Kalbar Operations Pty Ltd

Outline of final oral submission to IAC

The Kalbar case

- Environment Effects Statement
- Part A submission, including response to EES Submissions
- Oral opening submissions
- Overview of the Project provided by Mr Stefan Wolmarans
- Overview of rehabilitation activities provided by Dr Gibson-Roy
- Expert evidence (including both the written and oral evidence of the experts and their presentations
- Technical Notes and other information filed by Kalbar with the IAC
- Proposed mitigation measures as set out in the consolidated Mitigation Measures
- Part B submission
- Part C submission

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The importance of minerals in human progress

Zircon
Titanium Dioxide
Rare Earths

Importance to National and State economy and future energy needs

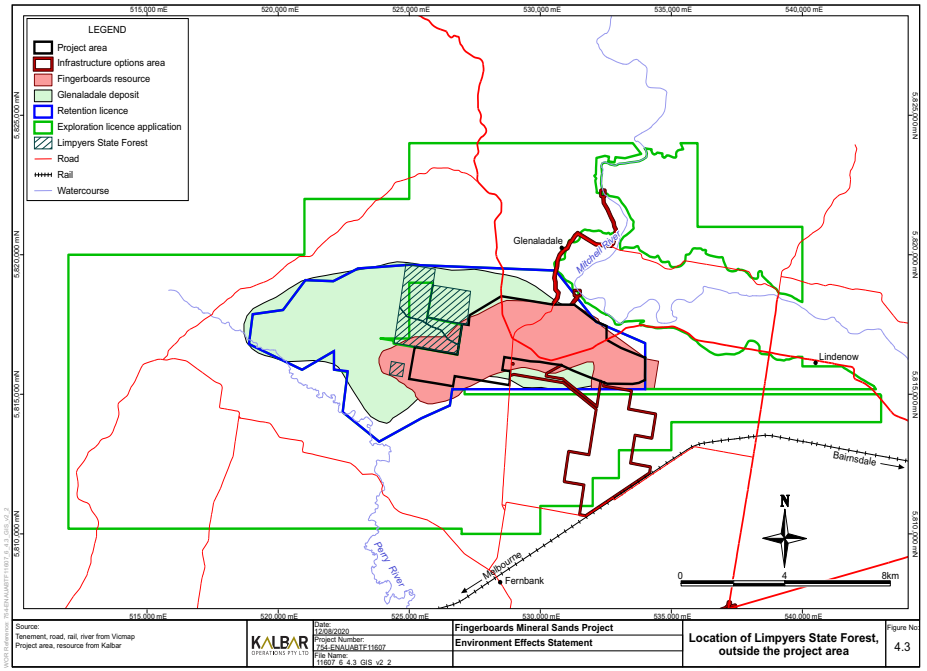
Common refrain:
"We are not against mining."

Mining is not a footloose industry

Mining must be located:

- where a mineral is located in sufficient volumes and concentration; and

- where it is economic to mine it and send it to a market.



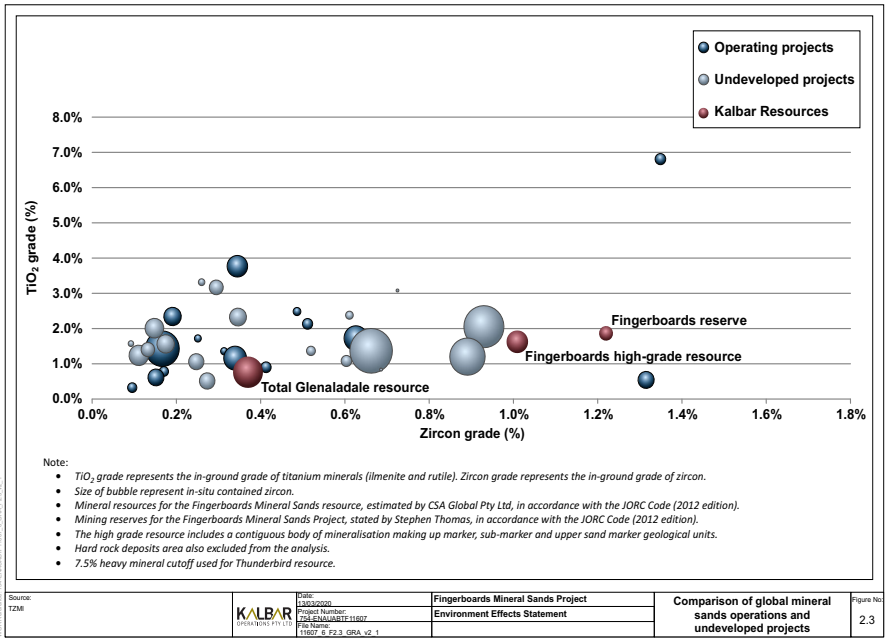
Fingerboards is a world class deposit

- The feasibility studies have allowed Kalbar to define a JORC 2012 reserve estimate for the project of **173 Mt of ore**, grading at 1.2% zircon, 1.9% titanium dioxide and 0.11% total rare-earth oxides.

- Existence of a marker unit relatively close to the surface: A significantly enriched layer lies unconformably on the lower sands at the base of the upper sands.

- Based on prevailing prices (at time of EES), the ore has an estimated value of A$27 per tonne, well above the total operating cost of A$13.50 per tonne of ore.

- **At current prices, the ore has a gross value more than $5 billion**.



Project Overview

- Mining an estimated 8 million tonnes of heavy mineral concentrate
- Water management
  - via water management dams (19 in total)
- Progressive rehabilitation
  - Reinstated landforms include plateaus targeted for grazing end uses with planted pasture (similar to existing), vegetated waterways and gullies, planted and vegetated roadsides (with an emphasis on native species) and a Native Grassy Woodland Reserve (restoration project) of approximately 200ha.
- Road diversions

(Updated summary in TD 537)

Kalbar is well placed to develop the resource

- Kalbar Operations is supported by Appian and has equity funding in place.
- Kalbar has experienced staff and consultants. (TD 524)
- The resource is massive and valuable; and is likely to become more valuable in the future.
- The cost of production is low in relation to the value of the resource.
- Kalbar can easily satisfy the relevant tests in the MRSD Act s 15(6)(d) and (6B) that it “is likely to be able to finance the proposed work and rehabilitation of the land” and “there is a reasonable prospect that the mining of the mineral resource described in the application will be economically viable”.

Proper approach

- The EES establishes that there is no absolute or overriding environmental or social impediment to the proposed mine; which would mean that this case is not so much about whether it should occur, but how it should occur; in particular, what are the likely impacts and how should they be mitigated.

- Other submitters have not been able to demonstrate any absolute or overriding environmental or social impediment to the proposed mine; rather they have raised, and relied on, concerns or uncertainties about potential impacts.

- There will always be uncertainties; and this is no bar to making a decision (*Ulan*).

- The method to be applied must be adaptive management of uncertainties that may have an adverse impact.

- Controls tend to be iterative in nature and are properly so in cases of this type. Hence some matters can and ought be left for further work and evaluation.

MRSD Act is the key statute

- Relevant legislation, and the nature of approvals needed, including matters to be considered and conditions that might be imposed, provide the legal context for the IAC report and recommendations.

- Mining is regulated by the the MRSD Act. Other complementary regulatory frameworks also apply: for example, radiation protection, water licencing, cultural heritage, environment protection and town planning.

- The key legislation is the MRSD Act.

Section 1: "*The purpose of this Act is to* ***encourage*** *mineral exploration and* ***economically viable mining*** *and extractive industries* ***which make the best use of, and extract the value from, resources*** *in a way that is* ***compatible with the economic, social and environmental objectives*** *of the State.*"

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MRSD Act is a sound legal base

- The MRSD Act provides a sound legal base to ensure that mining approval is compatible with the economic, social and environmental objectives of the State.
    - Work plan
    - Rehabilitation bond
    - Consents of other authorities
    - Offsets
    - Insurance
    - Compensation agreed or determined

See Act and TD11

Submitter Alex Arbuthnot (former VFF president):

“*The Victorian Act is a modern Act.*”

The regulators must be relied on

- Clearly there have been issues in the past with the way in which statutory bodies regulating mining have exercised their powers.
- The recent focus on this must inevitably mean that closer attention will be placed in the future on the important role of the regulators, with increased resources.
- The IAC should emphasise the important role of the regulators in ensuring that the mitigation measures are carried out.
- Nevertheless the IAC must proceed on the basis that regulators will do their job.

Stakeholders include Kalbar

- Kalbar is an important stakeholder in this process, having proceeded on the law of the State in relation to mineral exploration and development.
- Part B submission: Kalbar has “spent around $50 million to date in bringing the Fingerboards resource to its current position.”

Standards to be adopted

- The notion of onus of proof is misplaced in proceedings of this type.
- In determining whether the Project is compatible with the economic, social and environmental objectives of the State, the standard is "acceptability": IAC terms of reference cl 5(b) and (c).
- The Draft Evaluation Objectives generally call for the avoidance or minimisation of adverse impacts. They do not require that there be no impacts. (See also cl 34(b) and (c) of the IAC Terms of Reference.)

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Planning policy

- The Project is supported by planning policy concerning resource extraction.
- The Project is not inconsistent with planning policy concerning protecting productive farmland of strategic significance.

The function of the EES process

- Neither the text of the *Environment Effects Act 1978* nor recent past practice supports any expectation that a project the subject of an EES should be 'approval ready' for each and every approval that will subsequently be required.

- The endpoint of the IAC and Minister's Assessment process is not a decision, but advice to subsequent decision-makers – which advice is an input (but not a binding input) into these decisions.

- Nevertheless this Project is considerably more advanced - and specified - than a reference design. And further resolution of preferred options has emerged during the hearing.

- Remaining uncertainties do not prevent an informed decision as relevant alternatives have been explored and evaluated.

The relevance of the Scoping Requirements

- Whether the EES complies with Scoping Requirements is an administrative prerequisite to the exhibition of an EES. It is not a matter covered by the IAC Terms of Reference.

- Minister: *"I am informed by the Department of Environment, Land, Water and Planning (DELWP) that the EES adequately covers the matters identified in the scoping requirements, which I issued for this EES in March 2018, and that you have sufficiently addressed matters raised by the project's technical reference group, with some specific exceptions. "*

- The reference to the Technical Reference Group is significant because the Council was part of the Technical Reference Group.

- The Council's suggestion that the Scoping Requirements impose a legal onus on the Proponent to address any and all perceived deficiencies which the Council or another party might identify following publication of the EES is flawed.

The application of standards

- The IAC should seek to evaluate the Project by reference to standards of general application – preferably objective standards, if they exist.

- The proper approach to evaluation is not on the basis of preferences of the experts, whether called by parties for, or opposed to, the Project.

Sensitive receptors

The identification of sensitive receptors in the EES was substantially correct having regard to its purpose and application.

Mitigation measures

- Consistent with the broader Victorian approach to planning decision-making, the approach taken to imposing conditions on the Project is a performance-based approach in which broad objectives are specified, and the means to achieve those largely left to the proponent, subject to appropriate regulatory oversight.

- A performance-based approach has long been adopted in Victoria because it allows the development of flexible approaches which focus regulatory effort where it is most useful, while avoiding wasted effort on monitoring and management of insignificant impacts.

- It is appropriate to use a mix of compliance standards and other best practice measures to minimise impacts from the Project.

- The expression ‘reasonably practicable’ is appropriate in mitigation measures: it is an expression used in both the MRSD Act and the EP Act 2017, has been adopted in other major projects, and compliance is subject to regulatory oversight.

Availability of draft sub-plans

- Sub-plans are not routinely prepared as part of an EES assessment, even where it is reasonably anticipated that such a plan will be required.
- In many cases, the final content of the relevant sub-plans will itself depend on the recommendations of the IAC and the Minister's Assessment, which could render a draft plan entirely irrelevant.
- Had it been expected that these would be produced for comment, the Proponent would have anticipated that the Scoping Requirements might reflect this, as they did for the rehabilitation plan.

Environmental management framework

- The EMF (EES Chapter 12) covers various elements, some purely descriptive (e.g., approvals needed for the Project; roles and responsibilities), some internal and aspirational (e.g., Kalbar internal policies and commitments) and some covering elements that will feature within future legal requirements (e.g., mitigation measures, monitoring programs).

- The key elements of the EMF:
  a. Descriptive and explanatory content
  b. Objectives and indicators.
  c. Management plans that will be prepared pursuant to approvals.
  d. Mitigation measures identified through the EES technical studies.
  e. Proposed monitoring programs.
  f. Internal Kalbar policies, training, compliance commitments and the like.
  g. Community and stakeholder engagement principles and indicative processes.

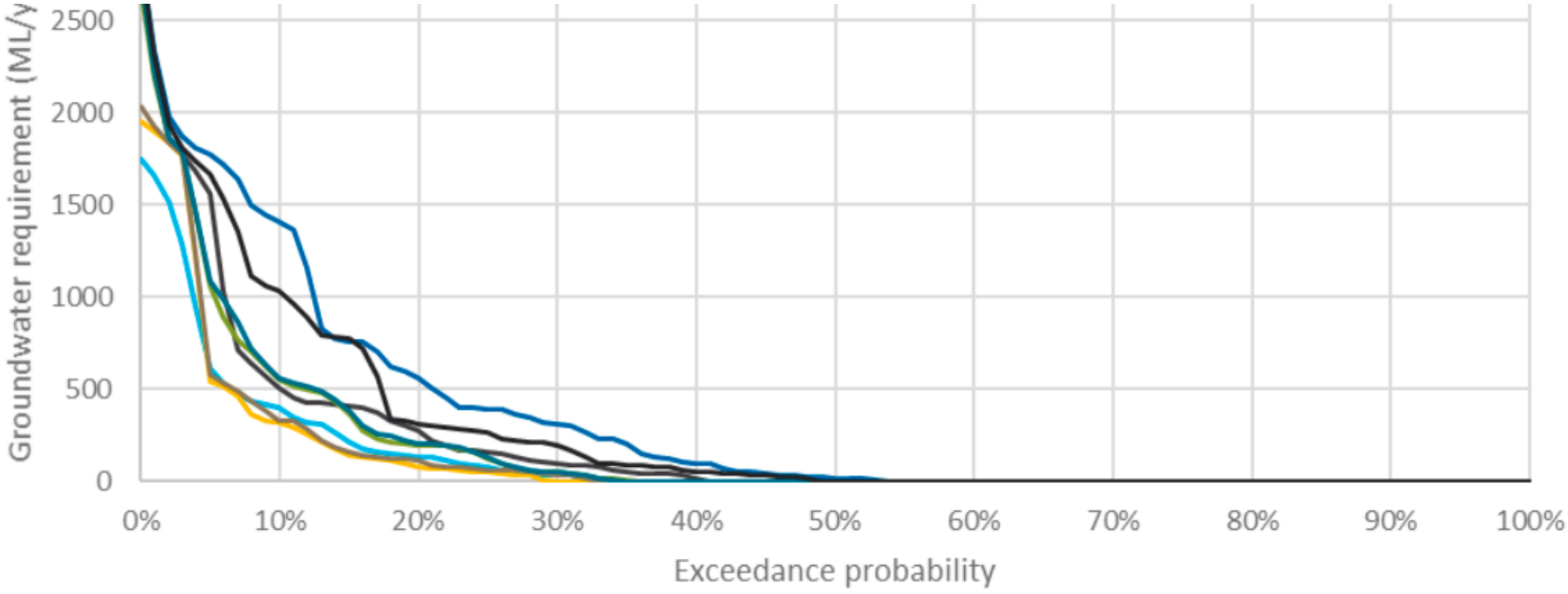
Kalbar: "The mitigation measures, monitoring programs and management plans sections are of most importance for this EES process in providing a basis for the IAC to advise on the impacts of the Project."

Water: The assessment framework

- The Project will need to obtain licences under the *Water Act 1989* to either take and use surface water and to extract groundwater in order to meet its project water needs, estimated to be in the order of 3GL/yr.
- Under the Victorian (and indeed Australian) legal framework, water is a tradable commodity with the intention that questions of allocation of an available resource are to be decided by the market.
- As it is not possible for Kalbar to have obtained a water licence before the Minister's Assessment, it cannot be criticised for failing to have the licences in place.
- Relative to the 'no Project' scenario, the operation of the Project will have no additional impact on water availability to the environment: any suggestion that the Project will increase water take beyond what is already permitted is incorrect.
- Once the Project is complete, Kalbar's entitlements will be returned to the market.
- Kalbar has strong incentives to minimise water use as far as possible

Groundwater: probabilities of draw

- The plausible outcome is that the Project will be reliant on both surface and groundwater, but mainly surface water.
- Based on the most recent modelling which was carried out for TN37, the average annual draw from groundwater is likely to be between 125 – 350ML per yea depending on the climate change scenario that occurs.
- Indeed in the majority of years no groundwater will be required.



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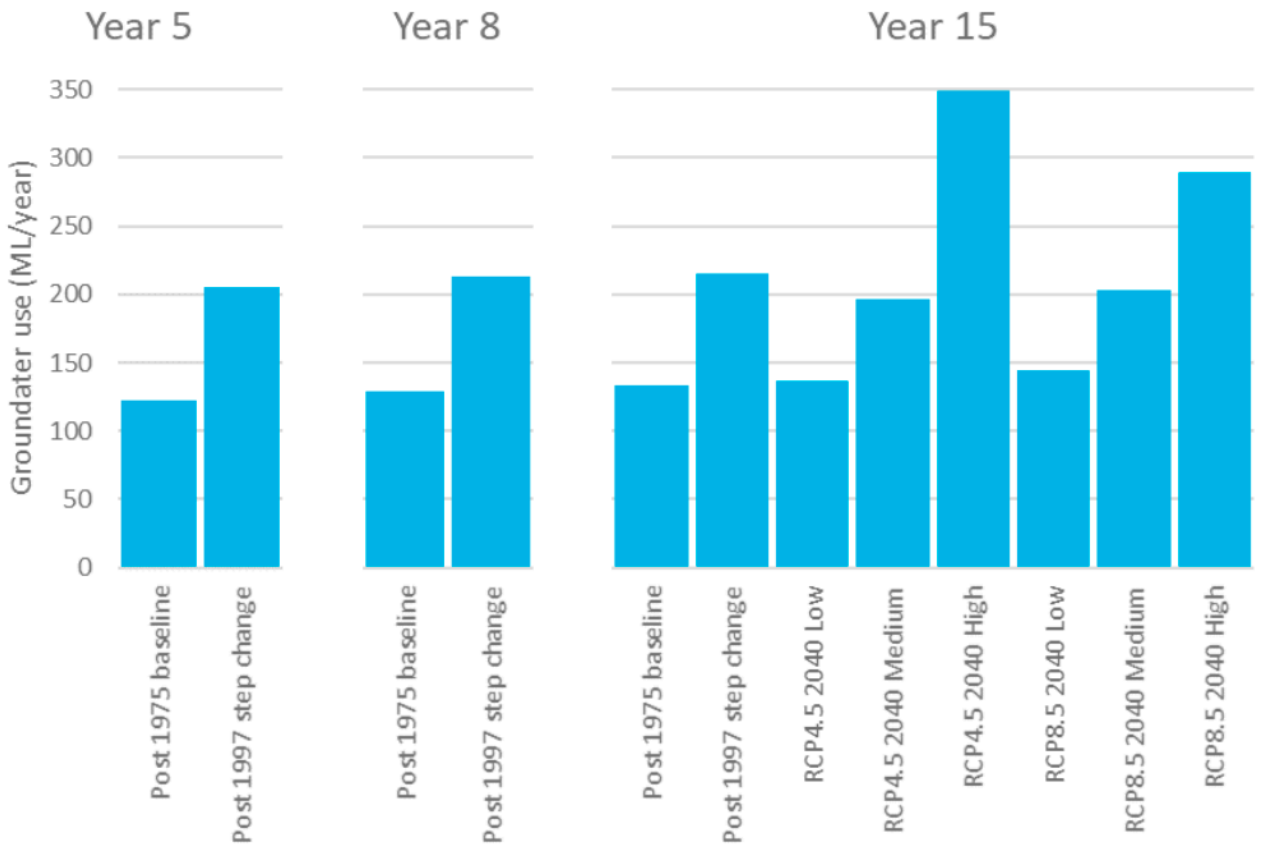


Water: Climate change and water availability

- The Scoping Requirements did not require that climate change be taken into account in all aspects of project planning, whatever the merit of this as a matter of principle.

- The scope for climate change to materially affect the extent of water availability is limited:

  - Any winter fill licence would only permit the Proponent to take water when flows exceeded 1,400 ML/day and Dr Kiem agreed that this would adequately protect irrigation uses.

  - This threshold limit on the ability of the Project to take surface water is not affected by climate change.

  - To the extent that a reduction in surface water flows would require the Project to rely more heavily on groundwater levels in the LaTrobe Group, the availability of groundwater would not be affected by climate change during the life of the Project.

Water: water balance

- None of the water experts challenged Kalbar's projection of likely water demand in the order of 3 GL/yr.

- It is accepted that the water balance is a model and, as a model, it is subject to the uncertainty and is necessarily reliant on assumptions. Nevertheless, it falls into the category of a "useful" model.

- Even if it turns out that Kalbar desires more water than that projected, it cannot simply take extra water and deprive others of access to that water. Rather it would need to obtain a licence and to buy the right to that water.

Water: Centrifuges in the water balance

- Council argued that a reduction in the efficiency of the centrifuges from 72.7% to 68% would increase water demand by 800ML (or 0.8GL). The effect of such a reduction is more likely to be 300ML. In order for losses to increase by 800 ML, the recovery would need to be reduced to 63%.

- The extent of recovery is a function of the ratio of solids to water in the centrifuge cake. The ability of the centrifuges to recover water only operates on that percentage of the cake that is actually water.

- Kalbar would accept a condition which required the carrying out of a pilot program to prove up the centrifuges prior to mining commencing.

Water: groundwater Modelling and characterisation

- No real attempt was made to challenge either the substance of the significant amount of modelling that has been undertaken or to challenge that it was carried out in accordance with applicable standards.

- The modelling has taken a conservative approach to modelling groundwater impacts, particular in relation to mounding and drawdown.

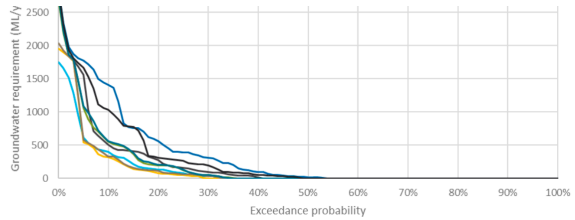
- The non-inclusion of rainfall recharge over active pits in the mounding calculations is not consequential, even with climate change scenarios.

- The modelling of groundwater mounding effects is sufficient to demonstrate that, even in dry conditions, the capacity of mounding to mobilise nutrients and metals to affect water quality in the Mitchell River is not significant.

- Kalbar accepts that it would be appropriate to require water quality monitoring, including at interception bores between the Project Area and the Mitchell River.

Water: drawdown

- Worst case drawdown was modelled on the basis of 15 years of pumping 3GL/yr. In reality, the extent of actual drawdown will depend on the extent to which the Project has to rely on groundwater, which is likely to be much less than that modelled.



- To the extent that drawdown might affect other groundwater users, this can be addressed through either:
  - Compensation agreements under the MRSD Act for ‘land affected’ within the meaning of that Act; or
  - Conditions on any licence granted under the Water Act.
- There is no reason to assume that the modelling of the aquifers artificially constrained drawdown.

Water: other issues

- No plausible mechanism has been identified by which the Project would materially impact the Gippsland Lakes.
- The only identified mechanism by which the Project could affect the Perry Chain of Ponds was on the basis of an unidentified and extensive area of permeability which would allow mounding to traverse the 1.5km between the Project Area and the Chain of Ponds. No such area was identified and the conclave agreed that any areas of permeability were likely to be smaller, rather than larger.
- The risk of potential acid sulphate soil occurring has been assessed as low, but Kalbar would consent to a requirement that contingencies be adopted in any event.
- The material before the IAC demonstrates that it is unlikely that the Project would have a significant impact on water quality in the Mitchell River.
- All large dams will be required to comply with ANCOLD standards and non-large dams will also adhere to those standards as far as they can be applied.
- There is no basis for finding that there is any realistic prospect of PAM degrading into acrylamide under the types of anaerobic conditions likely to be experienced as part of this project.
- Kalbar is amenable to a process that requires it to consult with the community with a view to identifying and minimising impacts on spring fed dams (if any) to the extent reasonably practicable.

Water: mitigation measures

- There was comparatively little dispute about the appropriate mitigation measures for water impacts. All the experts agreed that an adaptive management approach, incorporating monitoring, was an appropriate approach to managing the water impacts associated with the Project.

- The precise design of the monitoring and mitigation regime is best approved by the relevant regulators on the basis of their specialist expertise.

- Dr Webb acknowledged that methods existed for managing potential adverse impacts, particularly around daylighting, mounding, and acid sulphate soils. Dr Currell also acknowledged methods exist for managing mounding, including intercepting lower quality water.

Biodiversity

- There does not appear to be any significant dispute between experts over the overall extent of clearing expected, subject to any further avoidance or minimisation that may be able to be achieved.

- The total area to be cleared is estimated at 223.58 ha, comprising mostly of two EVCs - Plains Grassy Forest (110.47ha, 49%) and Valley Grassy Forest (74.88ha, 33%).

- Kalbar accepts that it will be necessary to survey the land at 2705 Dargo-Bairnsdale Road when this is possible.

Biodiversity

- The avoid, minimise, offset framework is a well-established part of Victoria's native vegetation management framework which requires the application of a hierarchical approach.

- The obligation to avoid and minimise impacts is, however, qualified by an acknowledgment that avoidance and minimisation do not need to be undertaken to an extent that would undermine the objectives of the proposed use or development.

- The key objective of the Project is to mine the ore body within the Project Area. Due to the relatively shallow depth of the ore body beneath the ground surface, together with other technical and financial factors, mining is required to be open cut.

Biodiversity

- The Proponent is continuing to refine the design of the Project avoid and minimise clearing where possible. This includes further work in relation to:
    - Perry Gully (including patches of high-quality vegetation totalling an area of 23.56 hectares).
    - An area of native vegetation in the south eastern corner of the project area (approximately 11.42 hectares).
    - Vegetation along Limpyers Road (approximately one hectare and 25 Large Trees), including several plants of Woollyheaded Pomaderris eriocephala.
    - Vegetation in the northern part of the proposed mine area.
    - Scattered native trees on the edge of the proposed mine footprint.

Biodiversity: offsetting

- The evidence and material does not support a finding that offsets are not available. Both Mr Organ and Mr Kern were confident that offsets could be obtained.

- The terms of clause 6 of the Incorporated Document and the Work Plan make it impossible that the Project can proceed without the delivery of offsets for each stage of the Project, to the satisfaction of DELWP, before clearing could occur for that stage.

Biodiversity: the extent of clearing

- Nothing in the planning scheme or the native vegetation framework establishes a hard cap on the extent of permissible clearing. As Mr Kern agreed, the acceptability of any clearing ultimately falls to be judged in the context of the merits of the Project as a whole.

- The staged nature of the clearing also helps to mitigate potential impacts.

- The policy objective of 'no net loss' will be satisfied (including in respect of large trees). To hold otherwise would be to undermine a fundamental precept of the Victorian native vegetation management framework.

- The area of endangered (as opposed to vulnerable) vegetation to be removed is a relatively small component of the overall clearing.

- The conservation status for EVCs does not reflect extinction risk (as it does for taxa of flora and fauna), but rather decline in geographical extent relative to pre-1750 extent.

- Organ: "a very large proportion of the vegetation to be cleared (approximately 85%) is of low to moderate quality."

Biodiversity: fauna impacts

- The Biodiversity Evaluation Objective requires the Project to avoid and minimise impacts on significant fauna (not common taxa).

- The experts were unanimous that the fauna surveys were appropriately carried out (which, relevantly, included surveys for the Giant Burrowing Frog).

- The Scoping Requirements did not require an audit of hollows or any kind of arboricultural assessment. Nor does the Victorian native vegetation management framework require identification of hollows as part of assessments for clearing of native vegetation. Nonetheless, the Ecological Impact Assessment undertook a qualitative assessment of the impact.

- Where impacts cannot be avoided, it is proposed to rely upon a combination of salvaged hollows, artificial hollows, and nest boxes.

Biodiversity: swift parrot

- There is no evidence to support a finding of any impact on the Swift Parrot, let alone a significant impact.
- First, none of the experts – including Mr Kern – gave evidence that the Project would, or was even likely to, have a significant impact on the Swift Parrot.
- Second, to the extent that vegetation in the Project area represents 'potential habitat' for the Swift Parrot, there is nothing to support the assertion that the vegetation comprises 'habitat critical to the survival of' the Swift Parrot
- The logic of MFG's submission – that any clearing of potential forage trees for the Swift Parrot is unacceptable – is inconsistent with recent State and Commonwealth decision-making.

Biodiversity: Giant Burrowing Frog

- Targeted surveys for the Giant Burrowing Frog were undertaken in accordance with approved survey standards of both the Commonwealth and the DEWLP and no Giant Burrowing Frogs were detected (either visually or aurally).

- Mr Lane stated that he considered the Giant Burrowing Frog was unlikely to be present.

- In evaluating the assertion that a submitter has detected the Giant Burrowing Frog, it is necessary to be cautious.

- The appropriate response, as Mr Lane agreed, is to have contingency measures in place such that, if the Giant Burrowing Frog is detected, appropriate action is taken. Such contingency plans are already contemplated in the mitigation measures proposed.

Biodiversity: further surveys

- In light of the changes to the Threatened Species Advisory List, it is appropriate to undertake further surveys to assess the presence of previously unlisted species.

- In terms of additional flora species that may be present, Kalbar would accept a recommendation that additional flora surveys for species with a moderate or greater chance of being present on the Project Area be undertaken at an appropriate time of year prior to the submission of the NVMP to DELWP for approval.

Air quality: Key documents

- The Part C submission sets out the key documents that are relevant to an assessment of the Project on air quality.

- The philosophy for dust management for the Project includes standard mitigations incorporated into all practices, as well as proactive and reactive measures applied on an as needs basis, tied to weather forecasts and real time monitoring. This approach is consistent with guidance provided in the PEM.

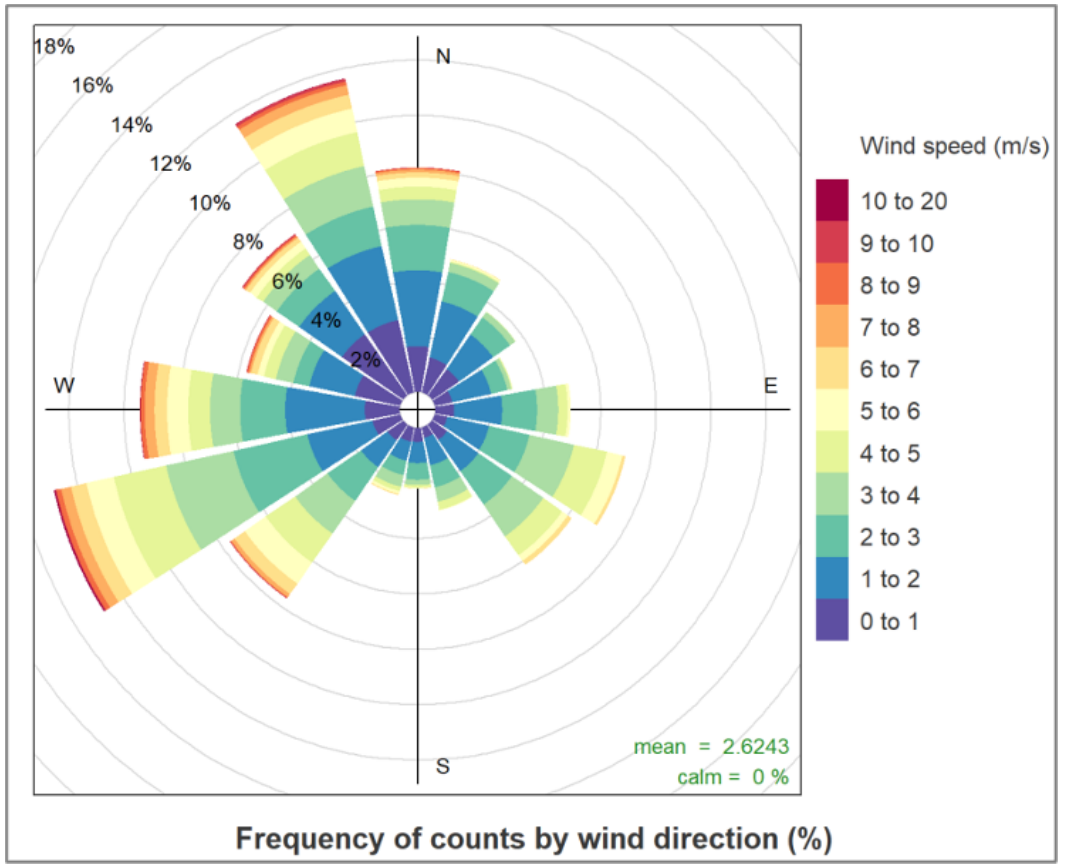
- Kalbar supports a global requirement requiring best practice to be adopted, for example, defined as “the most practical and efficient processes or technology used in suppressing dust that demonstrably minimises the environmental impact of the activity being undertaken”.

Air quality: Technical reviews

- The EPA has not raised any concern with the technical adequacy of the AQG.
- EPA's EES submission included 10 specific recommendations concerning criteria and mitigations. **Kalbar substantially adopted these recommendations through its updated mitigation and management documents.**
- EPA's Part B submission only included one "modified recommendation" for air quality, which concerned vehicle speed limits. It also recommended an update to reflect the new EP Act.
    - In relation to vehicle speeds, Kalbar prefers mitigation measures that reflects its proposed proactive and reactive strategies that utilise forecast weather conditions and real-time monitoring data to schedule and/or adjust measures.
- SLR undertook a review of the AQG on behalf of the Council. It did not list air quality as one of the 'key areas of concern' that it identified with the EES.
    - The second row under 'key concerns for Council' asked "Are the proposed EPRs adequate?" to which SLR answered "criteria are considered adequate", management plans / mitigations etc. "are all considered adequate" and then as a conclusion on this issue "No gaps / issues identified".

Air quality: Meteorological monitoring

Mr Welchman undertook a thorough review of a range of data sources and exercised a professional judgement as to the suitability of the data sources used. The opinions expressed have a clear and intelligible basis.



Air quality: use of one weather station

- The approved regulatory model in Victoria is AERMOD which uses data from only one monitoring station.
- The weather station used in AERMOD is not located in a depression. It is in a reasonably flat paddock, at around AHD 125, similar to much of the Project Area, and higher than most surrounding land.
- The location the weather station complied with AS/NZS 3580 Part 14 (2014), Meteorological monitoring for ambient air quality monitoring application.

Air quality: Data gaps

Data gaps in the meteorological monitoring are not significant.

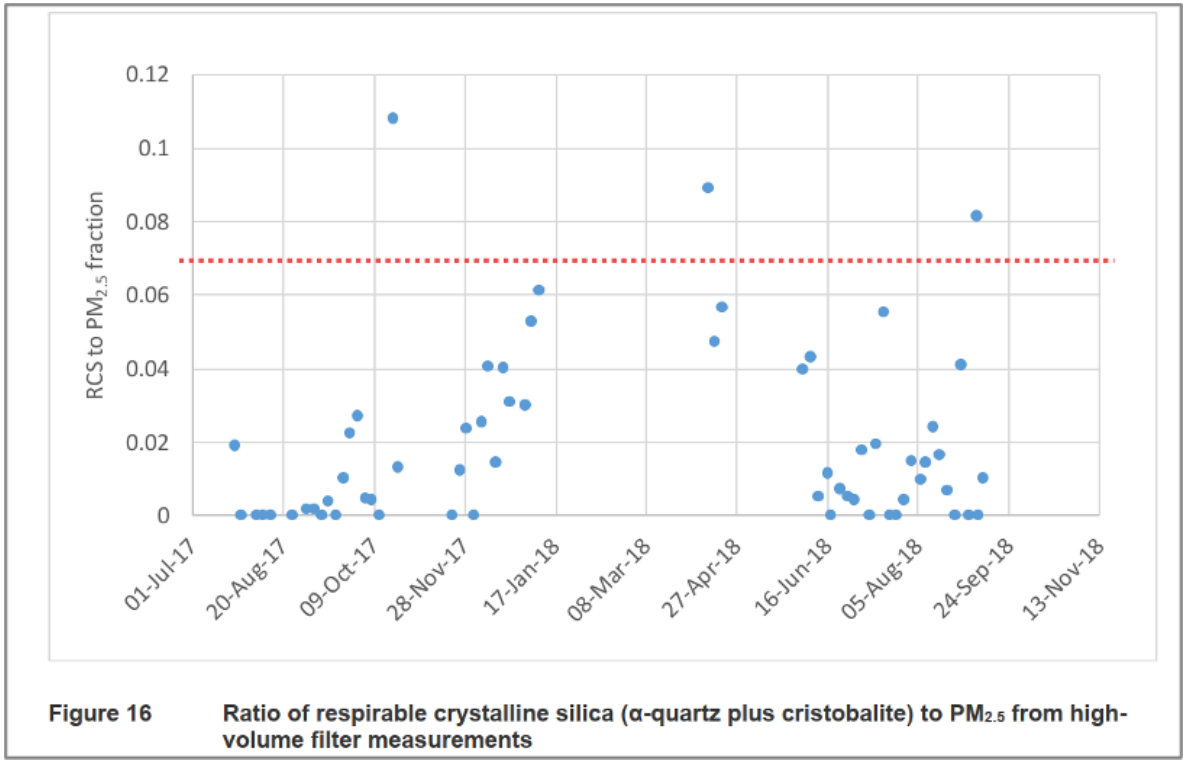


Figure 16 **Ratio of respirable crystalline silica (α-quartz plus cristobalite) to $PM_{2.5}$ from high-volume filter measurements**

Air quality: climate change

- The Air Quality assessment used the method prescribed in the PEM which uses 12 months of ambient and weather data collected on site.

- The Project will be employing real time monitoring and reactive management. The Project must be operated to comply with the nominated criteria at any point in time and to reduce emissions to the extent reasonably practicable.

Air quality: Chemical dust suppressants

- Whilst the Project water balance allocates 375ML per year for dust suppression, Mr Welchman highlighted the opportunity to reduce dust further by using chemical suppressants.

- Dust suppressants currently used in Australia are usually lignosulfonate, and the scientific evidence supports a finding that the overall impact from applying lignosulfonates is negligible.

- The actual dust suppressant used will need to be specified in the Work Plan and will need to be approved by the relevant regulator. There are several commercially available products that are likely to be acceptable.

Noise: Key documents

- The Part C submission sets out the key documents that are relevant to an assessment of the Project on noise.
- The technical work underpinning the NVIA is not affected by changes to guidelines and legislation.
- The NVIA used modelling that was conservative (for example, predictions assume that receivers are downwind from each source and predictions assume meteorological conditions that are favourable to noise propagation).
- The technical validity of the NVIA was not seriously challenged by any expert or submitter. Kalbar submits that the prediction methodologies applied were appropriate and thorough.
- The NVIA demonstrates the feasibility of the Project complying with relevant noise criteria using sensible and achievable mitigations.

Noise: Design development and adaptive management

- The purpose of the NVIA was not to prescribe the only scenario in which mining can achieve acceptable noise outcomes, but to demonstrate the feasibility of conducting the mine on this site and producing acceptable noise outcomes.

- Kalbar will have a consultant engaged for the duration of the Project who can update noise modelling, carry out compliance measurements and input advice to plan activities and stages in an iterative fashion.

Noise: Other noise issues

- The “quietest equipment ‘where feasible’” mitigation can be redrafted.
- The “equipment no louder than modelled in the EES” mitigation should be deleted.
- Kalbar acknowledges that all reasonably practicable noise mitigations should be applied. This should require best practice noise controls where they will produce an noticeable effect.
- The standards set in NIRV and the Noise Protocol take account of low ambient noise and are suitable for rural areas with low noise environments.
- A separate assessment of noise to campgrounds, tourist and education centres is not necessary.
- Kalbar accepts that future work should include an assessment of noise levels to Limpyers State Forest against the relevant non-quantitative objective of “human tranquillity and enjoyment”.

Radiation: Key documents

- The Part C submission sets out the key documents that are relevant to an assessment of the Project on radiation.

- Because the Project includes handling of material (mineral sand concentrate) with an activity concentration above 1Bq/g (i.e., HMC), it requires a radiation management licence under the *Radiation Act 2005*.

- DHHS' review explained that conditions on the radiation management licence will require compliance with the Mining Code, which in turn would involve the preparation of a Radiation Management Plan and Radioactive Waste Management Plan.

Radiation: Radioactive material

Table 11: Radionuclide content (kBq·kg^{-1}) of mineral streams from the Fingerboards project – October 2018.

Stage	Description	Tonnes (TPH)	Weight %	Minimum					Maximum				
				Uranium mass conc. (ppm)	Thorium mass conc. (ppm)	U-238 (Bq/g)	Th-232 (Bq·g^{-1})	Total (Bq/g)	Uranium mass conc. (ppm)	Thorium mass conc. (ppm)	U-238 (Bq/g)	Th-232 (Bq/g)	Total (Bq/g)
1	Ore	1500	100	7	36	0.09	0.14	0.23	25	120	0.31	0.48	0.79
2	Screen O/S	30	2	5	30	0.06	0.12	0.18	10	70	0.12	0.28	0.40
3	Screen U/S	1470	98	8	40	0.10	0.16	0.26	27	125	0.33	0.50	0.83
4	Fine Tailings	370	24.7	7	31	0.09	0.12	0.21	15	80	0.18	0.32	0.50
5	Spiral feed	1100	73.3	9	47	0.12	0.19	0.30	32	148	0.39	0.59	0.98
6	Spiral Cons	80	5.3	200	1500	2.46	6.00	8.46	250	1600	3.08	6.40	9.48
7	Sand Tailings	1020	68	5	10	0.06	0.04	0.10	10	100	0.12	0.40	0.52
8	Mag Cons	28	1.9	180	1700	2.21	6.80	9.01	240	1700	2.95	6.80	9.75
9	N/Mag Cons	52	3.5	220	1300	2.71	5.20	7.91	300	1400	3.69	5.60	9.29

The ore, topsoil and overburden do not have an activity level sufficient to class this material as radioactive material under the *Radiation Act 2005* (greater than 1Bq/g). Only the HMC is radioactive material (refer Figure 31).

Radiation: predicted doses

- The RAR projects low levels of radiation exposure for members of the public and workers, relevantly 0.37uSv for the public, 1.36 for a worker (within a worst case area of the WCP), and 2.93uSv for a truck driver (based on 5.5hrs x 250 days per year located within 1.5m to 2m from a HMC load).
- These projections involved very conservative assumptions. For example, for members of the public, the highest contribution is from inhaled dust (29uSv out of total predicted dose of 37uSv) and this assumes that:
    - a person is breathing dust from the Project at a concentration of 60ug/m3, 24 hours per day every day; and
    - the dust is ore, a material with a higher radionuclide content than other dust sources like topsoil and overburden, whereas only 3-5% of PM10 is ore.
- No expert has raised concern with the technical validity of the RAR, including dose predictions. There appears to be consensus that the predictions were conservative and well below regulatory limits.
- Professor Ruff advocated for the Project to achieve levels well below regulatory limits, adopting 0.1mSv for the public and 1-2mSv for workers as relevant trigger levels. The predicted doses in the RAR are below these levels, save for a truck driver (2.93uSv), where there is potential for this level to be reduced through mitigations, such as shift rotation and cabin shielding.

Radiation: independent review

- DHHS participated in the TRG and also attended the radiation expert conclave as an observer. Save for exposures via cattle and dairy, DHHS was satisfied with RAR, its conclusions and the management framework and mitigations proposed in the EES. In relation to cattle and dairy, it predicted that the potential dose outcome of such an assessment would be exceedingly low. Further work has shown this to be a negligible risk.

- The management licence for the Project can be expected to require compliance with the Mining Code, amongst other matters.

- The Mining Code provides a nationally consistent framework for the effective management and control of radiation risks associated with mineral sands mining.

Radiation: Radionuclides in crops

- Kalbar accepts that radionuclide uptake to crops is an exposure pathway that should be considered, and that it be monitored during the life of the Project. However, it is not necessary that a baseline survey based on direct measurement of existing vegetables be undertaken as part of the EES.

- It is important to recognise that the predicted uptake to vegetables arising from the Project and the resultant doses are extremely low. Based on conservative assumptions, the RAR conservatively calculated a dose increase of just 5.8uSv per year resulting from the Project. DHHS were satisfied with this approach.

- Vegetable sampling might best occur pursuant to an RMP and RWMP, using a method approved to the satisfaction of the relevant regulator, so that it can be carried out in a uniform manner during the life of the Project.

Radiation: Nuclear Activities (Prohibitions) Act 1983

- This Act does not apply to a person who mines uranium or thorium in the course of mining pursuant to a mining title some mineral other than uranium or thorium if uranium of an amount not greater than ·02 per centum by weight or thorium of an amount not greater than ·05 per centum by weight is removed from the land.

- The ore to be removed is well below the limits: 0.0002% for Uranium (requirement is 0.02%) and 0.012% for Thorium (requirement is 0.05%).

Radiation: EPBC Act and export matters

- The EPBC Act is concerned with the environment of Australia (i.e., the effects of ionising radiation, as assessed in the EES), not overseas environments including export considerations. (See Federal Court decisions in *Buzzacott*.)

- In any event, there are practical and legal reasons why the uranium and thorium from mineral sands are unlikely to be used for hostile purposes.

Radiation: Baseline data

- Mr Billingsley and DHHS considered the level of baseline data collected was sufficient to inform the EES, but that a more detailed baseline study would be required as part of licencing and management plan preparation.

- The baseline data provides confidence that it will be possible to leave a safe rehabilitated site.

- The predicted doses are not dependent on the baseline data.

Radiation: Availability of draft RMP and RWMP

- As Mr Joyner's second expert report notes, it would not be common practice for a draft a RMP and RWMP to have been prepared and exhibited with the EES.

- As can be seen from the Mining Code, an RMP and RWMP cover many practical and operational matters, such as specific operating practices for specific areas of plant, working hours, personal protective equipment to be worn and so on. Whilst a template could have been produced as an illustration, the details included would have been generic.

- The mitigation measures and monitoring requirements stated in the EMF outline the elements that need to be delivered to manage radiation risks. DHHS was satisfied that these were adequate.

Human health: Key documents

- The Part C submission sets out the key documents that are relevant to an assessment of the Project on human health.
- Clearly enough, any human health assessment in this case case needs to be founded on findings in relation to air quality and radiation in particular.
- The HHIA concluded that the health risks associated with particulates and dust fallout from the project would be low and acceptable.

Human health: Woodglen Water Storage and rain water tanks

- The HHIA calculated drinking water quality of rainwater harvested on roofs and collected in tanks. It assumed a conservative dust deposition rate of 59.7mg/m2/day on a 280m2 roof cumulatively over 20 years and no first flush system on the tank (amongst other assumptions such as tank size). The HHIA calculated that 14mm of dust would accumulate in the tank over 20 years. It then used the maximum concentrations of metals in fine and course tailings and the maximum leachability results for tailings, heavy mineral concentrate and overburden reported by EGi (2020) to estimate a maximum dissolved concentration of metals in tanks. It calculated this to be <0.0000000001mg/L per year, stating that this was negligible.

- If thought necessary Kalbar does not oppose a recommendation for an explicit assessment of dust deposition on the Woodglen storage and resulting impact calculations against drinking water guidelines.

Human health: Tier 2 assessments

- Ms Teague: "Under the ASC NEPM framework, the recommended process for assessing site contamination involves a tiered approach (refer to Schedule A of the ASC NEPM). The first stage is a Tier 1 screening assessment using generic screening criteria that have been conservatively derived for a particular land use setting or for general public health. **Exceedences of Tier 1 screening criteria are triggers for further investigations**, a refined site-specific Tier 2 or Tier 3 risk assessment, remediation, management, or a combination of these strategies."

- There were no exceedences of Tier 1 screening criteria of as a consequence of the Project, hence no Tier 2 assessment was necessary.

- Indeed, <u>less conservative</u> screening values can be adopted via a Tier 2 or 3 assessment, as conservatism in the screening value is replaced with a more detailed understanding of the health risk.

Human health: Insufficient information on sensitive receptors

- There is no substance to Council's Part B Submission that the HHIA did not assess relevant receptors, nor to the assertion that a Tier 1 assessment was insufficient for the purpose of assessing the potential health effects of the Project at the EES stage.

- This is shown in TN19. Ms Teague did carry out calculations for young children and adult workers.

Human health: Noise

- The health implications of noise from the Project can be considered by comparing the predicted noise levels against relevant World Health Organisation (**WHO**) benchmarks and criteria.

- The WHO criteria are less stringent than the criteria specified for the Project.

Traffic and transport: Key documents

- The Part C submission sets out the key documents that are relevant to an assessment of the Project on traffic and transport.
- The expert evidence does not contend that the Project warrants outright refusal on traffic grounds, but rather it is one that can work subject to appropriate road design and mitigations.
- Kalbar has accepted recommendations for further traffic counts and analysis.
- Mr Hunt accepted that outstanding matters were capable of resolution under the TTMP controls proposed by DoT (which have been accepted by Kalbar).

Traffic and transport: specific issues

- **Haul underpass at Fernbank Glenaladale Road:** Kalbar will implement whichever option the road authority requires at detailed design.

- **Roundabouts on Princes Highway:** Kalbar will implement whichever option the road authority requires at detailed design.

- **Local access route to Bairnsdale Fenning siding:** Kalbar will implement whichever option the road authority requires at detailed design.

- **Intersection spacing, site access and relocated Fingerboards intersection:** Kalbar accepts that geometry and intersection spacing refinements will be necessary at the detailed design stage around the site access / new Fingerboards intersection.

Traffic and transport: other issues

- **Land access:** Kalbar proposes all land access to be by negotiation and purchase from current landowners, as required. This includes land for roundabouts for transport Option 2. It will be a matter for a public authority if any power of compulsory acquisition is employed.

- **Subdivision associated with relocated roads:** The need for any subdivision or boundary realignment is minimal having regard to the indicative road relocations.

- **Land needed for Option 2 roundabouts:** If any additional land outside the road reserve is required for the construction of roundabouts, Kalbar will need to negotiate land acquisition to accommodate the roundabouts.

- **Project unknown because of options / uncertainty:** The EES is not an approval, it is part of an assessment of environmental effects, which may factor in mitigations that can be included in statutory approvals. Both Mr Hunt and Mr Carter gave evidence that with the mitigations and controls proposed, the Project could be carried out with acceptable traffic outcomes.

- **Level of road design detail:** Kalbar accepts the TTMP drafting provided in the DoT's Incorporated Document.

- **DoT's requested changes to the EMF:** Kalbar accepts these save for the proposal to include the Department of Transport as an Approval Authority for the development plan.

Rehabilitation

- In respect of the Project Area, trials carried out by Dr Loch for Kalbar have established that rehabilitation of the Project Area is feasible, a conclusion with which Dr Drake on behalf of MFG agreed at the conclave and confirmed in cross-examination.

- This is so notwithstanding that further work will be required to be done to refine the proposal and identify the best approach to rehabilitation, particularly in light of the use of centrifuges.

- It would be appropriate to recommend the imposition of a condition on the Work Plan requiring that such work be carried out to the satisfaction of ERR prior to mining taking place on the land.

- The development of an unplanned closure plan is something that can be safely developed after approvals are granted, but prior to mining.

Rehabilitation: restoration area

- Kalbar is committed to the proposal to restore 200 hectares of plantation and cleared land to the critically endangered Gippsland Red Gum Grassy Woodlands and Associated Native Grassland ecological community. Kalbar has already established a nursery to produce the required seed and has engaged a leading consultant to oversee the project.

- It is noteworthy that Mr Kern who, having seen Dr Gibson-Roy's work, pronounced himself 'confident' that restoration could be achieved.

- In terms of ongoing protection, the Proponent accepts that a long term commitment is required to ensure the proper management of the restored land.

- It would be appropriate to recommend a condition requiring the Proponent to enter into such an agreement to the satisfaction of ERR (or DELWP) prior to commencing the mine closure process. Such an agreement could extend to the setting aside of maintenance funds in a trust fund or similar.

- Beyond the immediate benefits, the process of developing the reserve has the potential to deliver other broader benefits in terms of demonstrating the effectiveness of large scale restoration and providing seed for other restorations projects.

Horticulture

- The criticism of RMCG's approach to consultation with local growers, suggesting it was overly informal and failed to capture relevant information, is an understandable perception given that RMCG did not ultimately agree with many of the concerns raised. But RMCG did meet with 11 out of the 12 growers.

- The HIA relevantly considered dust generation and deposition; contaminants in dust particles; water quality impacts; water availability; transport impacts; competition for labour; and impacts on a 'clean green' image. For each topic, there is detailed commentary followed by a synthesis which relates the issues raised by horticultural landowners to the findings of relevant technical studies within the EES, or further analysis by RMCG.

- The HIA was necessarily dependant on the work of other experts; and any findings of the IAC about horticulture are, also, necessarily dependant on it findings on foundational matters such as dust..

- To the extent that matters of principle are involved - such as the preferred method of allocating available water or the implications of job creation on labour supply - these are matters to be guided by law and policy.

Horticulture: dust on crops

- A key issue raised in submissions concerns the impact of dust on horticultural production in the Lindenow Valley.
- Drawing together its findings on the relevant horticultural context with the results of the air quality technical study by Katestone, the HIA explained "dust generated on the site is unlikely to have an economic impact on horticulture producers in the region. The probability of a dust contamination event, given mitigation procedures already in place … is considered low."
- This is a logical conclusion to draw. The modelled levels of dust deposition from the Project on the horticultural area are very low and management measures and monitoring are proposed to ensure these targets are achieved in practice.
- Importantly, much of the concern of horticulturalists was not so much about dust as about so-called "toxic dust", that is dust with a significant portion of metals such as uranium or thorium. But the evidence does not provide any basis for this concern. Rather the expert radiation evidence and the expert air quality evidence requires the conclusion that the likelihood of such "toxic dust" causing any detriment to vegetable crops is negligible.
- Kalbar does not oppose further monitoring to demonstrate that this is so. Indeed, this will assist in building public confidence in the Project.

Horticulture: competition for labour

- The HIA acknowledged that higher wages in mining would generate competition for labour access.

- This is an entirely acceptable consequence of the Project, and will create economic opportunity for local workers – including those currently unemployed or underemployed - through employment in an alternative industry to horticulture.

- An EES inquiry is not the place to protect one category of employer from competition for labour from another employer who offers higher wages. Such protection is incompatible with a free market for labour and penalises workers who would otherwise benefit from receiving higher wages.

- Moreover, labour is mobile, and workers can be drawn from outside East Gippsland, whether for horticulture or mining, to meet any shortfall.

Horticulture: Consumer perception – ‘clean green’ image

- The Project is unlikely to impact upon the consumer perceptions of produce from the Lindenow Valley horticultural area.

- Major retailers, who are not local in a region, prefer to not identify the place of production of perishable produce to maintain flexibility of getting supplies from where it is available at the desired price and quality to guarantee continuity of supply to their customers.

- In any event, if there is no actual impact, any perception of impact can be shown to be unjustified.

Aboriginal cultural heritage

- The *Cultural Heritage Impact Assessment* report (**CHIAR**) prepared by Andrew Long & Associates (**ALA**) dated April 2020 adopts a methodology consistent with that for the preparation of a CHMP. Having proceeded to the stage of a preliminary complex assessment, the CHIAR included a significant survey and review effort.

- Site surveys were conducted over thirteen days involving a multimember team of archaeologists and members of GlaWAC resulting in the identification of 68 stone artefacts.

- Intangible cultural values were recognised as a gap in the CHIAR, as this work was unable to be completed prior to exhibition of the EES. Earlier this year, Kalbar engaged Dr Seumas Spark to progress the cultural values assessment and this work is currently ongoing in consultation with the traditional owners.

- The CHMP will include site-specific management conditions, cultural heritage induction and ongoing requirements, retention and storage of all recovered cultural heritage materials, repatriation of recovered cultural heritage materials and contingency measures.

- Kalbar accepts there will be impacts to Aboriginal cultural heritage values, including value placed in landscape and country. Whilst the CHIAR shows that this is not a site warranting preservation on cultural heritage grounds, it will be important to respect the land through rehabilitation efforts, minimising offsite impacts on air and water, and applying appropriate procedures on the site to ensure tangible heritage is treated in an appropriate manner when discovered. These outcomes can be achieved through the CHMP.

Historical heritage

- No part of the site is covered by the heritage overlay, or includes properties on the Victorian Heritage Register.
- The Fingerboards intersection has local heritage interest which should be appropriately recorded.

Resource Development Evaluation Objective: Feasibility

- The Resource Development Evaluation Objective is as follows:

  "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."

- Section 15(6B) of the MRSD Act requires the applicant to demonstrate that there is a reasonable prospect that the mining of a mineral resource will be economically viable.

- The material establishes that there is a real prospect that mining of the mineral resource will be economically viable.

Economic impacts

- It is self evident - and does not appear to be in dispute - that the Project is likely deliver economic benefits for the region (including employment benefits).
    - Kalbar has already taken expression of interest from prospective employees.
- The Project will also provide wider economic benefits to the State (royalties and railway returns) and the Commonwealth (company tax).
- The IAC should find that, contrary to Council's assertions, the payment of higher wages is unambiguously a good thing, especially in the context of several years of wage stagnation.

Social impacts

- The Project will have both positive and negative social impacts.
    - Positive impacts: those who obtain employment, or better employment, and their families; those who provide services, or increased services, because of the Project; beneficiaries of community grants, those who take up training opportunities.
    - Negative impacts: people who sincerely believe that the Project should not proceed and who have campaigned against the proposal.
- It is not uncommon with development that attitudes change after it takes place as fears are often greater than reality. Social rifts are likely to heal.
- Kalbar accept that it has a role in this healing process and that it should be proactive in seeking to mitigate any negative social impacts.

Social impacts: mitigation measures

- The Proponent has accordingly proposed mitigation measures aimed at facilitating community engagement, detecting negative social impacts (such as increases in prices of goods and services arising from the Project), and endeavouring to ensure that benefits are shared with the local community (e.g., through local purchasing arrangements, training and apprenticeship opportunities).

- These are intended to be implemented in a number of ways:

  - Environmental Review Committee and the Community Reference Group required by the MRSD Act and Regulations,

  - a Social Impact Management Plan.

- Kalbar hopes that the Council will engage with Kalbar and will be heavily involved in the design of the Social Impact Management Plan.

Social impacts; the views of the community

- Sections of the community cannot claim to speak for all of the community or even “the community”.
- The community in this case includes a section who are strongly opposed to the Project - and have campaigned against it - but there are other sections who support the Project or, at least, do not oppose it.
- Hence it would not be correct to find that “the community” is opposed to the Project.

Social impacts: social licence

- While the concept of ‘social licence’ may have some political utility, it is not a concept that has any legal content. (*TasWind Farm Group*)
- Importantly, the statutory decisions that will need to be made (with input from the IAC and Ministers Assessment) do not make a “social licence” a relevant matter.
- Moreover, planning case law makes very clear that planning decision-making is not a popularity contest nor is the number of objections to a project, by itself, evidence of any social effect caused by the Project. (*Minawood)*.
- One particular danger of placing reliance on claims of social licence is that it may privilege loud voices over quieter ones (eee *Crib Point).*
- The surveys done by the Proponent as part of its SIA provide some quantification of the degree of support for the Project in the community. These surveys and the submission to the EES are transparent and verifiable.
- Significant portions of the community (including many landowners and households in or close to the Project Area) did not express opposition to the proposal.

Social impacts: expert evidence

- Council sought to in some way criticise the Proponent for not calling social impact evidence ostensibly on the basis of some established practice of doing so.

- The examples do not support this claim.

- In any event, the SIA in the EES was comprehensive and can be relied upon. It involved workshops, community meetings, interviews and surveys.

Conclusion

- The Project can be expected to deliver significant rewards at several levels: economic activity, jobs, taxes, royalties, community grants, and restored woodland. Moreover it will reward investors who, on the basis of encouragement from the State, have risked their savings to support the project.

- The extraction of the resource will also contribute to our modern society, including in relation to combating climate change.

- Of course there are impacts: but the EES has carefully identified the likely impacts and a rigorous set of provisions has been set in place to respond to these and to ensure that, when mitigated, the impacts are acceptable.

- The IAC should recommend that, subject to appropriate mitigation, the Project should be supported.