaps/issues identified.</p>
<p>Does the screening level Human health risk assessment – baseline adequately represent risk?</p>	<p>Section 8, Appendix A019</p>	<p>A Tier 1 human health risk assessment is presented based on the baseline data collected from each of the receiving environments at and surrounding the site using publicly available screening criteria.</p>	<p>The screening assessment is provided in a logical fashion and addresses relevant exposure pathways. Overall, the screening assessment undertaken in the report was adequate.</p> <p>Nevertheless, some issues, which are unlikely to impact on the overall conclusions of the HHRA, have been identified as discussed below.</p>

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
	Section 8.1.2, Appendix A019	The air screening criteria adopted in the HHRA are outlined including the use of effect screening levels (ESL) from Texas Commission on Environmental Quality (TCEQ, 2018). Multiple ESLs are “Interim value[s] based on an occupational exposure standard”.	The use of occupational exposure standards in a HHRA for the general public would appear inappropriate. It is understood that these criteria are consistent with those chosen in the Stage Two Air Quality and Greenhouse Gas Assessment (Appendix A009) “as advised by EPA Victoria”. The use of occupational standards should be at minimum considered in the uncertainty analysis although the preference would be to use criteria specifically derived for the general public (e.g. MRL from ATSDR, RfC from USEPA, RfC from OEHHA). This also applies to the screening undertaken in the HHRA using predicted concentrations (See Section 9).
	Section 8.1.4 and 8.1.8, Appendix A019	Some sediment quality guidelines adopted from the Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines published by CSIRO (Simpson et al., 2013).	Sediment quality guidelines should be adopted from the Australian and New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments (ANZG 2018). It is likely that guidelines from both documents are identical however this should not be assumed.
	Section 8.1.4 and 8.1.8, Appendix A019	Some sediment quality guidelines were adopted from Guideline on Investigation Levels for Soil and Groundwater (NEPC 1999c).	Limitations of using soil quality guidelines from the NEPC (1999) in lieu of sediment quality guidelines (where a lack of sediment quality guidelines was identified) should be discussed.
	Section 8.1.3, Appendix A019	Baseline dust deposition data is not available, and screening of vegetable consumption is not undertaken for metal contaminants.	Vegetables are grown in the local area however, according to the HHRA, it is “not known whether the produce is also available to local residents”. In the absence of location-specific information, it should be assumed that produce is available locally and that residents may grow their own home grown produce. Potential for vegetables to be consumed following dust deposition should be discussed further. It is acknowledged that screening criteria may not be available for this pathway (consumption of vegetables).

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
	Section 8.1.8, Appendix A019	Average concentrations and concentration range provided in Table 8-29 for metals in groundwater and Table 8-30 for radioactivity in groundwater.	These results represent averaged data collected from multiple groundwater wells. However, it is inappropriate to average data from different groundwater wells considering water extraction may only occur at specific locations from one single well.
	Section 8.2, Appendix A019	A discussion of uncertainties in the Tier 1 HHRA and data have been discussed.	Overall, the degree to which the uncertainties have been discussed is appropriate. It was identified in the discussion that additional local area baseline monitoring data is required for air (NOx, SO2, dust deposition), soil (metals and radionuclides), crops, surface water and groundwater. This data should be collected prior to establishing the proposed facility.
Does the screening level Human health risk assessment – predicted contaminant concentrations adequately represent risk?	Section 9, Appendix A019	A Tier 1 risk assessment is presented based on the predicted concentrations in each of the receiving environments at and surrounding the site using publicly available screening criteria.	The screening assessment is provided in a logical fashion and addresses relevant exposures pathways. Overall, the screening assessment was adequate. Some minor issues identified include: <ul style="list-style-type: none"> In most instances, it would assist the reader if baseline conditions were provided in tables alongside predictions (as done in Table 9.4, Section 9.1.4). In Section 9.4.2, it is difficult to identify sources of annual dose from previous sections (noting that units have changed).
Have uncertainty and variability in assumptions been adequately analysed?	Section 10, Appendix A019	An evaluation of the key uncertainties of this HHRA was presented in Table 10.1.	Overall, the brief discussion provided is adequate for a Tier 1 HHRA. Additional discussion could be provided for the following: <ul style="list-style-type: none"> Data adequacy: This should include a discussion of the quality of baseline data and confidence in future predictions of concentrations in different media that were modelled. The potential for an environmental effect from direct discharge to the environment following a large rainfall event. Screening levels and assumptions that they are based on.

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Are the conclusions of the Tier 1 HHRA adequate?	Section 11, Appendix A019	Conclusions on the baseline assessment and modelled proposed project conditions have been qualitatively or semi-qualitatively evaluated for human health.	The conclusions of the Tier 1 HHRA adequately reflect the assessment done. It is noted however that there are no recommendations made in the report including the baseline data that should be collected to fill data gaps, the monitoring requirements during the project and the management upon which the HHRA risk conclusions are based.
	Section 11.1, Appendix A019	Radionuclides in soil are with average global range (table 11.1)	With respect to nucleotides it is noted that for background conditions (refer to Section 8.1.3): <ul style="list-style-type: none"> • Average soil concentrations for thorium series are elevated in two areas; 002 – Margin to flats and 006 – Native forest. • Elevated radionuclide activity was identified in Perry Gully Creek bed surface soils (SS-01, SS03), Simpsons Gully Ridge and Carey's Road (SS-08). • Radiation doses from vegetable intake at the river flats and margin to flats was 0.61mSv and 0.92mSv, which makes up most of the annual radiation dose (1mSv) without considering any other radiation doses.
Key Concerns for Council			
What are the key risk issues?	Various sections of the HHRA	Human health is protected for key contaminants including (radionuclides) in soil, air and waters noting that there are some exceedances in baseline data for PM10 in air, metals in groundwater and surface water and radionuclides (002 – Margin to flats, 006- Native forests). There were minimal increases predicted for metals in mine contact water, radionuclides in soil and no exceedances of criteria for predicted concentrations of NO2, SO2, CO, PM10 and PM2.5 during and post construction.	In making this risk conclusion it is noted that: <ul style="list-style-type: none"> • The HHRA assumes proposed mitigation measures are adequate to mitigate potential contamination events. It is noted we cannot affirm adequacy and effectiveness of the proposed measures without reviewing associated detailed management plan(s) (it is understood these are to be prepared in subsequent stages of the Project). • Additional baseline data is required for the HHRA. • Risk to the environment following an extreme weather event has not been considered. • Some criteria adopted may not be appropriate.

Question / Aspect	Report Reference	High-Level Summary	Gaps / Comments
Is there consistency between technical reports	Executive Summary, human health discussion (10.8.14) and conclusion (Section 13.1.4) of the EES	There is limited discussion of the HHRA in the EES. It is stated that "The human health risk assessment determined no exceedances in baseline conditions of adopted human health screening criteria for air, radionuclide concentrations in groundwater and surface water, soil or sediments".	Overall, this risk finding is consistent with the HHRA and is justified however there were exceedances for maximum metal concentrations in surface water and groundwater (but not average concentrations).
	Stage Two Air Quality and greenhouse Gas Assessment (A009).	Concentration of contaminants in air	Concentrations used in HHRA appears to be consistent with the Air Quality and GHG Impact Assessment Impact Assessment (A009). As such, it was considered that the data presented was suitable for conduct of a screening level risk assessment. This could change should the data from other reports change as a result of other technical reviews. This comment/limitation applies to data considered in the radiation assessment report (A009) and the Groundwater and Surface Water Impacts Assessment (A006).
	Radiation assessment report (A011).	Radionuclide concentrations in different media	Concentrations used in HHRA appears to be consistent with the radiation assessment report (A011).
	Groundwater and Surface Water Impact Assessment (A006).	Concentration of contaminants in groundwater and surface water	Concentrations used in HHRA appears to be consistent with the Groundwater and Surface Water Impact Assessment (A006).

3 Concluding remarks

3.1 Consistency between technical reports and EES

There is limited discussion of the HHRA in the EES. It is stated that “The human health risk assessment determined no exceedances in baseline conditions of adopted human health screening criteria for air, radionuclide concentrations in groundwater and surface water, soil or sediments”. Overall, this risk finding is consistent with the HHRA and is justified however there were exceedances for maximum metal concentrations in surface water and groundwater (but not average concentrations).

Concentrations used in HHRA appears to be consistent with the Air Quality and GHG Impact Assessment Impact Assessment (A009), radiation assessment report (A011) and Surface Water Impact Assessment (A006). Should data generated in these reports be changed because of other technical reviews then an update of the human health risk assessment may be required along with further review.

3.2 Key Areas of concern for Council

Human health is protected for key contaminants including (radionuclides) in soil, air and waters noting that there are some exceedances in baseline data for PM₁₀ in air, metals in groundwater and surface water and radionuclides (soil sample ID and locations: 002 – Margin to flats, 006-Native forests). There were minimal increases predicted for metals in mine contact water, radionuclides in soil and no exceedances of criteria for predicted concentrations of NO₂, SO₂, CO, PM₁₀ and PM_{2.5} during and post construction.

In making this risk conclusion it is noted that:

- The HHRA assumes proposed mitigation measures are adequate to mitigate potential contamination events. It is noted that SLR cannot affirm adequacy and effectiveness of the proposed measures without reviewing associated detailed management plan(s).
- Additional baseline data is required for the HHRA.
- Should data generated in other reports be changed then the HHRA would need to be revisited.
- Risk to the environment following an extreme weather event has not been considered.
- Some criteria adopted may not be appropriate.

Yours sincerely



PHIL MAYES
Associate, Environmental Management and Approvals

Checked/
Authorised by: 