



# Balranald Mineral Sands Project

## Rehabilitation Management Plan

August 2022

Fusion reference:	MWB00005-H-PLN-0001
Approved date:	12 August 2022
Author/s:	Brendan Isaacs
Approved by:	Andrew Porter
Document owner:	Vicki Hood
Publish date:	12 August 2022

## Contents

Summary Table .....	5
1 Part 1 – Introduction to mining project.....	5
1.1 History of operations .....	5
Bulk sampling activity.....	5
Intent of Rehabilitation Management Plan (RMP).....	6
1.2 Current development consents, leases, and licences.....	6
1.3 Land ownership and land use.....	6
1.3.1 Land ownership and land use figures .....	7
2 Part 2 - Final land use.....	12
2.1 Regulatory requirements for rehabilitation.....	12
2.2 Final land use options assessment .....	12
2.3 Final land use statement.....	12
2.4 Final land use and mining domains .....	12
2.4.1 Final Land Use Domains.....	12
2.4.2 Mining domains.....	12
3 Part 3 - Rehabilitation risk assessment .....	17
4 Part 4 - Rehabilitation objectives and rehabilitation completion criteria .....	19
4.1 Rehabilitation objectives and rehabilitation completion criteria.....	19
4.2 Rehabilitation objectives and rehabilitation completion criteria – stakeholder consultation.....	22
5 Part 5 - Final landform and rehabilitation plan.....	22
5.1 Final landform and rehabilitation plans.....	22
6 Part 6 - Rehabilitation implementation.....	26
6.1 Life of mine rehabilitation schedule .....	26
6.2 Phases of rehabilitation and general methodologies .....	26
6.2.1 Active mining phase .....	26
6.2.2 Decommissioning .....	29
6.2.3 Landform establishment.....	31
6.2.4 Growth medium development.....	32
6.2.5 Ecosystem and land use establishment.....	32
6.2.6 Ecosystem and land use development .....	32
6.3 Rehabilitation of areas affected by subsidence.....	32
7 Part 7 - Rehabilitation quality assurance process .....	33
8 Part 8 - Rehabilitation monitoring program .....	34
8.1 Analogue site baseline monitoring .....	34
8.2 Rehabilitation establishment monitoring .....	34
8.3 Measuring performance against rehabilitation objectives and rehabilitation completion criteria.....	35

9	Part 9 - Rehabilitation research, modelling and trials.....	38
9.1	Current rehabilitation research, modelling and trials.....	38
9.2	Future rehabilitation research, modelling, and trials .....	38
10	Part 10 - Intervention and adaptive management.....	38
10.1	Trigger action response plan (TARP).....	38
11	Part 11 - Review, revision, and implementation.....	39

## Tables

Table 1	Summary Table.....	5
Table 2	Consents, authorisations, and licences.....	6
Table 3	Landownership.....	6
Table 4	Regulatory requirements .....	13
Table 5	Site mining domains .....	17
Table 6	Summary of rehabilitation risks and controls.....	17
Table 7	Rehabilitation objectives and proposed completion criteria. *NB: Rehabilitation objectives are as defined in Balranald Project Development Consent .....	20
Table 8	Stakeholder consultation .....	22
Table 9	LOM rehabilitation schedule.....	26
Table 10	Rehabilitation quality assurance .....	33
Table 11	Rehabilitation table (care and maintenance).....	36
Table 12	Statutory triggers to review RMP .....	39

## Figures

Figure 1	Plan 1A Pre-Mining Environment – Project locality .....	8
Figure 2	Plan 1B Pre-Mining Environment – Natural environment.....	9
Figure 3	Land ownership.....	10
Figure 4	Land use and vegetation communities.....	11
Figure 5	Final landform features.....	23
Figure 6	Plan2A Final landform contours.....	24
Figure 7	Plan 2B Final landform contours (Activity site).....	25

## Appendices

Appendix 1- Trigger Action Response Plan

Appendix 2- Life of mine rehabilitation plan

**Document Control**

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Description</b>	<b>Authorised</b>
1	12/08/2022	B.Isaacs	Initial document development	A.Porter

## Summary Table

*Table 1 Summary Table*

<b>Name of Mine</b>	Balranald Mineral Sands Project
<b>Rehabilitation Management Plan Commencement Date</b>	1 August 2022
<b>Rehabilitation Management Plan Revision Date and Version numbers</b>	v.1
<b>Mining Leases</b>	ML1736 (Expires 9 May 2037)
<b>Name of Lease Holder</b>	Iluka Resources Limited
<b>Date of Submission</b>	1 August 2022

## 1 Part 1 – Introduction to mining project

### 1.1 History of operations

Iluka Resources Limited (Iluka) operates a mineral sands mine in south-western New South Wales, known as the Balranald Mineral Sands Project (the Balranald Project). The Balranald Project includes two linear mineral sand deposits, known as the West Balranald and Nepean deposits located approximately 12 kilometres (km) and 66 km north-west of the town of Balranald (Balranald town), respectively.

Existing consents and licences (detailed in section 1.2) permit the mining of Balranald deposits via open cut methods, and are valid until 5 April 2032; however, no open cut mining has occurred at the site to date. Operations have been limited to bulk sampling (the activity) at the West Balranald deposit, which involved the removal of up to 100,000 tonnes (t) of mineral ore. Total disturbance area for the bulk sampling is less than 30 Ha. Further detail on the bulk sampling activity is provided below.

The site is currently in care and maintenance while results of the bulk sampling trial are assessed, and a decision is made on the nature of future operations. As such, no significant rehabilitation activities have commenced on site.

#### *Bulk sampling activity*

The approved bulk sampling activity involved the extraction of the mineral ore from depth using trial underground mining within the approved disturbance area of the West Balranald deposit.

The most recent sampling activity (T3) concluded in Q4 2020 with the site placed into care and maintenance from November 2020, to review the mining and environmental monitoring outcomes and determine the future development of the Balranald Project.

The outcome of the bulk sampling activity confirmed the effectiveness of the underground mining method, validated key elements of the mining unit design and have been used to help guide future life-of-mine (LOM) operational conditions and inform the potential suitability (commerciality and potential reduced environmental impacts) of underground mining as an alternative method for resource extraction.

Iluka now propose to expand the underground mining trial which will include an additional area of disturbance to the approved Balranald Project area to enable primary processing of the ore into heavy mineral concentrate (HMC) and transport of HMC offsite for secondary processing at Iluka's facilities in Victoria and/or Western Australia (WA). Iluka has prepared and submitted a modification application (MOD1, May 2022) to seek approval for this expanded trial.

### *Intent of Rehabilitation Management Plan (RMP)*

This Rehabilitation Management Plan (RMP) is the replacement of the former Mining Operation Plan (MOP) August 2021 as required by the new mining lease conditions, Division 3, Condition 10 of Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) regulation 2021.

This RMP covers the following:

1. Activities associated with the bulk sampling activity at the Balranald West Mine T3 Area, including, decommissioning and rehabilitation works, and
2. Exploration activities including the establishment of drill sites and access tracks, drilling, sampling and rehabilitation of drill sites and access tracks.

Management of the site during the care and maintenance phase will be carried out in accordance with the approved Environmental Management Plan (care and maintenance update).

The RMP will be updated on approval of modification application (MOD1, May 2022) to SSD-5285 approval, and/or from time to time as required.

## 1.2 Current development consents, leases, and licences

The Balranald Project is a Level 1 mine and has been assessed as a State Significant Development (SSD) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The relevant consents, authorisations, and licences for the Balranald Project, are outlined in Table 2 below.

*Table 2 Consents, authorisations, and licences*

Type	ID	Date of grant	Duration
Exploration Lease	EL7450	February 2010	11 years
Development Consent	SSD-5285	April 2016	16 years
Mining Lease	ML1736	May 2016	21 years
Environment Protection Licence	EPL20795	June 2016	Renewed annually

## 1.3 Land ownership and land use

Table 3 summarises land ownership within the Balranald Project approval area. Land affected by the bulk sampling activities is limited to the Karra property.

*Table 3 Landownership*

Property	Lot/DP	Land Tenure (i.e. WLL)	Owner
Karra	1175/762586, 1/751182	WLL	Private landholder
Pine Lodge	88/760470, 102/751214	WLL	Iluka
Hugh Dale	1223/762708, 1224/762709, 1225/762710, 1226/762711, 1227/762712, 1229/762714	WLL	Iluka
Nanda	43/751217, 31/75121740/751217, 41/751217	WLL	Iluka
Pt Tin Tin	4/751182, 5/751182	WLL	Iluka
Bramah	4809/762298	WLL	Iluka

Property	Lot/DP	Land Tenure (i.e. WLL)	Owner
Upson Downs	5325/768236, 5332/768243	WLL	Iluka
Bidura	5501/768410, 6615/769405 115/760764, 5291/768206 5290/768205	WLL	Iluka
Tin Tin	20/751232, 1/75123239/751217, 1174/762585	WLL	Private landholder
The Oaks	5326/768237	WLL	Private landholder
Turlee	4812/769046	WLL	Iluka
Wampo	2/1198290	WLL	Private landholder
Wintong	128/760747, 5331768242	WLL	Private landholder
Other	98/751245, 99/751245100/751245, 103/751245 73/751245, 104/751245 4864/769099, 6654/769427 1184/7623595	WLL	Private landholders

Properties in the local area are typically large western lands lease rural land holdings, and homesteads where dwellings are sparsely located.

The current activity site is located on Karra Station within Lot 1175 DP762586 and Western Land Leases WLL3195, WLL 3196, WLL 5875 and WLL 5506.

The activity site and surrounding land is zoned for primary production under the Balranald Local Environment Plan 2010 (Balranald LEP). Land uses in and surrounding the activity site are agricultural, the majority being for grazing.

There are currently no Biodiversity Stewardship Agreements established for the project, there is however a requirement to enter into a Stewardship Agreement and retire the required amount of offset credits within three years of commencing construction at the site.

### *1.3.1 Land ownership and land use figures*

The following land ownership and land use figures are provided:

Figure 1 Plan 1B Pre-Mining Environment – Natural Environment

Figure 2 Plan 1A Pre-Mining Environment – Project Locality

Figure 3 Land ownership

Figure 4 Land use and vegetation communities





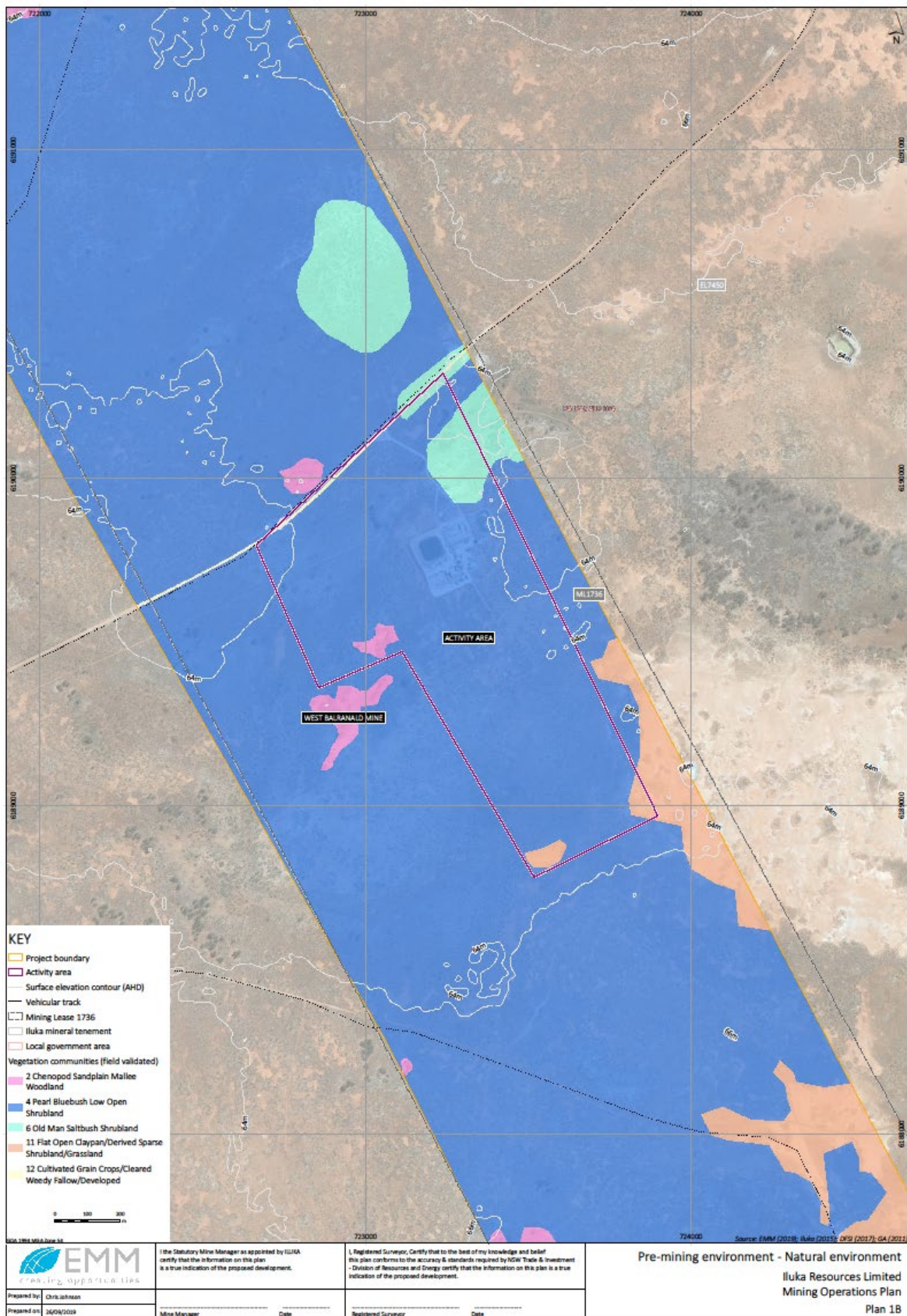
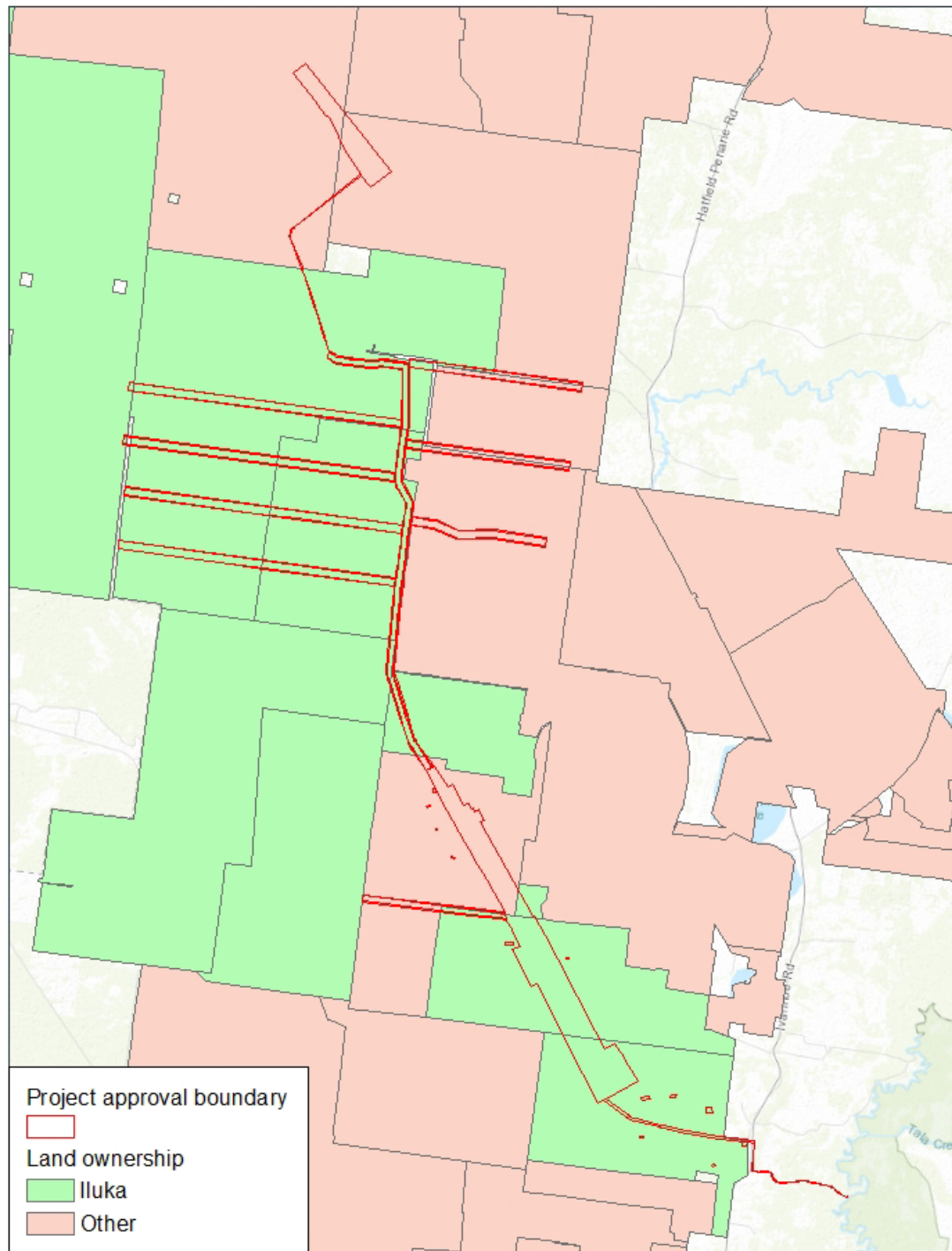


Figure 2 Plan 1B Pre-Mining Environment – Natural environment



**FIGURE 3**  
**LAND OWNERSHIP**

Figure 3 Land ownership

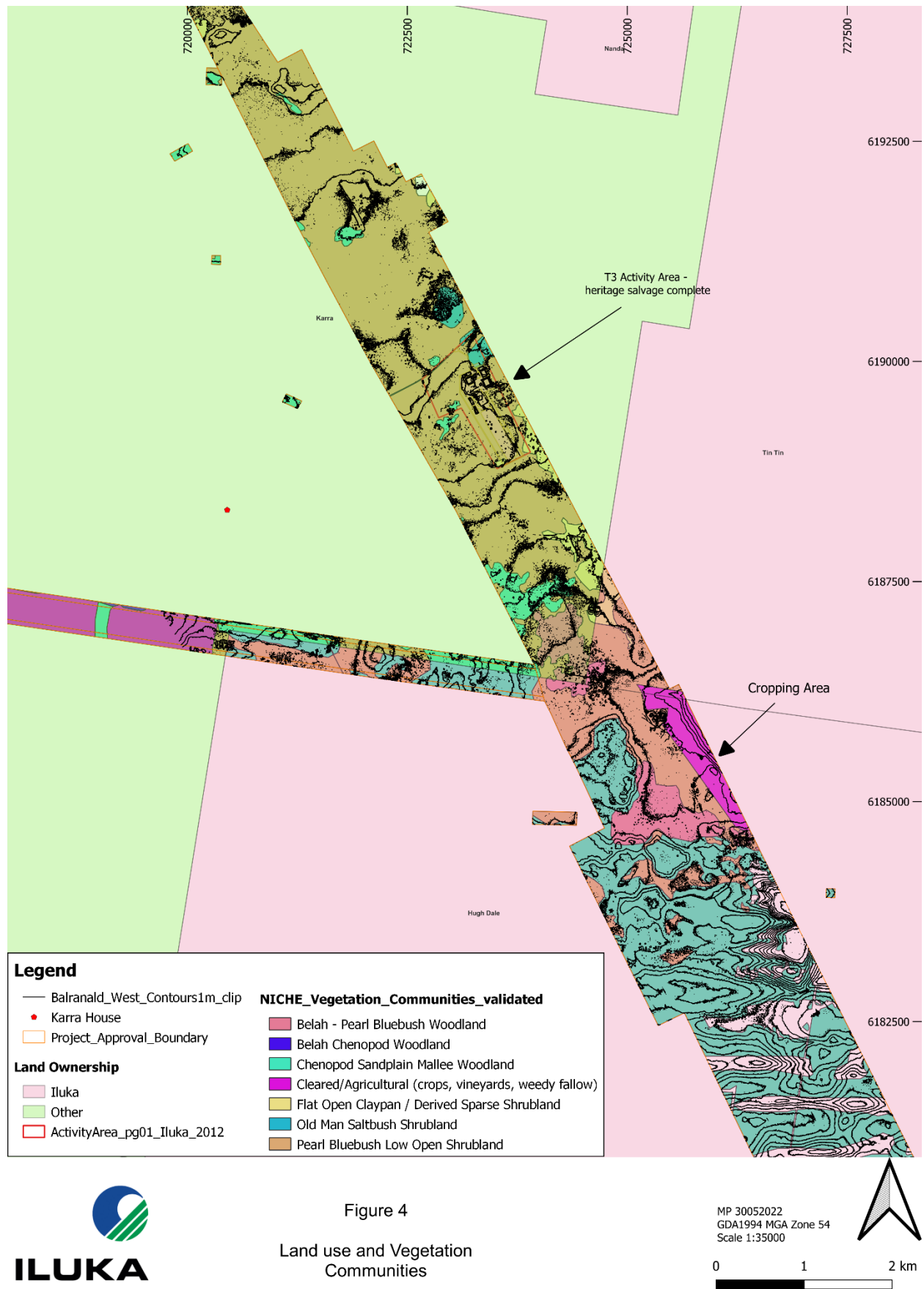


Figure 4 Land use and vegetation communities

## 2 Part 2 - Final land use

### 2.1 Regulatory requirements for rehabilitation

This RMP has been prepared in consideration of regulatory requirements that apply to the entire project site, including the T3 activity area, as summarised in Table 4.

### 2.2 Final land use options assessment

As the final land use for the site is described in the Balranald Project EIS and Development Consent (described in section 2.3), this section of the RMP is not required.

### 2.3 Final land use statement

The proposed final land use for the project area is agriculture (grazing native vegetation &/or cropping).

### 2.4 Final land use and mining domains

#### *2.4.1 Final Land Use Domains*

The final land use domains defined for the Balranald project are:

- Agricultural – Grazing (native vegetation subject to light or intermittent grazing), and
- Agricultural – Cropping.

#### *2.4.2 Mining domains*

Mining Domains have been defined based on similar disturbance and geomorphological features and are defined in Table 5, in accordance with the NSW Resources Regulator Guideline *Rehabilitation objectives and rehabilitation completion criteria* (NSW RR 2021).

Table 4 Regulatory requirements

Approval/ Condition	Act		
ML1736	Mining Act 1992 – Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) regulation 2021		
Part 2 Standard Conditions – <b>Division 1 Protection of the Environment and rehabilitation</b>		<b>Timing/Scope</b>	<b>Relevant Section(s) in RMP</b>
Condition 4	<p><b>Must prevent or minimise harm to the environment</b></p> <p>(1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise harm to the environment caused by activities under the mining lease.</p>	Life of development-mining lease.	Section 10 & Appendix 1 (TARP)
Condition 5	<p><b>Rehabilitation to occur as soon as reasonably practicable after disturbance</b></p> <p>The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.</p>	As soon as practicable-mining lease.	Section 6.2
Condition 6	<p><b>Rehabilitation must achieve final land use</b></p> <p>(1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area</p> <p>(2) The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with the subclause (1)</p> <p>(3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents as a risk to the holder’s ability to comply with subclause (1)</p> <p>(4) In this clause final land use for the mining area means the final landform and land uses to be achieved for the mining area –</p> <p>a) As set out in the rehabilitation objectives statement and rehabilitation completion criteria, and</p> <p>b) For a large mine – as spatially depicted in the final landform and rehabilitation plan, and</p> <p>c) If the final land use for the mining area is required by a condition of development consent for activities under a mining lease – as stated in the condition</p>	<p>Post mining-mining lease.</p> <p>Before grant of mining lease.</p> <p>Ongoing- mining lease.</p> <p>Post mining-mining lease.</p>	<p>Sections 2.2, 2.3 &amp; 2.4.1</p> <p>Section 1.2</p> <p>Section 10 &amp; Appendix 1 (TARP)</p> <p>Sections 2.2, 2.3 &amp; 2.4.1</p>
<b>Division 2 Risk Assessment</b>			
Condition 7	<b>Rehabilitation risk assessment</b>		

	<p>(1) The holder of a mining lease must conduct a risk assessment (a rehabilitation risk assessment) that –</p> <ul style="list-style-type: none"> <li>a) identifies, assesses, and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease –           <ul style="list-style-type: none"> <li>i) the rehabilitation objectives,</li> <li>ii) the rehabilitation completion criteria,</li> <li>iii) for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan</li> </ul> </li> <li>b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks</li> </ul> <p>(2) The holder of the mining lease must implement the measures identified.</p> <p>(3) The holder of a mining lease must conduct a rehabilitation risk assessment –</p> <ul style="list-style-type: none"> <li>a) For a large mine – before preparing a rehabilitation management plan, and</li> <li>c) Whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and</li> <li>d) Whenever given a written direction to do so by the secretary</li> </ul>	<p>Pre-development-mining lease.</p> <p>Life of development-mining lease.</p> <p>Prior to rehabilitation or as necessary-mining lease.</p>	<p>Sections 3 &amp; 10</p> <p>Sections 3 &amp; 10</p> <p>Section 10 &amp; Table 11</p>
SSD-5285	Environmental and Planning Assessment Act 1979 (EP&A Act)		
Schedule 3			
Condition 32	<p><b>Rehabilitation Objectives</b></p> <p>The applicant shall rehabilitate the site to the satisfaction to the Secretary Industry. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS (and depicted conceptually in the figure in Appendix 9) and comply with the objectives in Table 11.</p>	<p>Post mining-approved project area.</p>	<p>Section 4.1 &amp; Table 6</p>

<i>Table 11: Rehabilitation Objectives</i>			
<b>Feature</b>	<b>Objective</b>		
Mine site (as a whole)	<ul style="list-style-type: none"> <li>• Safe, stable &amp; non-polluting</li> <li>• Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site</li> <li>• Final landforms to:               <ul style="list-style-type: none"> <li>○ restore native vegetation communities and ecosystem function (in the applicable domains);</li> <li>○ sustain the intended land use for the post-mining domains;</li> <li>○ minimise the visual impacts of the development;</li> <li>○ be generally in keeping with the natural terrain features of the area;</li> <li>○ incorporate micro-relief; and</li> </ul> </li> <li>• incorporate drainage lines consistent with topography and natural drainage where reasonable and feasible</li> </ul>		
Water quality	<ul style="list-style-type: none"> <li>• Water retained on site is fit for the intended land use(s) for the post-mining domains</li> <li>• Water discharged from site is consistent with the baseline ecological, hydrological and geomorphic conditions of the creeks prior to mining disturbance</li> <li>• Water management is consistent with the applicable regional catchment strategy</li> </ul>		
Final void	<ul style="list-style-type: none"> <li>• Minimise:               <ul style="list-style-type: none"> <li>○ the size and depth of the final void</li> <li>○ the drainage catchment of the final void</li> <li>○ risk of flood interaction for all flood events up to and including the 1% AEP</li> </ul> </li> </ul>		
Surface infrastructure	<ul style="list-style-type: none"> <li>• To be decommissioned and removed, unless DRE agrees otherwise</li> </ul>		
Agriculture	<ul style="list-style-type: none"> <li>• Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within a reasonable timeframe</li> </ul>		
Community	<ul style="list-style-type: none"> <li>• Ensure public safety</li> <li>• Minimise the adverse socio-economic effects of mine closure</li> </ul>		
Condition 33	<p><b>Progressive Rehabilitation</b></p> <p>The Applicant shall rehabilitate the site progressively, that is, as soon as practicable following disturbance, to the satisfaction of the Secretary Industry</p>	Post mining as soon as practical-approved project area.	Section 6.2
Condition 34	<p><b>Rehabilitation Management Plan</b></p> <p>Prior to carrying out any development on site, the Applicant shall prepare the Rehabilitation Management Plan for the development to the satisfaction of the Secretary Industry. This plan must be:</p> <ol style="list-style-type: none"> <li>Prepared in consultation with the Department, OEH, DPI and Council</li> <li>Be prepared in accordance with the relevant guidelines and consistent with the rehabilitation objectives in the EIS and in Table 11;</li> </ol>	1 August 2022	Section 4.2  Section 4.1 Section 4.1, & Appendix 1 (TARP) Section 6

	<ul style="list-style-type: none"> <li>c) Include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary)</li> <li>d) Describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including timeframes for achieving specified rehabilitation objectives</li> <li>e) Include a mine closure strategy, that details measures to minimise the long-term impacts associated with mine closure, including final landform and the final void, final land use and socio-economic issues</li> <li>f) Include interim rehabilitation where necessary to minimise the area exposed for dust generation</li> <li>g) Include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria</li> <li>h) Build to maximum extent practicable on the other management plans required under this consent</li> </ul>		<p>Section 2          Sections 6.4.2 &amp; 9.2          Section 8          Section 10</p>
--	---	--	---



Table 5 Site mining domains

Code	Domain	Description
<b>Mining domains (operational)</b>		
1	Infrastructure area	Comprises the hardstand areas, ore pad, processing infrastructure, site buildings, haul road, access tracks, site compound, fencing, groundwater monitoring bores, production bores, diesel fuel storage and dispensing area and other plant and equipment.
3	Water management area	Comprises the water storage infrastructure (namely the turkey's nest dam, the process water dam and the fines dams).
4	Overburden Emplacement	Comprises temporary stockpiles of ore, MBP, NSOB, topsoil and subsoil.
6	Underground Mining Area (SMP)	Comprises the area over the mine path and subsidence zone

### 3 Part 3 - Rehabilitation risk assessment

Iluka has undertaken risk assessment workshops to identify the risks associated with the bulk sampling activity, T3 care and maintenance and rehabilitation.

A review and update of this risk assessment to comply with the NSW Resources Regulator, *Guideline - Rehabilitation Risk Assessment* (2021) has been undertaken by Iluka personnel from a range of disciplines. The updated risk assessment (conducted July/August 2022) specifically addresses risks to achieving specified rehabilitation objectives.

The Iluka team members consisted of specialist in the industry who have extensive knowledge in rehabilitation, environmental management, community engagement, mine closure planning, mine planning and mining operations.

A summary of key threats to rehabilitation and controls that may be used if appropriate is shown in Table 6 below.

Table 6 Summary of rehabilitation risks and controls

Risk	Controls in RMP
Surface subsidence	<ul style="list-style-type: none"> <li>• Biannual subsidence monitoring</li> <li>• Backfilling with sand tails and NSOB prior to placement of growth medium</li> <li>• Subsidence Management Plan</li> </ul>
Biological resource salvage – topsoil and timber	<ul style="list-style-type: none"> <li>• Stockpiling of felled vegetation</li> <li>• Soil surveys prior to topsoil stripping</li> <li>• Direct return of materials where possible</li> <li>• Stockpiling materials separately and records kept with details</li> <li>• Limit stockpile heights to 2m for topsoil and 10m for subsoil</li> <li>• Fit for purpose equipment and competent operators for handling topsoil</li> <li>• Weed control of stockpiles</li> <li>• Erosion control of stockpiles (Contour ripping)</li> <li>• Addition of ameliorates if required</li> </ul>
Landform stability Erosion and sedimentation control	<ul style="list-style-type: none"> <li>• Landforms shaped to design parameters</li> <li>• Landform surveys and erosion monitoring</li> <li>• Design and maintenance of drainage structures</li> <li>• Subsidence monitoring</li> <li>• Erosion modelling</li> </ul>

Risk	Controls in RMP
	<ul style="list-style-type: none"> <li>• Maintenance of any developing erosion</li> <li>• Spreading of stockpiled vegetation on slopes</li> <li>• Contour ripping of slopes if required</li> </ul>
Ground disturbance and heritage items	<ul style="list-style-type: none"> <li>• Salvage of heritage items prior to disturbance activities</li> <li>• Aboriginal Cultural Heritage Management Plan (ACHMP)</li> <li>• Awareness training and inductions</li> <li>• Rehabilitate as soon as practical after disturbance</li> <li>• Site disturbance and clearance protocols</li> <li>• Disturbance activity permit</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>• Soil contamination testing and remediation</li> <li>• Regular inspections (leaks, integrity)</li> <li>• Ripping of compacted areas prior to growth medium placement (hardstands, roads, processing areas)</li> <li>• Decommissioning of water infrastructure</li> </ul>
Hazardous material / saline material	<ul style="list-style-type: none"> <li>• Correct storage, handling and disposal of hazardous materials as per SDS</li> <li>• Regular inspections of water infrastructure</li> <li>• Testing soil for contamination prior to rehabilitation</li> <li>• Disposal or remediation of contaminated soils</li> <li>• Allow water storages to evaporate prior to decommissioning</li> <li>• Pollution Incident Response Management Plan</li> </ul>
Vegetation establishment	<ul style="list-style-type: none"> <li>• Growth medium spread according to plan and at required depths</li> <li>• Soil testing</li> <li>• Addition of ameliorants if required</li> <li>• Annual revegetation monitoring</li> <li>• Maintain exclusion fences</li> <li>• Control grazing animals</li> <li>• Weed management</li> </ul>
Weeds	<ul style="list-style-type: none"> <li>• Regular inspections for environmental weeds (un-disturbed, rehabilitation and stockpiles)</li> <li>• Control of weed infestations by herbicide or mechanical methods</li> <li>• Weed management plan</li> <li>• Weed and seed check of vehicles and equipment accessing the site</li> </ul>
Feral fauna	<ul style="list-style-type: none"> <li>• Maintain exclusion fences</li> <li>• Pest animal management plan</li> <li>• Restrict access to artificial water points</li> <li>• Annual rehabilitation monitoring reports</li> </ul>
Weather and climate influences	<ul style="list-style-type: none"> <li>• Progressive rehabilitation</li> <li>• Soil stripping and replacement to be conducted during conducive conditions where possible (Late autumn to early winter)</li> <li>• Avoid stripping dry and powdery soil</li> </ul>

Environmental and rehabilitation risks will also be managed in accordance with the Environmental Management Plan (EMP) (The EMP takes into consideration the requirements of applicable Iluka policies and the following documents:

- *Aboriginal Cultural Heritage Management Plan (ACHMP);*
- *Radiation Management Plan (Radiation MP);*
- *Subsidence Management Plan (SMP); and*

- *Groundwater Management Plan (GMP).*

The EMP outlines management measures for the following environmental risks (for all phases of the activity):

1. Subsidence
2. Erosion and sediment control
3. Weed infestation
4. Inadequate revegetation
5. Impacts to fauna
6. Impacts to surface water and groundwater
7. Radiation
8. Impacts to Aboriginal heritage

## 4 Part 4 - Rehabilitation objectives and rehabilitation completion criteria

### 4.1 Rehabilitation objectives and rehabilitation completion criteria

The rehabilitation objectives and completion criteria for each domain are outlined in Table 7. The rehabilitation objectives are consistent with those specified in Table 11 of Development Consent SSD-5285 for the Balranald Project. Given the status of the Balranald operations (bulk sampling only, and subject to a modification application) only rehabilitation objectives that are relevant to the existing disturbance have been addressed in this version of the Rehabilitation Management Plan.

Iluka uses a risk-based approach in developing completion criteria, which considers regulatory obligations and stakeholder engagement outcomes. For some objectives, further technical information and data is required to enable the relevant, achievable completion criteria to be developed. In these cases, completion criteria are noted as 'to be determined' pending further information.

The completion criteria listed in this RMP are 'proposed' and have not yet been submitted to NSW Resources Regulator for approval. Iluka will continue to review and refine completion criteria over the life of the project as operations progress, to consider learnings from operations and progressive rehabilitation, evaluation of monitoring data, and any new technical information. Completion criteria for all relevant objectives will be submitted to the NSW Resources Regulator for approval in accordance with timelines defined in the Mining Amendment (Standard Conditions of Mining Leases—Rehabilitation) Regulation 2021.

Table 7 Rehabilitation objectives and proposed completion criteria. \*NB: Rehabilitation objectives are as defined in Balranald Project Development Consent

Final land use domain	Mining domain	Rehabilitation objective*	Indicator	Proposed Completion criteria	Proposed validation method
Agricultural - Grazing (B) Agricultural - Cropping (C)	6 - Underground mining area	Safe, stable & non-polluting	Landform stability: Relative levels (surface elevations)	<b>CC 1.1:</b> To be determined once technical investigations/trials are complete	To be determined once technical investigations/trials are complete
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area 6 - Underground mining area	Safe, stable & non-polluting	Landform stability: slope	<b>CC 1.2:</b> 95% of the rehabilitated land will exhibit slopes with a grade less than x% (TBD considering local topography and erosion risk).	As constructed topographic survey (once off) and assessment of slopes compared with target slope.
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area 6 - Underground mining area	Safe, stable & non-polluting	Radiation: gamma levels	<b>CC 3.1:</b> Radiation exposure managed in accordance with the current approved site Radiation MP.	Evidence of compliance with rehabilitation requirements (e.g. post mining gamma survey data compared with target/limits) defined in the approved Radiation MP
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area 6 - Underground mining area	Safe, stable & non-polluting	Soil contamination: Soil chemistry	<b>CC4.1:</b> All areas of high risk for soil contamination have been assessed for relevant contaminants, and remediated as necessary.	Site audit identifying high risk locations for soil contamination; AND Assessment reports; AND If required, evidence of remediation (e.g. photos, post remediation soil test reports)

Final land use domain	Mining domain	Rehabilitation objective*	Indicator	Proposed Completion criteria	Proposed validation method
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area 6 - Underground mining area	Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site	Landform design: soil profile	<b>CC 5.1:</b> Minimum subsoil/topsoil depths (TBC) achieved on at least 90% of rehabilitated land	As constructed survey of soil horizon surfaces; OR Soil depth profiling for an appropriate number of sample sites
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area	Surface infrastructure to be decommissioned and removed, unless DRE agrees otherwise	Infrastructure	<b>CC 6.1:</b> All redundant plant, equipment and mine related infrastructure has been removed from site, or agreements are in place for any infrastructure remaining.	Register of retained mining infrastructure; AND agreements/approvals for retained mining infrastructure.
	1 - Infrastructure 3 - Water management areas 4 - Overburden emplacement area 6 - Underground mining area	Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within a reasonable timeframe	Vegetation establishment	<b>CC 7.1:</b> <i>To be determined once technical investigations/trials are complete.</i>	<i>To be determined once technical investigations/trials are complete</i>

## 4.2 Rehabilitation objectives and rehabilitation completion criteria – stakeholder consultation

Extensive consultation has been undertaken for the Balranald Project, including liaison with government agencies, the community, and indigenous groups. Iluka’s approach to stakeholder consultation is established in the company’s *Social Management Plan*.

*Table 8 Stakeholder consultation*

Stakeholder	Consultation Type	Matters discussed/Actions
DPE	Meeting latest 2 Aug 2021	Approvals Process
DPE/DPE-RR	Meetings July and August 2021	Project update and discuss MOP
DPE-Water/EPA	Meetings July 2021	Approval process, project update and groundwater monitoring results
Community	Newsletter, Webpage	Project updates
Affected Landholders	Formal	Entered into compensation agreements with affected landholders for loss of any potential income due to the project
Registered Aboriginal Parties (RAP’s)	EIS and Aboriginal Cultural Heritage Management Plan	April 2016 Site salvage program over the bulk sampling activity site September 2019 due diligence and cultural heritage surveys
Government, community and indigenous	Environmental Impact Statement (2011-2015)	Political, regulatory approvals, land access, land use and logistics, land management, water, emissions, social impacts, economic development and social licence to operate.

## 5 Part 5 - Final landform and rehabilitation plan

### 5.1 Final landform and rehabilitation plans

Final landform features and final landform contour plans are presented in Figure 5, Figure 6 and Figure 7. These plans are indicative for the current disturbed areas during the care and maintenance period.

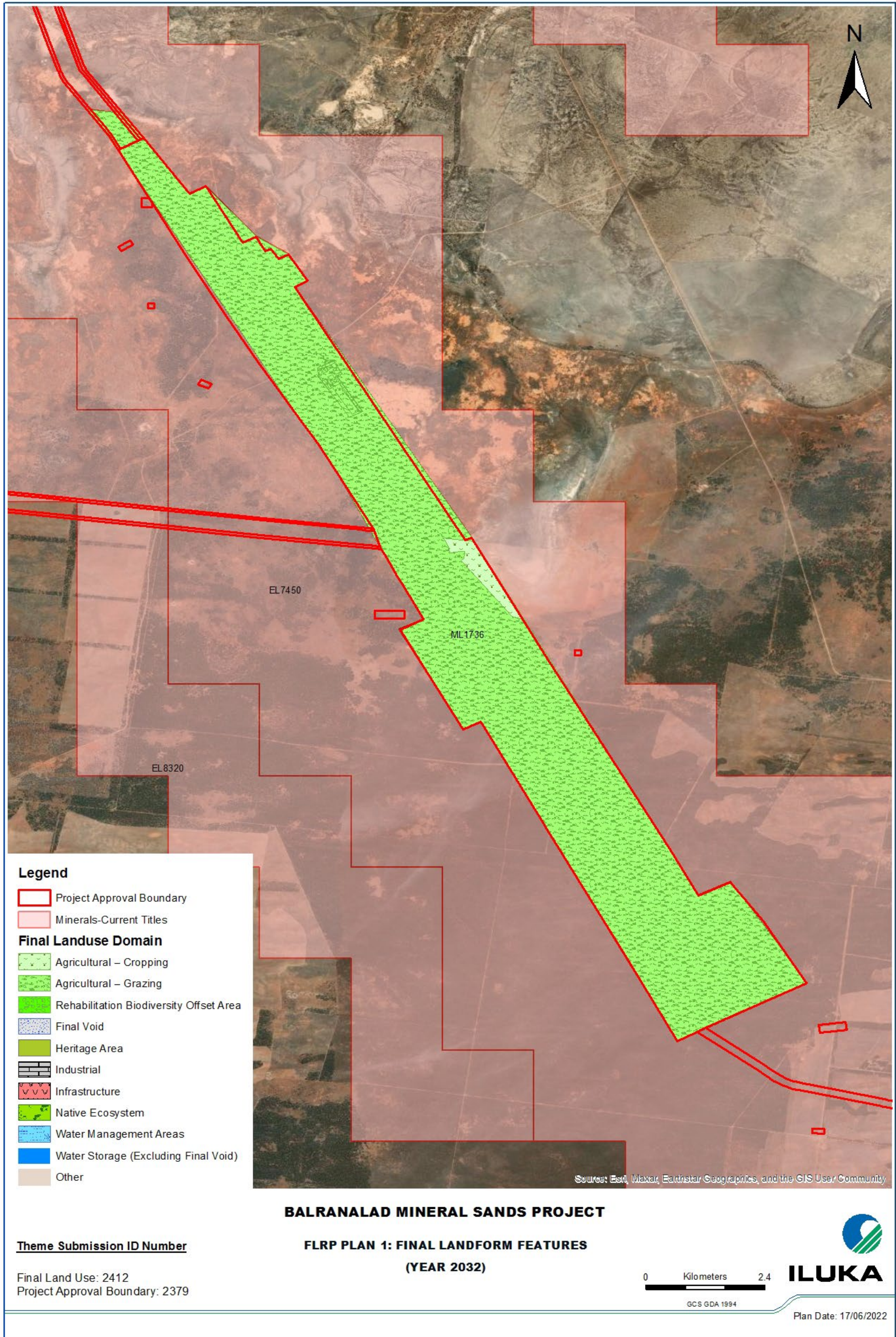


Figure 5 Final landform features

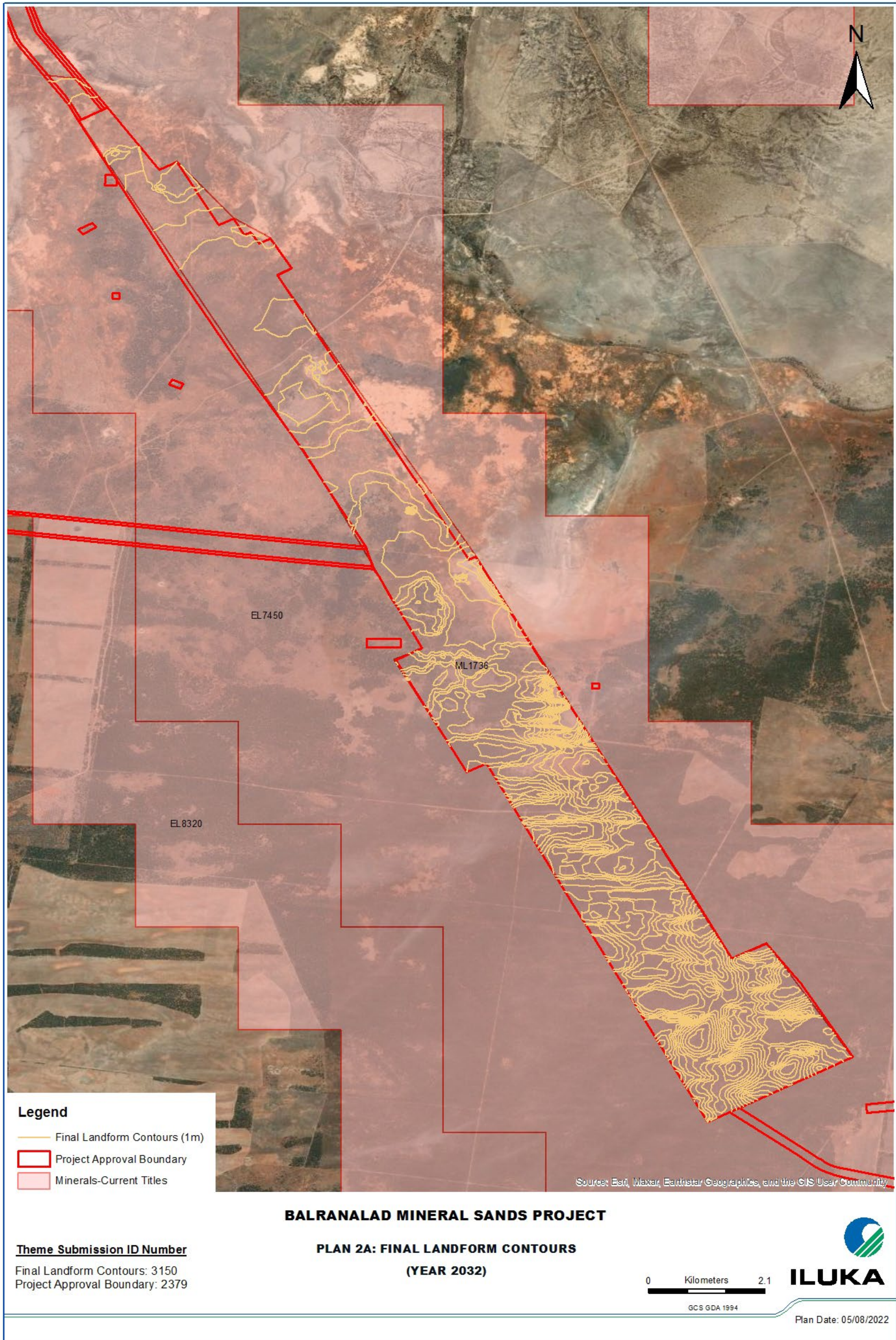


Figure 6 Plan2A Final landform contours



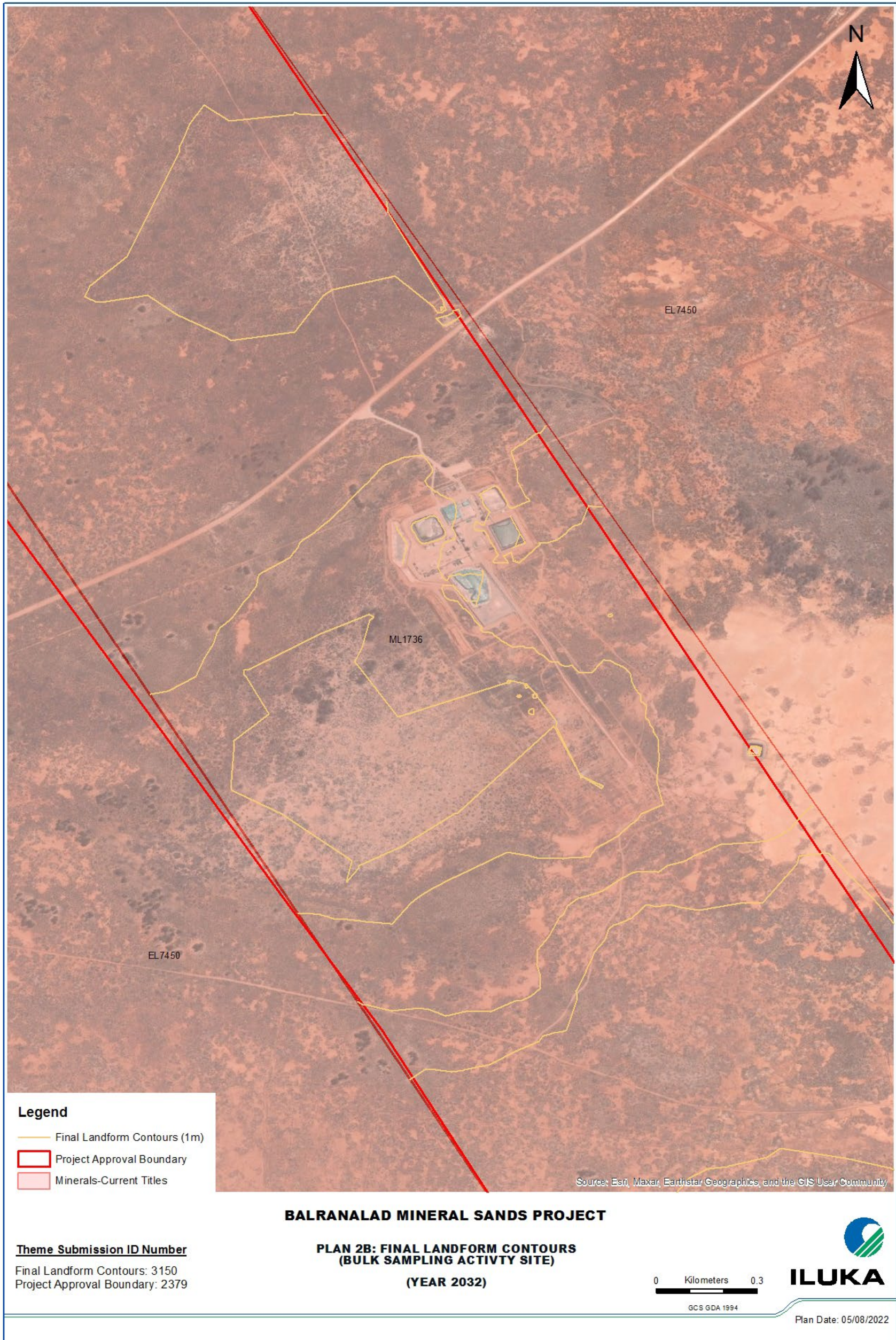


Figure 7 Plan 2B Final landform contours (Activity site)

## 6 Part 6 - Rehabilitation implementation

### 6.1 Life of mine rehabilitation schedule

The life of Mine (LOM) schedule that is currently proposed is to maintain the existing areas in a safe and stable manner whilst in care and maintenance, as such there is no rehabilitation planned to be undertaken during this period. The site is being maintained in a safe, stable, and non-polluting state until further regulatory approvals or modifications issued (currently MOD 1 application to SSD-5285 is in process) or company decisions are made on the future mining of the site.

In the event that the Balranald Project does not re-commence, rehabilitation and closure will be implemented in accordance the site rehabilitation objectives. The rehabilitation plan is attached in Appendix 2.

The status of domains for the bulk sampling activity site at the commencement of the RMP is as per Table 9 below.

*Table 9 LOM rehabilitation schedule*

Code	Domain	Status	Rehabilitation timing
1	Infrastructure Area	Care and Maintenance	Pending
3	Water Management Area	Care and Maintenance	Pending
4	Overburden Emplacement Area	Care and Maintenance	Pending
6	Underground Mining Area (SMP)	Care and Maintenance	Pending

### 6.2 Phases of rehabilitation and general methodologies

#### *6.2.1 Active mining phase*

Currently the site is in care and maintenance and no activities are occurring or planned to occur. It is noted that no clearing or topsoil stripping is to occur during the care and maintenance period and the following methodologies are related to an operational site.

Environmental mitigation and management strategies will be implemented during the active phases of the Balranald project that will minimise the potential impacts on the environment. These include ensuring preclearance techniques in Iluka procedures (PRC 7931: Site Disturbance Clearance Procedure) are implemented, including heritage, fauna and flora, materials such as topsoil, substrates and native seed resources are recovered, collected and are appropriately managed and used effectively as resources for the rehabilitation of the site.

#### **a) Soils and materials**

Soil assessments have been undertaken throughout both the feasibility stages and EIS. The LSC (Land and Soil Capability) assessment has found most of the entire Balranald project area to be predominately land suitability class 6 – Low capability land, with some minor areas of class 4 and 5.

An assessment of the suitability of the topsoil and subsoil resources has found that most soils on the site would not be suitable for stripping or reuse (based on standard criteria), however it is considered that

most soils can be stripped to pre-determined depths and reinstated for final landforms give appropriate stripping, handling and re-establishment techniques.

General rehabilitation processes relating to soil and material management include:

- Installing appropriate erosion control measures onsite
- Soil stripping and clearing campaigns to be planned in advance to avoid extremes of weather (i.e. hot and windy).
- Optimising recovery of topsoil and subsoil separately by use of appropriate surface mobile equipment selection to limit mixing of the layers.
- Stockpiling the soils appropriately and minimising erosion and weed incursion.
- Carrying out rehabilitation earthworks during optimum conditions to minimise deterioration of the soil resources.
- The topsoil layer will be stripped to a nominal depth of between 100mm and 300mm depending on soil quality.
- Subsoil layers will be stripped to a depth of 100mm to 500mm depending on depth of topsoil stripped.
- On the mine path areas (above the mining panels) a further 500mm to 1.5m of NSOB (Non-Saline Overburden) will be stripped.
- Topsoil will be stockpiled to a height of no more than 2m, whilst subsoil will be stockpiled to 10m.

#### **b) Flora**

No specific flora species will be targeted in rehabilitation processes or activities. This section is not relevant to this RMP.

#### **c) Fauna**

During the active mining phase, some cleared timber will be stockpiled for reuse in revegetation, including for use as fauna habitat (see section 6.2.5 for details on replacement of timber during rehabilitation).

#### **d) Rock/Overburden emplacement**

Typical overburden for the site comprises of sands, clayey sands and clay layers with minimal rock. Overburden and MBP (Mining By-products) will be backfilled as much as possible into the cavities and any remaining material will be stockpiled onsite and temporarily stabilised until the project is operational again. No stockpiles or waste dumps are planned to remain on site once rehabilitation is complete.

There are currently no or any foreseeable unplanned material deficits for the site.

#### **e) Waste management**

All wastes will be removed from site using appropriately licenced contractors and disposed of either in council approved landfill or sent for recycling or retreatment.

#### **f) Geology and geochemistry**

No permanent waste or ore beneficiation has occurred on site. This section is not relevant to the RMP.

#### **g) Material prone to spontaneous combustion**

Not Applicable

#### **h) Material prone to generating acid mine drainage**

Geochemical assessments were undertaken as part of the EIS SEARS requirements and were based mainly around the potential for Acid Mine Drainage. The results of the assessment indicate that the NSOB (non-Saline Overburden) and the SOB (Saline Overburden) are both NAF (Non-acid Forming), but the OOB (Organic Overburden) is PAF (Potential acid Forming) and must be managed as such.

The underground mining method used for the T3 trial reduces the risk of AMD considerably. In the underground mining method, sulphide minerals are concentrated with the fine sand tails which are reinjected into the mining stopes.

Mining by-products will contain some sulfidic material which has the potential to produce AMD during surface storage. Sand tails will be used to rehabilitate subsidence areas. To minimise the risk of AMD, they will be treated with e.g. limestone and capped with approximately 1.5m of non PAF material including subsoil and topsoil.

#### **i) Ore beneficiation waste management (reject and tailings disposal)**

Tailings generally consist of sand, slimes and flotation tails. The majority of tailings is sand tailings and will be used to remediate areas of subsidence.

The slimes and flotation tails are to be backfilled underground via re-injection.

#### **j) Erosion and sediment control**

Erosion and sediment control measures applied during the active mining (and care and maintenance) phase are defined in the Environmental Management Plan.

Rehabilitation areas will be managed so that topsoil replacement is undertaken at an appropriate time. As Iluka intends for revegetation to be predominantly from the topsoil seed store the soil replacement has to be done late autumn or early winter for the best chance of seedling establishment, with the hope of winter rainfall events.

#### **k) Ongoing management of biological resources**

Biological resources will be managed throughout the mining and production phases to maintain their integrity by the following techniques:

- The topsoil and subsoil from different vegetation communities will be stockpiled separately where practicable, with records maintained.
- Topsoil stripping principal aim is to maintain or retain biological activity in the topsoil.
- Handling equipment and contractors to be both fit for purpose and experienced. i.e. experienced personnel.
- Care not to mix soil layers whilst stripping- depths may change unexpectedly – poorer quality material to go as subsoil, so as not to contaminate topsoil.
- Disturbance areas to be stripped progressively and preferentially campaigned or timed around conducive weather events (rain). Avoid stripping when soil becomes too powdery.

Topsoil management measures that are to be used to maintain the viability of the topsoil seedbank.

- Topsoil stockpiles to be no more than 2m high and subsoil no more than 10m high
- Vehicle access to stockpiles managed
- Weeds to be monitored and managed

- Erosion control to be put in place
- Stockpiles or soil that is direct replaced to be recorded in an inventory to include time of placement, material depth, soil type, condition and volumes to ensure known history.
- Apply an ameliorant as required and rip tops of stockpiles to allow rain to soak in

Required depth of topsoil replacement for optimal germination and growth.

- A minimum of 150mm of topsoil is required to be replaced as any less there is a risk of mixing with the soil below and losing its quality.
- Topsoil is planned to be replaced at 150mm-300mm
- Subsoil is planned to be replaced at 150-500mm, depending on topsoil depths

#### **l) Mine subsidence**

As per the current Subsidence Management Plan (SMP), it is intended to undertake biannual subsidence monitoring during the care and maintenance period. Any subsidence detected will be backfilled when safe to do so, with sand tails that has been stockpiled on site.

There have been 10 known subsidence events during the T1-T3 trials. None of these have had an impact on any natural features and all have been within the mine path and within expected parameters of depth and width in correlation to mining stopes for the underground trials.

#### **m) Management of potential cultural and heritage issues**

The management of Aboriginal cultural heritage is undertaken in accordance with the Aboriginal Cultural Heritage Management Plan (ACHMP). Salvage activities have been undertaken over the entire site in accordance with the ACHMP in April 2016 and again in October 2019 for the T3 monitoring wells.

If an unknown Aboriginal site is discovered, the Trigger Action Response Plan described in the ACHMP will be implemented.

There are no rehabilitation obligations arising from the ACHMP.

#### **n) Exploration activities**

The rehabilitation of exploration activities is covered in the *West Balranald Mineral Sands Deposit Exploration Program 2021- Review of Environmental Factors*.

Iluka has a standard work instruction for the rehabilitation of drill sites. Drill holes will be rehabilitated upon completion of any drilling program in accordance with the *Exploration Code of Practice: Rehabilitation* (NSW Resources Regulator).

### **6.2.2 Decommissioning**

Decommissioning will include the disconnection of services, demolition and/or removal of all surface infrastructure including water infrastructure.

Water storage infrastructure, including the turkey nest, fines ponds and process water storage dam, will be decommissioned and rehabilitated as follows:

- Adequate time will be allowed in the schedule for drainage and evaporation of excess saline water in the water storage dams.

- Adequate time will be allowed in the schedule for removal of excess materials from the thickener pond to be transported offsite to an appropriate facility.
- HDPE liners, geofabric and ancillary infrastructure will be removed from site and disposed to an appropriately licenced waste facility.
- Earthen walls will be contoured

Other site infrastructure will be removed as follows:

- Redundant buildings and large infrastructure (including the hardstand area and drill pad) will be decommissioned and removed from site.
- Redundant internal access road material will be rehabilitated
- Redundant fences and gates will be rehabilitated
- Overburden and MBP will be used to backfill the cavities as much as possible.

#### **a) Site security**

The site is currently fully fenced and locked to prevent any inadvertent or public access. There are signs on the boundary fence indicating that the site is a mine site and no unauthorised access allowed. The site is inspected regularly by Iluka staff and accessed regularly by the exploration crew. The subsidence zone is fenced separately, gates locked and signposted.

Once rehabilitation is adequately progressed and safety risks have been reduced to acceptable levels, site fencing may be removed or amended, in accordance with the final land use.

#### **b) Infrastructure to be removed or demolished**

Redundant infrastructure will be decommissioned and removed during rehabilitation. Generally, decommissioning activities will include:

- purging and disconnecting services (e.g. air, water);
- removal of fuel, lubricants and other chemicals from storage facilities, pumps and pipelines;
- disconnect, dismantle and relocation of plant and equipment nominated for sale or re-use;
- demolition and removal of redundant fixed plant and infrastructure;
- decommission bores and water tanks;
- removal of concrete hardstands, bitumen and footings;
- removal of pumps, pipes and liners from redundant dams and drains;
- removal of power poles and associated infrastructure;
- removal of redundant major underground services; and
- removal of any rubbish and scrap.

#### **c) Buildings, structures, and fixed plant to be retained**

Some infrastructure may be retained post closure if it is compatible with the final land use and approval has been obtained for infrastructure to remain. Examples of infrastructure that could be retained include:

- roads;

- utility infrastructure such as powerlines, railway and the gas pipeline;
- surface water management infrastructure; and
- sheds or workshops.

**d) Management of carbonaceous / contaminated material**

Carbonaceous material is not relevant to the Balranald Project (for information on management of hydrocarbons, refer to subsection e)).

Potential contamination will be managed in accordance with the *Contaminated Land Management Act, 1997*.

Stockpile storage areas during decommissioning will be tested for potential contamination and the ability to form acid and be treated accordingly with lime or removed and buried on the mine path.

**e) Hazardous materials management**

Any unused hazardous substances will be removed and disposed of in accordance with regulatory requirements.

**f) Underground infrastructure**

Underground infrastructure includes mining stopes access holes, concrete footings and pipes.

Mining equipment used for directional drilling will be removed. Underground pipes will be dug up and removed, where practicable. Bores will be decommissioned in accordance with Minimum Construction Requirements for Water Bores in Australia 2020.

Any concrete footings will be removed to 0.5 meter below the ground surface and disposed of at a lawful location.

### **6.2.3 Landform establishment**

For future works once the required infrastructure is removed, the land surface will be reprofiled to be relatively consistent with adjacent landforms.

**a) Water management infrastructure**

The water management system will be maintained, where necessary to reinstate the natural drainage as much as possible to convey large rainfall run off events.

**b) Final landform construction: general requirements**

The final landform will replicate the original landform as much as possible and be compatible with the surrounding environment.

- Areas reprofiled to manage surface water drainage and to tie in with surrounding natural ground levels.
- Natural drainage lines to be incorporated into final landforms
- Drainage structures designed to minimise erosion potential, if necessary.

**c) Final landform construction: reject emplacement areas and tailings dams**

Not applicable

**d) Final landform construction: final voids, highwalls and low walls**

Not applicable to the current operation. If a decision is made to commence mining this Plan will be updated to address any retained voids.

**e) Construction of creek/river diversion works**

Not applicable to the current operation. If a decision is made to commence mining this plan will be updated to address rehabilitation of any affected significant waterways.

**6.2.4 Growth medium development**

Once the landform profile has been established, the following temporary stabilisation works will commence:

- Subsoil that was removed during construction will be replaced
- Where the uncompacted subsoil layer is greater than 0.5m in depth, subsoil may be compacted by a dozer or excavator.
- If required, agricultural – quality gypsum will be applied to topsoil to improve soil quality.
- Topsoil will be replaced
- Dry soils will be ripped to improve water infiltration, if required.
- Following the application of topsoil, stockpiled vegetation logs and branches will be spread across the area to provide habitat for ground flora and protection from erosion. This will assist with the spread of native vegetation or capture of windblown seeds, as no direct seeding is currently proposed.
- Weed and pest animal management will be undertaken as required.
- Soil binders or stabilisation agents will be investigated and used if required.

**6.2.5 Ecosystem and land use establishment**

The revegetation with seeds and tube stock is not proposed at this stage. If natural regeneration from the seed stock in soil is insufficient, then seeding will be investigated.

The collection of native seeds will have to be undertaken in the correct seasons as well as the application of these seeds, to ensure optimum chance of success.

**6.2.6 Ecosystem and land use development**

Activities in this phase are generally ongoing maintenance and land management activities. Maintenance activities may include:

- Weeds and feral animal control activities
- Managing for bushfire risks
- Erosion management or repair and water management

**6.3 Rehabilitation of areas affected by subsidence**

During the care and maintenance period subsidence monitoring is undertaken in accordance with the Subsidence Management Plan. Whilst there have been several known subsidence events during the trial mining (T1-T3), there have been no subsidence events outside of the potential known impact areas. The known subsidence events are rehabilitated with sand tailings and once stable and deemed safe NSOB, subsoil and topsoil relocation can be applied for rehabilitation.



## 7 Part 7 - Rehabilitation quality assurance process

A rehabilitation quality assurance process is to be implemented throughout all stages of the Balranald Project. Table 10.

The aim of the rehabilitation quality assurance process is to ensure that:

- Rehabilitation materials are identified, collected and preserved as required for rehabilitation use.
- Rehabilitation is being implemented and rehabilitation techniques are being followed per current methodologies and schedules.
- Rehabilitation risks are being monitored and addressed as required, and any new risks identified and controlled as required.

*Table 10 Rehabilitation quality assurance*

Phase	Quality assurance action or process	Responsible person	Documentation	Review
Active Mining	Develop and maintain a materials and soils balance	Surveyor	GIS or alternative mine planning software;	Annual Rehabilitation Report
	Implement environmental monitoring program, as per approved EMP	ERCR Superintendent	Environmental monitoring database (e.g. Monitor Pro); Analysis reports; Inspection records; Loss control system.	Annual Rehabilitation Report
Decommissioning	Inspections and decommissioning reports	Closure engineer	Closure reports	Annual Rehabilitation Report
	Contaminated soils testing post decommissioning	Environmental Advisor	Soil samples	Annual Rehabilitation Report
Landform Establishment	Prepare 'as-built' drawings to verify that the landform has been completed in accordance with design	Surveyor	GIS or alternative mine planning software;	Annual Rehabilitation Report
	A subsidence monitoring program will be implemented as per approved subsidence management plan	Surveyor	Subsidence monitoring report	Annual Rehabilitation Report

Phase	Quality assurance action or process	Responsible person	Documentation	Review
Growth Medium Development	Site records and survey of re spread of topsoil, subsoil, soil ameliorants, any ripping or compaction undertaken, Soil testing results for application of lime or other ameliorants	Environmental Advisor/ Surveyor	GIS or alternative mine planning software;	Annual Rehabilitation Report
Ecosystem and Land Use Establishment	As per section 8.2	Environmental Advisor / Ecological Consultant	As per section 8.2	Annual Rehabilitation Report
Ecosystem and Land Use Development	As per section 8.3	Environmental Advisor	As per section 8.3	Annual Rehabilitation Report

## 8 Part 8 - Rehabilitation monitoring program

During care and maintenance, and active mine site rehabilitation, environmental monitoring will continue as required by active environmental approvals and conditions. The closure monitoring program (Table 11) will be implemented to collect the data required to assess rehabilitation success against completion criteria. The closure monitoring program also outlines remedial actions that may be required if rehabilitation and closure performance is not on track, or completion criteria cannot be met. If at this time it is found that areas or aspects of rehabilitation do not meet the specified criteria, a risk assessment will be undertaken. This risk assessment will determine:

- if the closure objective has been achieved;
- the level of residual risk; and
- what (if any) additional work is required to manage the residual risk.

### 8.1 Analogue site baseline monitoring

Extensive vegetation surveys were conducted on the Balranald Project site to inform the environmental impact assessment and subsequent modification application. The need for any further analogue sites will be determined when completion criteria for revegetation are confirmed.

### 8.2 Rehabilitation establishment monitoring

Monitoring during the rehabilitation establishment period will be conducted to identify if any early intervention measures are required. Requirements for rehabilitation establishment monitoring will be dependent on the proposed completion criteria for revegetation; but may include assessment of:

- germination (e.g. plant density, species richness and significant bare ground);
- physical impacts to revegetation (e.g. browsing, wind damage, sand drift, water erosion);

- environmental impacts to revegetation (e.g. desiccation, water logging).

Appropriate methods, sampling strategy, timing and variables are to be confirmed by a suitably qualified professional.

### 8.3 Measuring performance against rehabilitation objectives and rehabilitation completion criteria

Completion criteria provide the evidence that indicates the rehabilitation has successfully been completed or is at a stage that has been recognised as per the completion criteria. Completion criteria need to be appropriate for the level of disturbance and surrounding environment, they need to be achievable with what resources are readily available and they must make sense whilst having some sort of specific or scientific target that can be measured or accounted for.

Performance is measured against the completion criteria according to the mines current state of “Care & Maintenance” and to the extent of the current T3 activity disturbance area, see Table 11. Measuring completion criteria for the site as a whole will be further refined as the project matures and mining methodologies are further investigated and confirmed. The complete set of obligations and completion criteria for the site as a whole is outlined in Table 7.

Table 11 Rehabilitation table (care and maintenance)

Final land use	Closure Objective	Aspect	Proposed completion criteria	Monitoring regime	Evidence required
Agricultural – grazing and/or cropping	Safe, stable and non-polluting	Landform stability	<b>CC1.1</b> <i>To be determined once technical investigations/trials are complete</i>	<i>To be determined once technical investigations/trials are complete</i>	<i>To be determined once technical investigations/trials are complete</i>
		Landform stability	<b>CC 1.2</b> 95% of the rehabilitated land will exhibit slopes with a grade less than 10% (TBD considering local topography and erosion risk). See also CC7.1: (Agriculture)	Once-off as-constructed topographic survey following replacement of topsoil	Assessment of slopes compared with target slope.
		Groundwater	<b>CC 2.1</b> Groundwater quality does not adversely affect beneficial users or sensitive environmental receptors	<i>To be determined once technical investigations are complete</i> [interim monitoring regime: as per approved environmental management plan]	<i>To be determined once technical investigations are complete</i>
		Radiation	<b>CC 3.1</b> Radiation exposure managed in accordance with the current approved site Radiation Management Plan	Rehabilitation/closure monitoring as defined in approved Radiation Management Plan.	Approved Radiation Management Plan; AND evidence of compliance with rehabilitation requirements (e.g. post mining gamma survey data compared with target/limits defined in RMP).
		Soil contamination	<b>CC 4.1</b> All areas of high risk for soil contamination have been tested for relevant contaminants, and remediated as necessary.	Assessment identifying high risk locations for soil contamination; Once-off soil sampling and analysis program, in accordance with contamination risk assessment outcomes.	Soil contamination risk register; Soil test reports for any identified 'high risk' areas; AND If required, evidence of remediation (e.g. photos, post remediation soil test reports, etc.)

Final land use	Closure Objective	Aspect	Proposed completion criteria	Monitoring regime	Evidence required
	Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site	Landform design	<b>CC 5.1</b> Minimum subsoil/topsoil depths (TBC) achieved on at least 90% of rehabilitated land	Once off as-constructed survey of soil horizon surfaces; OR Soil depth profiling	Mapping/assessment of soil horizon depths against target minimum.
	Surface infrastructure to be decommissioned and removed, unless DRE agrees otherwise	Infrastructure	<b>CC 6.1</b> All redundant plant, equipment and mine related infrastructure has been removed from site, or agreements are in place for any infrastructure remaining.	Once off stocktake of retained mining infrastructure	Catalogue of retained mining infrastructure; AND evidence of agreements/approvals for retained mining infrastructure.
	Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within a reasonable timeframe	Agriculture	<b>CC 7.1</b> To be determined once technical investigations/trials are complete.	<i>To be determined once technical investigations/trials are complete</i>	<i>To be determined once technical investigations/trials are complete</i>

## 9 Part 9 - Rehabilitation research, modelling and trials

### 9.1 Current rehabilitation research, modelling and trials

Subsidence investigations and modelling are being undertaken using Ambient Noise Tomography (ANT) within the underground mining area. The purpose of the investigations is to develop a method for rapidly reconciling the volume of material mined with the UGM system. Iluka has recognised the potential of utilising real-time 3D Ambient Noise Tomography as an innovative way of achieving this goal and the trial aims to evaluate this technology. The technology may be used to determine the location and extent of subsidence events during and post mining operations.

Rehabilitation operations are yet to commence, so no trials are underway at this time.

Iluka has conducted significant research and trials into the establishment native vegetation at mine sites across Australia.

### 9.2 Future rehabilitation research, modelling, and trials

Literature review and research to assist in the definition of site specific, achievable completion criteria for landform stability and revegetation.

## 10 Part 10 - Intervention and adaptive management

### 10.1 Trigger action response plan (TARP)

A Trigger Action Response Plan (APPENDIX 1) has been developed to provide for adaptive management that can be implemented in the event of poor performance or unexpected results from the rehabilitation effort.

The TARP takes a risk assessment-based approach to the identification of issues, proposed contingency measures and their trigger values when unexpected impacts to stabilisation and rehabilitation activities or variations to the care and maintenance phase occur.

The rehabilitation monitoring program will allow for adaptive management by reviewing performance from the stabilised area, evaluating substandard performance, the probability of an event occurring; evaluating the consequence; and using a risk-based approach to determine trigger levels action may be required. The TARP can be reviewed in response to the ongoing monitoring data and identification of substandard performance.

The TARP addresses the following risks to rehabilitation:

- Surface subsidence
- Biological resource salvage
- Landform stability and erosion and sediment control
- Ground disturbance and heritage items
- Infrastructure
- Hazardous material/ saline material
- Vegetation establishment
- Weed
- Feral fauna
- Weather and climate influences

## 11 Part 11 - Review, revision, and implementation

This Plan will be reviewed and updated in accordance with relevant statutory triggers, as summarised in Table 12.

*Table 12 Statutory triggers to review RMP*

<b>Statutory triggers to reviewing the rehabilitation management plan</b>	
SSD-5285 Schedule 5 Condition 4	<p><b>Revision of Strategies, Plans and Programs</b></p> <p>5. Within 3 months of the submission of:</p> <ul style="list-style-type: none"> <li>(a) annual review under condition 4 above.</li> <li>(b) incident report under condition 6 below.</li> <li>(c) audit under condition 8 below; or</li> <li>(d) any modification to the conditions of this consent (unless the conditions require otherwise),</li> </ul> <p>The Applicant shall review and, and if necessary, revise the strategies, plans and programs required under this consent to the satisfaction of the Secretary.</p> <p>Where this review leads to revisions in any such document, then within 4 weeks of the review of the revised document must be submitted to the Secretary for approval</p>
Mining Regulation 2016 Schedule 8A Clause 11.	<p><b>11 Amendment of rehabilitation management plans</b></p> <p>The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows –</p> <ul style="list-style-type: none"> <li>(a) To substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary – within 30 days after the document is approved</li> <li>(b) As a consequence of an amendment made under clause 14 to a rehabilitation outcome document – within 30 days after the amendment is made,</li> <li>(c) To reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment – as soon as practicable after the rehabilitation risk assessment is conducted</li> <li>(d) Whenever given written direction to do so by the Secretary – in accordance with the direction</li> </ul>
<b>Process for ensuring mining and rehabilitation activities are being conducted in accordance with the rehabilitation management plan</b>	
SSD-5285 Schedule 5 Condition 8 - Auditing	<p><b>Auditing</b></p> <p>8. Within 1 year of the commencement of construction, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must;</p> <ul style="list-style-type: none"> <li>(a) Be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;</li> <li>(b) Include consultation with the relevant agencies;</li> <li>(c) Assess the environmental performance of the development and assess whether it is complying with the requirements in this consent, and any other relevant approvals, EPL's; and/or mining lease/s;</li> <li>(d) Review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and</li> <li>(e) Recommend measures and actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals</li> </ul>

## APPENDIX 1- Trigger Action Response Plan



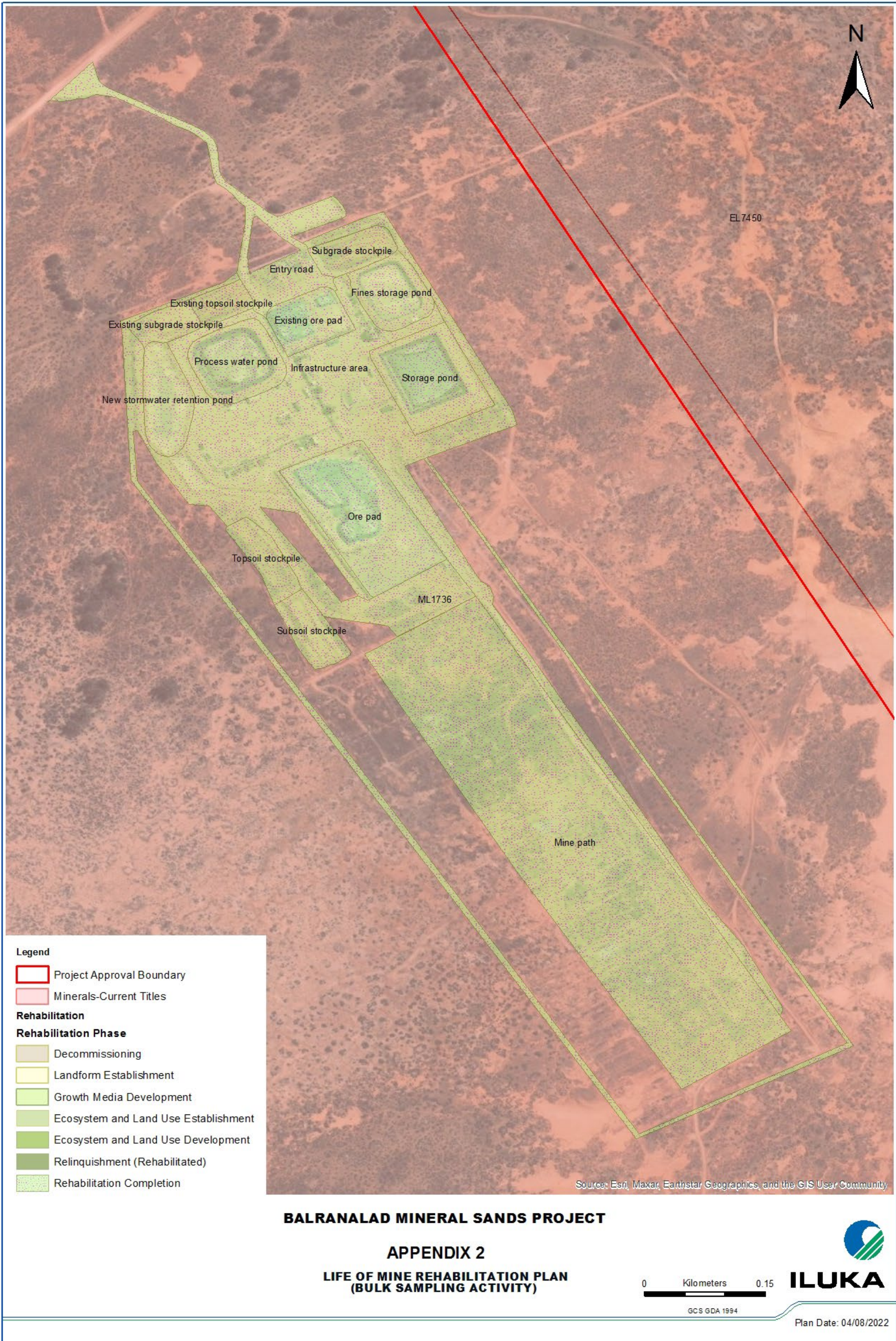
This TARP has been developed to respond to occurring or emerging threats to rehabilitation and includes a number of contingency responses that will be implemented if appropriate to mitigate possible impacts to successful rehabilitation.

Rehabilitation Risk	Consequence/Hazard	TARP	Contingency Response
Surface subsidence		<b>Trigger</b>	<ul style="list-style-type: none"> <li>Subsidence greater than anticipated</li> <li>Sinkholes develop</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Undertake a review of the subsidence work and Subsidence Management Plan</li> <li>Regrade area or backfill with material if available</li> <li>Water monitoring and management plan updated to incorporate changes</li> </ul>
Biological resource salvage – topsoil and timber	Insufficient topsoil	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Quality control monitoring confirms desired topsoil replacements cannot be met</li> <li>Topsoil materials volumes are less than required for closure and capping</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Review mine planning calculations especially swell factor volume accounting</li> <li>Review topsoil management procedure to allocate stripping more at the changed requirements if possible or review capping requirements based on stockpiled volume</li> </ul>
	Loss of topsoil or damage to topsoil in stockpiles	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Quality control monitoring identifies topsoil stockpiles damaged due to saline water use, or compacted from trafficking of vehicles, or weed incursion</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Undertake investigation including soil sampling if required</li> <li>Scalp contaminated area off and use as subsoil or OB depending on soil tests</li> <li>Ameliorate with lime, ripping or spray weeds as required</li> </ul>
	Timber resource not collected	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Timber resources damaged (burnt) or not sufficient for rehabilitation</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Ensure timber resource importance is included in environmental inductions</li> <li>Ensure timber resources are collected and stored appropriately</li> <li>Timber resource management to be included in Topsoil Management Procedure</li> </ul>
Landform stability Erosion and sedimentation control	Stabilisation fails and erosion/ sedimentation occurs	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Landform design parameters are inadequate allowing run off to cause erosion</li> <li>Erosion monitoring indicates lack of stability with gully erosion or rill erosion &gt;200mm occurring</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Review quality control procedures to ensure landforms built to design</li> <li>Review landform design parameters</li> <li>Repair areas of erosion &gt;200mm</li> </ul>

Rehabilitation Risk	Consequence/Hazard	TARP	Contingency Response
			<ul style="list-style-type: none"> <li>Review water management and structures, implement water management diversions or structures</li> </ul>
Infrastructure	Material or hydrocarbon spill	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Material spill from remaining infrastructure</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Clean up any spillage and make area safe</li> <li>Check quality control to ensure area was made safe and stable for care and maintenance period</li> <li>Undertake regular site inspections</li> </ul>
Hazardous material / saline material	Site contamination from AMD or Saline water	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Inadvertent spillage or leakage of hazardous material or saline water</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Review/repair capping requirements for AMD producing materials</li> <li>Undertake further review to determine extent and causal factors to establish remediation requirements</li> <li>Inspect integrity/repair of any remaining saline water facilities such as pipelines or water management structures</li> <li>Application of any required ameliorants</li> </ul>
Vegetation establishment	Self-regeneration from topsoil seed bank ineffective	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Rehabilitation monitoring determines that the recruitment of native vegetation from natural regeneration is less than adequate</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Investigate and implement as required reseeding/tubestock options</li> <li>Undertake soil samples to check soil quality parameters which may inhibit plant growth</li> <li>Compare against analogue site and climatic conditions as well as previous monitoring results</li> </ul>
Weeds	Excessive weed growth	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Rehabilitation monitoring determines excessive weeds present which are detrimental to the rehabilitation program</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Undertake weed control or management as per the weed management plan</li> <li>Will need to be timed for appropriate season for spraying and preferably before seed set</li> </ul>
Feral fauna		<b>Trigger</b>	<ul style="list-style-type: none"> <li>Increase in population abundance as identified through regular inspections and/or the rehabilitation monitoring</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Check exclusion fences and access to water points around the rehabilitation areas</li> <li>Undertake management consistent with the Pest management plan to reduce the population density to an acceptable level</li> </ul>
Weather and climate influences	Weather conditions turn dry and not conducive to vegetation establishment (drought)	<b>Trigger</b>	<ul style="list-style-type: none"> <li>Dry conditions delay vegetation germinations</li> <li>Dry conditions damage vegetation after initial establishment</li> </ul>

Rehabilitation Risk	Consequence/Hazard	TARP	Contingency Response
	conditions) or alternatively adverse conditions such as flooding, or bushfire affect rehabilitation		<ul style="list-style-type: none"> <li>Adverse conditions prevent germination or damage vegetation</li> </ul>
		<b>Action</b>	<ul style="list-style-type: none"> <li>Review affected areas and outline actions to rectify</li> <li>Ensure progressive rehabilitation to spread risk over various seasons</li> </ul>

## APPENDIX 2- Life of Mine Rehabilitation plan



**Legend**

- Project Approval Boundary
- Minerals-Current Titles

**Rehabilitation**

**Rehabilitation Phase**

- Decommissioning
- Landform Establishment
- Growth Media Development
- Ecosystem and Land Use Establishment
- Ecosystem and Land Use Development
- Relinquishment (Rehabilitated)
- Rehabilitation Completion

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**BALRANALAD MINERAL SANDS PROJECT**

**APPENDIX 2  
LIFE OF MINE REHABILITATION PLAN  
(BULK SAMPLING ACTIVITY)**

