Submission – Inquiry into factors shaping social licence and economic development outcomes in critical minerals projects across Australia.

The QUESTION: Is it possible to Rehabilitate Prime (cropping) Agricultural Lands to pre-mining productivity and profitability following critical mineral sands mining?

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(redacted)

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Committee Secretary
House of Representatives Standing Committee on Primary Industries
PO Box 6021
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Canberra ACT 2600

To Whom It May Concern

Re: Submission – Inquiry into factors shaping social licence and economic development outcomes in critical minerals projects across Australia.

The QUESTION: Is it possible to Rehabilitate Prime (cropping) Agricultural Lands to pre-mining productivity and profitability following critical mineral sands mining?

Summary

This submission is about the resolution of competing interests between mineral sands mining and the degradation of prime (cropping) agricultural lands in the Wimmera/Mallee, Victoria, which relates to the souring of the community social licence and the projected future loss of food security in Australia. Detailed examples are given of the failure of mining companies to meet the requirements of the MRSD Act 1990 and the stated objectives outlined in their Environment Effects Statements (EES) and publications together with the inability of the State Government to execute due diligence by not incorporating evidence-based decision making as prerequisite in its haste to enable mineral sand mining.

Extent of Critical Minerals and Strategic Materials

There is no shortage of of critical minerals and strategic material deposits in the world or Australia, refer to Australian Critical Mineral Deposits: Figure 1. All states have published Critical Mineral Road Maps or their equivalent in their rush to entice mining companies and associated investment to their States. In Victoria, compared to other states, it is unfortunate since most of the sand mineral deposits underlay prime cropping agricultural lands where in other states this is not the case. Refer to the Strategic Land Use Assessment over northwest Victoria mineral sands region: Figure 2. Note the 'Major Strings' and 'WIM' deposits… they are like a spider's webs over the entire region.

Mineral sands mining and food security become seriously conflicted particularly when there is no substantive evidence any where in the World (that I have located) that can demonstrate post-mineral sand mined cropping lands, following targeted rehabilitation, can be returned to pre-mining productivity and profitability. In fact, the experience to date points to the opposite.

Examples of Mineral Sands Mining Rehabilitation attempts in Victoria.

In an Iluka publication, (2024) 'REHABILITATION AT ILUKA MURRAY BASIN' – DELIVER SUSTAINABLE VALUE Iluka makes claims of its successful rehabilitation performance of four of its mines in the Murray Basin to range from 62 to 99%.

> *"Rehabilitation completion criteria are established that typically require the rehabilitated land to support agricultural productivity comparable to district averages. Upon the completion of the rehabilitation, a post-mining agricultural assessment is undertaken to demonstrate that the agricultural production has been re-established and can be maintained."*

Refer to pages 21 and 22 in the document below for the complete publication. Three of Iluka's mines were completed in 2012 and one in 2015. Multiple inspections by councillors, shire CEO's, farmers and future mine managers were shocked at what they observed. The WRP mine, which was completed in 2012, shows that the rehabilitated cropping areas remain devastated with poor germination, very poor yields, subsidence, sink holes in the landform creating an unsafe, unstable work place: a **forever disaster**.

Over the last13 years Iluka has attempted to fully rehabilitate their mine sites without success and now some landholders are seeking a 'remedy' through proceedings in the Federal Supreme Court.

DELIVER SUSTAINABLE VALUE

ILUKA

REHABILITATION AT ILUKA MURRAY BASIN

Iluka recognises the importance of responsible stewardship of the natural and agricultural environments in which we operate. We are committed to rehabilitating all of our mines to a sustainable post-mining land use. In most cases, this means restoring the land use that existed prior to mining.

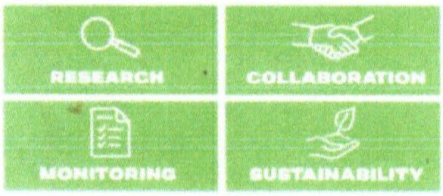
Iluka is proud of its strong track record in mine rehabilitation and closure, spanning more than 50 years across Australia including 17 years in the Murray Basin. This allows us to learn from our previous experience to continually improve and refine our rehabilitation techniques. We collaborate with relevant regulatory authorities and landowners to prepare comprehensive rehabilitation plans for our mines, which establish our legal obligations and completion criteria for rehabilitation.

HOW DO WE REHABILITATE LAND?

Iluka's rehabilitation planning starts before mine construction. We conduct studies on the proposed mine site and surrounding region to understand the soil types and profile, agricultural productivity, native flora and fauna, and water characteristics. The information gathered in these studies is used to develop designs and schedules for rehabilitation.

Rehabilitation planning also includes confirming the post-mining land use, identifying and managing rehabilitation risks, determining relevant closure objectives and completion criteria, undertaking research to address knowledge gaps, and developing rehabilitation management and engineering prescriptions.

A key aspect of our rehabilitation is the management of soil resources. When earthworks commence, we remove topsoil, subsoil and overburden (the deeper soils above the ore) in layers.



These layers are stockpiled separately so that they can be replaced appropriately during rehabilitation.

Once the topsoil is replaced, the land is revegetated to establish pasture, crops or native vegetation. Mine infrastructure which provides value to the post-mining land use may be kept, if it is acceptable to Iluka and the landowner. Examples include bores, roads, and sheds or workshops.

Iluka typically adopts a progressive rehabilitation approach, which means that rehabilitation starts as soon as possible after ore has been mined in a pit. This means that some parts of a mine pit may be backfilled and rehabilitated while other parts of the pit are still being excavated and mined. This reduces the need to double-handle overburden and soils, and the amount of rehabilitation required when mining is finished. Progressive rehabilitation also reduces the total disturbed area and impacts such as surface water runoff and dust.

Iluka manages and monitors rehabilitated land for several years to ensure that the agreed mine closure objectives and completion criteria have been met. If monitoring shows that the rehabilitated land does not meet the agreed objectives, we work with landowners and regulatory authorities to plan and carry out further work to improve the affected land.

COMPLETION OF REHABILITATION

Upon completion of rehabilitation activities on a mine site, Iluka prepares a completion report with data to show that agreed rehabilitation objectives have been met. This is supported by investigation reports from experts such as agronomists and engineers. Regulatory authorities then assess the rehabilitation at the site to confirm that it is complete and that relevant legal obligations have been met. In Victoria and NSW, once the regulatory authority is satisfied with the rehabilitation, the return of a monetary bond can be facilitated.

It is very common for rehabilitation plans to set targets for landform, groundwater, surface water, native vegetation and agricultural productivity that have to be shown to be met for regulatory sign-off to occur. If objectives are not met within the assessment period, remedial work or further monitoring is required until these targets have been achieved.

Rehabilitated ag...

DID YOU KNOW?
Iluka has completed over 18,000 hectares of rehabilitation on our former mine sites, comprising 14,000 hectares of agricultural land and 3,000 hectares of native vegetation.

ILUKA IN THE MURRAY BASIN

14 dec. Hec

Iluka has been mining in western Victoria since 2005 and has a dedicated rehabilitation team. Many years of experience and the ability to draw on learnings from the rehabilitation of our Kulwin, Echo, WRP and Douglas mine sites in the region means we are always improving our rehabilitation processes and employing new technologies to achieve full and sustainable rehabilitation of land in collaboration with regulators, farmers and other stakeholders. Our mission as a company to deliver sustainable value applies to our rehabilitation as much as it does to our operations.

AGRICULTURE

In cases where a mine is developed on agricultural land, extensive rehabilitation processes take place to ensure that land can be returned to productive agricultural use for cropping or grazing. Iluka has a strong history of returning land to productive agricultural use throughout Australia, including in western Victoria. Where appropriate, plans are made with landowners in addition to regulatory authorities to determine requirements.

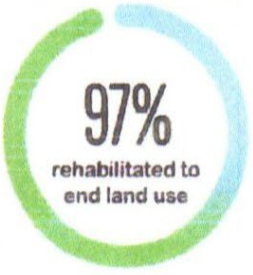
Prior to mining, an agricultural assessment is undertaken to understand the characteristics of the soils and the agricultural productivity of the land. Rehabilitation completion criteria are established that typically require the rehabilitated land to support agricultural productivity comparable to district averages. Upon completion of rehabilitation, a post-mining agricultural assessment is undertaken to demonstrate that the agricultural production has been re-established and can be maintained.

During the monitoring phase, the land may be utilised by farmers to conduct agricultural activities in line with the approved post-mining land use prior to full completion and handover.

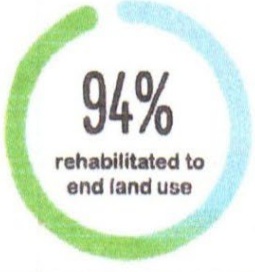
ILUKA'S FORMER MURRAY BASIN MINE SITES *Rehabilitation status at end-2023*

Kulwin mine
Mined 2009-2012
778 ha disturbance footprint

Echo mine
Mined 2009-2012
169 ha disturbance footprint



WRP mine
Mined 2012-2015
1,118 ha disturbance footprint



Douglas mine
Mined 2005-2012
905 ha disturbance footprint

WIM Resource Pty Ltd – Avonbank – 'Demonstration Trial'

The Avonbank Demonstration Trial was undertaken in 2019-2022 to test the feasibility of mining, processing, and rehabilitation within the project area. This trial was undertaken in line with a Work Plan associated with Avonbank retention licence (RL 2014). In addition to establishing a pilot plant and mining test pit an experiment was conducted into the efficacy of a proposed Rehabilitation Strategy which included agricultural trials.
The authors of this submission conducted an extensive assessment of this Demonstration Trial which culminated in a written Critique and found the trial was **not** supported by credible scientific methodology and repeatable evidence for yield estimates and harvester measurements. The efficacy of the Rehabilitation Trial had not been demonstrated.
For the above reasons the Minister was requested to reconvene WIM Resource and the three Consultants to comment on the many conflicts and inadequacies identified and then for the consultants to re-inform the IAC Panel accordingly.

A summary of the Critique Findings follows:

> "Overall, the inadequate experimental methodology, the problematic choice of an experiment site, the contradictory barley yield outcome in 2021 and the very wet 2022 season casts doubt on the validity of any barley and lentil yield measurements and of the soil Rehabilitation Strategy. In addition, the recent 2024 Harvest Yield Map indicates the total failure of the Rehabilitation Strategy over the partial rotation of crops in the Wimmera cropping Region."

Goschen and Donald Mineral Sands (DMS) apparently relied on the success of the Rehabilitation Strategy guiding their rehabilitation methodology and now that it failed, they are incompetent in meeting their declared claims and the MRSD Act requirements.

The Relevance of the Environment Protection Biodiversity Conservation Act 1999 (EPBC Act 1999)

The EES is an accredited assessment for the EPBC Act and as such is committed to the existing Standards of evidence. The EPBC Act states:

> *"The project (VHM Ltd – Goschen Mineral Sands Mine) is a controlled action under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) due to potential impacts on matters of national environmental significance (MNES). As the EES is an accredited assessment for the EPBC Act, my (being the Minister's) assessment examines impacts on MNES and is provided to the Commonwealth Minister for the Environment and Water to inform the decision about whether and under what conditions EPBC Act approval should be granted."*

The relevance of the EPBC Act 1999 is to safeguard the Earth's Biosphere to enable human existence on the planet. Our soils are a complex ecosystem. A critical part of the biosphere is the soil microbiology in topsoil and subsoil where cereal crop access water and micronutrients in depths to two (2) metres. Thes soils require farming practices that sustain its dynamic presence and food production (security) without an unduly reliance on ameliorants.

The Act states:

> ***"Part 1 3A Principle of ecological sustainable development***
> *3A (d) Conservation of biological diversity and ecological integrity… should be fundamental consideration in decision making."*

It is for the above reasons that Prime Agricultural Land ***should become the tenth (10) Protected Matter*** and so be covered by the DRAFT Policy Position: National Environmental Standard for Matters of National Environmental Significance where the MNES Standard Principles are clearly defined in four principles:

> *"The MNES Standard uses the term 'action', as opposed to 'decision', as the Standard sets the onus of the Principles in the Standards on to the proponent rather than the decision maker. The Minister is required to make decisions 'not inconsistent with' the Standards. The proponent needs to show they have incorporated the Principle into the submission so the Minister can be supported (have the evidence) to make a decision that is not inconsistent with the Standard."*

The Policy Intent of **Principle 4:** (of the draft document**) Actions are supported by evidence** is stated below:

> *"Assessment of the impact of actions needs to be supported by scientifically sound, legally defensible, transparent, and adaptive data and information. This ultimately supports decision-making and reduces uncertainty, strengthens trust, and ensures the environmental, social, and economic outcomes are genuinely balanced."*

The relevance of the above is that in the Victorian Government's quest to secure a major portion of the global mineral sands investment has, for expediency, bastardised the intent of the EPBC Act in its execution of the respective Mineral Sands Mine EES's by not applying the Standards of evidence inherent in the Act.
In each of the EES's provided by VHM Ltd (Goschen Mine), Donald Mineral Sands (DMS Mine at Banyena) and WIM Resource Pty Ltd (Avonbank Mine at Dooen near Horsham) no substantive evidence was presented to substantiate their EES claimed objectives that: E.g.

What VHM (Goschen) says it is going to do in the EES:

> *"To restore land disturbed by mining to an equivalent (or better) agricultural land capability to enable a variety of productive agricultural uses."*

and must comply with the requirements of the Mineral Resources Sustainable Development Act 1990 (MRSDA1990) which states:

> *"(a) iv. the desirability or otherwise of returning agricultural land to a state that is as close as is reasonably possible to its state before the mining licence… was granted."*

This was not done because, to our understanding, nowhere in the World has post-mineral sands mining rehabilitation, on prime agricultural land, (cropping lands) been able to achieve pre-mining productivity and profitability. The second reason is the mineral sands mining companies have not deemed it necessary to conduct such trials although Goschen and DMS mines had at least a decade to conduct independent research trials which could have supported their later EES claims.
WIM Resource Pty Ltd and DMS did set up a Demonstration Trial at Dooen and Banyena to both evaluate ore recovery/treatment methods and assess a Rehabilitation Strategy; unfortunately for them

both were failures for the multiple reasons referred to in the attached Critique of the Demonstration Trial discussed earlier and in reports on the Banyena Pilot Pit site.

The Bastardisation of the Intent of the EPBC Act by the State of Victoria.

Since no substantive evidence was forthcoming from the three EES's, proponent statements, witness statements and additional submissions to inform the Inquiry and Advisory Committees (IACs) they had to rely on witness opinions, beliefs and misinformation to make recommendations to the Minister concerning the efficacy of the lack of substantive evidence in making such momentous decisions. The Goschen EES - IAC experience and report provided below is an excellent example.

In reading the relevant agricultural and soil sections of the Goschen Mineral Sands and Rare Earths Project – Inquiry and Advisory Committee Reports – 27 June 2024 it became painstakingly clear the IAC were not happy with the 'opinions' offered and their directed modified EES so they instigated major inclusions within the Management Environment Framework [2] that would effectively set up an independent mandatory research trial within the MINE WORK PLAN that would, if professionally executed by the Regulator, produce the substantive evidence that was lacking in the proposed Rehabilitation methodology being able to return disturbed soils from post-mining to pre mining profitability and productivity on prime agricultural (cropping) lands. Refer to the Minister's statements below.

Executive Statement in the Minister's Assessment under the Environment Effects Act 1978

> *"It is my assessment that, on balance, the project has merit and potential for economic benefits for the region and Victoria but comes with some environmental effects that need to be mitigated and, in some cases, offset.*
> *I support the findings of the IAC that none of the environmental effects could or should prevent the project proceeding, provided the mitigation measures recommended by my assessment are implemented."*

Note the words in the first line, '**on balance',** that meaning, without any substantive evidence only having witness's opinions, beliefs and misinformation to support an expedient decision made to support the States thrust to accelerate critical mineral mines investment without due diligence and meeting the Standards of the EPBC Act.

And in the Minister's Assessment

> *"It is my assessment that agriculture, soils, geotechnical and rehabilitation impacts can be mitigated and minimised to acceptable levels, with the implementation of the EMF and specific measures, as amended by the IAC and through my assessment.*
> *I note and acknowledge* ***existing information gaps and related uncertainty*** *around the effectiveness of some proposed mitigation measures; however this information can be appropriately obtained through the suggested further investigations outlined in the EMF and incorporated into relevant management plans or approvals.*
> *This further information is important to ensure that the project is appropriately managed, however is not required to inform my assessment that the project would have acceptable environmental impacts. I support the recommendations of the IAC regarding the phrasing of the various mitigation measures for soils and land resources, geotechnical stability, agriculture and rehabilitation and closure.*

I largely support the IAC's phrasing of MM-SLR01, provided correct reference to Mr Shovelton's expert witness statement is included."

To appease the lack of substantive evidence the IAC (to their credit and professional integrity) were able to guide the Minister to direct the inclusion in the Mine Work Plan, subject to the Regulator exercising full compliance, what could become a significant independent rehabilitation trial, suitably monitored and reported on. This trial would provide the previously lacking substantive evidence, one way or another, needed to meet the EES claimed objectives and the requirements of the MRSD Act. This was called the 'Reference Trial' which would compare the post-mining productivity of the disturbed rehabilitated prime agricultural land (cropping lands) with the pre-mining productivity using independent machine harvester yield map monitoring. Progressive targets were set (TARP) encouraging remediation actions by independent agronomist to improve yearly agricultural yields up to a period of five (5) to seven (7) years (to accommodate crop rotations and extreme seasonal variations) after which time agronomist were to continue with remediation if commensurate agricultural productivity had not been reached. **Whereas, if this outcome had been reached the engaged farming groups have demand the mineral sands mining operation be HALTED and the mine be placed into Premature Closure.**

Since both Goschen and DMS mineral sands mines have no proven rehabilitation strategies, their fate was to rely on the supposed success of the WIM Resource Demonstration Trial (which failed), so their future is in jeopardy too and as such their operations should be suspended until such time each mineral sands mining company can provide substantive evident that their particular rehabilitation strategies, on local soil profiles, can deliver commensurate productivity post mineral sands mining.

Potential lack of food production and food security with these three projects in the event of a 'mini-Gold Rush'.

Figure 3 shows the Goschen Project on MIN007256 located near Labert and in the proximity of both Swanhill and Kerang. The mine area size is 1,534.6 Ha (shown in yellow) and the disturbed areas approximately 1,247 Ha. The VHM tenements are shown and extend to approximately 100 times the area of the actual mining licence making the possible future mining are, at a maximum of 100,000 Ha. In likely occurrence of the full tenement being mined for mineral sands the loss of cereal grain production would be significant.
A back of the envelope calculation indicates in the event (highly probable) of the failure of rehabilitation of productive agricultural land (cropping land) that loss of production would be 250,000 tonnes/year being equivalent to twice the entire cereal consumption of the people of Melbourne in one year. i.e. 100,000 x 2.5 tonnes/ha. x 1000 to bring the sum to kilograms divided by 25kg cereal consumption/person/year = **10,000,000** persons. In 2024 the population of Melbourne was approximately **5,350,000** persons! This lack of food production is forever since no successful rehabilitation has been proven.

Alternatively, if the three mines (Goschen, DMS and Avonbank) mined out their existing mine licence areas (say 6700Ha.) the loss of cereal production **per year** would be about 13,490 tonnes and equivalent to 539,600 persons. The combined populations of Geelong, Bendigo, Ballarat, Wodonga, Albury and Shepparton in 2024 was 526,000 persons!

Imagine the loss of cereal production and food security if the Victorian 'new' Critical Mineral Roadmap achieved even a 'mini-Gold Rush' bonanza. Refer to figure 2 again. This might be the rationale behind 'Priority Zones' considered in the 'new' roadmap.

Attached for information are three letters forwarded to the relevant Minister alerting them to our concerns and the desperate need to invoke the Precautionary Principle before proceeding with granting further mineral sands mining licences in Victoria.

Recommendations

1. Advocate for Prime Agriculture Lands (class 3 and above) to be included in the list of 'Protected Matters'.
2. Advocate for all future EES's to comply (evidence-based) with the 'Draft Policy Position: National Standard for Matters of National Environmental Significance.' (MNES)
3. Advocate for all large-scale mineral sands mining projects in Prime Agricultural Lands be rescinded with full compensation for expended finances – for all parties.
4. Advocate under the EPBC Act to withhold all mineral sands mining applications until each proposed project can demonstrate post-mining productivity and profitability is commensurate with the pre-mining production and profitability and is in the national interest.

References

1. Goschen Mineral Sands and Rare Earths Project Minister's Assessment under Environment Effects Act 1978
2. Management Environment Framework 'Day 3' version Chapter 21 VHM Limited EES
3. Mine Works Plan – Rehabilitation Plan Goschen Mineral Sands and Rare Earths Project
4. Goschen Mineral Sands and Rare Earths Project Minister's Assessment under Environment Effects Act 1978
5. Goschen Mineral Sands and Rare Earths Project Minister's Assessment under Environment Effects Act 1978
6. '***Priority Zones'*** Victoria's new Critical Minerals Roadmap page 2 & 3 https://www.allenscom.au/insights-news/insights/2025/01/victoria

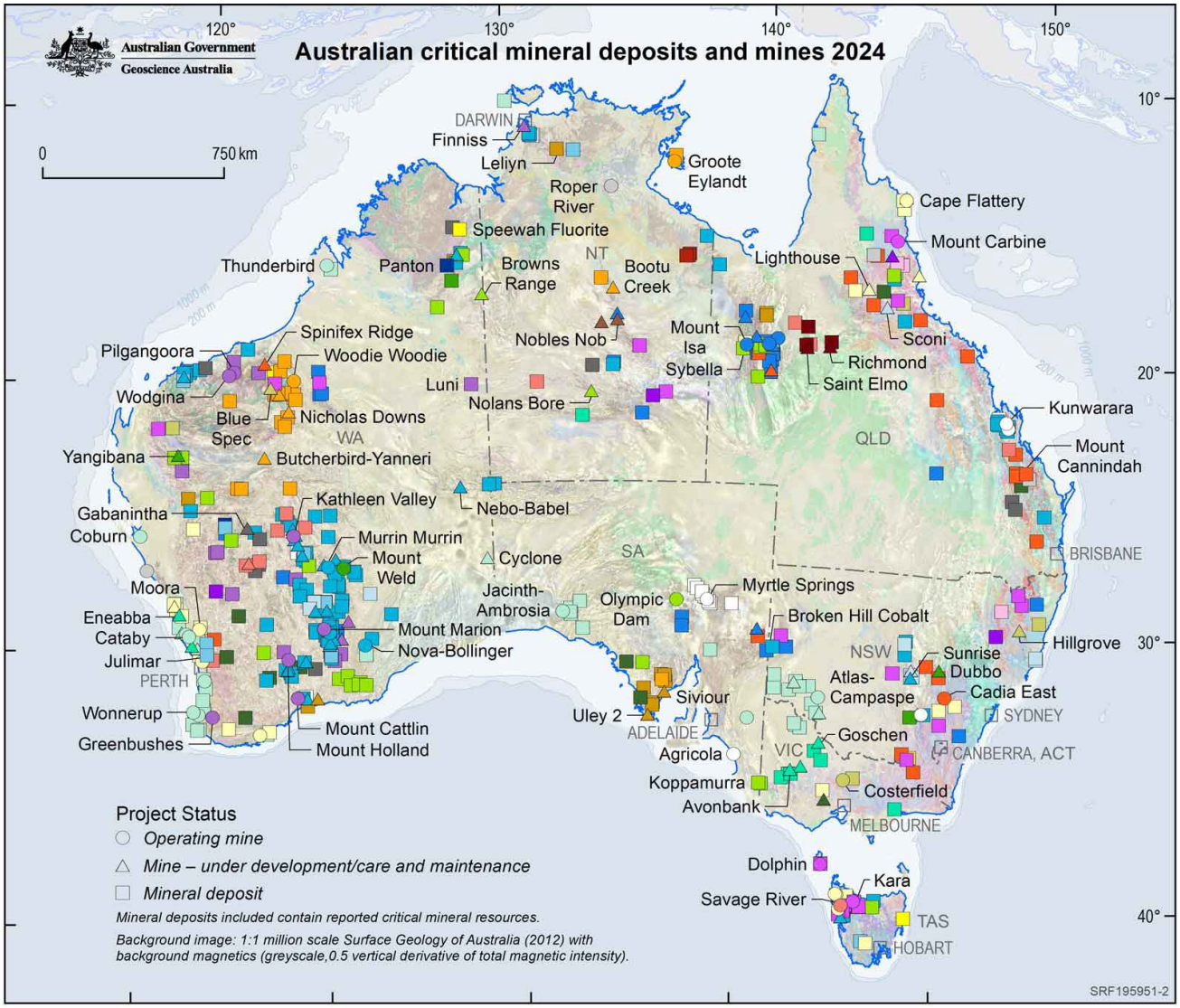


FIGURE 1 Australian Critical Mineral Deposits

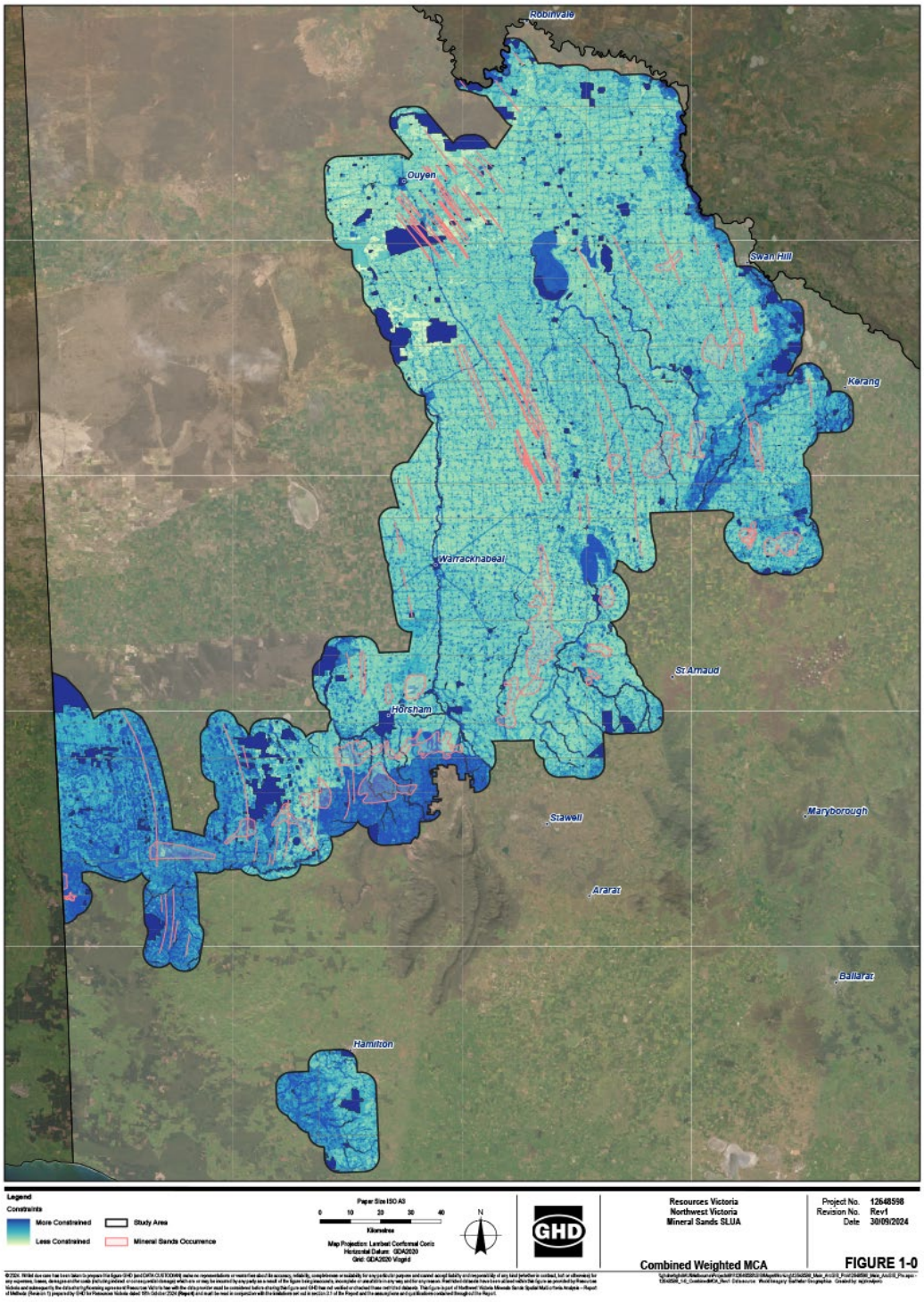
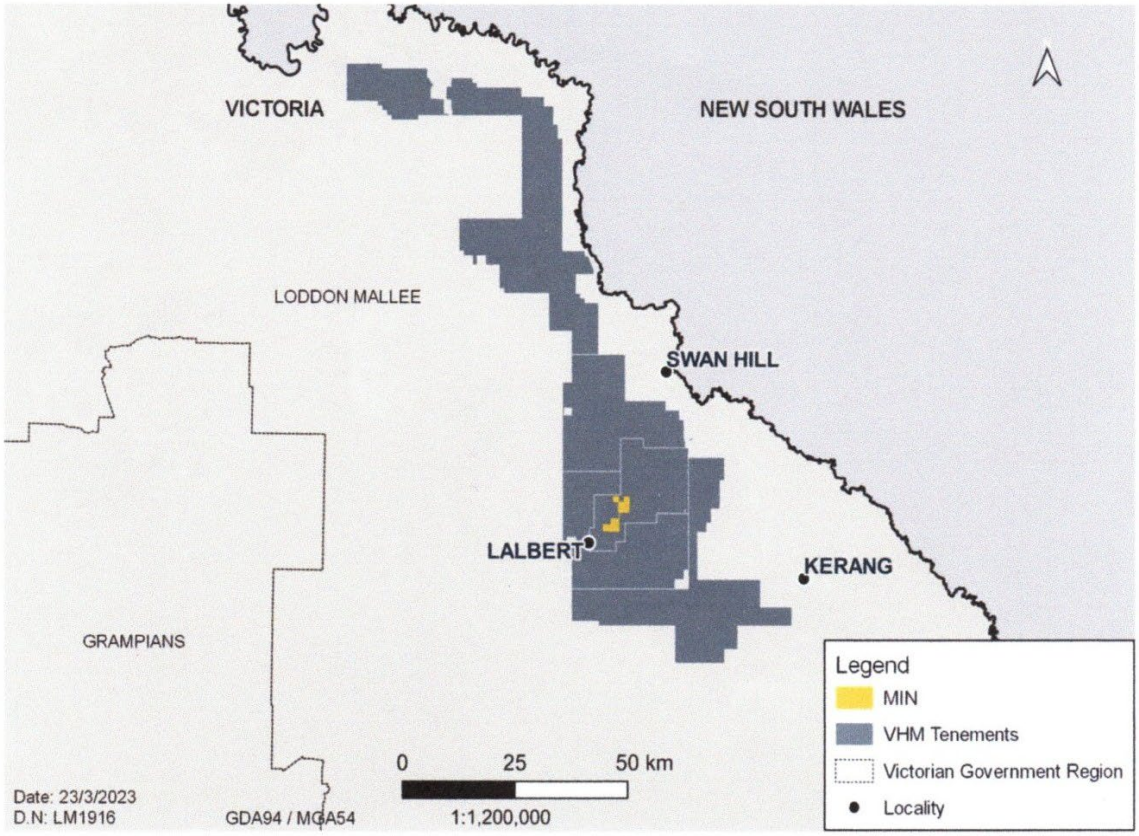


FIGURE 2 Strategic Land Use Assessment over northwest Victoria mineral sands region.

Figure 1 Project Location



2.2 Project Development

It is recognised that there are opportunities to avoid or minimise environmental impacts during the many stages of Project development. During Project inception and early design development stages of the Project, decisions on the location of the Project, its design and construction techniques have enabled impacts to be significantly avoided or minimised in accordance with the hierarchy presented in **Figure 2**.

FIGURE 3 Goschen Project on MIN007256 located near Labert

Credentials

Dr John Russell (0417 191 143) has been a lecturer and researcher into soil amelioration at La Trobe University for 16 years. (1999 – 2016), More recently, the last 8 years, he has focussed on soil health, (soil structure, aeration and biology) and conducted many field trials in the in the Wimmera/Southern Mallee before very recently becoming interested in the impact of the mining of mineral sands on cropping lands and the challenge of cropping land rehabilitation.
His qualifications are:
Fellow Institute Engineers Australia
Degree in Agricultural Engineering University of Melbourne
Diploma Civil Engineering Monash University
Doctorate Degree Engineering University of London
Diploma of Education University of Melbourne
A Senior Engineer Melbourne Water for 16 years
Lecturer La Trobe University for 16 years with a large research portfolio.

Paul Oxbrow (0427 855 123) is a leading regenerative landholder in the Wimmera
He is the Convenor of the Rehabilitation Sub-Committee for the Dunmunkle Land Protection Group Inc.(DLPG) and Past President of VicNoTill.
Paul is a third - generation farmer in the Rupanyup District and his family's 2000Ha farming enterprise is to be consumed in a decade or two by the Donald Mineral Sands Jackson Deposit extension.
He is deeply concerned with the wellbeing and future of his community, industry and food and fibre security.