



BALRANALD MINERAL SANDS MINE

2024 ANNUAL REVIEW

(1 January 2024 to 31 December 2024)


Name of operation	Balranald Mineral Sands Mine
Name of operator	Iluka Resources Limited
Development consent / project approval #	SSD – 5285
Name of holder of development consent / project approval	Iluka Resources Limited
Mining Leases #	ML 1736 & ML 1855
Name of holder of mining lease	Iluka Resources Limited
Water licence #	WAL31101, WAL44602, WAL44970 & WAL 41857
Name of holder of water licence	Iluka Resources Limited
RMP start date	12 August 2022
RMP end date	Continuing
Annual Review start date	01 January 2024
Annual Review end date	31 December 2024
<p>I, Brendan Isaacs, certify that this audit report is a true and accurate record of the compliance status of Balranald Mineral Sands Project for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of Iluka Resources Limited.</p> <p><i>Note.</i></p> <p>a) <i>The Annual Review is an ‘environmental audit’ for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p>b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Brendan Isaacs
Title of authorised reporting officer	Environmental Rehabilitation & Community Relations Superintendent
Signature of authorised reporting officer	
Date	26/03/2025

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1. STATEMENT OF COMPLIANCE

1.1 Statement of compliance

This report is the 2024 Annual Review for the Balranald Mineral Sands Mine (the 'Balranald Mine' or the 'Mine') as required by Condition 4, Schedule 5 of State Significant Development Consent SSD-5285 granted under the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). This report has been prepared using the *Annual Review Guideline Post-approval requirements for State significant mining developments* (DPE, October 2015).

A summary of the compliance status of the operation with the conditions of the relevant approvals is provided in 1.

Table 1: Statement of compliance

Statutory approval	All conditions complied with
SSD Development Consent (SSD-5285)	No
Mining Lease 1736	Yes
Mining Lease 1855	Yes
Environment Protection Licence 20795	Yes
EPBC Approval (2012/6509)	No

1.2 Non-compliance

There was one instance of non-compliance identified during the reporting period against Schedule 2, Condition 2 of the SSD Development Consent (SSD-5285) and Condition 1 of EPBC Act Approval (EPBC 2012/6509) , as summarized in Table 3. The non-compliance is categorized as low in accordance with the compliance status key as outlined in Table 2.

Table 2: Compliance status key

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • Potential for moderate environmental consequences, but is unlikely to occur; or • Potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 3: Summary of non-compliances

Relevant approval	Condition	Condition description	Compliance status	Comment	Where addressed in Annual Review
SSD Development consent (SSD-5285)	Schedule 2 Condition 2	<p>The Applicant must carry out the development: (a) generally in accordance with the EIS; and (b) in accordance with the conditions of this consent.</p> <p><i>Note: The general layout of the development is shown in Figure 2.</i></p>	Low	Work outside the Approved boundary occurred on the 23 May 2024. The incident was reported to the Secretary and was determined as a non-compliance.	Section 12
EPBC Act Approval (EPBC 2012/6509)	Condition 1	<p>Within the project area the person taking the action must not clear:</p> <p>a. more than 2,544 hectares (ha) of Malleefowl habitat; and</p> <p>b. more than 3,143 ha of Corben's Long-eared Bat habitat.</p> <p>The person taking the action must not clear outside the project area as part of this approval.</p>	Low	Work outside the Approved boundary occurred on the 23 May 2024. The incident was reported to DECCEW.	Section 12

2. INTRODUCTION

2.1 Operations overview

Iluka have approval to develop a mineral sands mine in south-western New South Wales (NSW), known as the Balranald Mineral Sands Mine (the Balranald Mine). It includes construction, open-cut mining, primary processing, and rehabilitation of 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, respectively. The Balranald Mine also included undertaking an approved bulk sampling activity at the West Balranald deposit with the removal of up to 100,000 tonnes (t) of mineral ore to trial the use of underground mining methods. Location of the mine is shown in Figure 1.

Development consent (SSD-5285) was granted for the Balranald Project by a delegate of the NSW Minister for Planning under the EP&A Act on 5 April 2016 (herein referred to as the consent). Approval was also granted under the EPBC Act (EPBC 2012/6509) by a delegate of the Commonwealth Minister for the Environment on 6 January 2017 (herein referred to as the Commonwealth approval).

Iluka has undertaken some of the approved bulk sampling activity involving the extraction of the mineral ore from depth using trial underground mining technology within the approved disturbance area of the West Balranald deposit.

The underground mining trials were conducted as follows:

- Trial 1 (T1) proof of concept undertaken between February and May 2015;
- Trial 2 (T2) commerciality test undertaken between May to October 2016;
- Trial 3 (T3) commerciality test undertaken between June to November 2020; and
- Site placed into care & maintenance from 18 November 2020.

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.

On 21 December 2022, Iluka were granted approval to modify the consent (MOD1) to expand the underground mining trial which includes 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. Figure 2 shows the underground mining trial approved by the MOD1 Consolidated Consent.

2.2 Environmental management responsibilities

Table 4 provides the details of the Iluka personnel with environmental management responsibilities during the reporting period.

Table 4: Environmental management responsibilities

Name	Role	Contact details
Philip Lazzari	Project Manager	philip.lazzari@iluka.com
Dave Wright	Operations Manager	dave.wright@iluka.com
Brendan Isaacs	Environmental Rehabilitation and Community Relations Superintendent	brendan.isaacs@iluka.com
Chrissie Eckersley	Environmental Advisor	chrissie.eckersley@iluka.com
Prachi Chauhan	Environmental Advisor	prachi.chauhan@iluka.com

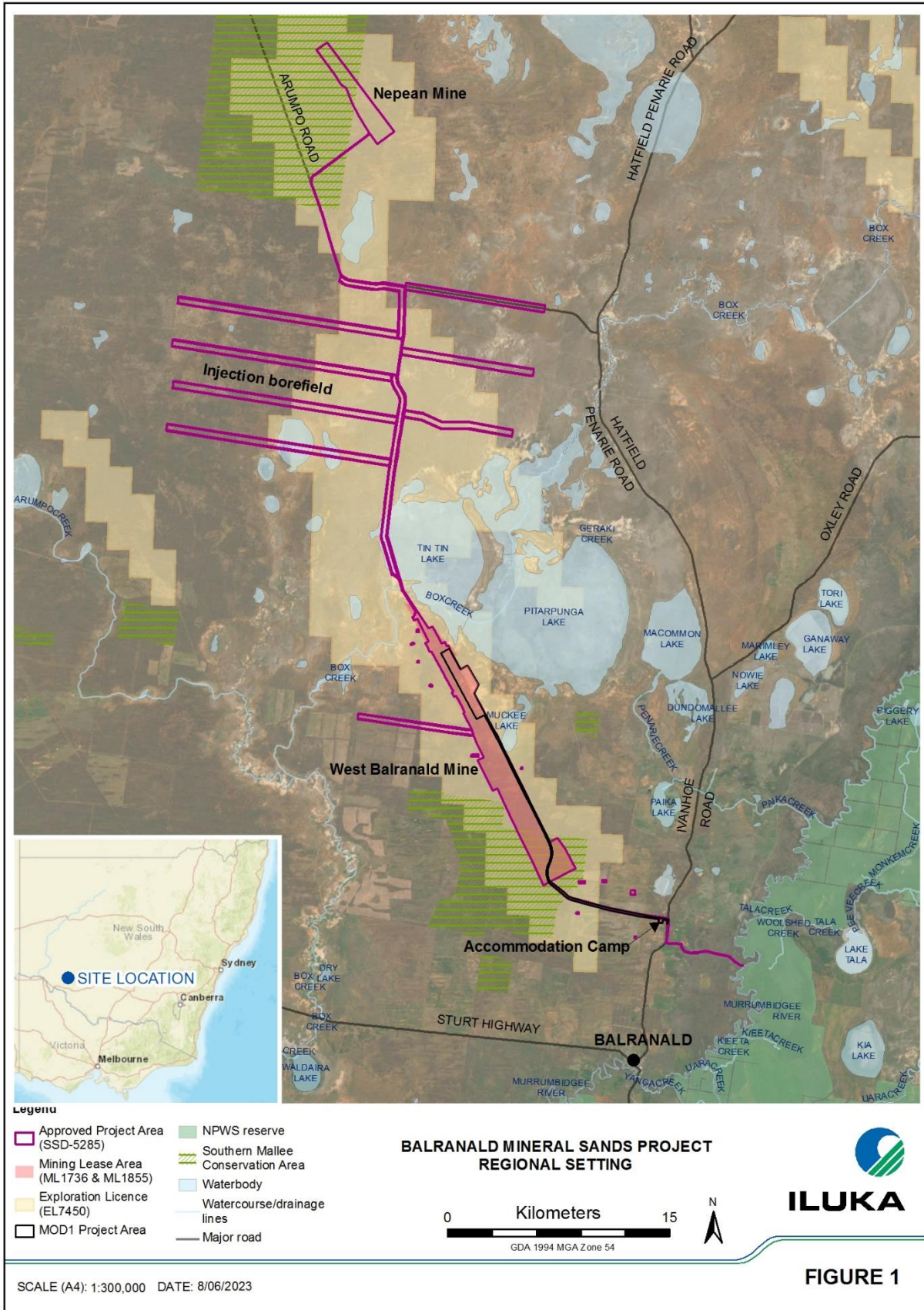


Figure 1: Project location and activity area

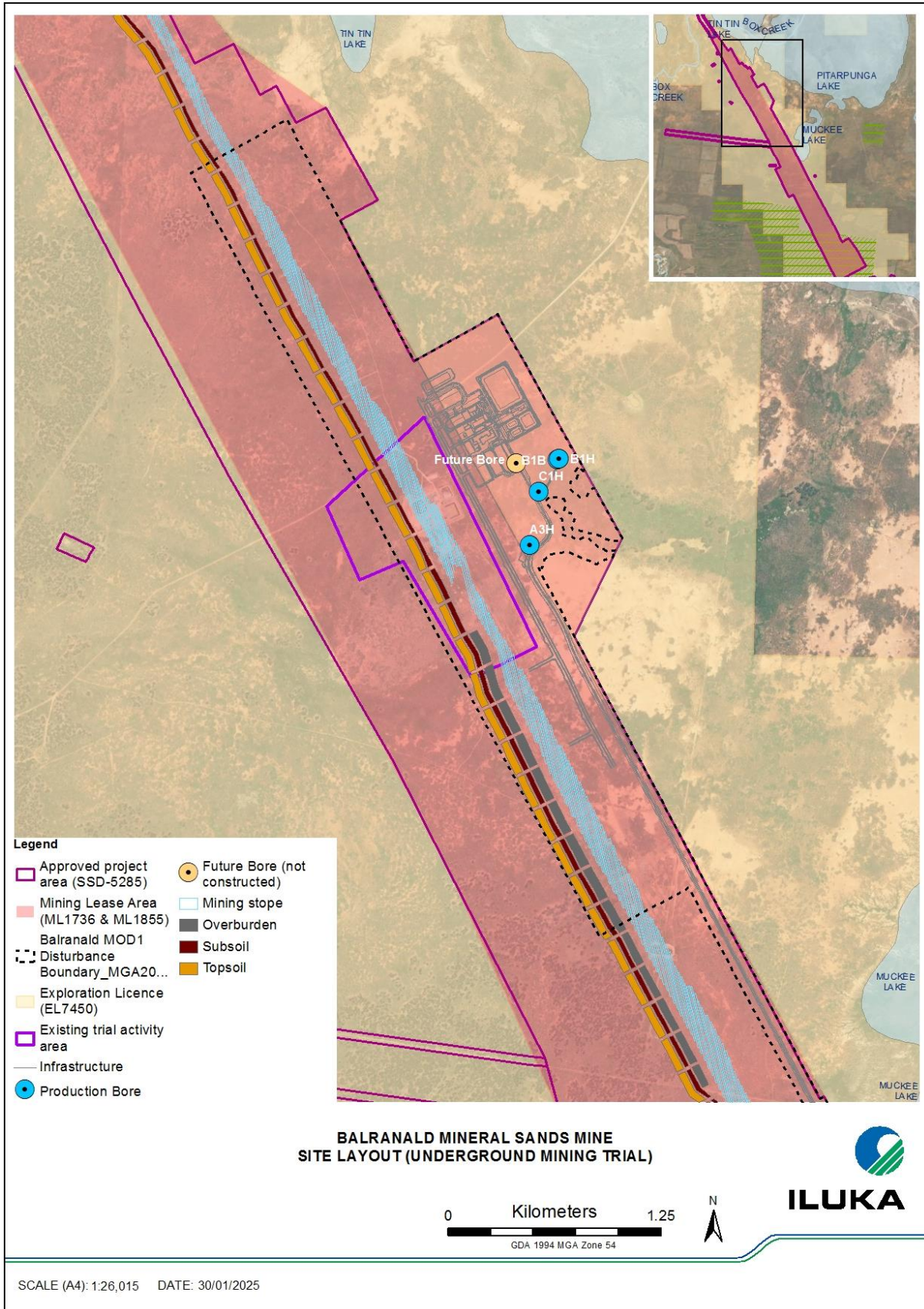


Figure 2: Approved modified project (MOD1) conceptual site layout

3. APPROVALS

The Balranald Mine is a Level 1 mine and was assessed as a State Significant Development (SSD) under Part 4 of the EP&A Act.

The current approvals (including consents, authorisations, licenses and management plans) for the Mine are summarised in Table 5 and Table 6.

Table 5: Current consents, authorisations and licences

Type	Identification	Details
Development Consent	SSD-5285	Granted: 5 April 2016 Duration: 16 years
Development Consent Modification	SSD-5285 (MOD1)	Modified: 21 December 2022
Development Consent Modification	SSD-5285 (MOD2)	Modified: 1 August 2023
EPBC Act Referral 2012/6509	EPBC 2012/6509	Granted: 6 January 2017 Expires: 1 January 2046
EPBC Act Referral 2012/6509 Variation	EPBC 2012/6509 (Variation 1)	Varied: 1 August 2023
Mining Lease	ML1736	Granted: 9 May 2016 Duration: 21 years
Mining Lease	ML1855	Granted: 13 June 2023 Duration: 21 years
Environmental Protection Licence	EPL20795	Granted: June 2016 and renewed annually
Water Access Licence(s)	WAL31101 WAL44602 WAL44970 WAL41857	Total allocation volume – 50 ML Total allocation volume – 4,233 ML Total allocation volume – 1,117 ML Total allocation volume – 101 ML

Table 6: Approved management plans during reporting period

Management Plan	Changes during reporting period
Environmental Management Strategy (9 February 2023, Version 1)	New plan: approved 28 February 2023.
Aboriginal Cultural Heritage Management Plan (ACHMP) (18 May 2023, Version 3)	Updated to include the management of Aboriginal Cultural Heritage within the approved MOD1 additional disturbance area.
Air Quality Management Plan (8 March 2023, Version 1)	New plan: approved 17 March 2023.
Noise Management Plan (22 February 2023, Version 1)	New plan: approved 3 March 2023.
Water Management Plan (31 October 2023, Version 4)	Plan updated to include extraction of water from Murrumbidgee River, approved 3 November 2023.
Traffic Management Plan (22 May 2024, Version 3)	Plan updated to include additional temporary transport route for construction, approved 28 May 2024.
Biodiversity Management Plan (11 July 2023, Version 7)	New plan: approved 27 July 2023.
Workforce Accommodation Plan (3 July 2024)	New plan: approved 9 July 2024.

4. OPERATIONS SUMMARY

4.1 Introduction

The T3 mining trial commenced in early August 2020 and was completed in early November 2020. The trial site was demobilised and put into care and maintenance in November 2020. Iluka was granted approval in December 2022 to construct an underground mining operation, construction officially commenced on 7 August 2023.

4.2 Site construction

Construction activities during the reporting period 2024 included:

- Construction of mining panels
- Construction of process plant infrastructure
- Construction of drill pads and borrow pits
- Construction of 23km long private mine access road
- Installation of site boundary fencing
- Commencement of construction of accommodation camp
- Installation of communications tower on site

- Installation of production and monitoring bores
- Installation of internal power lines
- Upgrades to the public roads

Table 7 outlines the public road upgrades that were completed during the reporting period in compliance with the consent (Condition 22 of Schedule 3) in consultation with the applicable road authorities.

Table 7: Public road upgrades completed during 2024 reporting period

Road upgrades	Road authority
Widening of O' Connor Street and Moa Street intersection to accommodate oversize vehicles.	Council
Construction of mine access road /Balranald - Ivanhoe Road intersection.	TfNSW/Council

Approximately 240Ha of land was cleared to allow the construction of the private mine access road, mineral processing facility and other infrastructure to support mining operations.

Photos 1 to 3 represent ongoing site construction during the reporting period 2024.



Photo 1: Construction of new site access road in 2024.



Photo 2: Aerial view of construction of new site access road in 2024.



Photo 3: Aerial view of site as of October 2024.

4.3 Mining operations

Production statistics associated with construction of the MOD1 (extended underground mining trial) are provided in Table 8.

No mining or processing operations occurred during the reporting period with relevant activities limited to construction.

Table 8: production summary (MOD1 Underground mining)

Material	Approved limit (specify source)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Topsoil (m3)	No limit	12,642	216,947	355,000
Subsoil (m3)	No limit	0	22,651	77,664
Overburden (m3)	No limit	0	21,348	115,000
Ore (m3)	No limit	0	0	161,265
Coarse reject (m3)	No limit	0	0	19,342
Fine reject (Tailings) (m3)	No limit	0	0	0
Product (HMC) (t)	700,000 tonnes per annum (SSD-5285) MOD1	0	0	81,292

4.4 Exploration

No exploration activities were undertaken during the reporting period. Prior to mining the northern faulted area, a grade control drill program consisting of between 10 to 16 AC drill holes will be required to refine the strand geometry and this is proposed to be completed in late 2025 or 2026.

Further sonic drilling will be required in 2025 – 2026 to support conversion of Indicated Resources to Measured Resource classification in advance of mining activities.

4.5 Decommissioning

Nine monitoring bores and one production bore were decommissioned during the reporting period. Decommissioning was undertaken in accordance with the *Minimum Construction Guidelines for Water Bores in Australia (Fourth Edition)* (NUDLC, 2020).

4.6 Next reporting period

Construction of the mine access road followed by sealing will be completed in Q1 of the next reporting period.

The remaining public road upgrades within Balranald will be completed during the next reporting period as described in the approved Traffic Management Plan. Roads that will be upgraded in the next reporting period are:

- McCabe Street and Balranald-Ivanhoe Road intersection,
- Balranald-Ivanhoe Rd & Mine Access Road intersection,
- Sturt Highway & Balranald-Tooleybuc Road intersection;
- Murray Street & Lea Street Tooleybuc;
- Murray Street & Tooleybuc Road

Other construction activities that will be completed during the next reporting period include:

- Construction of mining & processing infrastructure:
 - processing plants;
 - underground mining infrastructure;
 - commissioning of drilling equipment; and
 - commissioning of Wet Concentrator Plant (WCP)
- Construction of non-processing infrastructure:
 - accommodation camp;
 - warehouses and storage, workshops;
 - site offices and car parks; and
 - fences
- Construction of transport infrastructure:
 - internal access tracks and road ways; and
 - vehicle wash facilities
- Services and utilities infrastructure:
 - fuel storage and dispensing area;
 - telecommunications tower; and
 - diesel power station and powerlines

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Based on feedback received from the Department on 8 May 2024 for previous (2023) Annual Review, the following actions were required as outlined in Table 9.

All comments and actions were addressed which were acknowledged by the Department in the letter dated 10 May 2024.

Table 9: Actions required from previous (2023) Annual Review

Action required from previous Annual Review	Requested by	Action taken by the Operator	Where discussed in Annual Review
1. Update the Title block to be consistent with table 1 in the AR guidelines.	DPHI	Complete Title block updated to be consistent with Table 1 in the AR guidelines (2015)	Page i
2. Include a map showing offset areas.	DPHI	No change required No offsets have been established for the mine during the reporting period. In accordance with timing specified in Condition 16 of Schedule 3 of the Consent, offsets are required to be secured in 2025.	
3. Update the AR to identify and include any performance criteria or intended outcomes and environmental performance compared to those criteria or intended outcomes for air quality, noise, water and biodiversity. Summarise what the performance criteria were, what monitoring was undertaken and how did the results compare to the performance criteria.	DPHI	No change required Table 9 in 2023 Annual Review provided summary information for environmental monitoring and management. This was in alignment with Table 6 in the <i>Annual Review Guideline</i> (DPE, 2015)	
4. Update the AR to clarify the consent requirement or management plan commitment that “Appendix A: Hydrogeochemical assessment – March 2023	DPHI	No change required It was outlined in Section 7.2.1 of 2023 Annual Review that the referred report was completed as result of	

Action required from previous Annual Review	Requested by	Action taken by the Operator	Where discussed in Annual Review
groundwater monitoring event” meets.		groundwater monitoring conducted in compliance with the approved <i>Groundwater Management Plan (GWMP) for Bulk Sampling Activities</i> (EMM, 2020), which was later on was superseded by the <i>Water Management Plan (WMP)</i> (Iluka, 2023).	
5. Update the AR to include rehabilitation performance against rehabilitation performance indicators as per Table 8 of the Guideline.	DPHI	No change required No rehabilitation was undertaken at the site during the reporting period. Table 11 in Section 8 of the 2023 Annual Review was added to summarise disturbance and rehabilitation. Appendix B and C also provided further information on disturbance and rehabilitation.	

6. ENVIRONMENTAL PERFORMANCE

Table10 provides a summary of the environmental performance monitoring completed during the reporting period in accordance with the approved management plans for the mine.

Table 10: Environmental performance summary

Aspect	Approval criteria / EIS prediction	Performance during reporting period	Trend / key management implications	Implemented / proposed management actions
Noise	Noise criteria specified in Table 2 of SSD-5285.	Attended noise monitoring was conducted quarterly during the reporting period. Noise monitoring reports are published on the Iluka website.	Noise levels from site complied with the relevant limits at all monitoring locations during each quarter.	Continue noise monitoring during construction and operations in accordance with the Noise Management Plan.
Air Quality	Air quality criteria specified in Table 3 of SSD-5285.	<p>The annual average of both PM10 and PM2.5 particulate matter remained below the Consent criteria.</p> <p>The 24 hour averaging criteria for PM10 and PM2.5 was exceeded on several occasions.</p> <p>This is discussed in detail in Section 7.</p>	<p>Wind direction at the times of exceedances was recorded to be from different direction and not from the mine site. Therefore no exceedances were attributed to the site activities.</p> <p>Elevated results are associated with sheep activity in vicinity of the BAM unit during the time of exceedance.</p> <p>Wind direction during December 2024 was predominantly from SW on most of the days especially on days of exceedances in PM concentration at the CPM1 monitor. This indicated potential impact from the bushfires in Grampians Victoria.</p>	<p>Continue to monitor PM10 and PM2.5 taking note of any adverse weather conditions or dust events not attributed to site activities.</p> <p>Continue to implement dust controls as outlined in the Air Quality Management Plan.</p>
Groundwater	Water licence extraction limits, trigger levels	Meter readings recorded for all groundwater extraction.	All groundwater extraction was within extraction limits of Water Access Licences and Approvals.	Compliant water meters with telemetry installed and meter readings recorded at least

Aspect	Approval criteria / EIS prediction	Performance during reporting period	Trend / key management implications	Implemented / proposed management actions
	specified in the Water Management Plan.	<p>Monthly groundwater levels and quality testing conducted</p> <p>Quarterly groundwater levels obtained for regional monitoring sites.</p> <p>Annual groundwater quality testing conducted and reported.</p>	<p>Groundwater levels remained stable and no trigger levels reached.</p> <p>No adverse groundwater quality trends identified or trigger levels reached.</p>	<p>monthly. Continue monitoring groundwater levels each quarter.</p> <p>Quality monitoring to be undertaken annually.</p> <p>Annual groundwater monitoring reports to be published on the Iluka website.</p>
Surface water / Erosion and sediment	No offsite release of turbid water or sediments.	Drainage networks monitored after rain events.	Drainage networks have performed well and maintained any runoff from disturbed areas within the site boundary.	<p>Continue to implement erosion and sediment controls outlined in the Water Management Plan.</p> <p>Monitor drainage networks after rain events.</p> <p>Ensure temporary erosion controls are applied to construction areas where there is risk of erosion and offsite sedimentation.</p> <p>Monitoring of surface water quality in accordance with the Water Management Plan.</p>
Biodiversity	Protection of Malleefowl, Corben's Long-	No impact to Malleefowl, Corben's Long-eared Bat or Raptors during clearing activities.	One active Malleefowl mound identified within the disturbance footprint.	No vegetation clearing within 200m of the active Malleefowl

Aspect	Approval criteria / EIS prediction	Performance during reporting period	Trend / key management implications	Implemented / proposed management actions
	eared Bat and Raptors.	Clearing report attached as Appendix E.	<p>Hollow bearing trees identified within Corben's Long-eared Bat habitat mapped as med-high density hollows.</p> <p>Raptor nests identified in clearing areas.</p>	<p>ground until breeding has ceased. (i.e. end of February)</p> <p>No clearing within Corben's Long-eared Bat habitat between May and November.</p> <p>Hollow bearing trees (HBTs) within Corben's Long-eared Bat habitat to be marked up and surrounding vegetation cleared first followed by HBTs 48hrs later. Felled trees to be re-located 24hrs after felling.</p> <p>Raptor nests to be inspected with drone for presence of eggs and chicks prior to clearing.</p>
	<p>Minimise clearing in the approved footprint.</p> <p>Protect adjacent vegetation and habitat.</p>	<p>Site Disturbance Permits were issued for all ground disturbing activities undertaken.</p> <p>Clearing areas were demarcated on the ground by a competent surveyor.</p>	<p>A breach of one permit occurred when vegetation was cleared outside approved MOD 1 boundary. This was notified to the Secretary followed by detailed report of the incident.</p>	<p>All future ground disturbing activities will be subject to this permitting process.</p>
	Timber, vegetation and soil salvage.	Vegetation and topsoil removed from the mine access road and site has been stockpiled for future use in rehabilitation.	Topsoil stockpiles moderately erodible due to dry soil conditions.	Stockpile attributes and locations mapped and included in database.

Aspect	Approval criteria / EIS prediction	Performance during reporting period	Trend / key management implications	Implemented / proposed management actions
				<p>Stockpiles signposted with unique identification numbers.</p> <p>Stockpile volumes obtained from survey and included in database.</p>
	Weed and feral pest management	<p>All vehicles, plant and equipment were inspected for weed seeds and soil contamination before mobilising to site.</p> <p>Fox and pig baiting program and weed control was implemented upon identification on site and in the surrounding lands.</p>	Increasing number of feral animal sightings. Goat populations on the rise due to low commercial demand and price.	<p>Lessees consulted to undertake pest control.</p> <p>Goat control scheduled for 2025.</p> <p>Continue to implement fox and pig baiting program.</p> <p>Continue to implement weed control.</p>
	Bushfire prevention and response	<p>Fence lines inspected around the site to ensure effective fire break between surrounding properties.</p> <p>The Pollution Incident Response Plan was successfully tested on the 26 May 2024, in accordance with the Environmental Protection Licence 20795.</p>	Fuel loads minimal during 2024 due to dry conditions.	<p>Periodic fire break maintenance.</p> <p>Testing of emergency response procedure and equipment.</p> <p>Annual testing of the Pollution Incident Response Plan in accordance with the Environment Protection Licence 20795.</p>

Aspect	Approval criteria / EIS prediction	Performance during reporting period	Trend / key management implications	Implemented / proposed management actions
Aboriginal Cultural Heritage	No harm to Aboriginal Cultural Heritage	Several unexpected artefact finds were encountered during the development of drill pads. These were collected and stored in the keeping place in consultation with RAPs and archaeologists.	<p>A number of sites identified within the EIS boundary will remain in situ and be avoided by development.</p> <p>Unexpected finds may be encountered during clearing and topsoil stripping works during construction.</p>	<p>Protection of modified trees and hearth sites identified for avoidance by fencing.</p> <p>Adherence to the unexpected finds protocols outlined in the ACHMP.</p> <p>Maintain consultation with Registered Aboriginal Parties for the Project through biannual Aboriginal Cultural Heritage working group meetings.</p>

7. AIR QUALITY MANAGEMENT

The Continuous Particulate Monitor (CPM1) is for real time monitoring of particulate matter PM10 and PM2.5 to monitor compliance with the criteria set out in SSD-5285.

7.1 Short term impact assessment

Short term impact assessment of particulate monitoring indicate 17 exceedances in PM10 criteria and 7 exceedances in PM2.5 criteria during 2024 reporting period (refer to Figure 3 and 4). Investigation revealed that no exceedance was attributable to activities conducted on site as the wind direction during those events had been in the direction of the site. Grazing activities in the adjacent farm land were found to have caused a rise in dust levels on several occasions. Bushfire in Grampians was analysed to have caused rise in particulate levels at the monitor in the month of December.

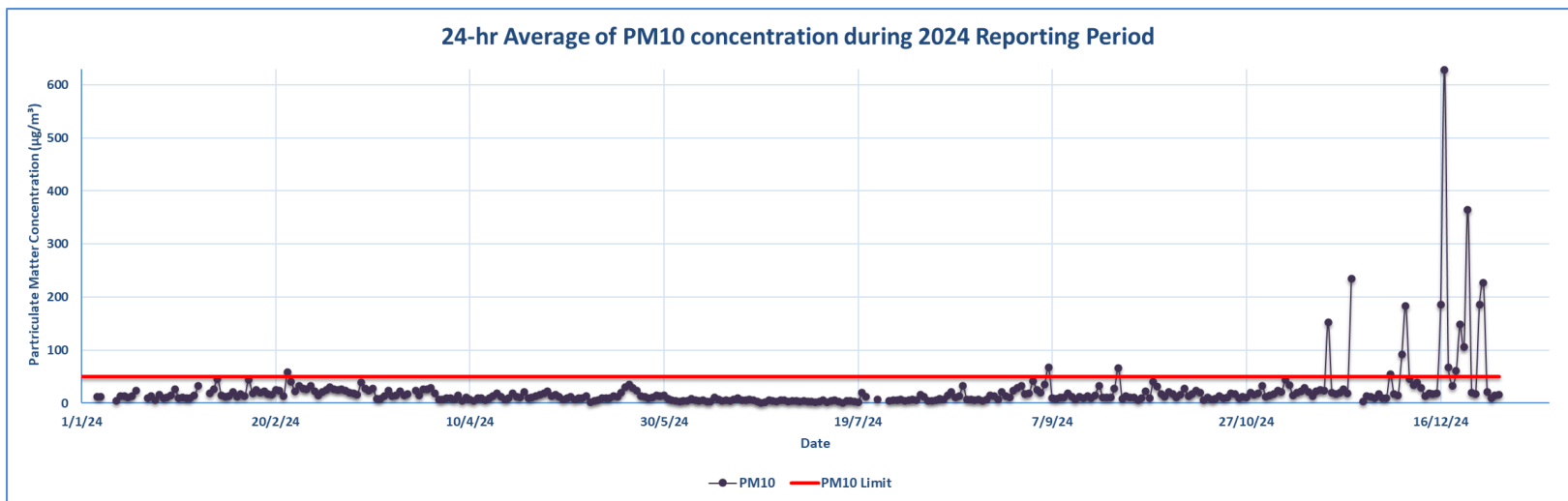


Figure 3: 24 hour average of PM10 concentration at CPM1 during 2024 reporting period

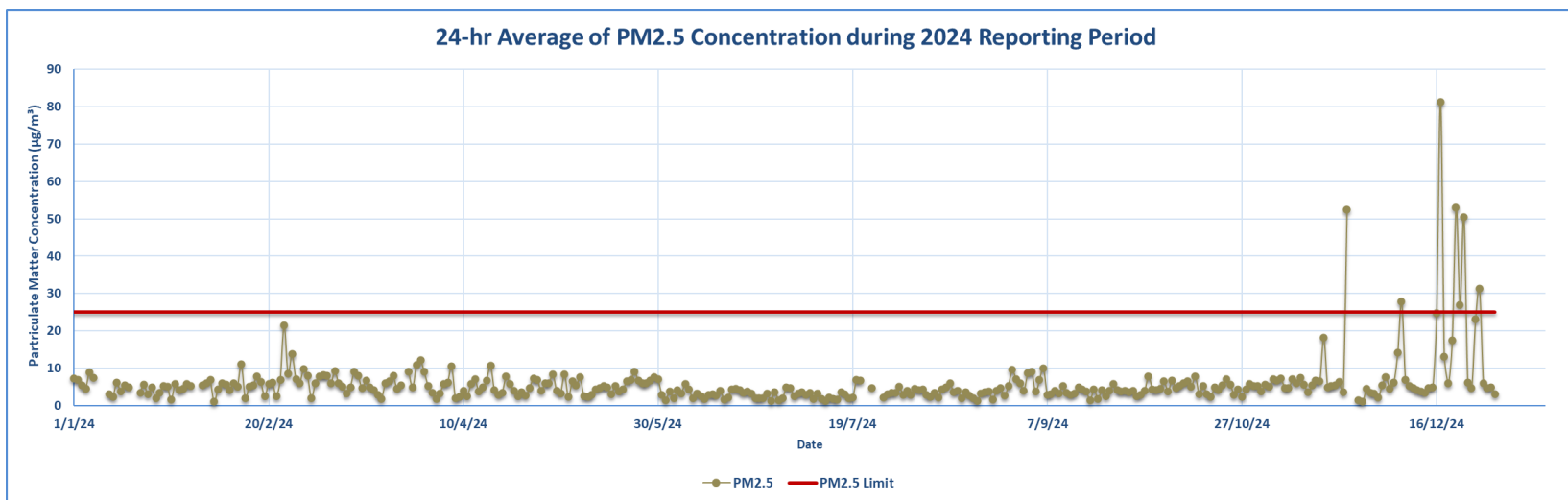


Figure 4: 24 hour average of PM2.5 concentration at CPM1 during 2024 reporting period

7.2 Long term impact assessment

The annual average of PM10 and PM2.5 concentrations measured at the CPM1 monitor is recorded to be under the prescribed limits. Table 11 provides the annual average of concentration of both the particulate matters during the 2024 reporting period.

Table 11: Annual average concentration of PM10 and PM2.5 in 2024 reporting period

Pollutant	Averaging Period	Limit	Average Concentration
PM10	Annual	25 µg/m ³	22.14 µg/m ³
PM2.5	Annual	8 µg/m ³	5.83 µg/m ³

A number of mitigation measures were employed during 2024 reporting period to prevent any exceedances caused by dust generated from the development activities on site including:

- Applying brackish water to roads and open areas;
- Limiting clearing to minimal amount required for construction;
- Inspection of work areas; and
- Contractor management and awareness

Iluka will continue to monitor Particulate Matter at CPM1 and deploy additional controls in events where site activities are analysed to have contributed in the exceedance of PM10 and/or PM2.5 limits at the monitoring station.

8. WATER MANAGEMENT

8.1 Water take

Water use for the previous water year 1 July 2023 to 30 June 2024 is summarised in Table 12.

Table 12: Summary of water use during 2024 reporting period

Water Licence #	Water Source and Water Sharing Plan	Entitlement / allocation	Passive take / inflows	Active pumping	Total (ML)
44602	Western Murray Porous Rock Groundwater Source/NSW Murray Darling Basin Porous Rock Groundwater Sources 2020.	4,233 ML	0 ML	0 ML	0 ML
44970		1,117 ML	0 ML	0 ML	0 ML
31101		50 ML	0 ML	16.7 ML	16.7 ML
41857	Murrumbidgee Regulated River Water Source 2016	101 ML	0 ML	22.6 ML	22.6 ML

8.2 Groundwater monitoring

8.2.1 Underground mining operation

Regional groundwater monitoring commenced in September 2023 in accordance with the approved Water Management Plan for the underground mining operation. Water levels were measured quarterly and published on the Iluka website. The frequency of water quality monitoring for regional bores has decreased from bi-annually to annually as required by the approved Water Management Plan. The first annual quality monitoring was undertaken in Q1 2024.

Regional groundwater levels remained nearly stable during each quarter. A minor increase in levels (between 0.01m and 0.1m) was observed in Q4 compared to Q1 across all bores except LBSPB03 where level decreased by 0.09m.

A graph of the quarterly regional groundwater levels is shown in Figure 5. Additional 33 monitoring bores and 18 Vibrating Wire Piezometers (VWPs) were constructed within the Shepparton Formation, Loxton Parrilla Sands and Olney aquifers during the reporting period in preparation for mining activities in 2025. Monitoring bores were constructed by a qualified driller under Miscellaneous Works Approval (60MW583326). Baseline data will be collected from these locations for approximately 6 months prior to commencement of mining operations in 2025.

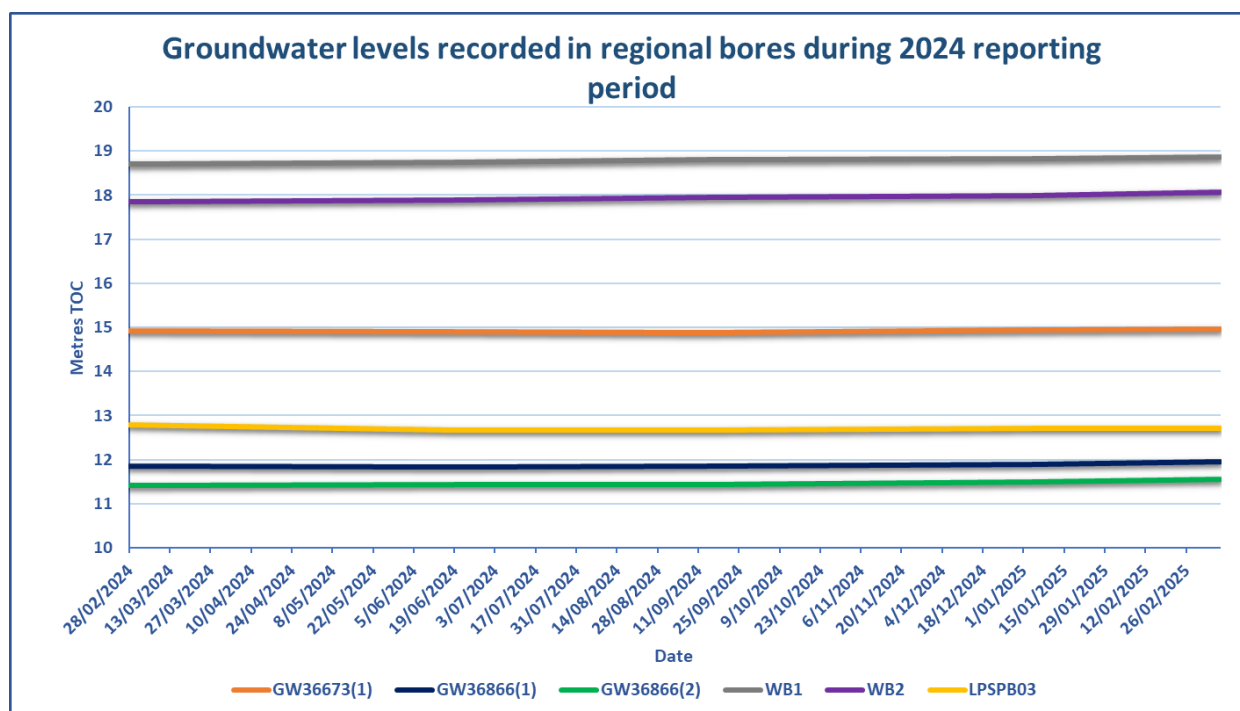


Figure 5: Quarterly groundwater levels for regional bores

8.3 Erosion and sediment

A total of 324.5mm of mean rainfall was recorded in 2024 at the Balranald RSL weather station located in the town of Balranald (BOM Station No. 049002). This is slightly above the average rainfall of 324.1mm for the region.

No sediment was observed to have discharged from the site and all drainage networks and storage basins were functional and below freeboard levels.

A site based weather station was installed at the same location as Continuous Particulate Monitoring (CPM1) station near Karra homestead in 2024. Due to technical faults with the rain gauge, which was resolved in mid-2024, rainfall data is not available until then. All the future weather data will be obtained from this station for better representation of actual site conditions.

9. REHABILITATION

An Annual Rehabilitation Report and Forward Program has been prepared in accordance with *Mining Amendment (Standard Conditions of Mining Leases— Rehabilitation) Regulation 2021* under the *Mining Act 1992*.

The 2024 Annual Rehabilitation Report and 2025-2027 Three Year Forward Program are provided as Appendix A and Appendix B, respectively.

Table 13 shows the current status of rehabilitation at the site, during the reporting period no rehabilitation had been undertaken at the site.

Table 13: Rehabilitation status

Mine Area Type	Previous Reporting Period (Actual) Year (ha)	This Reporting Period (Actual) Year (ha)	Next Reporting Period (Forecast) Year (ha)
A. Total mine footprint	38.9	290	350
B. Total active disturbance	38.9	290	350
C. Land being prepared for rehabilitation	0	0	0
D. Land under active rehabilitation	0	0	0
E. Completed rehabilitation	0	0	0

10. COMMUNITY

10.1 Complaints

No community complaints were received during the 2024 reporting period. A copy of the complaints register for the Project is provided on the Iluka Resources website in accordance with the Condition 11, Schedule 5 of SD-5285.

10.2 Community Engagement

Murray Basin Newsletter

Iluka published newsletters in May 2024 and November 2024 to inform the community about the progress of the Balranald Project and Iluka's other projects in the Murray Basin.

The newsletters and other project updates are available on the Iluka website [Balranald Engagement Hub](#)

Aboriginal Cultural Heritage Working Group

Two Aboriginal Cultural Heritage Working Group meetings were established in May 2024 and December 2024 that consisted of a representative of Registered Aboriginal Parties (RAPs), and Iluka.

Following topics were discussed during the meeting in May 2024:

- Location 8 Subsurface Investigation Report and recommendations that emerged from the report.
- Amendment in payment terms for all RAP parties engaged for cultural heritage works at Iluka.
- Iluka events and involvement of Iluka in local community events.
- Discussion of "Iluka Lends a Hand" program and opportunities for local community to get involved.

In December 2024, following topics were discussed:

- Iluka project update to date.
- Requirement of drug and alcohol screening to be done prior to site attendance for cultural heritage works.
- Successful amendment of payment terms for all RAP parties engaged for cultural heritage works. Invoice templates will be distributed.
- Iluka's response to unexpected finds made within project development envelope in 2024.
- Proposed Solar Farm salvage and collection works for March/April 2025.
- Proposed RAP Recruitment Drive for 2025 and opportunities for engagement with the Iluka Indigenous Affairs Team.

Minutes of both the meetings is uploaded on the Iluka website [Balranald Engagement Hub](#) in accordance with Condition 10 of Schedule 5 of SSD-5285.

Iluka is committed to protecting and preserving Aboriginal Cultural Heritage and consulting with Traditional Owners on all Cultural Heritage matters.

Annual Community Meeting

Annual Community Meeting was held on 06 December 2024. The meeting involved Iluka, Local Landcare Group, NSW Local Lands Services and Balranald Community Landowners to discuss the following:

- Biosecurity issues affecting agricultural land, and impacting on endemic fauna species within the Shire.
- Local government initiatives for pest population control and assistance with access to pest management resources (baits, etc.)
- Project update on status of Mine's construction schedules including upcoming transport of deliveries to site.

Community consensus was reached on simultaneous deployment of baits be organised to maximise bait uptakes. Contact details were provided to the community to assist with better access to baits.

Balranald Shire Council

Iluka was in regular communication with BSC and has continued to negotiate the VPA and RMA. Whilst most elements of the VPA and RMA have been agreed to in principle, it was unlikely to be formalised prior to 31 January 2024. An extension to 30 July 2024 was granted by DPE on 22 December 2023 to finalise the details about the balance of the contributions and road maintenance framework and to fully execute the VPA.

The VPA and RMA was endorsed by the Council on 30 July 2024, a copy of the signed agreement was forwarded to the Department.

Iluka have been consulting with BSC regarding the formation of the Community Partnerships Committee, which will administer the VPA. The Committee will consist of Iluka personnel, members of Council and community members. The Terms of Reference (ToR) were drafted and forwarded to Council for review and comment. It is proposed that the committee be formed during Q2 2025.

BSC and TfNSW were consulted regarding the approved Oversize Over mass (OSOM) vehicle route. It was agreed by both roads authorities that the approved route (2016) was no longer fit for purpose and an alternative route was preferred.

Iluka requested to the Department a change to the OSOM on 9 December 2024 and an exemption to upgrade two intersection that form part of the originally approved OSOM route.

The proposed OSOM is now via Sturt Hwy and Moa Street through to the Mine Access Road. The Traffic Management Plan will be updated and submitted for the Secretary's approval.

10.3 Community contributions

Iluka's community contributions during the reporting period are summarised below in Table 14.

Table 14: Community contributions made by Iluka during the reporting period

Community group	Sponsorship and donations
Balranald Football Netball Club (BFNC)	Sponsorship over 4 year term to make improvements to the clubs facilities.
Balranald Murrumbidgee Classic	Sponsorship for Murrumbidgee Classic 2024 fishing competition.
Balranald NAIDOC Committee	Sponsorship for 2 BBQ for Balranald NAIDOC games and mental health/suicide prevention event.
Homebush Rodeo	Sponsorship for Breakaway Roping event and Junior Steer Ride.
Balranald Cricket Club	Sponsorship for AED, clothing, fridge/freezer for the cricket club.
Balranald Community Arts & Crafts Inc	Donation of 2 laptops, 1 docking stations and a printer.
AFL Wanderers Tour	Sponsorships for uniforms for 3 local young people to attend AFL Wanderers tour to Europe
Balranald branch of Isolated Children's Parents Association of NSW Inc	Sponsorship for ICPA NSW Conference
Wentworth District Meals on Wheels Incorporating Balranald Ass. Inc.	Sponsorship for Balranald Meals on Wheels celebration

11. INDEPENDENT AUDIT

First Independent Environmental Audit was conducted in 2024 for the period of 7 August 2023 to 7 August 2024, by suitably qualified, experienced and independent auditors endorsed by the Secretary in accordance with Condition 8, Schedule 5 of SSD-5285. The copy of the audit report along with Iluka's responses to all the recommendation made in the report, was submitted to the Secretary on 15 October 2024 to fulfil the requirement of Condition 9, Schedule 5 of SSD-5285.

Following key outcomes were drawn from the audit:

- The Management Plans, statutory reports and other post approval documents were up to date.
- Excellent management processes implemented by Iluka to monitor and maintain compliance.
- Monitoring programs were effectively implemented.

The audit identified one non-compliance against Condition 2 of Schedule 2 of SSD-5285, which is discussed in detail in Section 12.

Following improvement opportunities were raised by this audit that were acknowledged by Iluka. Table 15 describes those recommendations and their status.

Table 15: Independent Environmental Audit recommendations and responses

IO-#	Recommendation	Iluka Response and Current Status
IO-2024-01	<p>AEMR Reporting</p> <p>Reports in future AEMRs, the annual averaging period for particulate emissions against the criteria set out in Schedule 3 Condition 7 of the consent.</p>	<p>Complete.</p> <p>Section 7 added to include review of air quality management in 2024 reporting period.</p>
IO-2024-02	<p>Information on the Project webpage</p> <p>Post the minutes of the Aboriginal Cultural Heritage Working Group onto the Iluka webpage within three months of the meeting.</p>	<p>Complete.</p> <p>2 Meetings were held in 2024, meeting minutes of which have been uploaded on the Balranald Engagement Hub webpage.</p>
IO-2024-03	<p>Amendment to the EMS</p> <p>Amend the EMS to nominate a maximum time for which documents listed in Schedule 5 Condition 10 should be updated/uploaded onto the Iluka webpage.</p>	<p>Will be included in next revision.</p>
IO-2024-04	<p>T3 tailing covers</p> <p>Repair damaged covers to the T3 tailings stockpile.</p> <p>Consider the use of soil binder.</p>	<p>The tails stockpile produced from the underground mining trials will be consumed during mining by end of 2025. The stockpile is fenced with shade cloth on the downwind side. Standard dust mitigation measures will be applied as necessary to minimise mitigation of sand tailings.</p>
IO-2024-05	<p>Plant pre-starts and monthly environmental checklist</p> <p>Modify the pre-start checklists and/or the Iluka monthly environmental checklists to include observations to confirm noise controls for plant and equipment are consistent with the manufacturer's specifications.</p>	<p>Complete</p> <p>The environmental inspection sheet has been amended.</p>

IO-#	Recommendation	Iluka Response and Current Status
IO-2024-06	<p>Road Transport Protocol</p> <p>Improve the Road Transport Code of Conduct to explicitly include river awareness to reduce potential noise impacts that may be generated by heavy vehicles such as idling, compression braking, etc.</p>	<p>The transport Management Plan and Road Transport Protocol will be revised prior to haulage of HMC and include measures to reduce potential noise impacts.</p>
IO-2024-07	<p>Monthly Environmental Checklist</p> <p>Include monthly water testing of the T3 process water dam and other relevant water sources in the monthly environmental checklist.</p>	<p>Ongoing</p> <p>Water in the T3 process dam is being tested monthly.</p>
IO-2024-08	<p>Post clearance procedures</p> <p>Ensure that Part D of the FRM-0003 permits are completed post-clearance to ensure the conditions were followed and any learnings can be integrated into the procedures.</p>	<p>Part D of the Site Disturbance Permit are completed once the permit is closed. A new version is saved as pdf.</p>
IO-2024-09	<p>Correct reference to pre-clearing procedures.</p> <p>Update the FRM-0003 form code to align with the code stated in the BMP (FRM-6126) or update the BMPs to change the code to FRM-0003.</p>	<p>The document reference will be updated in the BMP during its next revision.</p>
IO-2024-10	<p>Pre-clearance inspections</p> <p>Incorporate pre-clearance weed inspections records into the FRM-0003/FRM-6126) clearing permits.</p>	<p>Complete</p>
IO-2024-11	<p>Aboriginal cultural heritage working group</p> <p>When the ACHWG is meeting and producing meeting papers as the ACHWG for the project, this needs to be reflected in their agendas and minutes.</p>	<p>Complete</p> <p>The meeting agenda and minutes template is amended to reflect the correct name of the group “Aboriginal Cultural Heritage Working Group”</p>

IO-#	Recommendation	Iluka Response and Current Status
IO-2024-12	<p>Subsurface Archaeological Testing Program Amend section 6.2 of the ACHMP to include: involvement in the survey and investigation works by local Aboriginal stakeholders and the Aboriginal Cultural Heritage Working Group, as required by Conditions 19(b) and 20(b)(ii). cross-referencing where the megafauna assessment requirements are covered in the ACHMP, so that Section 6.2 covers all the requirements for the Subsurface Archaeological Testing Program.</p>	<p>The proposed changes will be included in the next revision of the ACHMP.</p>
IO-2024-13	<p>Refuelling area Provide a bunded concrete apron at the T3 Compound refuelling area to capture miscellaneous spills and prevent localised hydrocarbon contamination.</p>	<p>Complete</p> <p>A grated pit has been installed since the date of the site inspection at the fuelling facility to capture any hydrocarbon spills.</p>

To comply with Condition 8, Schedule 5 of SSD-5285, the second Independent Environmental Audit will be conducted in 2027.

12. INCIDENTS AND NON-COMPLIANCE

12.1 Non-compliances

One non-compliance was recorded during the reporting period 2024 that was reported to the Secretary, details of which is outlined below.

Non-compliance:

- Work outside the project boundary occurred on the 23 May 2024 when the contractor (working for Iluka) was clearing dense Chenopod Sandplain Mallee Woodland with an excavator to install boundary fence-line adjacent the mine access road within the approved disturbance boundary. The digger operator realised he had missed the pegged alignment and gone outside the approved clearing area.
- Figure 6 and Figure 7 depicts the location of the incident.

Approval Condition:

- Schedule 2 Condition 2 of SSD-5285
- Condition 1 of EPBC 2012/6509

Immediate actions taken:

- Operator notified Iluka Site Supervisor, who notified the Environmental Superintendent who assessed the area on 24 May 2024 and identified clearing had occurred outside the approved disturbance boundary;
- All clearing works were suspended until further notice;
- GPS coordinates and photographs were taken of the clearing;
- Incident report was raised and internal notifications to Senior Management.

Regulator notifications:

- Following regulatory agencies were notified with the preliminary investigation report on 23 May 2024 followed by a detailed investigation (5WHYs) report on 21 June 2024:
 - Department of Planning, Housing and Infrastructure (DPHI)
 - Department of Climate Change, Energy, the Environment and Water (DCCEEW)
 - Resources Regulator (RR)
- The DPHI assessed the incident to be determined as a breach to condition of SSD-5285 in their response letter dated 26 June 2024.
- A response from Resources Regulator on 06 June 2024 advised that the incident was not identified as a breach under EL7450 (1992) of the Mining Act as the clearing was not associated with 'prospecting'.
- No response was received from DCCEEW as of the end of reporting period 2024.

Cause of Incident:

- Following root causes were identified in the investigation:
 - The relevance and importance of the permit and native vegetation protection was not appreciated by the contractor.

Mitigation actions taken:

- The fence was installed to follow the inadvertently cleared area outside the approved disturbance boundary so no further clearing will be required and there is no net increase in disturbance or net loss of biodiversity is incurred, serving the purpose for its construction.

Actions taken to prevent recurrence of the non-compliance:

- Developed a standard procedure for survey marking for vegetation clearance.
- Amended the site disturbance permit procedure to ensure controls are verified and in place prior to works commencing.
- Finalised a procedure that outlines the permitting process and mandatory requirements.
- Developed and delivered an awareness presentation for contractors working under site disturbance permits.
- Reviewed site induction content to ensure sufficient information is provided to personnel regarding site disturbance risks.

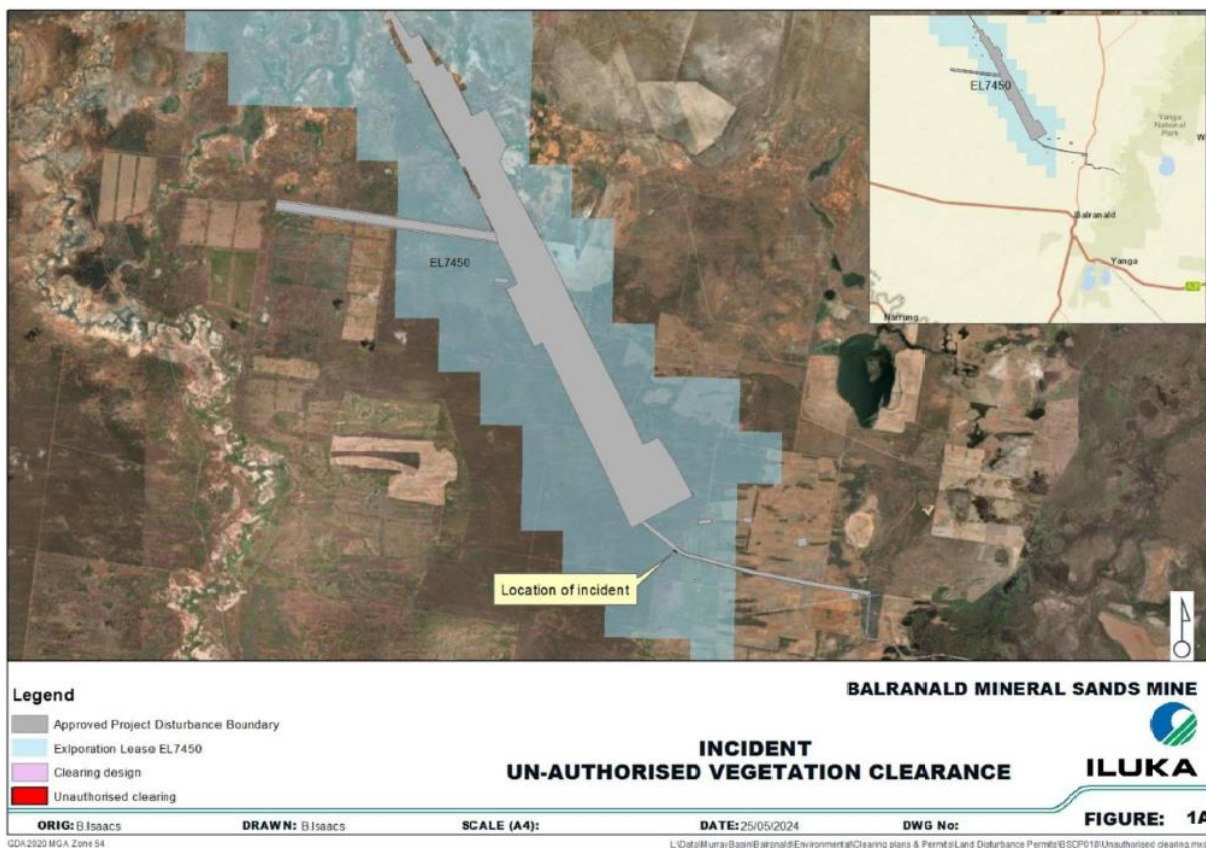


Figure 6: Incident location - unauthorised vegetation clearance - 1

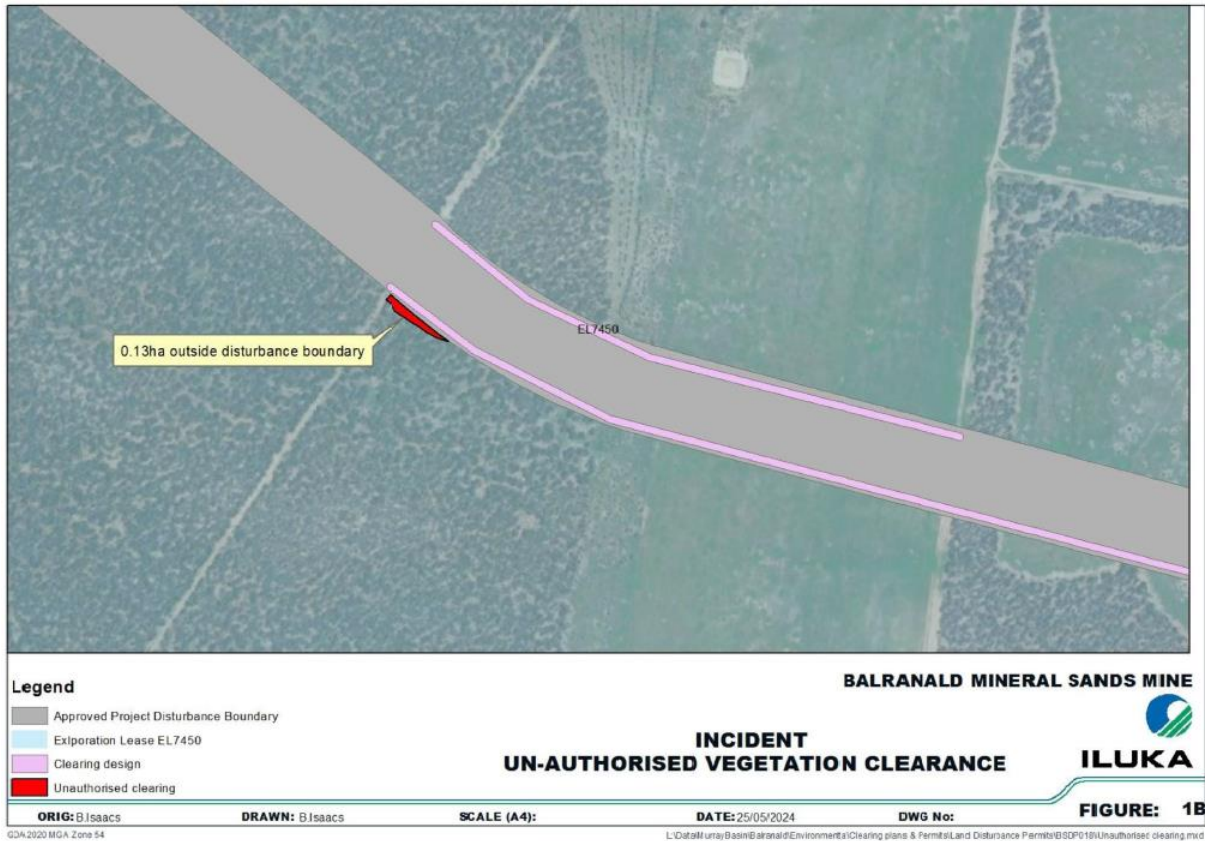


Figure 7: Incident location - unauthorised vegetation clearance – 2

12.2 Reportable incidents or exceedances

One reportable incident was recorded during reporting period 2024 details of which is discussed in Section 12.1.

12.3 Official cautions or warnings

An official letter was issued by DPHI on 26 June 2024 for a non-compliance as a result of the self-reported clearing incident that occurred on 23 May 2024.

Whilst not during the 2024 reporting period, it is noted that an official warning notice was issued by DCCEEW for breach of Condition1 of EPBC Act Approval (EPBC 2012/6509) on 21 February 2025 as a result of self-reporting the clearing incident that occurred on May 23 2024.

13. ACTIVITIES FOR NEXT REPORTING PERIOD (2025)

13.1 Environmental management

Implementation of all environmental monitoring in accordance with the relevant approved environmental management plans will continue in next reporting period.

Quarterly attended noise monitoring will continue during construction and commencement of operations in accordance with the approved Noise Management Plan.

Air quality monitoring for PM₁₀ and PM_{2.5} will continue during construction and commencement of operations using a continuous particulate monitor to obtain data and provide ongoing compliance monitoring for air quality. Air quality monitoring will be undertaken in accordance with an approved Air Quality Management Plan.

Regional groundwater bore levels will be taken each quarter and samples taken for quality analysis taken once in the reporting period.

Continue to obtain baseline data from Groundwater monitoring bores until the commencement of mining operations. Continue implementing groundwater monitoring in accordance with the approved Water Management Plan.

Following documents will require updating in the next reporting period in preparation for operations in 2025:

- Water Management Plan
- Traffic Management Plan
- Pollution Incident Response Management Plan

13.2 Stakeholder engagement

Balranald Shire Council and Transport for NSW will be consulted during 2025 regarding the remaining required public road upgrades required under Condition 22 of Schedule 3 for the Balranald Mineral Sands Project Development Consent (SSD-5285).

Balranald Shire Council will be consulted regarding the establishment of the Community Partnerships Committee to administer the Voluntary Planning Agreement (VPA), which will involve both parties agreeing to the Terms of Reference and nomination of members from Iluka, Council and the community.

Consultation with RAPs will continue in 2025 to maintain the Aboriginal Cultural Heritage Working Group. The group will meet at least twice per year, and will be an advisory committee which Iluka will work with in relation to ongoing management of Aboriginal heritage associated with the project.

Community consultation will be undertaken over the next reporting period, including attending community events, providing project updates and responding to queries or complaints during the construction phase.

13.3 Approval conditions triggered during next reporting period

Approval conditions to be triggered during the next reporting period are listed in Table 16.

Table 16: Approval conditions to be triggered during the next reporting period

Action	Source	Timing
Implement remaining road upgrade works detailed in Table 8 & 9 of SSD-5285	SSD-5285 Schedule 3, Condition 22	30 June 2025 (as approved by the Secretary)
Retire stage 1 Offset credits as specified in Table 7 of SSD-5285	SSD-5285 Schedule 3, Condition 16A	Within 24 months of the commencement of disturbance (9 August 2025)
Notify the Department prior to the commencement of the Underground Mining Trial.	SSD-5285 Schedule 2, Condition 11(d)	1 week prior to commencing mining operations.

APPENDICES

Appendix A: Annual Rehabilitation Report 2024



**NSW
Resources
Regulator**

ARR0001399

BALRANALD MINERAL SANDS PROJECT ANNUAL REHABILITATION REPORT

Monday 1 January 2024 to Tuesday 31 December 2024

Summary table

DETAIL	
Mine	Balranald Mineral Sands Project
Reference	ARR0001399
Annual report period commencement date	Monday 1 January 2024
Annual report period end date	Tuesday 31 December 2024
Forward program	FWP0001280
Mining leases	ML 1855 (1992), ML 1736 (1992)
Lease holder(s)	Iluka Resources Limited
Contact	Brendan Isaacs
Date of submission	Thursday 27 February 2025

Important

The department may make the information in your report and any supporting information available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your report to be confidential, please communicate this to the department via the message function on this submission within the NSW Resources Regulator Portal.

Mine details

Project description

Iluka Resources have approval to develop a mineral sands mine in south-western NSW, known as the Balranald Mineral Sands Mine. It includes construction, open-cut mining, primary processing, and rehabilitation of 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, respectively. The Balranald Mine also included undertaking an approved bulk sampling activity at the West Balranald deposit to trial the use of underground mining methods. On 21 December 2022, Iluka were granted approval to modify the consent (MOD1) to expand the underground mining trial which includes an additional area of disturbance to the approved Balranald Mine 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.

Life of mine

10 years

Current development consents, leases and licences

Development consents granted under the *Environmental Planning and Assessment Act 1979*

- SSD-5285
- SSD-5285
- SSD-5285
- SSD-5285
- SSD-5285
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- SSD-5285

Authorisations covering the mining area granted under the *Mining Act 1992*

ML 1855 (1992), ML 1736 (1992)

Any other approvals, licences, or authorities issued by government agencies that are relevant to the progress of mining operation and rehabilitation activities

Consolidated Development Consent SSD-5285
EPBC Act Approval (2012/6509)
Environmental Protection Licence (20795)

Summary of the scope and/or purpose of the new applications or modifications to existing approvals (if applicable)

No changes have been made to these approvals during the 2024 reporting period.

Changes to land ownership and land use

Lease agreement for part of the Boxdale property (LOT1 DP1301575), this is where the accommodation village is located. No additional changes have been made to the Mine's current landownership and land use during 2024.

Surface disturbance and rehabilitation activities during the reporting period

Surface disturbance and rehabilitation activities that were conducted and an analysis of the progress against the rehabilitation schedule

Approximately 174 ha of native vegetation and cropping land during the 2024 reporting period was cleared within ML1736 and ML1855 for the new mine access haul road, village camp and other ancillary infrastructure, with topsoil and subsoil stockpile volumes listed in the Key Production Milestones table below. Rehabilitation activities are yet to commence.

Rehabilitation planning activities that were conducted, including any specialist studies

No contamination, heritage, landform design or demolition rehabilitation planning activities took place during the reporting period. Iluka Resources was involved in the Annual Homebush Landcare meeting on biosecurity issues affecting local agricultural land, specifically foxes, pigs and rabbits. Outcome of the planning meeting was to organise coordinated baiting times to maximise culling of vertebrate pests within the local Shire.

Overview of subsidence repair and/or remediation works undertaken

No subsidence repair or remediation works took place during the reporting period.

Overview of rehabilitation management and maintenance activities

No land rehabilitation undertaken during the reporting period. Feral animal and weed control were undertaken in 2024 with targeted biosecurity measures to reduce population numbers within the Mining Lease. Bait laced with 1080 were used to control feral foxes and pigs, and noxious weed specific pesticide to kill off Bathurst burr infestations. Erosion control works during the construction phase of the Mine included installation of silt fencing, drainage systems with culverts on either side of the mine access haul road were constructed.

Details of any rehabilitation actions taken as required by any letters, notices or directions issued by government agencies, including the NSW Resources Regulator

No rehabilitation directives required nor issued by any government agency to Balranald Mineral Sands Mine during the reporting period.

Details of any rehabilitation areas that have achieved the final land use

No rehabilitation activities undertaken during the 2024 reporting period.

Key production milestones

MATERIAL	UNIT	FWP0001280 YEAR 1	THIS REPORT
Stripped topsoil <small>(if applicable)</small>	(m ³)	355,000	216,947
Rock/overburden	(m ³)	155,000	21,348
Ore	(Mt)	0	0
Reject material¹	(Mt)	0	0
Product	(Mt)	0	0

¹ This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

Disturbance and rehabilitation statistics

Current disturbance and rehabilitation progression

ELEMENT	UNIT	THIS REPORT
A Total surface disturbance footprint	(ha)	229.45
B Total active disturbance	(ha)	229.45
C Land prepared for rehabilitation	(ha)	0
D Ecosystem and land use establishment	(ha)	0
E Ecosystem and land use development	(ha)	0
F Rehabilitation completion	(ha)	0

Rehabilitation key performance indicators (KPIs)

ELEMENT	UNIT	THIS REPORT
G Total new active disturbance area	(ha)	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
H New rehabilitation commenced during annual reporting period	(ha)	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
I Established rehabilitation	(ha)	0
J Annual rehabilitation to disturbance ratio	%	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
K Rehabilitated land to total mine footprint	%	0

Progressive achievement of established rehabilitation

ELEMENT	UNIT	THIS REPORT
L Established rehabilitation - agricultural final land uses	%	0
M Established rehabilitation - native ecosystem final land uses	%	0
N Established rehabilitation - other/non-vegetated final land uses	%	0

Variation to the rehabilitation schedule

Identify the components of the most recent forward program that were not achieved

N/A

Key factors that delayed progressive rehabilitation

N/A

Outline actions that will be included in the forward program and carried out to minimise disturbance and undertake progressive rehabilitation as far as reasonably practical

N/A

Rehabilitation monitoring and research findings

Rehabilitation monitoring

The rehabilitation monitoring carried out in the annual reporting period

Nil

Status of performance against rehabilitation objectives and rehabilitation completion criteria

The monitoring program that has been implemented

No, the mine did not have rehabilitated areas and not yet reached Landform Establishment Phase.

Are all rehabilitation areas in Landform Establishment phase or higher represented in the monitoring program to assess performance against the rehabilitation objectives and approved or, if not yet approved rehabilitation completion criteria and final landform and rehabilitation plan?

0

Year rehabilitation areas will be included as part of the monitoring program

2028

An appraisal of whether rehabilitation is moving towards achieving the proposed rehabilitation objectives, approved or, if not yet approved, rehabilitation completion criteria and final landform and rehabilitation plan as soon as reasonably practicable.

No rehabilitation undertaken to date, site in construction phase.

Appraisal description

Rehabilitation is moving towards achieving the final land use as soon as reasonably practicable.

Rehabilitation monitoring program findings

No rehabilitation monitoring program carried out as the mine site (including ancillary infrastructure) is currently under construction during the reporting period. Monitoring of vertebrate pest animal and declared weeds species were conducted and control measures were implemented during the reporting period. Monitoring inspections of water storages and drainage infrastructure were undertaken during the reporting period to ensure stormwater runoff and sediment is being captured and not being discharged offsite while construction works were ongoing.

Performance issues and their causes including identification of any knowledge gaps that must be addressed

Nil

Outcomes of rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	STATUS	ON TRACK?
RRT0001115	Lime dosing optimisation	The objective of this study is to identify the minimum limestone addition rate that meets Iluka's environmental obligations and maintains low environmental risk into the future.	The following scope of work has been developed to deliver the project objectives: <ul style="list-style-type: none"> • STAGE 1 – Review and risk assessment. • STAGE 2 – Scope and plan geochemical laboratory work programme. • STAGE 3 – Geochemical laboratory work program, impact assessment, and limestone amendment procedures. • STAGE 4 – Reporting and final limestone requirements. 	30 Jun 2025	Ongoing	Yes
RRT0001135	Remote dozer trials	To confirm that areas previously mined using underground mining method are geotechnical stable for final landform establishment.	Remotely operated dozer and tow behind compactor will be deployed on previously mined areas where subsidence was observed during the T3 trials.	30 Jun 2025	Ongoing	Yes
RRT0001136	Remote dozer trials	To confirm that areas previously mined using underground mining method are geotechnical stable for final landform establishment.	Remotely operated dozer and tow behind compactor will be deployed on previously mined areas where subsidence was observed during the T3 trials.	30 Jun 2025	Not started	Yes

Outcomes of completed trials and research

N/A

Attachment 1 – Reporting Definitions

REPORTING CATEGORY	DEFINITION
<p>A1 Total disturbance footprint – surface disturbance</p>	<p>All areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to surface disturbance activities.</p> <p>The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion (see definitions below).</p> <p>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.</p>
<p>A2 Underground Mining Area</p>	<p>Underground mining operations areas/subsidence management areas.</p>
<p>B Total active disturbance</p>	<p>Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).</p>
<p>C Rehabilitation – land preparation</p>	<p>Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.</p> <p>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation.</p>

REPORTING CATEGORY	DEFINITION
D Ecosystem and land use establishment	<p>Includes the area which has been seeded/planted with the target vegetation species for the intended final land use. However, vegetation has not matured to a stage where it can be demonstrated that it will be sustainable for the long term and or require only a maintenance regime consistent with target reference/analogue sites.</p> <p>Typically, rehabilitation areas would be in this phase for at least two years (and usually more) before rehabilitation can be classified as being in the ecosystem and land use development phase. This phase does not apply to infrastructure areas that are being retained as part of final land use for the site.</p>
E Ecosystem and Land Use Development	<p>Rehabilitation has matured to a level where target revegetation outcomes are on a trajectory towards meeting the final rehabilitation objectives and rehabilitation completion criteria (as verified by monitoring).</p> <p>This phase includes infrastructure areas that are to be retained for an approved post mining land use, following completion of all necessary measures to render the infrastructure fit for this purpose (for example structural integrity).</p>
F Rehabilitation Completion	<p>The NSW Resources Regulator has determined in writing that the mining area has achieved the approved rehabilitation objectives and approved rehabilitation completion criteria and final landform and rehabilitation plan following the submission of <i>Form: ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate and/or notification of mine or petroleum site closure</i>.</p>
G New active disturbance area	<p>The area of any new active disturbance that has been created during the annual reporting period (definition A1 in Table 5).</p>
H New rehabilitation commenced during annual reporting period	<p>The sum of any new rehabilitation commenced in the annual reporting period. These areas may be in the rehabilitation land preparation phase or the ecosystem & land use establishment phase (definitions C and D in Table 5).</p>
I Established rehabilitation (hectares)	<p>The total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5).</p>

REPORTING CATEGORY	DEFINITION
<p>J Annual rehabilitation to disturbance ratio</p>	<p>The rehabilitation to disturbance ratio (H/G) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the year. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that year are the same.</p>
<p>K % Rehabilitated land to total mine footprint</p>	<p>The proportion of the total mine footprint (area of land that has been disturbed by past or present surface disturbance activities) that has established rehabilitation ($I/A1 \times 100$). For open cut mining, the proportion of the total mine footprint verified to be “established rehabilitation” should substantially increase as an operation progresses towards mine closure.</p>
<p>L Established rehabilitation for agricultural final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5) that have been returned to an agricultural final land use.</p>
<p>M Established rehabilitation for native ecosystem final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or rehabilitation completion phase (definitions E & F in Table 5) that have been returned to native ecosystem final land use.</p>
<p>N Established rehabilitation for other/non-vegetated final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E & F in Table 5) that have been returned to other/non-vegetated final land use.</p>

Attachment 2 – Definitions

WORD	DEFINITION
Active	In the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
Active mining phase of rehabilitation	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
Analogue site	In the context of rehabilitation, an analogue site is a ‘reference site’ that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains.
Annual rehabilitation report and forward program	As described in the Mining Regulation 2016.
Annual reporting period	As defined in the Mining Regulation 2016.
Closure	A whole-of-mine-life process, which typically culminates in the relinquishment of the mining lease. It includes decommissioning and rehabilitation to achieve the approved final land use(s).
Decommissioning	The process of removing mining infrastructure and removing contaminants and hazardous materials.
Decommissioning Phase of Rehabilitation	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or ‘fit for purpose’ built infrastructure to be retained for future use(s) following lease relinquishment.

WORD	DEFINITION
Department	The Department of Regional NSW.
Disturbance	See Surface Disturbance.
Disturbance area	<p>An area that has been disturbed and that requires rehabilitation.</p> <p>This may include areas such as on-licence exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped), and areas requiring rehabilitation that are temporarily stabilised (i.e. managed to minimise dust generation and/or erosion).</p>
Domain	<p>An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.</p>
Ecosystem and Land Use Development	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved rehabilitation objectives and completion criteria.</p> <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.</p> <p>This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.</p>
Ecosystem and Land Use Establishment	<p>This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.</p>
Exploration	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
Final landform and rehabilitation plan	As defined in the Mining Regulation 2016.
Final land use	As defined in the Mining Regulation 2016.
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.
Growth Medium Development	<p>This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short lived pioneer species).</p> <p>This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.</p>
Habitat	Has the same meaning as that term under the <i>Biodiversity Conservation Act 2016</i> and the <i>Fisheries Management Act 1994</i> (as relevant).
Indicator	An attribute of the biophysical environment (e.g. pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (i.e. defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
Land	As defined in the <i>Mining Act 1992</i> .
Landform Establishment	<p>This phase of rehabilitation consists of the processes and activities required to construct the final landform.</p> <p>In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).</p>
Large mine	As defined in the Mining Regulation 2016.
Lease holder	The holder of a mining lease.

WORD	DEFINITION
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.
Mine rehabilitation portal	<p>Means the NSW Resources Regulator’s online portal that lease holders must use (via a registered account) to:</p> <ul style="list-style-type: none"> ■ upload rehabilitation geographical information system (GIS) spatial data ■ develop rehabilitation GIS spatial data (using online tracing functions) ■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities. <p>Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of lease holders.</p>
Mining area	As defined in the <i>Mining Act 1992</i> .
Mining domain	A land management unit with a discrete operational function (e.g. overburden emplacement), and therefore similar geophysical characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
Mining land	As defined in the <i>Mining Act 1992</i> .
Native vegetation	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
Overburden	Material overlying coal or a mineral deposit.
Performance indicator	An attribute of the biophysical environment (for example pH, slope, topsoil depth, biomass) that can be used to demonstrate achievement of a rehabilitation objective. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion, that is, a defined end point. It may be aligned to an established protocol and used to evaluate changes in a system.

WORD	DEFINITION
Phases of rehabilitation	<p>The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:</p> <ul style="list-style-type: none"> ■ active mining ■ decommissioning ■ landform Establishment ■ growth medium development ■ ecosystem and land use establishment ■ ecosystem and land use development.
Progressive rehabilitation	<p>The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.</p>
Rehabilitation Completion	<p>The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of <i>Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate</i> application by the lease holder.</p>
Rehabilitation Completion criteria	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation cost estimate	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation management plan	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation objectives	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation risk assessment	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation schedule	<p>The defined timeframes for progressive rehabilitation set out in the forward program.</p>

WORD	DEFINITION
Relevant stakeholders	<p>Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes:</p> <ul style="list-style-type: none"> ■ the relevant development consent authority ■ the local council ■ the relevant landholder(s) ■ community consultative committee (if required under the development consent) or equivalent consultative group ■ affected land holder(s) ■ government agencies relevant to the final land use ■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) ■ local Aboriginal communities, and ■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.
Risk	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
Secretary	The Secretary of the Department.
Security deposit	An amount that a mining lease holder is required to provide and maintain under a mining lease condition, to secure funding for the fulfilment of obligations under the lease (including obligations that may arise in the future).
Surface disturbance	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
Tailings	A combination of the fine-grained solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water ² .
Waste	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

² Commonwealth of Australia (DITR), 2007. *Tailings Management*.

Attachment 3 – Rehabilitation Complaints

DATE	COMPLAINANT	COMPLAINT DETAILS	RESPONSE DETAILS	STATUS OF RESPONSE	DATE RESPONSE COMPLETED (IF APPLICABLE)
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Attachment 4 – Stakeholder consultation

DATE	STAKEHOLDER	CONSULTATION ACTIVITIES AND FORMS	MATTERS SUBJECT TO CONSULTATION	ACTIONS TAKEN
6 Dec 2024	Local Landcare Group, NSW Local Lands Services, Balranald Community Landowners	Annual community meeting with local government representatives held at Homebush Pub.	Biosecurity issues affecting agricultural land, and impacting on endemic fauna species within the Shire; Local government initiatives for population control and assistance with access to pest management resources (baits,etc); Project update on status of the Mine's construction schedules including upcoming transport of deliveries to site.	Contact details provided to community to assist with better access to baits; Community consensus on simultaneous deployment of baits be organised to maximise culling numbers.

Attachment 5 – Plans

Plan 1A_Current status of mining rehab 2024.pdf

Plan 1B_Current landform contours.zip

Annual Report (LARGE MINE) v1.6

Appendix B – Three Year Forward Program 2025 – 2027



**NSW
Resources
Regulator**

FWP0001544

BALRANALD MINERAL SANDS PROJECT FORWARD PROGRAM

Wednesday 1 January 2025 to Friday 31 December 2027

Summary

DETAIL

Mine	Balranald Mineral Sands Project
Reference	FWP0001544
Forward program commencement date	Wednesday 1 January 2025
Forward program end date	Friday 31 December 2027
Forward program revision (if applicable)	
Contact	Brendan Isaacs
Mining leases	ML 1855 (1992), ML 1736 (1992)
Project location	Iluka Resources Limited
Date of submission	Thursday 27 February 2025

Important

The department may make the information in your program and any supporting information available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your program to be confidential, please communicate this to the department via the message function on this submission within the NSW Resources Regulator Portal.

Three-year forecast – surface disturbance activities

Project description

Iluka have approval to develop a mineral sands mine in south-western NSW, known as the Balranald Mineral Sands Mine. It includes construction, open-cut mining, primary processing, and rehabilitation of 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, respectively. The Balranald Mine also included undertaking an approved bulk sampling activity at the West Balranald deposit to trial the use of underground mining methods. On 21 December 2022, Iluka were granted approval to modify the consent (MOD1) to expand the underground mining trial which includes an additional area of disturbance to the approved Balranald Mine 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.

Description of surface disturbance activities

Exploration activities

There are two drilling programs proposed within the next three years. Infill RC-AC drilling is proposed to delineate the geometry of the strand over an area impacted by faulting of the basement at depth. The West Balranald strand elevation is changed by 10 metres between two 400m spaced drill sections at 549,300N and 549,700N in the Balranald local grid system. Prior to mining the northern faulted area, a grade control drill program consisting of between 10 to 16 AC drill holes will be required to refine the strand geometry and this is proposed to be completed in late 2025 to early 2026. Further Sonic drilling will be required in 2026 to support conversion of Indicated Resources to Measured Resource classification in advance of mining activities. Sonic drilling enables upgrading of mineral resources to Measured Resource classification and verifies correlations between the RC-AC and Sonic sample dataset. It is expected that an additional four sections of Sonic drilling will be completed for resource definition during this period.

Construction activities

Construction associated with the approved MOD1 underground mining trial commenced in 2023. Construction and commissioning activities will continue until late 2025. The following will be located within Mining Leases ML1736 and ML1855:

- Processing Plant infrastructure – comprising wet concentrator plant (WCP), floatation plant, and wet high intensity magnetic separation plant (WHIMS);
- timber stockpiles (felled vegetation);
-

Stockpile Emplacement Facility - includes the underground mining area; ore stockpile; and the temporary stockpiles area for topsoil, subsoil and overburden

- Product and Tails Pads – heavy mineral concentrate (HMC), sand tails;
- Liquid Storage Facility - process water (PWD), potassium amyl xanthate (PAX) and fines dams;
- Hydrocarbon Infrastructure – diesel fuel storage and dispensing station
- underground mining infrastructure;
- hardstand and laydown areas;
- site offices, warehousing, workshops, amenities and carparking;
- accommodation camp, services and utilities infrastructure, telecommunications tower;
- Roadway network - Main haul road, mine access roads and internal access tracks

Mining schedule

Mining development method and sequencing and general mine features.

Mineral ore will be extracted to surface by utilising underground bore hole mining technology developed during previous bulk sampling activities. The predicted processing rate is anticipated to be between 50 and 200 tph. Mining stopes and drill pads will be developed at strategic locations within the mining panels to accommodate the directional drill rigs for the extraction of ore and re-injection of fines. An underground pillar will be left after every 11th underground stope or approximately 500m to ensure stability and maintain ground monitoring infrastructure. The extension of the underground mining trial has been approved for up to six years with mining operations scheduled to commence in September 2025.

Areas identified for emplacements, the sequencing of emplacements, construction, and management.

Topsoil, subsoil and overburden will be stockpiled separately, with topsoil stockpiled to a maximum height of 2 m to preserve soil biota and minimise compaction. Subsoil will be stockpiled to a maximum height of 10 m, dependent on soil properties and condition. Stockpile attributes will be recorded including location, placement date, originating vegetation community, material strip depth, soil type, stripping conditions and volumes. Stockpiles will be managed in accordance with the erosion and sediment control measures outlined in the Water Management Plan. Vehicle access to stockpiles will be controlled to prevent further compaction and erosion. Weeds will be managed on topsoil stockpiles to minimise weed seed accumulation and spread. During mining operations topsoil, subsoil and approximately 2 m of overburden will be pre-stripped from the mine path and stockpiled for use in the rehabilitation phase. Sand tailings from ore processing will be placed within the pre-stripped mining voids and the next phase of pre-stripping volumes direct placed. This includes overburden, subsoil and topsoil from the proceeding mining voids. The final landform will be constructed approximately 1-2m above natural surface to account for expected subsidence. Final land form establishment works will be undertaken once subsidence has stabilised according to monitoring results. A “direct strip and replace” approach will then be adopted as the general mining practice where reasonably practicable.

Processing infrastructure activities and the location of tailings facilities and schedule for emplacement.

The processing plant will have a number of circuits including the screening, wet concentrator plant, flotation plant and wet high intensity magnetic separation plant. The ore will be concentrated through the processing plant to generate two primary product streams, magnetic Heavy Mineral Concentrate (HMC) and non-magnetic HMC. HMC will be temporarily stockpiled on site and transported to an off-site location for processing. Two primary tailings streams will be generated. These are fine particle (slimes) and sand tails (Float tails and coarse sand). The sand tails will be dewatered and stockpiled prior to being mechanically placed in the pre-stripped voids ahead of underground mining. The topsoil, subsoil and overburden pre-stripped from these areas prior to the emplacement of the coarse sand tails will be returned in order to achieve a sustainable rehabilitation outcome. The slimes will be reinjected underground in accordance with processes and management measures outlined in the Water Management Plan. Processing is scheduled to commence September 2025, shortly after underground mining commences.

Waste disposal and materials handling operations.

Putrescible waste generation will be disposed of in onsite skip bins, bins will remain covered at all times and replaced on a regular basis by a third party contractor who will dispose of the waste to an appropriately licenced waste facility. There may be an opportunity to manage putrescible waste onsite, this will be identified through potential long-term recycling initiatives developed during the operational phase. Liquid hydrocarbons will be stored within purpose built bunds that can contain 120% of the largest container to fully contain any leakage. Other hydrocarbon waste such as oil filters, fuel filters, oily rags and spill absorbents will be stored separately in plastic bins to prevent leakage of hydrocarbons. Hydrocarbon waste will be collected by a licenced third party contractor and disposed of at an appropriately licenced waste facility. Soils contaminated with hydrocarbons will be collected by scraping up the minimum amount of soil necessary and storing in plastic bins or 1000L shuttles for collection by a licenced third party contractor and disposal to an appropriately licenced waste facility. For larger amounts of contaminated soil, a lined sump may be used to temporarily store contaminated soil for either onsite remediation and disposal in pit below the overburden layer or disposal offsite to an appropriately licenced facility.

Key production milestones

MATERIAL	UNIT	YEAR 1	YEAR 2	YEAR 3
Stripped topsoil <small>(if applicable)</small>	(m ³)	164,770	19,105	112,875
Rock/overburden	(m ³)	449,135	225,660	180,623
Ore	(Mt)	0.16	1.04	1
Reject material¹	(Mt)	0.06	0.47	0.45
Product	(Mt)	0.1	0.57	0.54

¹ This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

Three-year rehabilitation forecast

Rehabilitation planning schedule

Rehabilitation planning schedule

The Rehabilitation Management Plan was updated in November 2024 to include rehabilitation of mining activities approved under the Modification (MOD1) of Development Consent SSD-5285. Prior to the commencement of mining operations in 2025 the mine plan outlining movement of overburden, subsoil and topsoil will be established that includes sequencing and scheduling of material movements ahead of underground mining. A Subsidence Management Plan will be developed prior to commencement of underground mining in 2025 to monitor areas where underground mining has concluded to understand the rate of subsidence and when maximum subsidence is reached to allow final land form establishment to be undertaken.

Stakeholder consultation

Balranald Shire Council will be informed when necessary, as an ongoing commitment to provide updates on the Project's progress with construction works, including when Iluka expect to finish construction and formally commence mining operations (i.e., following successful commissioning of the processing plant). Balranald Shire Council and Transport for NSW will also be consulted regarding the key requirements on road upgrades during the construction of the mine's road network and the transportation of mine infrastructure and building materials. Consultation with Registered Aboriginal Parties (RAPs) will be undertaken as required in the next 3 years. The mine will coordinate with RAPs should they be required to assist in the salvage and recording of any unexpected heritage finds discovered during construction. Consultation with RAPs will continue to maintain the Aboriginal Cultural Heritage Working Group. The group will continue to meet at least twice per year, and will be an advisory committee which Iluka will work with in relation to ongoing management of Aboriginal heritage associated with the project. Consultation with the Resources Regulator will be undertaken as an ongoing commitment as part of the rehabilitation objectives and final land use plans as approved under MOD1 for the site required under the Mining Regulation 2016. Community consultation including attending community events, providing project updates and responding to queries or complaints.

Rehabilitation studies, risk assessments and/or design work

A risk assessment will be conducted to identify risks associated with preparing a final landform post underground mining, this includes the use of remote dozer. Monitoring results and studies from previous underground mining trials will be used to better understand subsidence behaviour and stability issues after the extraction of mineral sands at depth. The outcome of

the studies will inform how the final landform will present and any re-work required prior to ecosystem establishment. The land prepared in front of underground mining operations will be constructed approximately 1-2 m above natural surface and be informed by these studies and local geology. Subsidence will be monitored post mining to build a data set to calibrate the modelled subsidence rate and extent prior to final landform establishment. It is proposed that an un-manned remotely operated dozer will be utilised post mining to initially test geotechnical stability and re-shape landform prior to topsoil placement utilising conventional earthmoving equipment. Surface water management will be in accordance with the approved Water Management Plan and site surface water plans developed when planning to disturb additional areas. Surface water management objectives are to prevent offsite release of turbid water through diversion and sediment dams and re-use of water to maximise efficiency. No final void using underground mining method. No decommissioning works planned.

Rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	STATUS
RRT0001136	Remote dozer trials	To confirm that areas previously mined using underground mining method are geotechnical stable for final landform establishment.	Remotely operated dozer and tow behind compactor will be deployed on previously mined areas where subsidence was observed during the T3 trials.	30 Jun 2025	Not started

Rehabilitation maintenance and corrective actions

No rehabilitation activities were undertaken during the 2024 annual reporting period as construction activities were still ongoing. The Environmental Management Plans (EMPs) were updated and approved in 2024, replacing the care and maintenance EMP to ensure environmental risks associated with construction activities and different phases of rehabilitation are appropriately managed, and mitigated in a timely manner. All rehabilitation areas will be maintained in accordance with the mine's Rehabilitation Management Plan (RMP) and Biodiversity Management Plan (BMP). Inspections and control of declared weeds and vertebrate pests will continue at all mining domains during construction, operations and all phases of rehabilitation. Rehabilitation areas will be inspected after significant rain events to ensure drainage structures are working effectively and there is no significant erosion occurring to landform or stockpiled materials. Maintenance of drainage and erosion control infrastructure will be undertaken where corrective actions are warranted.

Rehabilitation schedule

Resource recovery of felled vegetation, topsoil and subsoil during construction activities of the 2023-2025 Forward Program period was implemented for later use in rehabilitation phases. During the active mining phase, early rehabilitation ("prehab") will progressively be undertaken ahead of underground mining operations to ensure there is 50 m buffer between underground mining and surface disturbance activities. Pre-prepared mining pits (shallow void) of approx. 2.5 m deep will be created by salvaging topsoil, subsoil and overburden then temporarily stockpiled adjacent to the mine path. Once there is sufficient buffer, sand tailings from the processing plant will be returned to the mining pits for encapsulation. The salvaged soil will then be stripped and returned by direct replacement into the voids to a height of 1-2 m above natural ground level. When underground mining is completed, the final landform will be allowed to subside. Sand tailings will be progressively placed in the voids within subsidence zones and risk assessed for geotechnical stability before final land form establishment. Growth medium development will include minor shaping and contour ripping of batter slopes to create a safe, stable and non-polluting landform. Seeding of prepared topsoil areas will occur generally between April-June when seasonal conditions are most favourable for seed germination.

Completion of rehabilitation

No rehabilitation has been completed to date.

Subsidence remediation for underground operations

Monitoring of pre-prepared areas ahead of underground mining will be undertaken from 2025 to establish the rate of subsidence and expected maximum subsidence. This will inform the timing of final landform establishment, and the extent of re-work required for ecosystem establishment.

Progressive mining and rehabilitation statistics

Three-yearly forecast cumulative disturbance and rehabilitation progression

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
A Total surface disturbance footprint	(ha)	289.34	301.65	348.09
B Total active disturbance	(ha)	289.34	301.65	348.09
P Total new area of land proposed for active rehabilitation	(ha)	0	0	0

Rehabilitation key performance indicators (KPIs)

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
O Total new active disturbance area	(ha)	59.89	12.31	46.44
P Total new area of land proposed for active rehabilitation during the reporting period	(ha)			
Q Annual rehabilitation to disturbance ratio				

Attachment 1 – Reporting Definitions

REPORTING CATEGORY	DEFINITION
<p>A Total disturbance footprint – surface disturbance</p>	<p>All areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to surface disturbance activities.</p> <p>The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion (see definitions below).</p> <p>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.</p>
<p>B Total active disturbance</p>	<p>Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).</p>
<p>C Rehabilitation – land preparation</p>	<p>Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.</p> <p>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation.</p>
<p>D Ecosystem and land use establishment</p>	<p>Includes the area which has been seeded/planted with the target vegetation species for the intended final land use. However, vegetation has not matured to a stage where it can be demonstrated that it will be sustainable for the long term and or require only a maintenance regime consistent with target reference/analogue sites.</p> <p>Typically, rehabilitation areas would be in this phase for at least two years (and usually more) before rehabilitation can be classified as being in the ecosystem and land use development phase. This phase does not apply to infrastructure areas that are being retained as part of final land use for the site.</p>

REPORTING CATEGORY	DEFINITION
O	The area of any new active disturbance that will be created during the next three years, as defined under definition A1 (definition A1 Table 5).
P	The sum of any new rehabilitation to be commenced in the next three years. These areas may be in the phases “Rehabilitation - Land Preparation” or the “Ecosystem & Land Use Establishment” (definitions C & D in Table 5).
Q	The rehabilitation to disturbance ratio (S / R) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the three years. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that period are the same.

Attachment 2 – Definitions

WORD	DEFINITION
Active	In the context of rehabilitation, land associated with mining domains is considered 'active' for the period following disturbance until the commencement of rehabilitation.
Active mining phase of rehabilitation	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
Analogue site	In the context of rehabilitation, an analogue site is a 'reference site' that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains.
Annual rehabilitation report and forward program	As described in the Mining Regulation 2016.
Annual reporting period	As defined in the Mining Regulation 2016.
Closure	A whole-of-mine-life process, which typically culminates in the relinquishment of the mining lease. It includes decommissioning and rehabilitation to achieve the approved final land use(s).
Decommissioning	The process of removing mining infrastructure and removing contaminants and hazardous materials.
Decommissioning Phase of Rehabilitation	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or 'fit for purpose' built infrastructure to be retained for future use(s) following lease relinquishment.

WORD	DEFINITION
Department	The Department of Regional NSW.
Disturbance	See Surface Disturbance.
Disturbance area	<p>An area that has been disturbed and that requires rehabilitation.</p> <p>This may include areas such as on-licence exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped), and areas requiring rehabilitation that are temporarily stabilised (i.e. managed to minimise dust generation and/or erosion).</p>
Domain	<p>An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.</p>
Ecosystem and Land Use Development	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved rehabilitation objectives and completion criteria.</p> <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.</p> <p>This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.</p>
Ecosystem and Land Use Establishment	<p>This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.</p>
Exploration	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
Final landform and rehabilitation plan	As defined in the Mining Regulation 2016.
Final land use	As defined in the Mining Regulation 2016.
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department’s website.
Growth Medium Development	<p>This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short lived pioneer species).</p> <p>This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.</p>
Habitat	Has the same meaning as that term under the <i>Biodiversity Conservation Act 2016</i> and the <i>Fisheries Management Act 1994</i> (as relevant).
Indicator	An attribute of the biophysical environment (e.g. pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (i.e. defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
Land	As defined in the <i>Mining Act 1992</i> .
Landform Establishment	<p>This phase of rehabilitation consists of the processes and activities required to construct the final landform.</p> <p>In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).</p>
Large mine	As defined in the Mining Regulation 2016.
Lease holder	The holder of a mining lease.

WORD	DEFINITION
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.
Mine rehabilitation portal	<p>Means the NSW Resources Regulator’s online portal that lease holders must use (via a registered account) to:</p> <ul style="list-style-type: none"> ■ upload rehabilitation geographical information system (GIS) spatial data ■ develop rehabilitation GIS spatial data (using online tracing functions) ■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities. <p>Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of lease holders.</p>
Mining area	As defined in the <i>Mining Act 1992</i> .
Mining domain	A land management unit with a discrete operational function (e.g. overburden emplacement), and therefore similar geophysical characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
Mining land	As defined in the <i>Mining Act 1992</i> .
Native vegetation	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
Overburden	Material overlying coal or a mineral deposit.
Performance indicator	An attribute of the biophysical environment (for example pH, slope, topsoil depth, biomass) that can be used to demonstrate achievement of a rehabilitation objective. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion, that is, a defined end point. It may be aligned to an established protocol and used to evaluate changes in a system.

WORD	DEFINITION
Phases of rehabilitation	<p>The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:</p> <ul style="list-style-type: none"> ■ active mining ■ decommissioning ■ landform Establishment ■ growth medium development ■ ecosystem and land use establishment ■ ecosystem and land use development.
Progressive rehabilitation	<p>The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.</p>
Rehabilitation Completion	<p>The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of <i>Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate</i> application by the lease holder.</p>
Rehabilitation Completion criteria	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation cost estimate	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation management plan	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation objectives	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation risk assessment	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation schedule	<p>The defined timeframes for progressive rehabilitation set out in the forward program.</p>

WORD	DEFINITION
Relevant stakeholders	<p>Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes:</p> <ul style="list-style-type: none"> ■ the relevant development consent authority ■ the local council ■ the relevant landholder(s) ■ community consultative committee (if required under the development consent) or equivalent consultative group ■ affected land holder(s) ■ government agencies relevant to the final land use ■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) ■ local Aboriginal communities, and ■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.
Risk	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
Secretary	The Secretary of the Department.
Security deposit	An amount that a mining lease holder is required to provide and maintain under a mining lease condition, to secure funding for the fulfilment of obligations under the lease (including obligations that may arise in the future).
Surface disturbance	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
Tailings	A combination of the fine-grained solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water ² .
Waste	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

² Commonwealth of Australia (DITR), 2007. *Tailings Management*.

Attachment 3 – Plans

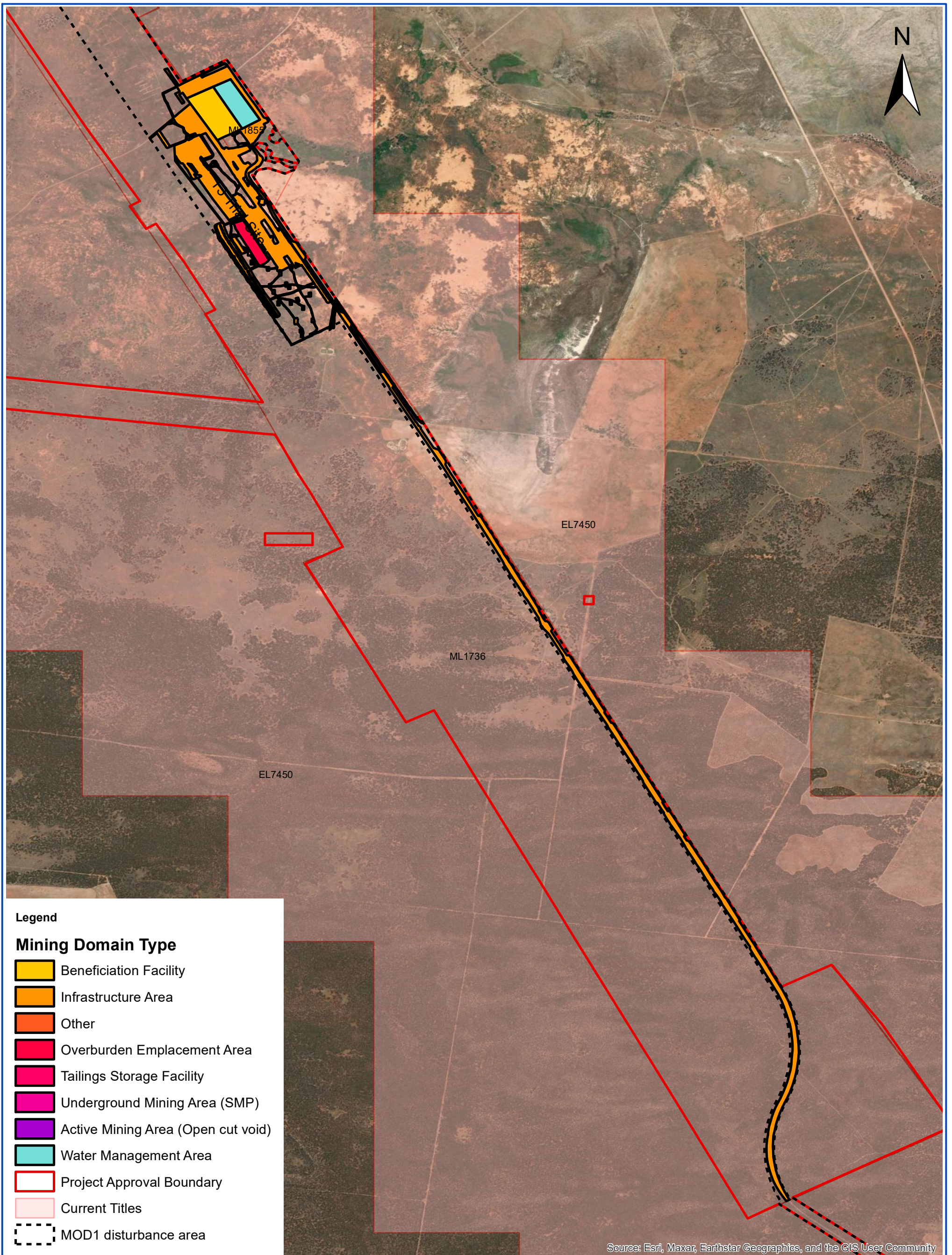
Plan 2A_Forecast Data Year 1_2025.pdf

Plan 2B_Forecast Data Year 2_2026.pdf

Plan 2C_Forecast Data Year 3_2027.pdf

Forward Program (LARGE MINE) v2.1

Appendix C – Plan 1 – Current status of mining and rehabilitation



Legend

Mining Domain Type

- Beneficiation Facility
- Infrastructure Area
- Other
- Overburden Emplacement Area
- Tailings Storage Facility
- Underground Mining Area (SMP)
- Active Mining Area (Open cut void)
- Water Management Area
- Project Approval Boundary
- Current Titles
- MOD1 disturbance area

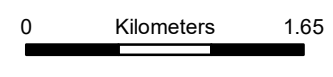
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BALRANALAD MINERAL SANDS PROJECT

Theme Submission ID Number

PLAN 1A: CURRENT STATUS OF MINING AND REHABILITATION

Disturbance: 8974
Project Approval Boundary: 6138

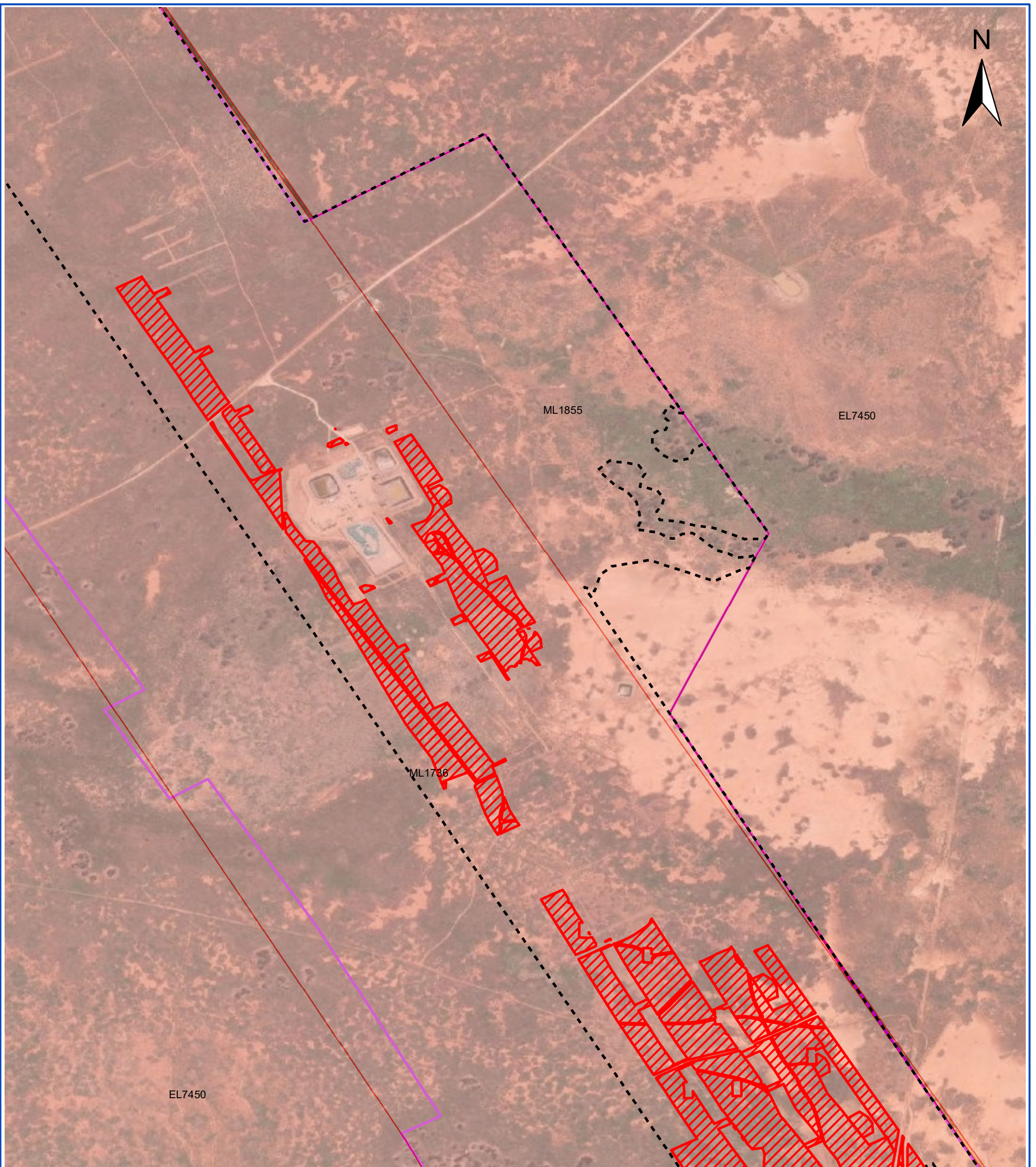


GCS GDA 1994



Plan Date: 16/02/2025







Appendix D – Plan 2 – Forecast disturbance and rehabilitation years 2025-2027



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

Legend

Forecast Area

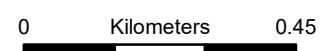
-  Forecast Disturbance
-  Forecast Land Prepared for Rehabilitation
-  Ecosystem and Land Use Establishment
-  MOD1 disturbance area
-  TitlesCurrent
-  Project Approval Boundary

BALRANALAD MINERAL SANDS PROJECT

PLAN 2A: MINING AND REHABILITATION- YEAR 1

Theme Submission ID Number

Forecast Data Year 1: 8977
Project Approval Boundary: 6138

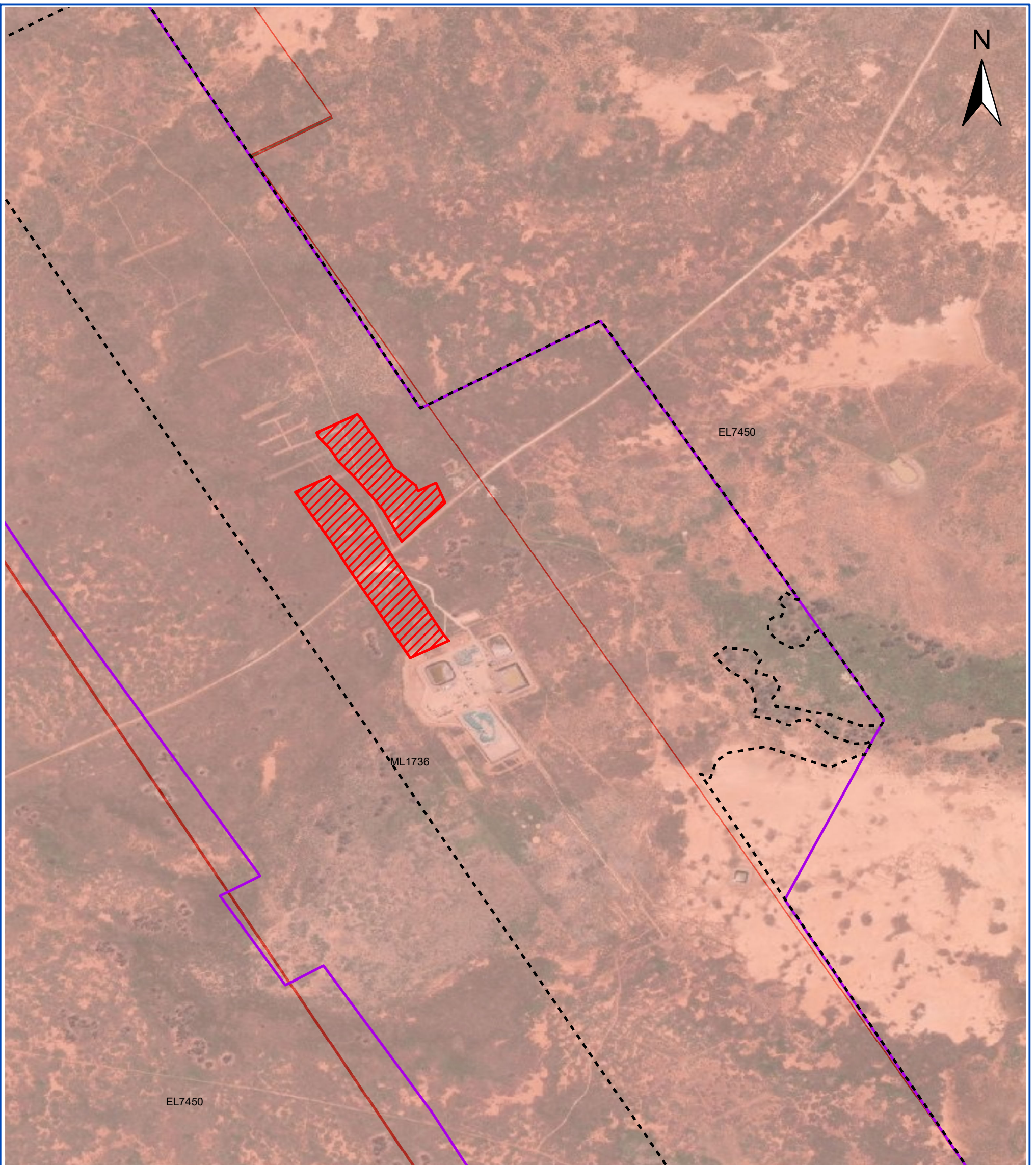


GCS GDA 1994









ILUKA

Plan Date: 16/02/2025



Legend

Forecast Area

-  Forecast Disturbance
-  Forecast Land Prepared for Rehabilitation
-  Ecosystem and Land Use Establishment
-  MOD1 disturbance area
-  Project Approval Boundary
-  Minerals-Current Titles

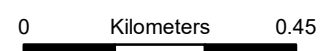
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BALRANALAD MINERAL SANDS PROJECT

PLAN 2A: MINING AND REHABILITATION- YEAR 2

Theme Submission ID Number

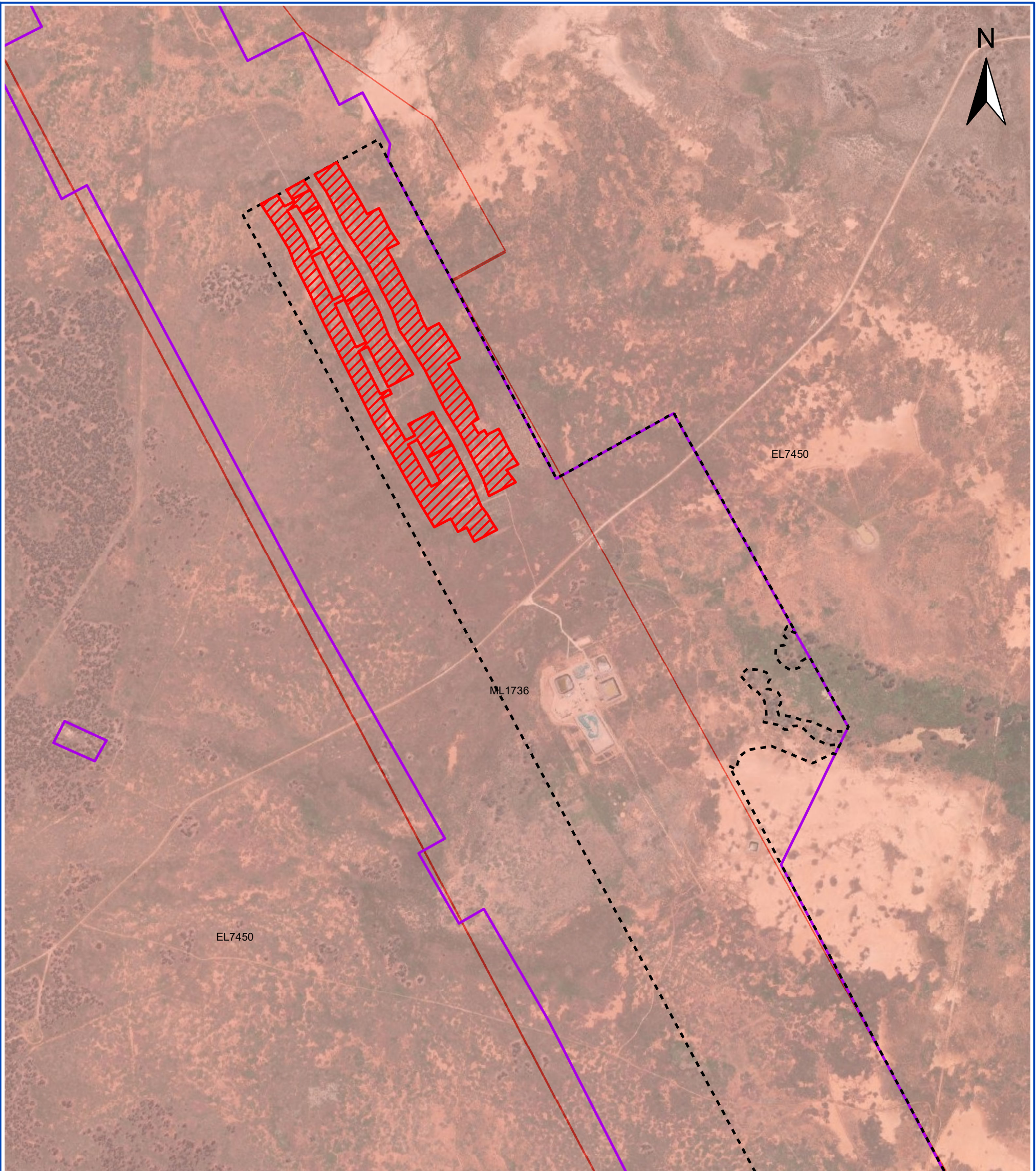
Forecast Data Year 2: 9055
Project Approval Boundary: 6138



GCS GDA 1994









Plan Date: 16/02/2025



Legend

Forecast Area

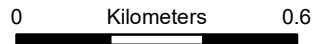
-  Forecast Disturbance
-  Forecast Land Prepared for Rehabilitation
-  Ecosystem and Land Use Establishment
-  MOD1 disturbance area
-  Project Approval Boundary
-  Minerals-Current Titles

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

BALRANALAD MINERAL SANDS PROJECT

PLAN 2C: MINING AND REHABILITATION- YEAR 3

Theme Submission ID Number
 Forecast Data Year 3: 9057
 Project Approval Boundary: 6138



GDA2020 MGA Zone 54



Plan Date: 17/02/2025

Appendix E – Balranald west mine vegetation clearing report 2024



BALRANALD WEST MINE

VEGETATION CLEARING REPORT 2024

Document Number: BVCR002

Revision	Details Of Review Or Changes	Date Created	Document Reference
0	Clearing report for 2024 (1 Jan to 31 Aug)	31/8/2024	BVCR002
1	Clearing report for 2024 (1 Jan to 31 Dec)	13/3/2025	BVCR002

Iluka Resources Limited
 ABN 34 008 675 018
 L17, 240 St Georges Terrace Perth TABLE OF CONTENTS

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INTRODUCTION

1. PURPOSE AND SCOPE

The purpose of this clearing report is to document vegetation clearing activities undertaken from 1 January 2024 to 31 December 2024 in accordance with the Commonwealth Biodiversity Management Plan and the NSW Biodiversity Management Plan for the Balranald Mineral Sands West Balranald Mine.

2. BACKGROUND

Iluka has approval to develop a mineral sand mine in south-western (NSW), known as the Balranald Project. It includes construction, mining, primary processing, and rehabilitation of 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, respectively.

Development consent (SSD-5285) was granted for the Balranald Project by a delegate of the NSW Minister for Planning under the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 5 April 2016 (herein referred to as the consent). Approval was also granted under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2012/6509) by a delegate of the Commonwealth Minister for the Environment on 6 January 2017 (herein referred to as the Commonwealth approval). The project EIS was supported by a Biodiversity Assessment prepared by Niche Environment and Heritage Pty Limited in 2016 (Niche 2016).

Since the consent was granted, Iluka undertook some of the approved bulk sampling activity between 2016 and 2020, involving the extraction of the mineral ore from depth using trial underground mining within the approved disturbance area of the West Balranald deposit. On 21 December 2022, Iluka were granted approval to modify the consent (MOD1) to expand the underground mining trial which includes 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.

Construction of the West Balranald Mine Underground Mining Operation officially commenced on 7 August 2023. Construction involves the clearing of vegetation for the development of mining infrastructure.

3. METHODS

3.1 Corben's Long-eared Bat habitat

Hollow bearing tree (HBT) surveys were undertaken by EMM Consulting Pty Ltd (EMM) in September 2022 within MOD1 areas mapped as medium, medium-high tree hollow density, findings were reported in the Balranald Mineral Sands Project Modification 1 EPBC Biodiversity Pre-disturbance Survey Report (EMM 2022).

Identified HBTs were located using a hand held GPS and demarcated in the field with flagging tape for identification during clearing. Two Site Disturbance Permits (BSDP008 & BSDP017) were approved by the ERCR Superintendent and issued to the clearing contractor for clearing.

Clearing areas were demarcated in the field by a qualified surveyor with pegs and flagging tape prior to clearing works.

The surrounding vegetation was first cleared using an excavator around the HBTs before clearing the HBTs a minimum of 48 hours later. The felled HBTs were then relocated into stockpiles at least 24 hours after being felled.

Where HBTs were isolated (i.e. no surrounding woodland vegetation) they were pushed over and left in situ for 24 hours before being relocated to stockpiles.

3.2 Malleefowl habitat

Targeted Malleefowl surveys were undertaken by EMM in September 2023 (Appendix 1) within the MOD1 disturbance area and up to 200m around this area. Only one mound (BMW2) within the 200m buffer zone was confirmed as active as of 7 September 2023 (Figure 3).

Iluka internal Site Disturbance Permit (BSDP008) was approved by the Iluka ERCR Superintendent and issued to the clearing contractor for clearing. A 200m buffer around the active Malleefowl mound (BMW2) was established and shown on all clearing plans. No vegetation clearing was permitted within the 200m buffer until breeding had ceased and confirmed by a suitably qualified environmental professional.

The active mound was monitored by the Environmental Rehabilitation and Community Relations (ERCR) Superintendent using a remote camera to observe activity during the breeding season and to determine when breeding has ceased.

3.3 Raptor nests

In September 2023, EMM conducted surveys to identify potential active raptor nests and reported findings in the Balranald Mineral Sands Project Malleefowl and raptor pre-disturbance survey report (EMM 2023). One small nest was located within MOD1 with four more located just outside MOD1, which would not be impacted by development.

Raptor nests were checked for the presence of eggs and chicks using a drone on 21 November 2023 by the ERCR Superintendent.

4. RESULTS

4.1 Corben's Long-eared Bat habitat clearing

Clearing of Corben's Long-eared Bat habitat and HBTs in the northern part of the mine access road occurred between 14 February and 28 February 2024 (Figure 2). Clearing of Corben's Long-eared Bat habitat and HBTs in the southern extent of the mine access road occurred between 19 April and 24 April 2024 (Figure 1). The HBTs were situated within Spinifex Dune Mallee and Chenopod Sandplain Mallee Woodlands. A total of 10.77 Ha of vegetation was cleared within Corben's Long-eared Bat habitat mapped as medium and medium-high hollow tree density.

Table 1 shows the dates surrounding vegetation was cleared, dates when HBTs were removed and the dates HBTs were relocated to stockpiles. Figure 1 and Figure 2 shows the locations of HBTs.

Table 1- Details of HBTs removed

HBT identification number	Date surrounding vegetation cleared	Date HBTs felled	Date HBTs relocated to stockpiles
5, 8, 31, 34, 39, 40, 43, 48, 62, 65, 94, 95, 99, 100, 102, 103, 104, 105, 107, 108, 109, 111, 112, 113, 114, 115, 116, 118, 120, 123, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 165, 166, 167, 168, 169, 170, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203	19/04/2024	22/04/2024	24/04/2024
204, 207, 210, 218, 219, 221, 229, 231, 233, 236, 240, 246, 248, 253, 254, 256, 257, 259, 260, 261, 262, 265, 267, 268, 269, 270, 276, 283, 285, 288, 289, 292, 294, 295, 298, 301, 302, 305, 308, 310, 311, 321, 322, 324, 326, 327, 328, 329, 330, 333, 335	25/02/2024	28/02/2024	29/02/2024
214, 318	14/02/2024	20/02/202	27/02/2024
330	15/02/2024	20/02/2024	27/02/2024
264, 271, 274, 290, 293	20/02/2024	24/02/2024	27/02/2024
205, 206, 209, 225, 227, 232, 238, 239, 255, 260, 273, 275, 277, 281, 282, 299, 300, 303, 312, 315, 319, 320, 331, 337, 339, 340	25/02/2024	28/02/2024	29/02/2024



Legend

- HBTs
- ▭ Clearing boundary
- ▭ MOD1 disturbance boundary

**BALRANALD WEST MINE
CORBEN'S LONG-EARED BAT HABITAT
VEGETATION CLEARING 2024**



Figure 1A

ORIG: B.Isaacs

DRAWN: B.Isaacs

SCALE (A4):

DATE: 5/01/2024

DWG No:

GDA2020 MGA Zone 54

L:\Data\WurrayBasin\Balranald\Environmental\Disturbance\Vegetation clearing Maps 2024.mxd

Figure 1- Corben's Long-eared Bat habitat clearing 1A



Legend

- HBTs_cipped to clearing bdy
- ▭ Clearing boundary
- ▭ MOD1 disturbance boundary

**BALRANALD WEST MINE
CORBEN'S LONG-EARED BAT HABITAT
VEGETATION CLEARING 2024**



Figure 1B

ORIG: B.Isaacs

DRAWN: B.Isaacs

SCALE (A4):

DATE: 5/01/2024

DWG No:

GDA2020 MGA Zone 54

L:\Data\MurrayBasin\Balranald\EnvironmentalDisturbance\Vegetation clearing Maps 2024.mxd

Figure 2- Corben's Long-eared Bat habitat clearing 1B

4.2 Malleefowl habitat clearing

Malleefowl habitat clearing was undertaken between 14 January –22 February 2024. A total of 45.8 Ha of vegetation was cleared for the future mine access road, comprising of both Spinifex Dune Mallee and Chenopod Sandplain Mallee (Figure 3). One mound (BWM2) was observed to be active during the September 2023 pre-disturbance surveys. This mound was protected with a 200m buffer until no mound activity was observed on remote camera for 5 consecutive days and the mound was deemed inactive from 9 April 2024, work activities within the 200m were completed on 22 April 2024.

Table 2 shows the status of identified mounds at the end of 2024. Figure 3 shows the location of identified mounds.

Table 2- Malleefowl mound status

Mound identification number	Mound status	Mound active (Y/N)
BWM1	Destroyed 2023	-
BWM2	Protected	N
BWM3	Destroyed 2023	-
BWM4	Destroyed 2023	-
BWM5	Destroyed 2023	-
BWM6	Protected	N
BWM7	Avoided by development	N

4.3 Raptor nest bearing trees

One tree containing a raptor nest (NT1) was cleared outside the breeding season in February 2024.

4.4 Non-threatened species habitat clearing

A total of 183.8 Ha was cleared mainly comprising of cleared agricultural land, Pearl Bluebush Shrubland, Old Man Saltbush Shrubland and Disturbed Annual Saltbush Forbland on Clay Plains (Figure 4).

4.5 Fenceline clearing

Approximately 5 ha was cleared for a new livestock fence along various sections of the mine access road (Figure 5). The average width of the clearing was approximately 8m.

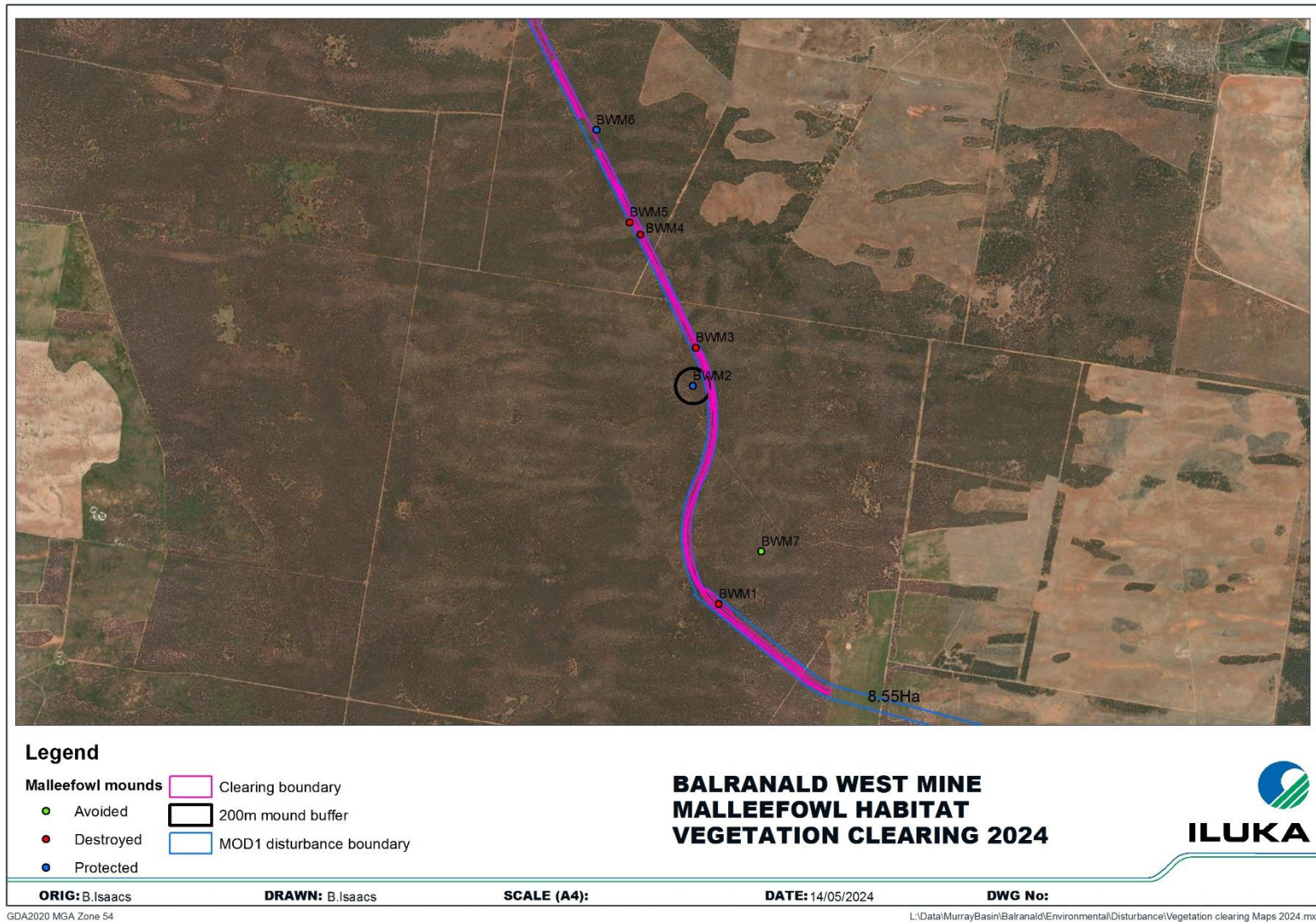


Figure 3- Malleefowl habitat clearing

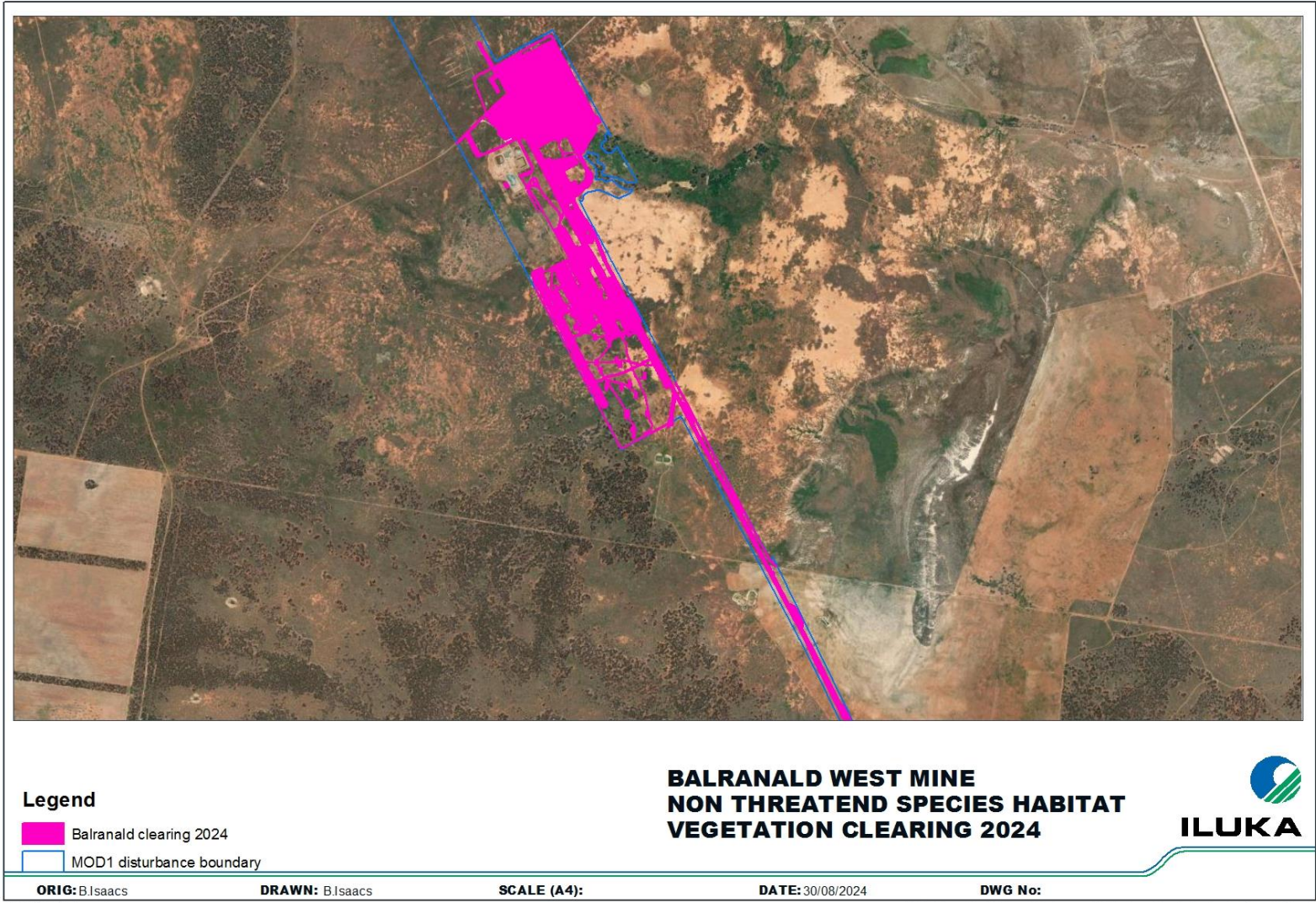


Figure 4- Non-threatened species habitat clearing

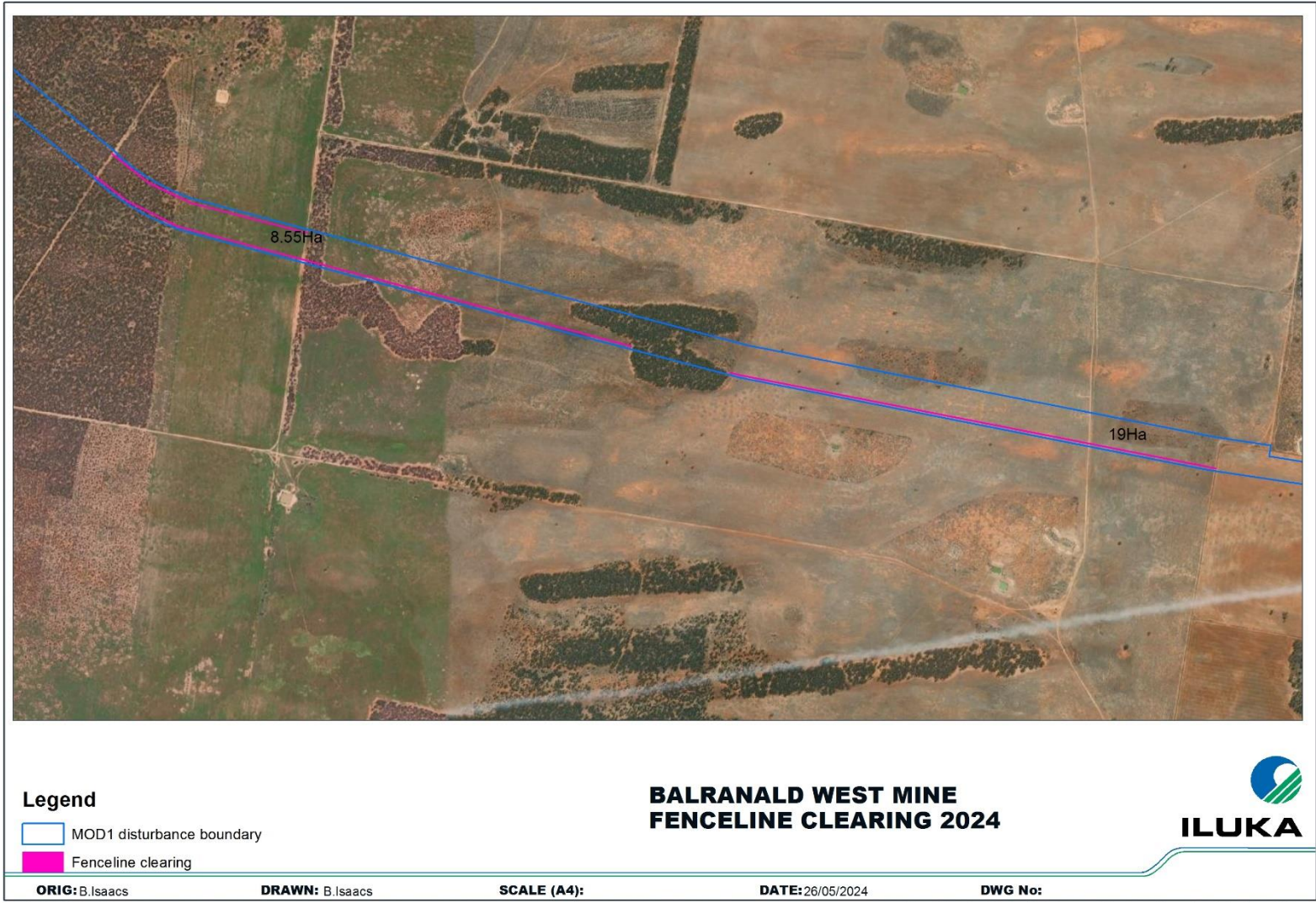


Figure 5- Fenceline clearing

5. CONCLUSION

A total of 240.37Ha of vegetation was cleared during 2024 within the alignment of the mine access road and processing plant area, a breakdown of clearing for each habitat type is provided in Table 3. No threatened fauna species were directly impacted during clearing activities.

Table 3- Vegetation clearing summary

Habitat	Vegetation community(s)	Cleared (Ha)
Corben's Long-eared Bat	Chenopod Sandplain Mallee	3.45
	Cleared-derived native grassland	3.87
	Spinifex Dune Mallee	2.15
	Belah - Pearl Bluebush Woodland	0.6
	Black Box Grassy Open Woodland	0.7
Sub total		10.77
Malleefowl	Spinifex Dune Mallee	11.7
	Chenopod Sandplain Mallee	34.1
Sub total		45.8
Non-threatened species	Cleared agricultural land	8
	Flat Open Claypan / Derived Sparse Shrubland	18.65
	Pearl Bluebush Low Open Shrubland	134.35
	Old Man Saltbush Shrubland	18.2
Fencelines	Spinifex Dune Mallee	0.15
	Chenopod Sandplain Mallee	0.9
	Cleared/Agricultural (crops, vineyards, weedy fallow)	2.6
	Cleared/Derived Native Grassland/Shrubland	0.95
Sub total		183.80
Total area cleared		240.37

6. REFERENCES

EMM 2023, *Balranald Mineral Sands Project Malleefowl and raptor pre-disturbance survey report*, EMM Consulting Pty Ltd.

7. APPENDICES

Appendix 1 – Pre-disturbance reports 2023

Appendix 2 – Photographs of clearing works

APPENDIX 1- PRE-DISTURBANCE REPORT 2023

Balranald Mineral Sands Project

Malleefowl and raptor pre-disturbance survey report

Prepared for Iluka Resources Limited

October 2023

Balranald Mineral Sands Project

Malleefowl and raptor pre-disturbance survey report

Iluka Resources Limited

E230962 RP1

October 2023

Version	Date	Prepared by	Reviewed by	Comments
V1	29 September 2023	Jamie Barney	Sarah Perry	Draft
V2	10 October 2023	Jamie Barney	Sarah Perry	Final

Approved by



Sarah Perry

Associate Ecologist

10 October 2023

Level 3 175 Scott Street

Newcastle NSW 2300

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1.2	Project background	1
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Figure 3.3	Nest trees locations	15

1 Introduction

EMM Consulting Pty Limited (EMM) was commissioned by Iluka Resources Limited (Iluka) to undertake pre-disturbance surveys for the Balranald Mineral Sands Project (the project) in order to:

- satisfy the Commonwealth approval (EPBC 2012/6509) requirements for Malleefowl outlined in the Commonwealth Biodiversity Management Plan (EMM 2023a)
- satisfy the New South Wales (NSW) State approval (SSD-5285) requirements for raptors outlined in the NSW Biodiversity Management Plan (EMM 2023b).

1.1 Purpose of this report

This report focuses on the following pre-clearance surveys undertaken by EMM in accordance with the Iluka's Commonwealth and State Biodiversity Management Plans:

- Map Malleefowl mounds in MOD1 disturbance areas previously mapped as moderate, high and very high Malleefowl habitat (Niche 2016).
- Assess nesting sites for listed raptor species including Black falcon (*Falco subniger*), Grey Falcon (*Falco hypoleucos*), Little Eagle (*Hieraetus morphnoides*), Spotted Harrier (*Circus assimilis*) and White-bellied Sea-Eagle (*Haliaeetus leucogaster*).

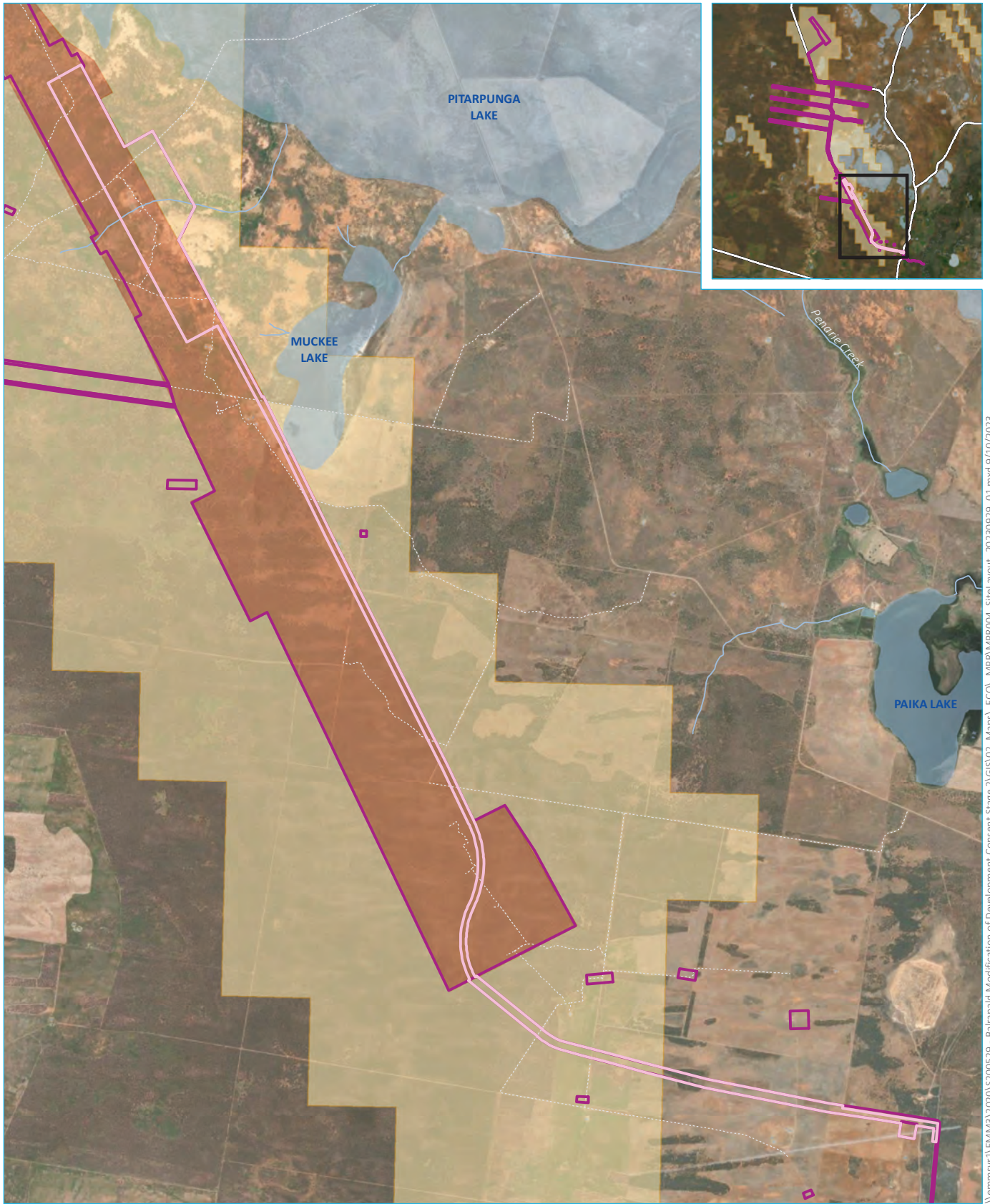
1.2 Project background

Iluka has approval to develop a mineral sand mine in south-western (NSW), known as the Balranald Project. It includes construction, mining, primary processing, and rehabilitation of 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.

Development consent (SSD-5285) was granted for the Balranald Project by a delegate of the NSW Minister for Planning under the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 5 April 2016 (herein referred to as the consent). Approval was also granted under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2012/6509) by a delegate of the Commonwealth Minister for the Environment on 6 January 2017 (herein referred to as the Commonwealth approval). The project EIS was supported by a Biodiversity Assessment prepared by Niche Environment and Heritage Pty Limited in 2016 (Niche 2016).

Since the consent was granted, Iluka undertook some of the approved bulk sampling activity between 2016 and 2020, involving the extraction of the mineral ore from depth using trial underground mining within the approved disturbance area of the West Balranald deposit. On 21 December 2022, Iluka were granted approval to modify the consent (MOD1; Figure 1.1) to expand the underground mining trial which includes 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).

In accordance with Commonwealth and State approval requirements Biodiversity Management Plans (BMPs) have been approved with this report satisfying the Pre-disturbance requirements for EPBC 2012/6509 and SSD-5285 respectively.



Source: EMM (2023); Iluka Resources (2021); ESRI (2023); DFSI (2017); GA (2011)

KEY

- Revised project area
- MOD1
- Existing environment
- Existing track
- Watercourse/drainage line
- Waterbody
- Exploration Licence (EL7450)
- Mining Lease (ML1736)

Project conceptual layout

Balranald Mineral Sands Project
Malleefowl Pre-disturbance
Report Figure 1.1



\\emmsvr1\EMM3\2020\200529 - Balranald Modification of Development Consent Stage 2\GIS\02_Maps\ECO\MPR\MPR004_SiteLayout_20230929_01.mxd 9/10/2023

2 Methods

2.1 Field investigation

2.1.1 Hollow bearing trees

A comprehensive hollow bearing tree survey was undertaken by EMM in September 2022 within MOD1 areas mapped as medium, medium-high tree hollow density (Niche 2016) (condition 2(a) EPBC 2012/6509), guided by hollow bearing tree survey methods in the Biodiversity Assessment Method (BAM) (DPIE2020a; DPIE2020b).

Transect surveys were undertaken by two Ecologists up to 20 metres (m) apart, to search for and record hollow bearing trees to determine suitability for Corben's Long-eared Bat. Hollow bearing trees were individually counted, coordinates recorded from a hand-held GPS, tree species (where possible), size of hollow, and count of hollows. Hollows were categorised and counted from small (<5 centimetres (cm)), medium (5–20 cm), large (>20 cm) to very large (>40 cm), to assess the suitability of the hollow for Corben's Long-eared Bat (i.e. small and medium hollows at least 1 m above the ground).

These surveys were not repeated in 2023 as the site conditions remain stable, the approach for vegetation clearance is set out clearly in the Commonwealth and State BMPs.

2.1.2 Malleefowl

Targeted Malleefowl surveys were undertaken by EMM in September 2022 and September 2023 within the MOD1 disturbance area and a 200 m buffer. The areas surveyed were in habitat mapped as moderate, high and very high suitability for Malleefowl (Niche 2016) (condition 2(a) EPBC 2012/6509). Survey methods were conducted in accordance with the Commonwealth Guidelines for Australia's threatened birds (DEWHA 2010). Suitable Malleefowl habitat includes PCT 170 – Chenopod sandplain mallee woodland/shrubland and PCT 171 – Spinifex linear dune mallee.

Transect surveys were undertaken by two personnel including at least one ecologist, searching for direct sightings, nest mounds, footprint tracks, feathers, and listening for calls. When Malleefowl nest mounds were identified, they were recorded as being either active, with signs of recent use including a well-established mound, footprint tracks and recent leaf litter, or inactive, being weathered down, and lacking signs of recent use. The location of each Malleefowl mound was recorded from coordinates obtained from a hand-held GPS.

2.1.3 Raptor nest

In September 2023, EMM conducted surveys to identify potential active raptor nests. This survey involved two individuals, including an ecologist, who conducted transect surveys across all vegetation zones within the MOD1 disturbance area. During these surveys, handheld GPS devices were used to accurately record the locations of each nest. Additionally, photographs were taken of each nest, documenting whether the nest was currently in use by raptors and the condition of the nest.

2.2 Limitations

Condition 2a(ii) of the approval (EPBC 2012/6509) requires pre-disturbance surveys for Corben's Long-eared Bat. The approval defines pre-disturbance surveys as surveys in strict accordance with Survey guidelines for Australia's threatened bats (DEWHA 2010a), which require 20 trap nights over a minimum of five nights in areas <50 hectares (ha), or another method approved by the Department. The purpose of the surveys conducted in September 2022 was to collect detailed information regarding the number and suitability of hollows for Corben's Long-eared Bat to inform clearing processes for the Commonwealth BMP. Iluka will undertake all clearance activities in accordance with the requirements of Commonwealth and State BMPs.

3 Results

3.1 Hollow bearing trees

A total of 278 hollow bearing trees were identified within MOD1 during the 2022 survey in areas mapped as medium or medium-high tree hollow density (Figure 3.1). Most hollow bearing trees identified had small and medium hollows, often with several hollows on single trees. All trees with small and medium hollows above 1 m from the ground were considered to be suitable for Corben’s Long-eared Bat. Figure 3.1 shows the location of hollow bearing trees identified within MOD1, and Appendix A details the survey results for the 278 hollow bearing trees recorded.

3.2 Malleefowl

Nine Malleefowl mounds were discovered during the 2022 and 2023 surveys within the MOD1 disturbance area and 200 m buffer (Figure 3.2). During August 2023, four mounds were removed by Iluka Resources Limited to avoid Malleefowl usage during the 2023 breeding season. Five Mounds now remain within the disturbance area and 200 m buffer, with only one confirmed as active as of 7 September 2023. One direct observation of Malleefowl and two indirect sightings of Malleefowl footprints were recorded during the 2023 surveys; no sightings or footprint records were made during the 2022 surveys.

Table 3.1 Malleefowl Mounds

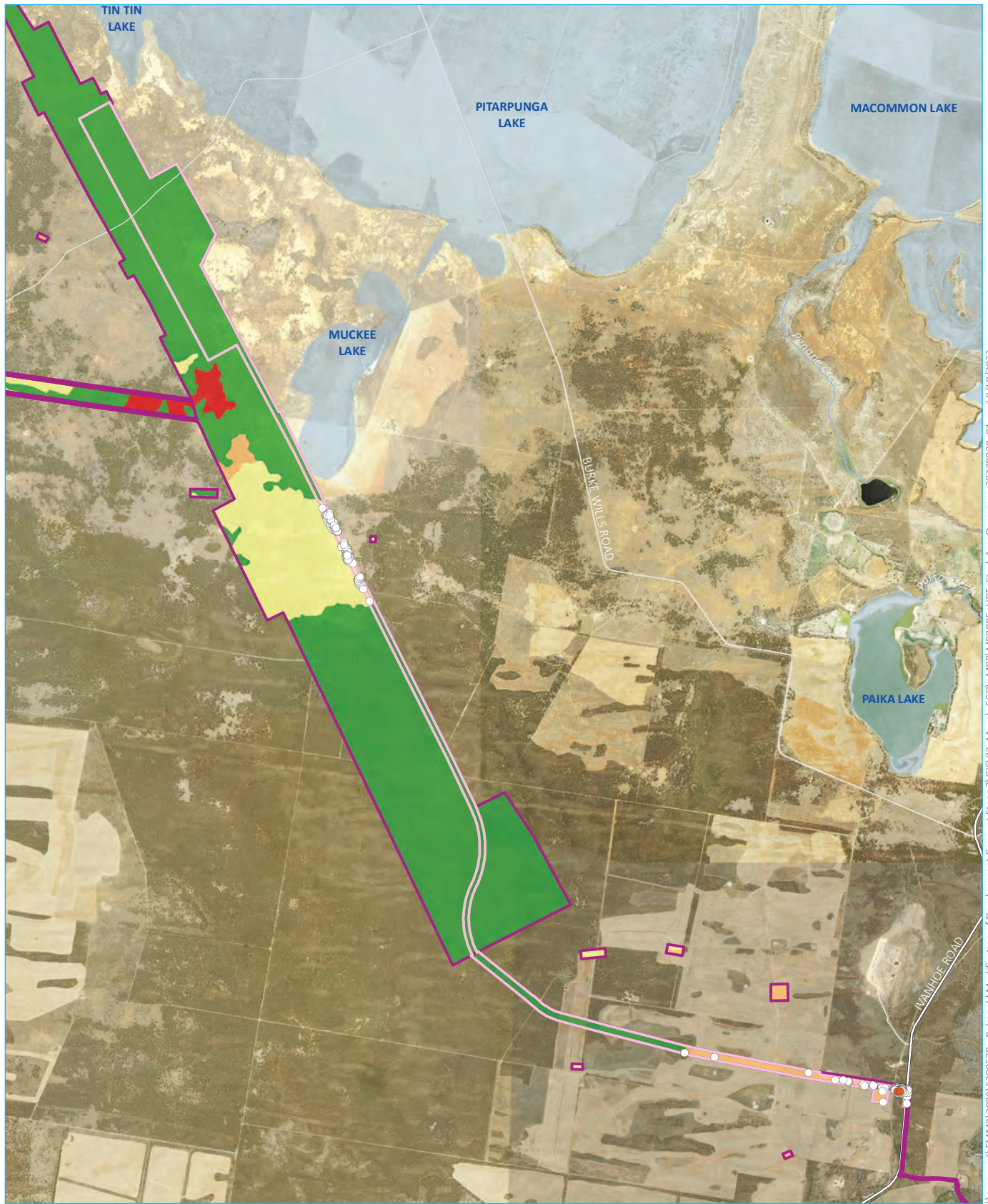
ID	Malleefowl Usage (September 2023)	Coordinates (GDA 2020 Zone 54)	Location
BWM1	Inactive - destroyed	-34.530922, 143.499518	Within MOD 1 disturbance area
BWM2	Active – Malleefowl observed on mound	-34.508701, 143.495671	Within 200 m buffer of MOD1
BWM3	Inactive - Destroyed	-34.504774, 143.495877	Within MOD 1 disturbance area
BWM4	Inactive - Destroyed	-34.493365, 143.488701	Within MOD 1 disturbance area
BWM5	Inactive - Destroyed	-34.492144, 143.487345	Within MOD 1 disturbance area
BWM6	Likely Inactive - Malleefowl footprints on Mound, no other signs of usage.	-34.482771, 143.482957	Within 200 m buffer of MOD1
BWM7	Unchecked during September 2023 surveys as the mound falls outside of the MOD1 disturbance area and buffer	-34.525461, 143.504630	Outside of MOD 1 disturbance area and 200 m buffer
BWM8	Inactive – Long unused mound	-34.532278, 143.501611	Within MOD 1 disturbance area
BWM9	Likely Inactive – woody debris present across whole mound	-34.487121, 143.481600	Within 200 m buffer of MOD1
BWM10	Likely Inactive – Herbs growing on mound	-34.480365, 143.481311	Within 200 m buffer of MOD1

3.3 Raptor nests

One small nest was located within MOD1 with four more located just outside MOD1 (Figure 3.3).

Table 3.2 Nest trees

ID	Comment	Location	Impact
NT1	Small nest	Within MOD1 disturbance area	Tree to be removed
NT2	Small nest	Within 200 m buffer of MOD1	Avoided
NT3	Larger nest, likely raptor nest, however, no signs of use and in a state of deterioration.	Within 200 m buffer of MOD1	Avoided
NT4	Small nest	Within 200 m buffer of MOD1	Avoided (just outside MOD1 boundary)
NT5	Larger nest, likely raptor nest, however, no signs of use	Within 200 m buffer of MOD1	Avoided



Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



KEY

- Revised Balranald project area
- MOD1
- Existing environment
- Major road
- Minor road
- Named watercourse
- Named waterbody
- Hollow bearing trees (HBT)
- HBT with no potential for Corben's long-eared bat
- HBT with potential for Corben's long-eared bat
- Tree hollow density
- High
- Medium/High
- Medium
- Low

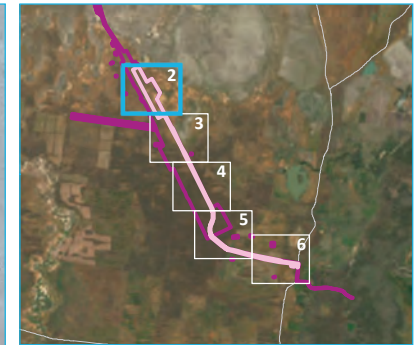
Hollow bearing trees
Map 1 of 6

Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1



\\emmsvr1\EMM3\2020\200529 - Balranald Modification of Development Consent Stage 2\GIS\02_Maps\ECO\MIPR\MIPR005_HBT_StudyAreaOverview_20230929_01.mxd 9/10/2023

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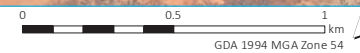
- KEY**
- Revised Balranald project area
 - MOD1
 - Avoidance area
 - Existing environment
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Named waterbody
 - Tree hollow density
 - Medium/High
 - Low

Hollow bearing tree
Map 2 of 6

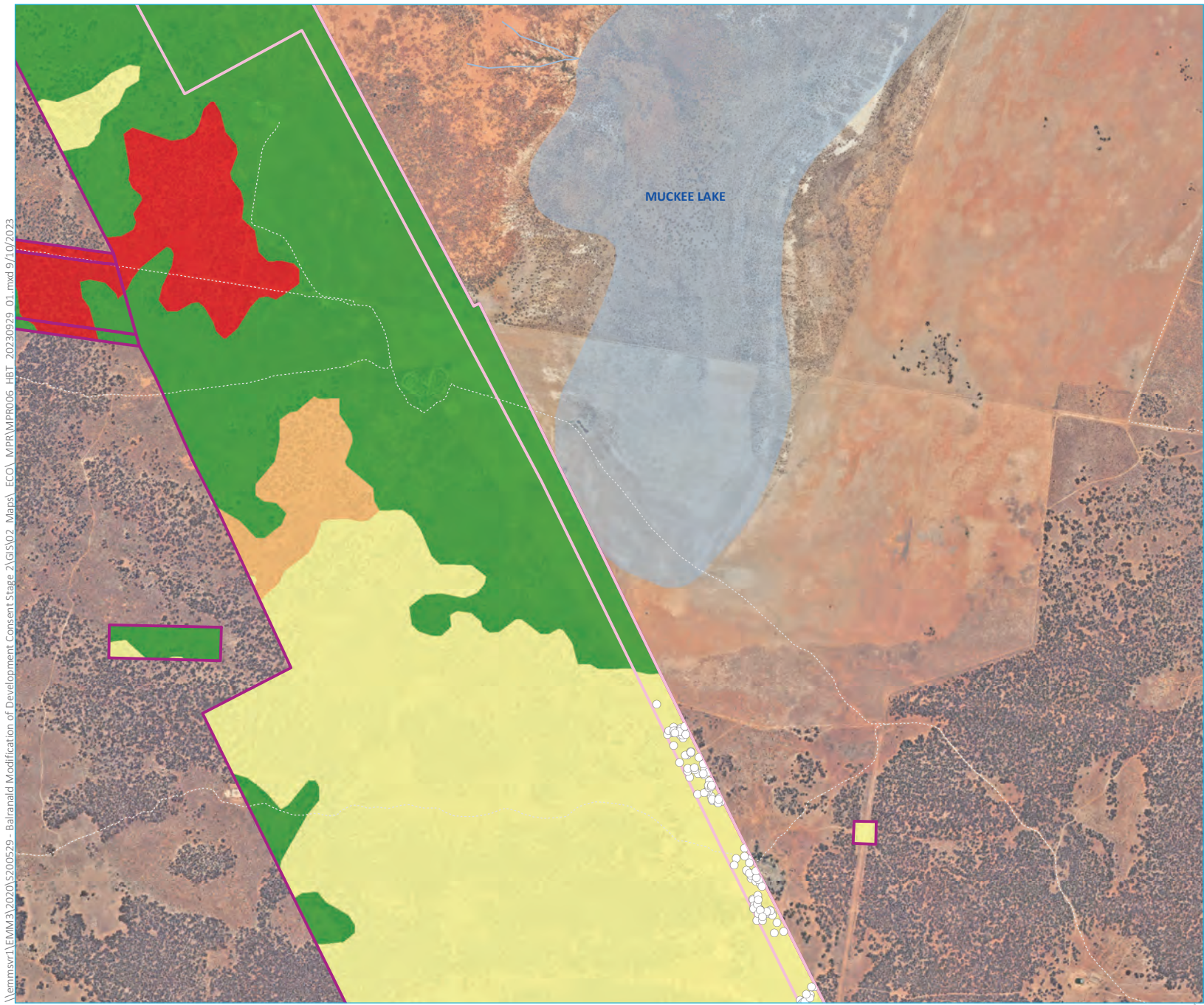
Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1



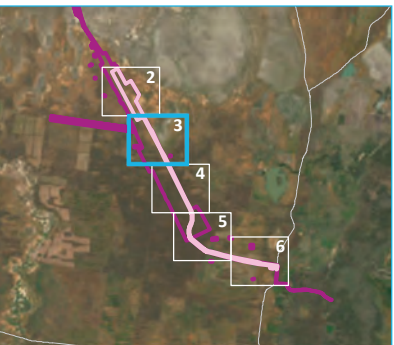
Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



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Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



- KEY**
- Revised Balranald project area
 - MOD1
 - Existing environment
 - Vehicular track
 - Watercourse/drainage line
 - Named waterbody
 - Hollow bearing trees (HBT)
 - HBT with potential for Corben's long-eared bat
 - Tree hollow density
 - High
 - Medium/High
 - Medium
 - Low

Hollow bearing tree
Map 3 of 6

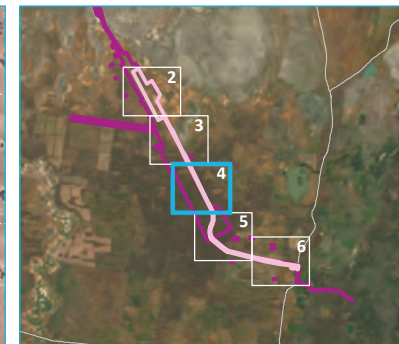
Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1



GDA 1994 MGA Zone 54



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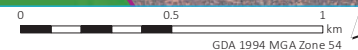
- KEY**
- Revised Balranald project area
 - MOD1
 - Existing environment
 - Vehicular track
 - Named waterbody
 - Hollow bearing trees (HBT)
 - HBT with potential for Corben's long-eared bat
 - Tree hollow density
 - Medium
 - Low

Hollow bearing tree
Map 4 of 6

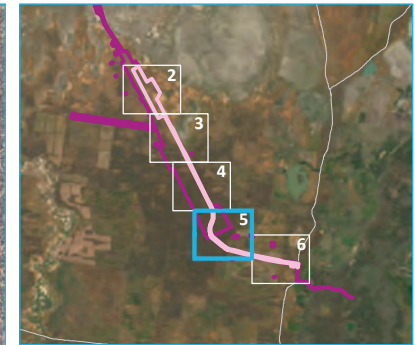
Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1



Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



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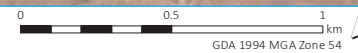
- KEY**
- Revised Balranald project area
 - MOD1
 - Existing environment
 - Vehicular track
 - Named waterbody
 - Tree hollow density
 - Medium/High
 - Medium
 - Low

Hollow bearing tree
Map 5 of 6

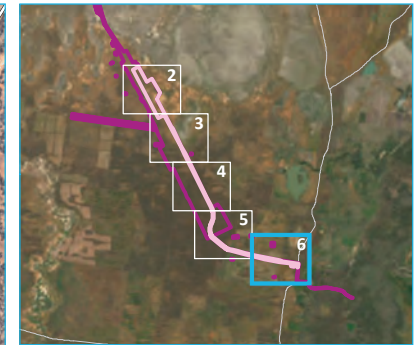
Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1



Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



\\lemmsvr\EMM\3\2020\5200529 - Balranald Modification of Development Consent Stage 2\GIS\02_Maps\ ECO\ MPR\MPR006_HBT_20230929_01.mxd 9/10/2023



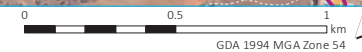
- KEY**
- Revised Balranald project area
 - MOD1
 - Existing environment
 - Major road
 - Minor road
 - Vehicular track
 - Named waterbody
 - Hollow bearing trees (HBT)
 - HBT with no potential for Corben's long-eared bat
 - HBT with potential for Corben's long-eared bat
 - Tree hollow density
 - Medium/High
 - Medium
 - Low

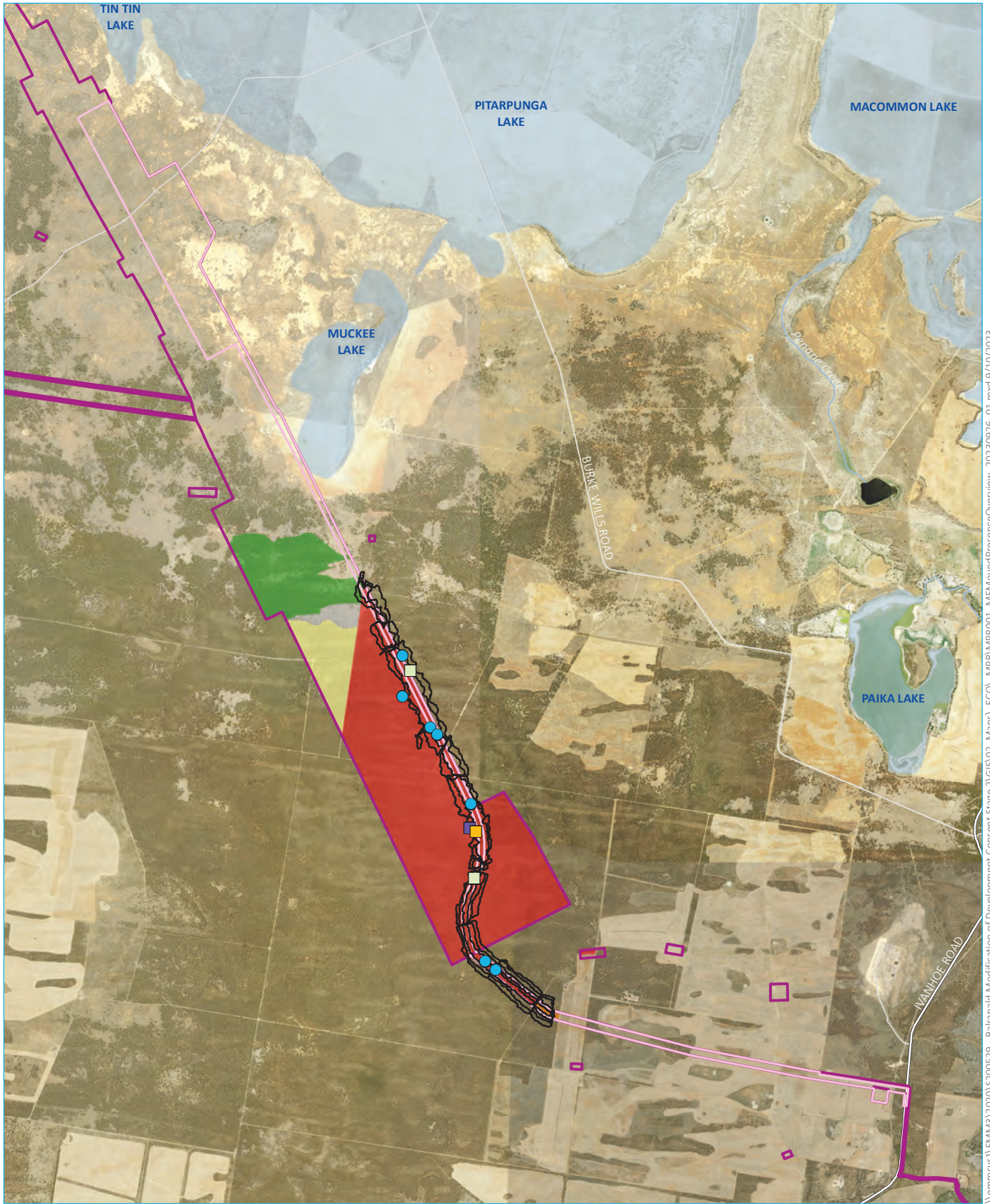
Hollow bearing tree
Map 6 of 6

Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.1

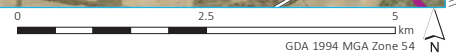


Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)





Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



KEY

- | | | |
|--------------------------------|--|--|
| Revised Balranald project area | Malleefowl observation Feather | Malleefowl habitat potential Unknown |
| MOD1 | Malleefowl observation Footprint | Malleefowl habitat potential Very High |
| Malleefowl survey track | Malleefowl observation Sighting | Malleefowl habitat potential High |
| EMM survey results | Existing environment Major road | Malleefowl habitat potential Moderate |
| Active Malleefowl mound | Existing environment Minor road | Malleefowl habitat potential Low |
| Inactive Malleefowl mound | Existing environment Named watercourse | |
| | Existing environment Named waterbody | |

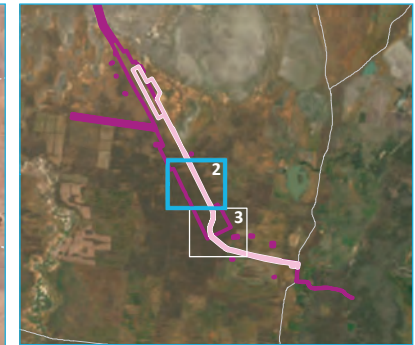
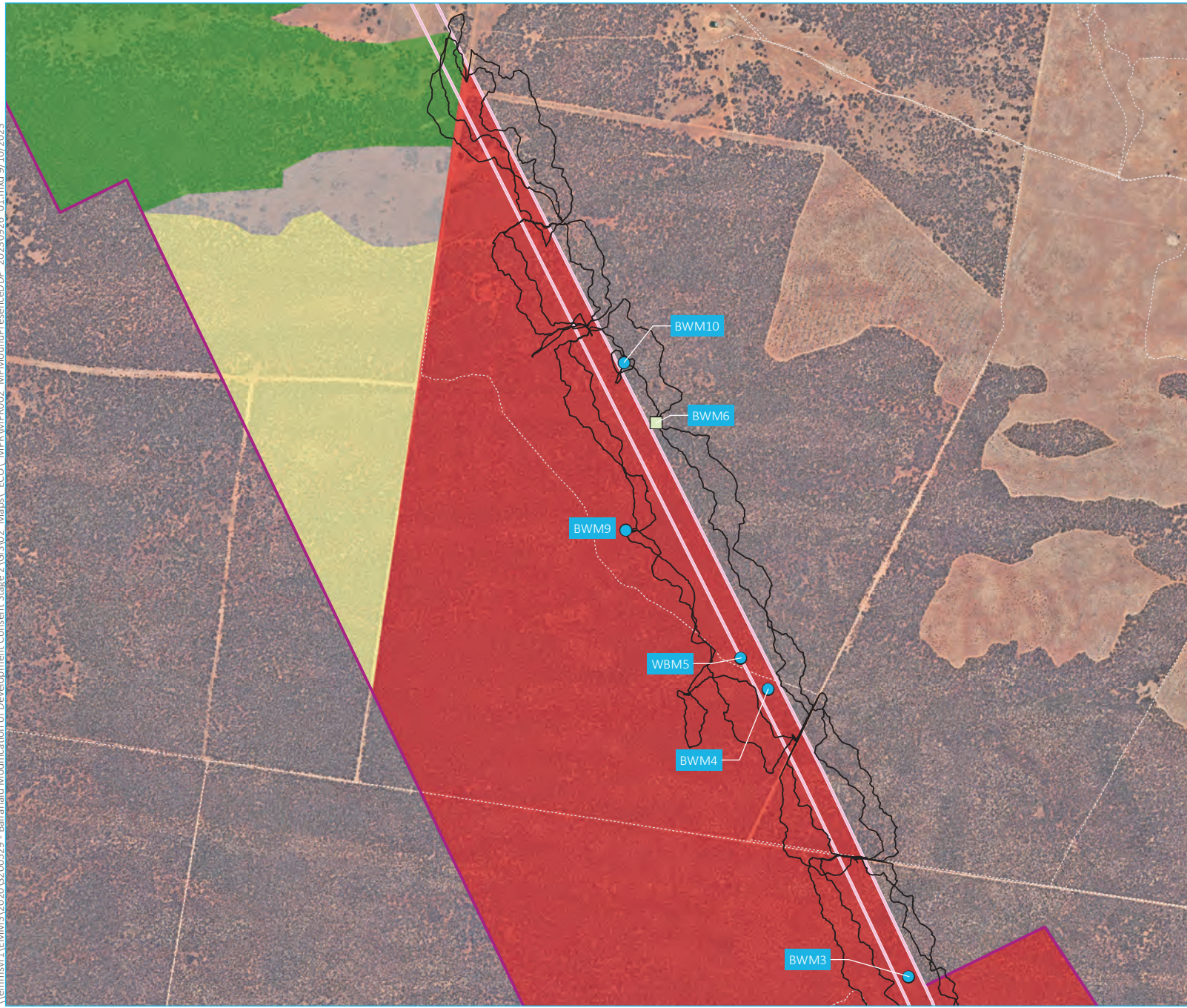
Malleefowl mounds and presence
Map 1 of 3

Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.2



\\emmsvr1\EMM3\2020\200529 - Balranald Modification of Development Consent Stage 2\GIS\02_Maps\ECO\MIPR\MIPR001_MIFMoundPresenceOverview_20230926_01.mxd 9/10/2023

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- KEY**
- MOD1 study area
 - EIS Approved Balranald Project Area (SSD-5285)
 - Malleefowl survey track
 - Inactive Malleefowl mound
 - Malleefowl observation footprint
 - Existing environment
 - Vehicular track
 - Named waterbody
 - Malleefowl habitat potential
 - Unknown
 - Very High
 - Moderate
 - Low

Malleefowl mounds and presence
Map 2 of 3

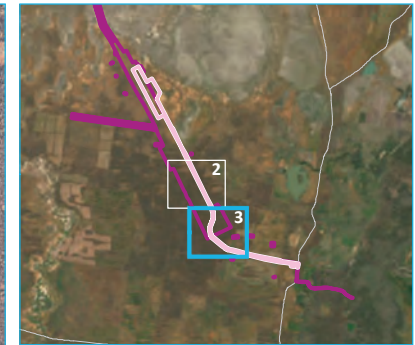
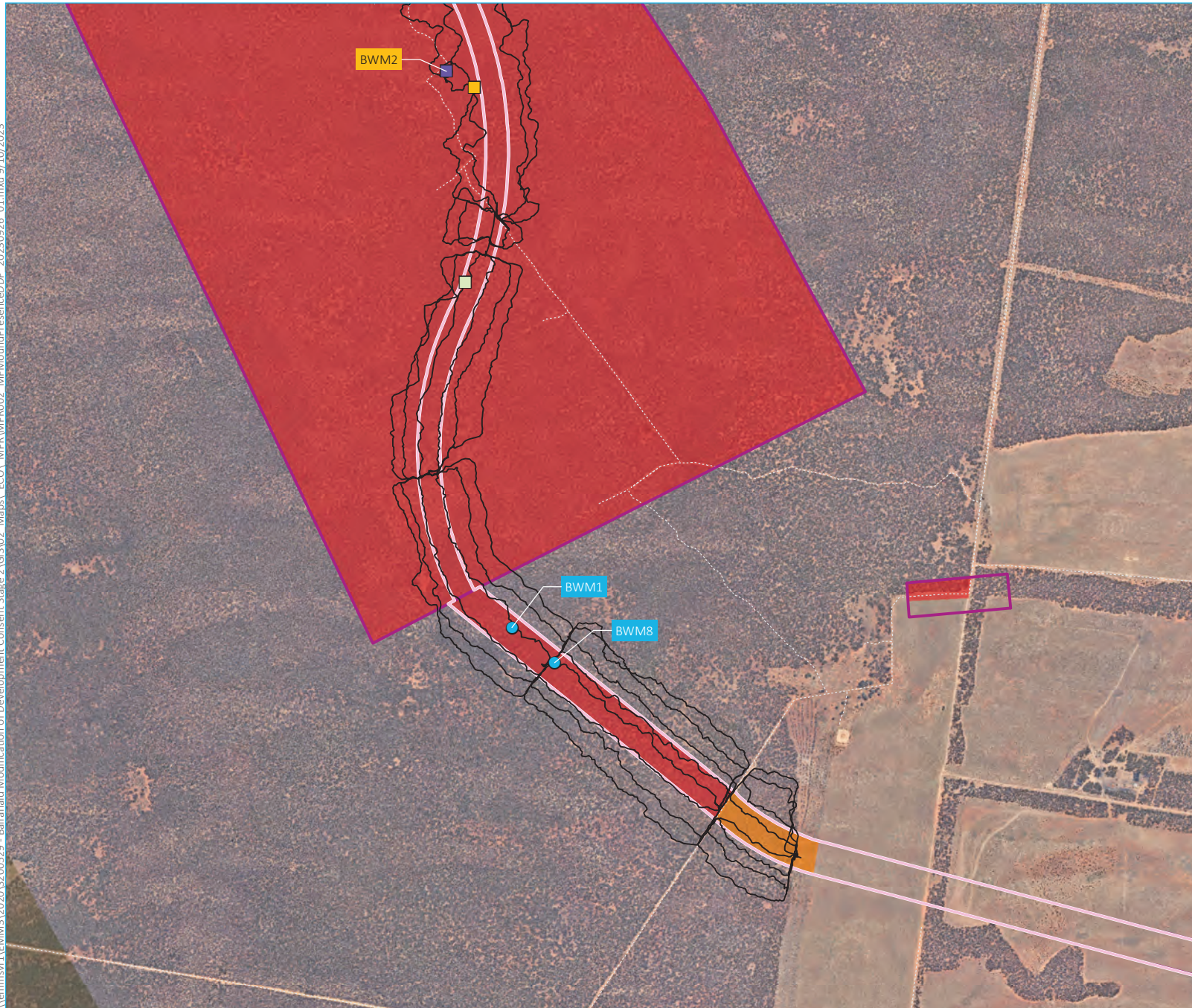
Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.2



Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



\\lemmsvr\EMM\3\2020\5200529 - Balranald Modification of Development Consent Stage 2\GIS\02_Maps\ ECO_MPR\MPR002_MFMoundPresenceDDP_20230926_01.mxd 9/10/2023



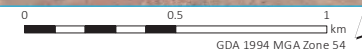
- KEY**
- MOD1 study area
 - EIS Approved Balranald Project Area (SSD-5285)
 - Malleefowl survey track
 - EMM survey results**
 - Active Malleefowl mound
 - Inactive Malleefowl mound
 - Malleefowl observation**
 - Feather
 - Footprint
 - Sighting
 - Existing environment**
 - - - Vehicular track
 - Named waterbody
 - Malleefowl habitat potential**
 - Very High
 - High

Malleefowl mounds and presence
Map 3 of 3

Balranald Mineral Sands Project
Malleefowl Pre-disturbance Report
Figure 3.2



Source: EMM (2023); Iluka Resources (2022); Niche (2015); ESRI (2023); DFSI (2017); GA (2011)



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Appendix A

Survey results

A.1 Malleefowl mound monitoring datasheet

Date	Inspected By	Nest Number	Sought (v/x)	Found (v/x)	Staked (v/x)	Tagged (v/x)	Active (Y/N)	Profile (see below)	X sticks (see below)	Scraped (Y/N)	Eggshell (n/s/l)	Fire since last monitored? (Y/N)	Prints				Scats				Outer nest surface (n/s/l)					Inner nest surface (n/s/l)					Dimensions (cms)				Photo taken (Y/N)	X sticks replaced (Y/N)	Notes: - location notes that may help others find the mound - general notes regarding the mound itself - time since and evidence of bushfire (if applicable)
													Malleefowl	Fox	Kangaroo	Other (specify)	Malleefowl	Fox	Kangaroo	Other (specify)	Crust	Moss	Herb	Shrub	Tree	Crust	Moss	Herb	Shrub	Tree	Perimeter	Rim	Height (Nth)	Height (South)			
17/08/2023	BI	BWM1	Y	Y	N	N	N	1	N/A	N/A	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Mound destroyed by mine development
7/09/2023	JB & BI	BWM2	Y	N	N	N	Y	3	N	Y	S	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Known Mound
17/08/2023	BI	BWM3	Y	Y	N	N	N	3	N/A	N/A	S	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Mound destroyed by mine development
17/08/2023	BI	BWM4	Y	Y	N	N	N	2	N/A	N/A	S	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Mound destroyed by mine development
17/08/2023	BI	BWM5	Y	Y	N	N	N	3	N/A	N/A	L	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Mound destroyed by mine development
7/09/2023	JB & BI	BWM6	Y	N	N	N	N	6	N	N	S	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Known Mound
6/09/2023	JB & BI	BWM8	N	Y	N	N	N	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	New Mound
7/09/2023	JB & BI	BWM9	N	Y	N	N	N	6	N	N	S	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	New Mound
7/09/2023	JB & BI	BWM10	N	Y	N	N	N	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	New Mound

A.2 Malleefowl mound photos



Malleefowl mound ID: BWM1



Active Malleefowl mound ID: BWM2



Malleefowl mound ID: BWM3



Malleefowl Mound ID: BWM4



Malleefowl Mound ID: BWM5



Malleefowl Mound ID: BWM6



Malleefowl Mound ID: BWM8



Malleefowl Mound ID: BWM9



Malleefowl Mound ID: BWM10

A.3 Malleefowl footprints



Malleefowl footprints 1(Left) / Malleefowl footprints 2 (Right)

A.4 Nest Trees



Nest tree ID: NT1



Nest tree ID: NT2



Nest tree ID: NT3



Nest tree ID: NT4



Nest Tree ID: NT5

A.5 Hollow bearing trees

Table A.1 Hollow bearing trees

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	10	3	0	0	0		737169.9561	6173770.107
Eucalyptus sp.	20	2	0	0	0		737159.9376	6173745.83
Eucalyptus sp.	15	1	0	0	0		737175.009	6173755.046
Eucalyptus sp.	10	2	0	0	0		737170.4204	6173774.017
Eucalyptus sp.	10	1	0	0	0		737169.3791	6173775.792
Eucalyptus sp.	10	3	0	0	0		737173.6097	6173772.912
Eucalyptus sp.	15	2	0	0	0		737168.0137	6173775.255
Eucalyptus sp.	15	0	1	0	0		737172.3802	6173735.649
Eucalyptus sp.	30	2	2	0	0		733083.2724	6174440.537
Eucalyptus sp.	15	2	1	0	0	In dead branches	737219.4804	6173737.182
Eucalyptus sp.	40	2	2	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737156.4595	6173738.395
Eucalyptus sp.	30	1	1	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737164.0587	6173743.514
Eucalyptus sp.	20	2	1	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737166.7473	6173759.987
Eucalyptus sp.	40	1	1	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737163.7106	6173724.318
Eucalyptus sp.	25	1	2	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737154.2267	6173786.22
Eucalyptus sp.	50	1	1	0	0	In dead branches and live branches	737156.0077	6173711.895
Eucalyptus sp.	25	1	0	0	0	In dead branches	737226.5353	6173763.47
Eucalyptus sp.	20	2	0	0	0	In dead branches and live branches	737215.4822	6173715.415
Eucalyptus sp.	25	2	0	0	0	In dead branches	737222.1844	6173710.178
Eucalyptus sp.	15	2	0	0	0	In dead branches	737227.8697	6173773.254

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	25	2	0	0	0	In dead branches	737226.8041	6173757.339
Eucalyptus sp.	25	1	1	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737158.9237	6173776.901
Eucalyptus sp.	30	2	1	0	0	In dead branches. Nesting Chough (<i>Pyrrhonorax</i> spp.) in tree.	737160.5888	6173753.797
Eucalyptus sp.	50	1	1	0	0	In dead branches and live branches	737147.3938	6173703.494
Eucalyptus sp.	65	2	1	0	0	In dead branches	735381.7367	6174084.29
Eucalyptus sp.	25	2	1	0	0	In dead branches	737223.7086	6173705.359
Eucalyptus sp.	25	1	0	0	0	In dead branches	737224.1381	6173753.076
Eucalyptus sp.	20	6	1	0	0		736115.6602	6173908.399
Stag	15	4	0	0	0		736398.0585	6173833.036
Western Rosewood Alectryon oleifolius	40	4	0	0	0		736575.3925	6173841.738
Eucalyptus sp.	20	0	5	0	0		736125.2587	6173907.3
Eremophila sp.	70	5	0	0	0	Dead tree with cracks	736573.6906	6173853.809
Western Rosewood Alectryon oleifolius	65	5	0	0	0	Dead tree with cracks	736397.9904	6173862.899
Eucalyptus sp.	60	3	0	0	0	In dead branches	736741.5192	6173795.986
Eucalyptus sp.	65	0	1	0	0	In trunk. 1 m above ground.	735878.15	6173940.952
Mulga sp.	70	3	0	0	0	Nearly dead tree with cracks	736764.8183	6173530.318
Eucalyptus sp.	40	2	0	0	0	Live trunk and branches	736119.9718	6173912.258
Eucalyptus sp.	35	3	2	0	0	Live trunk and branches	736122.0056	6173911.854
Western Rosewood Alectryon oleifolius	80	6	0	0	0	Dead tree with cracks	736417.7515	6173834.315

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	50	2	3	0	0	Dead branches	736115.472	6173913.102
Eremophila sp.	70	5	0	0	0	Dead tree with cracks	736591.2732	6173834.535
Eucalyptus sp.	65	1	1	0	0	In dead branches	736798.1997	6173795.15
Western Rosewood Alectryon oleifolius	35	1	0	0	0	Dead branch	733643.4961	6174366.506
Eucalyptus sp.	40	3	3	0	0	In dead branches	736779.7176	6173724.516
Eucalyptus sp.	35	2	3	0	0	Dead branches	736023.4602	6173938.454
Eucalyptus sp.	25	3	1	0	0		736746.3954	6173728.522
Black Box Eucalyptus largiflorens	32	1	0	0	0	Dead branches	726787.5255	6183784.009
Eucalyptus sp.	25	1	0	0	0	Dead stem with hollows	726840.4728	6183619.096
Eucalyptus sp.	25	2	0	0	0	Dead stem with hollows	726878.7307	6183594.278
Eucalyptus sp.	25	2	0	0	0	Live trunk and dead stem with hollows	726606.622	6184141.662
Black Oak Casuarina spp.	60	1	0	0	0	Live trunk with hollow	726520.1394	6184243.608
Eucalyptus sp.	60	2	2	0	0	Dead stem with hollows	727051.1416	6183205.379
Black Box Eucalyptus largiflorens	75	3	0	0	0	Broken live branches and dead stumps	726804.7146	6183751.741
Eucalyptus sp.	15	2	0	0	0	Dead stem with possible hollow	727064.0966	6183105.828
Black Oak Casuarina spp.	55	1	0	0	0	Live trunk with hollow	726526.7622	6184206.193
Black Box Eucalyptus largiflorens	75	3	2	0	0	Broken live branches and dead stumps	726825.3971	6183739.516
Eucalyptus sp.	15	1	0	0	0	Dead stem with hollows	726659.8885	6184113.19
Eucalyptus sp.	25	1	1	0	0	Dead stumps in live tree	726443.2612	6184405.461

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Black Oak Casuarina spp.	60	2	0	0	0	Live trunk with hollow	726565.7557	6184223.095
Stag	55	3	0	0	0	Dead tree	726455.1044	6184432.594
Eucalyptus sp.	25	1	2	0	0	Dead stem with hollow	726517.8467	6184304.534
Stag	55	3	0	0	0	Dead tree	726427.5658	6184398.033
Eucalyptus sp.	30	1	1	0	0	Dead stem with hollows	726828.642	6183566.643
Eucalyptus sp.	35	1	0	0	0	Dead stem with hollow	727023.7437	6183208.624
Eucalyptus sp.	35	1	1	0	0	Dead stem with hollows	726810.8755	6183661.819
Black Oak Casuarina spp.	45	2	1	0	0	Live trunk with hollow	726563.9281	6184132.123
Eucalyptus sp.	30	2	2	0	0	Dead stem with hollows	726812.798	6183656.95
Black Box Eucalyptus largiflorens	65	2	0	0	0	Broken dead branches	726851.0309	6183736.319
Eucalyptus sp.	20	1	1	0	0	Dead stem with hollows	726625.3774	6184121.923
Mulga sp.	55	1	0	0	0	Live trunk with hollow	726483.6227	6184273.942
Eucalyptus sp.	20	1	1	0	0	Live trunk and dead stem with hollows	726610.8637	6184141.978
Eucalyptus sp.	30	0	1	1	0	Dead stem with hollows	726844.3803	6183610.595
Black Box Eucalyptus largiflorens	75	3	1	1	0	Broken live branches and dead stumps	726804.6632	6183768.398
Black Oak Casuarina spp.	50	2	0	0	0	Live trunk and dead branches with hollows	726519.0109	6184233.783
Eucalyptus sp.	20	2	1	0	0	Dead stem with hollows	726668.9593	6184097.443
Eucalyptus sp.	50	1	1	0	0	Live trunk and dead stem with hollows	726600.9116	6184140.167

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	15	1	1	0	0	Dead stem with hollow	726379.9155	6184533.827
Eucalyptus sp.	25	1	0	0	0	Dead stem with hollows	726817.3444	6183631.488
Eucalyptus sp.	65	1	2	0	0	Dead stem with hollows	726899.0469	6183595.4
Eucalyptus sp.	30	0	1	0	0	Dead stem with hollows	726549.8659	6184240.927
Eucalyptus sp.	20	0	1	0	0	Dead stem with hollow	726570.4027	6184296.907
Eucalyptus sp.	30	1	0	0	0	Dead stem with possible hollow	727029.8743	6183194.124
Eucalyptus sp.	35	1	1	0	0	Dead stem with hollows	727035.4191	6183197.828
Stag	15	1	0	0	0	Dead tree	727047.5995	6183130.831
Eucalyptus sp.	15	1	0	0	0	Dead stem with hollows	726813.9819	6183619.341
Black Box Eucalyptus largiflorens	55	2	1	0	0	~ 5 cm wide Hole in trunk shows signs of current use. Chew marks and hair stuck in sap.	726737.3306	6183843.854
Black Oak Casuarina spp.	50	1	1	0	0	Live trunk and dead branches with hollows	726518.0003	6184248.836
Black Box Eucalyptus largiflorens	80	2	1	0	0	Broken live branches and dead stumps	726783.0159	6183790.581
Eucalyptus sp.	30	1	1	0	0	Dead stem with hollows	726853.7394	6183564.737
Eucalyptus sp.	45	2	0	0	0	Dead stumps in live tree	726433.7394	6184414.432
Eucalyptus sp.	75	0	2	1	0	Dead stumps in live tree	726455.2847	6184350.579
Black Box Eucalyptus largiflorens	65	2	2	0	0	Broken live branches	726845.6053	6183727.467
Black Box Eucalyptus largiflorens	70	1	1	0	0	Dead branches	726796.2676	6183777.499

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	45	2	1	0	0	Live trunk and dead stem with hollows	726592.8134	6184136.217
Eucalyptus sp.	45	0	1	0	0	Dead stem with hollows	726898.7568	6183591.255
Eucalyptus sp.	30	1	1	0	0	Dead stem with hollows	726548.0603	6184251.526
Eucalyptus sp.	45	2	0	0	0	Dead stem with hollows	726908.2476	6183508.541
Black Box Eucalyptus largiflorens	32	4	2	0	0	Dead tree	726727.6015	6183813.994
Eucalyptus sp.	20	0	2	0	0	Eucalyptus sp.	726593.0258	6184217.563
Eucalyptus sp.	20	3	0	0	0	Hollow logs at base of tree	727067.3014	6183226.825
Eucalyptus sp.	8	0	1	0	0	Eucalyptus sp.	726629.9803	6184103.691
Eucalyptus sp.	20	3	1	0	0	Eucalyptus sp.	726457.9079	6184405.713
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	727106.6829	6183087.195
Eucalyptus sp.	20	1	0	0	0	Eucalyptus sp.	726469.3113	6184403.841
Black Box Eucalyptus largiflorens	20	0	1	0	0	Black Box	726500.0072	6184424.975
Black Box Eucalyptus largiflorens	10	0	1	0	0	Black Box	726511.2382	6184404.076
Eucalyptus sp.	20	2	0	0	0	Eucalyptus sp.	726466.7995	6184415.708
Eucalyptus sp.	10	1	0	0	0	Eucalyptus sp.	726497.9652	6184382.606
Eucalyptus sp.	10	0	3	0	0	Eucalyptus sp.	727118.0869	6183123.149
Eucalyptus sp.	10	4	0	0	0	Eucalyptus sp.	726595.9366	6184245.583
Eucalyptus sp.	15	0	2	0	0	Eucalyptus sp.	726870.382	6183598.928
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	727101.8793	6183121.523
Eucalyptus sp.	15	2	1	0	0	Eucalyptus sp.	726847.3718	6183599.156
Eucalyptus sp.	10	1	0	0	0	Eucalyptus sp.	726484.262	6184400.212
Eucalyptus sp.	20	3	2	0	0	Eucalyptus sp.	726887.7328	6183612.084
Eucalyptus sp.	30	0	3	0	0	Eucalyptus sp.	726920.9014	6183554.042
Eucalyptus sp.	15	5	0	0	0	Eucalyptus sp.	726632.5607	6184176.974

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	20	3	0	0	0	Hollow logs at base of tree	727053.914	6183229.392
Eucalyptus sp.	15	1	0	0	0	Eucalyptus sp.	726846.5831	6183613.732
Eucalyptus sp.	10	1	1	0	0	Hollow logs at base of tree	726509.0398	6184308.127
Eucalyptus sp.	40	0	1	1	0	Hollow logs at base of tree	726836.6802	6183746.858
Eucalyptus sp.	20	0	1	0	0	Eucalyptus sp.	726486.8349	6184429.968
Black Box Eucalyptus largiflorens	40	3	0	3	0	Black Box	726775.1836	6183890.152
Eucalyptus sp.	8	0	1	0	0	Eucalyptus sp.	726614.1671	6184162.677
Eucalyptus sp.	10	3	0	0	0	Eucalyptus sp.	726487.7798	6184397.181
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	727132.2028	6183026.165
Black Box Eucalyptus largiflorens	8	2	0	0	0	Black Box	726649.7871	6184097.398
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	727074.594	6183141.366
Eucalyptus sp.	15	0	3	0	0	Eucalyptus sp.	726616.2161	6184189.339
Black Box Eucalyptus largiflorens	8	0	1	0	0	Black Box	726629.0379	6184110.159
Eucalyptus sp.	6	1	0	0	0	Hollow logs at base of tree	727050.1849	6183164.745
Eucalyptus sp.	30	0	3	0	0	Hollow logs at base of tree, no hollows in tree	726950.2459	6183515.474
Eucalyptus sp.	10	1	0	0	0	Eucalyptus sp.	726494.9824	6184396.906
Eucalyptus sp.	20	1	0	0	0	Eucalyptus sp.	726891.0428	6183609.032
Eucalyptus sp.	15	0	2	0	0	Eucalyptus sp.	726831.5043	6183639.617
Eucalyptus sp.	20	0	1	0	0	Eucalyptus sp.	726486.3437	6184421.125
Eucalyptus sp.	10	1	0	0	0	Hollow logs at base of tree	726533.5358	6184315.041
Eucalyptus sp.	30	2	3	0	0	Hollow logs at base of tree	727048.2449	6183206.676
Eucalyptus sp.	40	3	1	0	0	Hollow logs at base of tree	726826.0586	6183758.004

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	20	3	0	0	0	Eucalyptus sp.	726611.8825	6184170.025
Eucalyptus sp.	15	2	0	0	0	Eucalyptus sp.	726611.458	6184229.799
Eucalyptus sp.	15	0	1	0	0	Eucalyptus sp.	726588.6723	6184267.397
Eucalyptus sp.	10	2	0	0	0	Eucalyptus sp.	726498.1176	6184410.437
Eucalyptus sp.	10	0	1	0	0	Eucalyptus sp.	726834.8606	6183594.833
Eucalyptus sp.	20	4	1	0	0	Eucalyptus sp.	726458.6319	6184417.947
Eucalyptus sp.	10	0	1	0	0	Hollow logs at base of tree	726534.0852	6184324.633
Eucalyptus sp.	15	3	0	0	0	Eucalyptus sp.	726874.0815	6183604.18
Eucalyptus sp.	40	2	0	0	0	Eucalyptus sp.	726796.0758	6183838.947
Eucalyptus sp.	30	2	0	0	0	Hollow logs at base of tree	727043.7436	6183201.53
Eucalyptus sp.	15	0	3	0	0	Eucalyptus sp.	726843.2882	6183611.317
Eucalyptus sp.	40	2	0	0	0	Eucalyptus sp.	726824.7112	6183787.051
Eucalyptus sp.	40	0	4	0	0	Hollow log at base of tree	726851.7995	6183719.548
Eucalyptus sp.	20	5	0	0	0	Hollow logs at base of tree	727069.5439	6183230.694
Eucalyptus sp.	10	0	1	0	0	Hollow log at base of tree	726832.495	6183676.132
Eucalyptus sp.	10	1	1	0	0	Hollow logs at base of tree	726533.426	6184320.03
Eucalyptus sp.	20	3	0	0	0	Eucalyptus sp.	726483.2548	6184410.438
Eucalyptus sp.	20	1	1	0	0	Eucalyptus sp.	726507.3003	6184436.024
Black Box Eucalyptus largiflorens	8	3	0	0	0	Black Box	726655.7504	6184092.119
Eucalyptus sp.	20	3	1	0	0	Eucalyptus sp.	726588.3319	6184223.069
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	726657.4641	6184109.614
Eucalyptus sp.	20	3	0	0	0	Eucalyptus sp.	726461.8675	6184407.548
Eucalyptus sp.	10	4	0	0	0	Eucalyptus sp.	726510.7805	6184400.008
Eucalyptus sp.	8	1	0	0	0	Eucalyptus sp.	727253.2546	6182814.506
Eucalyptus sp.	40	1	0	0	0	Eucalyptus sp.	726794.9882	6183822.818
Eucalyptus sp.	8	0	1	0	0	Eucalyptus sp.	726623.5092	6184163.937

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Black Box Eucalyptus largiflorens	40	3	1	3	0	Striated Pardolote (<i>Pardalotus striatus</i>) using large hollow	726774.1747	6183854.952
Eucalyptus sp.	15	3	0	0	0	Eucalyptus sp.	726627.3731	6184170.772
Eucalyptus sp.	10	0	1	0	0	Hollow log at base of tree	726836.5391	6183658.332
Eucalyptus sp.	10	3	0	0	0	Hollow logs at base of tree	727086.1062	6183267.271
Eucalyptus sp.	30	4	1	0	0	Hollow logs at base of tree	727066.8036	6183217.928
Eucalyptus sp.	60	1	0	0	0	Dead stem with possible hollow	727051.1394	6183236.779
Eucalyptus sp.	70	2	2	0	0	Dead stumps on live branches	727074.6095	6183269.564
Eucalyptus sp.	50	1	1	0	0	In dead branches and live branches	737113.7759	6173713.835
Eucalyptus sp.	40	1	3	0	0	In dead branches and live branches	737070.3419	6173719.979
Eucalyptus sp.	20	1	0	0	0	In dead branches and live branches	737052.6056	6173707.691
Eucalyptus sp.	50	1	1	0	0	In dead branches and live branches	737109.0086	6173696.38
Eucalyptus sp.	40	0	1	0	0	In dead branches and live branches	737074.7437	6173708.517
Eucalyptus sp.	45	1	0	1	0	In dead branches and live branches	737082.6985	6173710.544
Eucalyptus sp.	25	2	1	0	0	In dead branches and live branches	737034.1211	6173709.202
Eucalyptus sp.	40	1	0	0	0	In dead branches and live branches	737044.5096	6173721.735
Eucalyptus sp.	30	1	1	0	0	In dead branches and live branches	737096.5738	6173709.881
Eucalyptus sp.	35	1	1	0	0	In dead branches and live branches	737098.6027	6173706.566
Eucalyptus sp.	40	2	0	0	0	In dead branches and live branches	737065.3394	6173714.856
Eucalyptus sp.	20	1	2	0	0	In dead branches and live branches	737030.4476	6173709.762

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	35	1	2	0	0	In dead branches and live branches	737055.0415	6173714.25
Eucalyptus sp.	35	2	0	0	0	In dead branches and live branches	737045.8638	6173715.712
Eucalyptus sp.	45	2	0	0	0	In dead branches and live branches	737101.572	6173704.729
Eucalyptus sp.	20	0	2	0	0	In dead branches and live branches	737046.3535	6173717.171
Eucalyptus sp.	20	1	1	0	0	In dead branches and live branches	737091.7639	6173703.43
Eucalyptus sp.	65	1	2	0	0	In dead branches and live branches	737135.2788	6173698.193
Eucalyptus sp.	35	2	2	0	0	In dead branches and live branches	737029.1961	6173717.336
Eucalyptus sp.	60	1	0	0	0	In dead branches and live branches	737025.4128	6173727.688
Eucalyptus sp.	30	1	0	0	0	In dead branches and live branches	737021.4701	6173715.969
Eucalyptus sp.	65	0	1	0	0	In dead branches and live branches	736982.7892	6173815.165
Eucalyptus sp.	65	1	1	1	0	In dead branches and live branches	736969.053	6173782.805
Eucalyptus sp.	50	2	4	0	0	In dead branches and live branches	737014.6875	6173807.734
Eucalyptus sp.	20	2	0	0	0	In dead branches and live branches	737006.0393	6173787.723
Eucalyptus sp.	35	5	4	0	0	In dead branches and live branches	736999.2303	6173807.804
Eucalyptus sp.	45	2	1	0	0	In dead branches and live branches	737005.9747	6173807.886
Eucalyptus sp.	65	1	2	0	0	In dead branches and live branches	736987.8602	6173789.55
Eucalyptus sp.	65	0	2	0	0	In dead branches and live branches	736985.1256	6173801.078
Eucalyptus sp.	30	1	1	0	0	In dead branches and live branches	736995.9515	6173797.594
Eucalyptus sp.	45	2	2	0	0	In dead branches and live branches	737008.4696	6173792.328

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	30	2	2	0	0	In dead branches and live branches	736994.2655	6173790.194
Eucalyptus sp.	20	2	0	0	0	In dead branches	737051.2223	6173771.264
Eucalyptus sp.	30	3	1	0	0	In dead branches	736991.2837	6173770.076
Eucalyptus sp.	30	0	3	0	0	In dead branches	736973.6086	6173765.278
Eucalyptus sp.	20	0	1	0	0	In dead branch	737002.0949	6173766.183
Eucalyptus sp.	20	2	0	0	0	In dead branches	737044.6214	6173767.591
Eucalyptus sp.	20	0	3	0	0	In dead branches	737055.2016	6173773.218
Eucalyptus sp.	30	0	2	0	0	In dead branches	736970.848	6173766.266
Eucalyptus sp.	30	0	1	0	0	In dead branches	736999.7961	6173783.129
Eucalyptus sp.	15	0	1	0	0	In dead branches	736975.4132	6173772.277
Eucalyptus sp.	20	1	2	0	0	In dead branches	737011.4958	6173760.357
Eucalyptus sp.	20	0	1	0	0	In trunk	737058.9029	6173756.893
Eucalyptus sp.	20	5	0	0	0	In dead branch	736996.8447	6173763.853
Eucalyptus sp.	20	3	0	0	0	In dead branches	737054.5885	6173776.118
Eucalyptus sp.	20	2	0	0	0	In dead branches	737037.4291	6173771.317
Eucalyptus sp.	20	0	1	0	0	In trunk	737057.6394	6173765.776
Eucalyptus sp.	30	3	0	0	0	In dead branches	736983.9871	6173784.384
Eucalyptus sp.	30	0	3	1	0	In dead branches	736975.198	6173782.772
Eucalyptus sp.	20	2	0	0	0	In dead branches	737028.8516	6173784.5
Eucalyptus sp.	20	1	1	0	0	In dead branches	737018.791	6173771.002
Eucalyptus sp.	30	3	1	0	0	In dead branches	736992.8683	6173775.893
Eucalyptus sp.	20	2	1	0	0	In dead branches	737023.2651	6173785.24
Eucalyptus sp.	15	0	1	0	0	In trunk	737063.7617	6173764.923
Eucalyptus sp.	50	2	2	0	0	In dead branches and live branches	737027.1007	6173805.78
Eucalyptus sp.	25	1	1	0	0	In dead branches and live branches	737027.0873	6173788.611
Eucalyptus sp.	25	1	1	0	0	In dead branches and live branches	737130.7914	6173768.023
Eucalyptus sp.	40	2	0	0	0	In dead branches and live branches	737139.8782	6173782.535

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Easting	Northing
Eucalyptus sp.	50	1	1	0	0	In dead branches and live branches	737069.5505	6173797.493
Eucalyptus sp.	60	0	1	0	0	In dead branches and live branches	737072.2441	6173780.391
Eucalyptus sp.	50	0	1	0	0	In dead branches and live branches	737130.0369	6173787.279
Eucalyptus sp.	45	2	1	0	0	In dead branches and live branches	737095.0692	6173796.013
Eucalyptus sp.	25	1	0	0	0	In dead branches and live branches	737135.2261	6173770.526
Eucalyptus sp.	40	1	1	0	0	In dead branches and live branches	737115.2138	6173786.157
Eucalyptus sp.	45	1	1	0	0	In dead branches and live branches	737116.6259	6173794.502
Eucalyptus sp.	40	0	1	0	0	In dead branches and live branches	737129.521	6173780.192
Eucalyptus sp.	25	2	0	0	0	Dead	737044.0489	6173786.371
Eucalyptus sp.	30	1	2	0	0	In dead branches and live branches	737093.0503	6173779.854
Eucalyptus sp.	55	1	0	0	0	In dead branches and live branches	737103.7919	6173775.976
Eucalyptus sp.	20	1	1	0	0	In dead branches	737086.8026	6173745.519
Eucalyptus sp.	20	2	0	0	0	In dead branches	737094.5701	6173769.233
Eucalyptus sp.	20	1	1	0	0	In dead branch and trunk	737110.7595	6173767.713
Eucalyptus sp.	15	1	0	0	0	In dead branch	737114.9522	6173752.169
Eucalyptus sp.	10	1	0	0	0	In dead branch	737133.513	6173757.118
Eucalyptus sp.	20	2	1	0	0	In dead branches	737077.6318	6173759.377
Eucalyptus sp.	20	2	0	0	0	In dead branches	737135.0553	6173772.402
Eucalyptus sp.	20	1	2	0	0	In dead branches	737130.5269	6173772.914
Eucalyptus sp.	20	0	1	0	0	In dead branch	737124.5046	6173750.05
Eucalyptus sp.	20	2	0	0	0	In dead branches	737123.5976	6173759.287
Eucalyptus sp.	50	1	1	0	0	In dead branches	737121.2992	6173717.874
Eucalyptus sp.	20	1	0	0	0	In dead branches	737037.5066	6173732.892
Eucalyptus sp.	20	1	0	0	0	In dead branch	737060.6533	6173741.611

Table A.1 **Hollow bearing trees**

Tree Species	DBH (cm)	Small Hollow	Medium Hollow	Large Hollow	Very Large Hollow	Notes	Eastings	Northing
Eucalyptus sp.	30	0	3	0	0	In dead branch and live trunk	737054.1865	6173725.114
Eucalyptus sp.	30	1	0	0	0	In dead branch	737123.0998	6173736.193
Eucalyptus sp.	20	2	0	0	0	In dead branches	737039.8894	6173745.197
Eucalyptus sp.	20	3	1	0	0	In dead branch and live trunk	737051.1475	6173748.061
Eucalyptus sp.	30	2	1	0	0	In dead branches and live trunk	737070.0155	6173752.518
Eucalyptus sp.	20	4	1	0	0	In dead branches	737035.31	6173741.322
Eucalyptus sp.	20	1	0	0	0	In dead branch	737127.5847	6173729.555
Eucalyptus sp.	20	2	0	0	0	In dead branches	737065.0576	6173739.835
Eucalyptus sp.	20	2	0	0	0	In dead branch and live trunk	737062.4911	6173740.212
Eucalyptus sp.	20	2	0	0	0	In dead branches	737055.3277	6173745.366
Eucalyptus sp.	20	3	0	0	0	In dead branches	737032.1646	6173741.926
Eucalyptus sp.	20	3	0	1	0	In dead branches	737094.0411	6173736.008
Eucalyptus sp.	20	3	0	0	0	In dead branches	737068.5414	6173734.274
Eucalyptus sp.	28	0	2	0	0	In dead branches	737054.5347	6173740.756
Eucalyptus sp.	40	3	0	0	0	In dead branches and live branches	737165.0443	6173705.363
Eucalyptus sp.	20	1	0	0	0	In dead branch	737110.2974	6173750.436
Stag	28	0	1	0	0	Standing dead tree, chimney hollow	737111.4449	6173720.694
Eucalyptus sp.	30	1	0	0	0	In dead branches	737120.8021	6173724.049
Eucalyptus sp.	20	2	0	0	0	In dead branch	737111.559	6173734.183
Eucalyptus sp.	15	2	0	0	0	In dead branches	736976.5997	6173763.788
Eucalyptus sp.	15	1	0	0	0	In dead branch	736984.5038	6173763.592
Eucalyptus sp.	20	3	0	0	0	In dead branches	737082.7103	6173740.943
Eucalyptus sp.	30	2	0	0	0	In dead branch	737131.0628	6173733.513
Eucalyptus sp.	20	3	0	0	0	In dead branch	737106.894	6173747.2

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APPENDIX 2- PHOTOGRAPHS OF CLEARING WORKS



Mine access road clearing (March 2024)



Processing plant area (March 2024)



Active Malleefowl mound BWM2 (January 2024)

Appendix F – Annual Malleefowl Monitoring Programme – 2024 Monitoring Report



Annual Malleefowl Monitoring Program Balranald Mineral Sands Mine Project


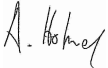
2024 Monitoring Report

Iluka Resources Limited

12 January 2025

→ The Power of Commitment



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Executive summary

Iluka Resources Limited (Iluka) operates a mineral sands mine in south-western New South Wales, known as the Balranald Mineral Sands Mine Project (the Balranald Mine Project). The southern and northern ends of the site are located approximately 12 kilometres (km) and 66 km north-west of the town of Balranald, respectively.

The Balranald Mine Project was approved under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2012/6509). A condition of approval is that Iluka must undertake annual monitoring for Malleefowl (*Leipoa ocellata*) in accordance with the approved Biodiversity Management Plan (BMP) and the Malleefowl Monitoring and Management Sub Plan (MMMSPP). The Malleefowl is listed as endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act) and as vulnerable under the EPBC Act.

In accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team 2020), the primary aim of the Malleefowl monitoring program is to track changes in the number of breeding birds inhabiting selected sites across the project area.

Annual monitoring of Malleefowl at the Balranald Mine Project commenced with baseline monitoring in December 2023 for the 2023-2024 breeding season (Year 1) (EMM 2024). GHD Pty Ltd (GHD) was engaged by Iluka to undertake monitoring for Malleefowl for the 2024-2025 (Year 2) season. This report presents the results of the Year 2 monitoring.

GHD's ecologists undertook the Malleefowl monitoring in October 2024. The monitoring comprised two parts:

- Monitoring of the three established 2 x 2 km sites/areas, and
- Monitoring of the area up to 200 m from the approved haul road disturbance boundary.

GHD also deployed motion-sensing cameras at selected locations, in an effort to record Malleefowl activity around mounds and potentially chick hatchings.

During the monitoring, 23 mounds or potential mounds were found and assessed. Six of the mounds were deemed 'active': three in Area 2 (mounds 1, 4 and 5), two in Area 3 (mounds 7 and 10) and one along the northern end of the Haul Road (mound 18). Seventeen (and possibly nineteen) of the 23 mounds had been detected and assessed in previous survey events.

Sightings of Malleefowl were recorded at six locations. Four birds were seen relatively close to active mounds and one bird was seen actively working on a mound.

All six of the mounds monitored by cameras shows signs of Malleefowl activity. All images of Malleefowl were of adult birds rather than chicks. At every mound, up to two birds were seen attending the mounds. No chick hatching was observed. All of the mounds monitored by cameras also shows signs of feral predator activity – cats, foxes, pigs.

The Malleefowl mound counts and the Malleefowl bird sightings made by GHD in October 2024 are similar to counts made in previous survey and monitoring events.

It was beyond the scope of this monitoring to evaluate the survey design and adequacy of sample sizes, as obtained by using only three areas and the haul road. However, with only one active mound found along the haul road and five elsewhere, finding the haul road mound to be inactive in future may present a considerable challenge – determining that its inactivity is not due to the project disturbance is likely to be difficult to show convincingly.

The use of motion-sensing cameras at active mounds showed clearly that feral animals continue to be a threat to Malleefowl breeding success. The results indicate that the feral predator control efforts to date need to be continued and possibly increased to reduce the threat to acceptably low levels.

Future management and monitoring of the site for Malleefowl should include:

- Continue or increase control efforts for the most prevalent feral predators – foxes and pigs.

- Consider targeted cat-control methods to reduce or eradicate the local population of cats
- Implement control methods for goats, to reduce the vegetation damage they cause to Malleefowl habitat
- Enforce slow traffic speed limits on any roads that pass close to known mounds or through Malleefowl high-use areas
- Continue to monitor known mounds and birds.

This report is subject to, and must be read in conjunction with, the limitations set out in sections 1 and 2 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

Iluka Resources Limited (Iluka) operates a mineral sands mine in south-western New South Wales (NSW), known as the Balranald Mineral Sands Mine Project (the Balranald Mine Project). It includes construction, open-cut mining, primary processing, and rehabilitation of two linear mineral sand deposits, located approximately 12 kilometres (km) and 66 km north-west of the town of Balranald, respectively.

The Balranald Mine Project was approved under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 5 April 2016 and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2012/6509) on 6 January 2017. A condition of the approval requirements is that Iluka must undertake annual monitoring for Malleefowl (*Leipoa ocellata*) in accordance with the approved Biodiversity Management Plan (BMP) and the Malleefowl Monitoring and Management Sub Plan (MMMSP). Iluka's MMMSP has been prepared in accordance with the guidelines provided in the National Manual for the Malleefowl Monitoring System (National Malleefowl Recovery Team, 2020) and the National Recovery Plan for Malleefowl (Benshemesh J., 2007). The Malleefowl is listed as endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act) and as vulnerable under the EPBC Act. The MMMSP outlines the life history, distribution and threats to Malleefowl and details measures for the management and monitoring of Malleefowl individuals and mounds within the project area.

Annual monitoring of Malleefowl at the Balranald Mine Project commenced with baseline monitoring in December 2023 for the 2023-2024 breeding season (Year 1) (EMM 2024). GHD Pty Ltd (GHD) was engaged by Iluka to undertake monitoring for Malleefowl for the 2024-2025 (Year 2) season. This report presents the results of the Year 2 monitoring.

1.2 Scope and purpose of this report

This report provides the results of Malleefowl monitoring for 2024 at the Balranald Mineral Sands Mine Project in accordance with the approved Biodiversity Management Plan (BMP) and the Malleefowl Monitoring and Management Sub Plan (MMMSP).

In accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team 2020), the primary aim of the Malleefowl monitoring program is to track changes in the number of breeding birds inhabiting selected sites across the project area.

The agreed scope for this monitoring is for GHD to undertake the following:

- Monitor existing mounds within three 2 x 2 km sites and record details as per the MMMSP.
- Conduct ground searches for new mounds.
- Conduct thermal imaging surveys using drone (drone supplied and operated by Iluka) – note that this was not completed in 2024, but should be used in future surveys and monitoring.
- Visit any suspected new mounds identified by thermal imaging and record details.
- Monitor existing mounds within 200 m of the MOD1 approval boundary.
- Conduct searches on foot for new mounds adjacent to the mine access road within 200 m of MOD1 approval boundary (10 km x 0.5 km section) within Malleefowl habitat and record details.
- Install remote cameras on any active mounds to record activity and chick hatchings. Retrieve cameras (to be done by Iluka) when breeding has ceased and assess data, recording number of hatchings.
- Use GPS to record and name/number all previously identified mounds and any new mounds identified (both in plots and in 200 m buffer of road).
- Collate all monitoring data and produce an annual report as per requirements of the MMMSP within 10 weeks of monitoring.
- Submit all raw data sheets to the National Malleefowl Monitoring Program.

GHD is to supply:

- Sufficient remote cameras for all active mounds located.

Iluka is to supply:

- Location details for currently known active or inactive mounds.
- Drone fitted with thermal camera;
- Drone pilot;
- Change out batteries in remote cameras as required until end of breeding season; and
- Postage / delivery of cameras back to consultants nominated office

As instructed by Iluka on site, the drone use and thermal imaging of mounds did not proceed for this round of monitoring in 2024.

1.3 Research questions

In addition to the primary monitoring aims, monitoring also aims to answer the following questions:

- Is vegetation clearing, increased noise and lighting resulting in a negative impact on Malleefowl breeding activity adjacent to the West Balranald Mine (MOD1)?
- Is fox and feral predator control under the BMP having a positive impact on Malleefowl breeding activity?
- Are bushfires having a negative impact on Malleefowl breeding activity?
- Are Malleefowl constructing new nests in rehabilitation areas?

It is understood that not all of these questions will be answerable after every monitoring event.

1.4 Limitations and assumptions

This report has been prepared by GHD Pty Ltd for Iluka Resources Limited and may only be used and relied on by Iluka Resources Limited for the purpose agreed between GHD and Iluka Resources Limited as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Iluka Resources Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report are limited by the following:

The field assessment:

Involved the use of Collector for ArcGIS mapping application to record site information. This mapping tool was accurate to within 10 m on site.

Did not involve any targeted surveys for species other than Malleefowl.

Was limited in Area 1 and the haul road by access constraints as directed by Iluka Resources Limited.

The opinions, conclusions and any recommendations in this report are based on conditions encountered, observations made, and information reviewed up to the date of preparation of the report. As GHD was only present on specific dates and certain time periods, this report is only indicative (and not definitive) of conditions present on the site(s). Conditions governing flora and fauna (whether in type or quantity) can change and fluctuate at different times throughout the year (due to factors including seasonal changes, external events or third-party intervention), and it is generally not possible to observe such changes or fluctuations where only a discrete site visit has taken place. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD has prepared this report on the basis of information provided by Iluka Resources Limited. GHD has not independently verified or checked this information beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4.1 Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.5 Study site

The Balranald Mine Project site is north of Balranald in south-west NSW. Access to the Balranald Mine Project site is approximately 12 km north of the Balranald township (Figure 1). From there, the project site itself extends approximately 60 km to the north-northwest.

For long-term monitoring of Malleefowl, three permanent monitoring sites (each 2 x 2 km) were established towards the southern end of the project site in December 2023 (EMM 2024) (Figure 1). Access to and within these locations is limited to foot only, with some limited vehicle access to the perimeter of the sites.

Within the Balranald Mine Project site is the MOD1 approval area, which is defined as the 'modified' area that contains all activities associated with the mining operation, construction, operations, haul road, rehabilitation and associated infrastructure and activities (Figure 1). Within and up to 200 m from the approved MOD1 disturbance boundary, monitoring is required of existing known Malleefowl mounds, and surveys for new mounds within suitable Malleefowl habitat are also required to identify any new mounds that may need to be protected during the breeding season (Sep-Feb).

The sites selected as part of this monitoring program are intended to form part of the National Malleefowl Monitoring System. Monitoring Malleefowl in relation to the Balranald Mine Project provides an opportunity to satisfy aim 2 of the National Malleefowl Monitoring System, namely 'interpret breeding density trends in the light of management practices and environmental variables'.

1.6 Previous assessments

ArcGIS data shows information from six previous Malleefowl mound assessments relating to the project:

- OEH 2013
- Ecotone 2013
- Niche 2015
- EMM 2022
- BWM 2023 (pre-clearance work)
- EMM 2024 (Baseline monitoring)

2. Methods

Four ecologists undertook the Malleefowl monitoring between 8 – 9 October 2024, reduced to two ecologists between 10 – 11 October 2024. Daily teams were formed as required from our Mildura-based ecology team: Alex Holmes, Dan Eyles, Will Wilson and Emma Pacholli.

2.1 Malleefowl Habitat and Mound Monitoring

The annual Malleefowl monitoring comprises two parts:

- Monitoring of the three established 2 x 2 km sites, and
- Monitoring of the area up to 200 m from the approved MOD1 disturbance boundary.

According to the MMMSP, annual monitoring of three 2 x 2 km sites is required between September and February (Malleefowl breeding season). For this assessment, monitoring of those sites was undertaken in early October. Monitoring immediately following rainfall was avoided, as rainfall could cause prints to be less obvious or completely washed away.

At each of the three sites, habitat condition was assessed by percentage cover of each vegetation stratum (ground-cover grass, ground-cover herbs, ground-cover other, small shrubs, medium shrubs, large shrubs and leaf litter) and a site photo was taken. Previously known mounds were visited and the location of new mounds (if any) were recorded.

For the monitoring of the area up to 200 m from the approved MOD1 disturbance boundary, existing (i.e., previously known and documented) mounds were visited and details recorded, and survey was undertaken for new mounds, to identify all mounds that may need to be protected during the breeding season (Sep-Feb).

For all monitoring, ground surveys were conducted in accordance with the National Malleefowl Monitoring Manual. At each mound, condition and activity was assessed using the 1 to 6 profile rating system of the National Malleefowl Monitoring Manual to define mound size, use and age. Data were collected in the field using datasheets from the MMMSP, and the following information was recorded at each mound identified:

- Observer and date.
- Site and mound number.
- GPS location of mound.
- Mound dimensions and profiles.
- Malleefowl activity (i.e. the occurrence of litter trails or any other signs that may indicate the mound is being prepared for breeding).
- Prints or tracks on the mound (i.e., Malleefowl, Fox, Kangaroo, other).
- Signs of predation (e.g., evidence of eggshell or feathers) (searched for at active mounds in a 20 m radius around the mound).
- Mound status including active mounds, leaf litter present, inactive mounds or long-unused mounds.

Mound status was assessed as per definitions provided in the MMMSP, p16 (active mound, leaf litter present, inactive mound, long-unused mound).

Data will be provided to Iluka in MS Excel spreadsheets (for contribution to a long-term monitoring dataset and for Iluka to hold on file). Raw data sets will be sent to the National Malleefowl monitoring program.

2.2 Cameras

With site-knowledge input from Iluka's environment team, GHD deployed motion-sensing cameras at selected locations, in an effort to record Malleefowl activity around mounds and chick hatchings. GHD deployed seven motion-sensing cameras at six active mounds. Cameras were retrieved by Iluka in early November, when breeding was expected to have ceased. Results from the cameras aimed to determine or confirm nest activity and predator activity around the mounds.

2.3 Permits

This monitoring was undertaken in accordance with conditions identified under Scientific License (license number SL100146) under section 132c of the NSW NPW Act 1974, and in accordance with the Standard Operating Procedures in place under GHD's animal ethics committee.

3. Results

3.1 Malleefowl mounds

During the monitoring, 23 mounds or potential mounds were found and assessed. The locations of the mounds are shown in Figure 1 and are summarised as follows:

- Area 1: 2 mounds, with another one being potentially an active mound
- Area 2: 8 mounds
- Area 3: 5 mounds
- Haul Road (in 200 m buffer area): 7 mounds

Six of the mounds were deemed 'active': three in Area 2 (mounds 1, 4 and 5), two in Area 3 (mounds 7 and 10) and one along the northern end of the Haul Road (mound 18).

Seventeen of the 23 mounds had been detected and assessed in previous survey events. Two others (mounds 13 and 17) may also have been detected and assessed in previous survey events. Determining corresponding previous identification numbers to some mounds was found to be difficult due to mound identification not being shown on the baseline monitoring maps (EMM 2024). The history of mound assessment is shown in Appendix B. Photographs of mounds in October 2024 are shown in Appendix C.

All mounds assessed as 'active' during the October 2024 monitoring had been detected and assessed in previous surveys. However, only three of those active mounds (mounds 4, 5 and 7) were assessed as part of the baseline monitoring (EMM 2024), because the baseline monitoring did not include the 200 m buffer area along the Haul Road.

Of the five mounds that have ever been assessed as 'active' in years past, one was found to be active in the October 2024 survey (mound 5 in Area 2). Of the 10 additional mounds that were ever assessed as 'potentially active' in years past, four were found to be active in the October 2024 survey (mounds 1, 4, 7, 10; two in Area 2 and two in Area 3).

Of the two mounds that have only ever been assessed as 'inactive' in years past, one (mound 18) was found to be active in the October 2024 survey, while the other (mound 20) was found to be 'long-unused'.

ArcGIS data show another 15 mounds in the general area that were not considered for this monitoring. Four of those mounds no longer exist (destroyed as part of the Iluka operations) and nine lie outside the designated survey area for annual monitoring.

Two mounds known from previous surveys that lie within the monitoring survey area (BWM8 along the Haul Road, and Ecotone FID38 in Area 1) were not assessed during the October 2024 monitoring. BWM8 was assessed as 'inactive' in pre-clearance surveys in 2023 and subsequently destroyed during the haul road construction, while Ecotone FID38 was assessed as 'inactive' by EMM (2024) and deemed to no longer be a mound in 2024 by GHD, as it has likely degraded to the point of no longer being perceptible.

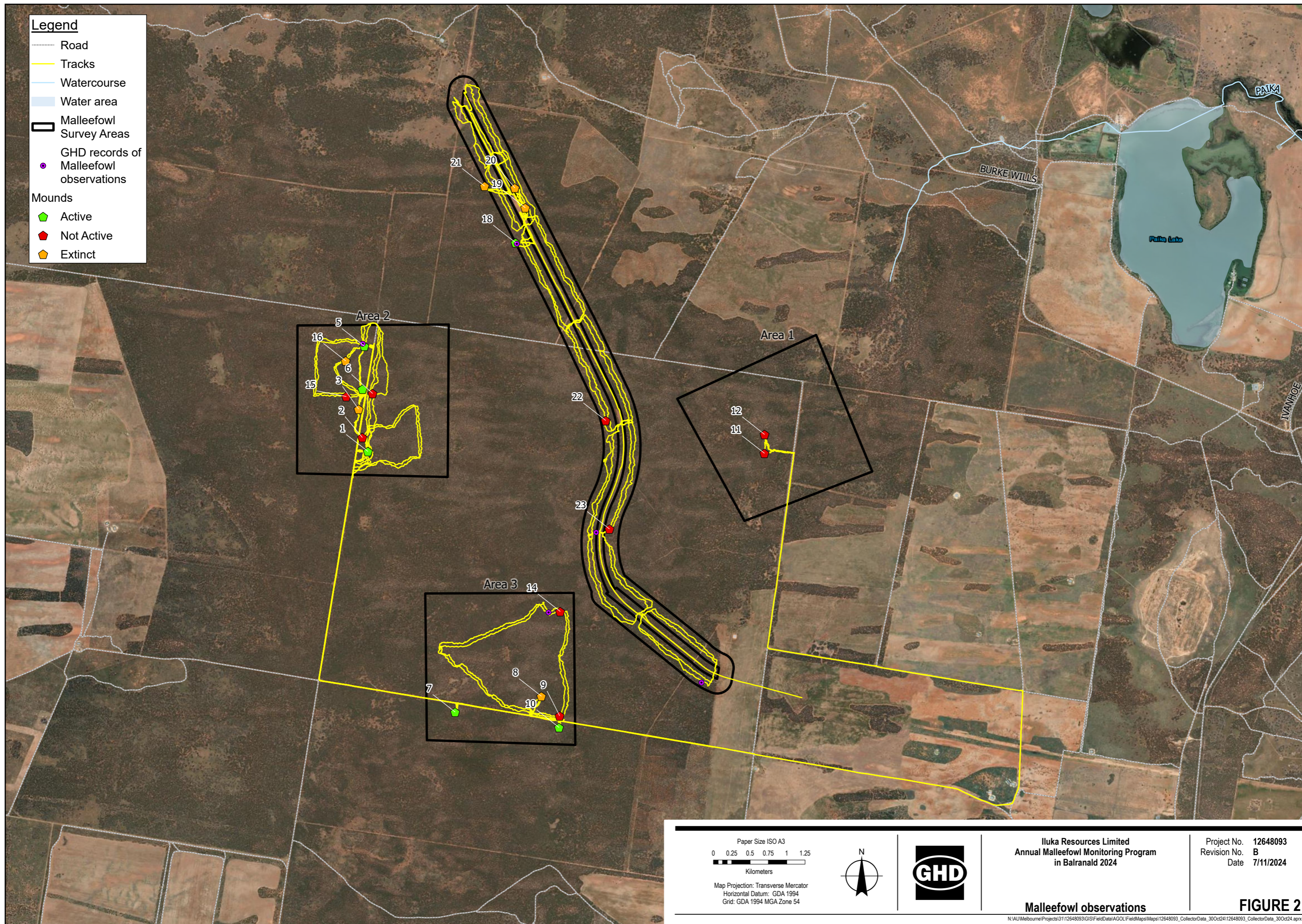


Table 1 Malleefowl mounds assessed by GHD in October 2024.

Mound number	Site	Active, as assessed (Y/N)	Active (camera)	Notes	Recorded historically?	When observed previously?
1	Area 2	y	Y		y	Niche 2015
2	Area 2	n			y	Niche 2015, EMM 2024
3	Area 2	n			y	Ecotone 2013, Niche 2015, EMM 2024
4	Area 2	y	Y		y	Ecotone 2013, Niche 2015, EMM 2024
5	Area 2	y	Y	Malleefowl present on mound	y	Ecotone 2013, Niche 2015, EMM 2024
6	Area 2	n			n	
7	Area 3	y	Y		y	EMM 2024
8	Area 3	n			y	Niche 2015
9	Area 3	n			y	EMM 2024
10	Area 3	y	Y		y	Niche 2015
11	Area 1	n			y	EMM 2024
12	Area 1	n			y	Ecotone 2013, EMM 2024
13	Area 1	n		Raised ground. Does not appear to be mound	n?	Likely previously Ecotone 2013 (FID38)
14	Area 3	n			y	Niche 2015
15	Area 2	n			n	
16	Area 2	n			n	
17	Haul Road	n		Not found - potentially destroyed	n?	Likely BWM 2023 (BWM8)
18	Haul Road	y	Y	Two Malleefowl present	y	BWM 2023
19	Haul Road	n			y	Niche 2015, EMM 2022, BWM 2023
20	Haul Road	n			y	BWM 2023
21	Haul Road	n			y	Niche 2015
22	Haul Road	n			y	Ecotone 2013, Niche 2015, EMM 2022, BWM 2023
23	Haul Road	n			n	

3.2 Malleefowl sightings

During the monitoring in October 2024, sightings of seven Malleefowl were recorded at six locations (two birds at one location) (Table 2). Four birds were seen relatively close to active mounds. One bird in Area 2 was seen actively working on mound 5.

ArcGIS information showed fifteen observations of Malleefowl birds, prints or feathers from previous surveys (Table 3).

Table 2 *Malleefowl sightings in October 2024*

Observation	Location	Date	Count	Notes
bird	Area 2	8/10/2024	1	bird seen, working mound 5 (active)
bird	Area 3	9/10/2024	1	near mound 14 (inactive)
bird	Haul Road	10/10/2024	2	near mound 18 (active)
bird	Haul Road	10/10/2024	1	
bird	Haul Road	11/10/2024	1	near mound 23 (inactive)
bird	Haul Road	11/10/2024	1	

Table 3 *Malleefowl sightings in previous surveys*

Observation	Survey	Location	Count	Notes
footprint	Ecotone 2013	Area 2	1	on road, not far from Mound 5
footprint	Ecotone 2013	Area 1	1	
footprint	Ecotone 2013	Area 1	1	near mound 12
footprint	Ecotone 2013	Outside monitoring area (southwest of Area 1)	1	
bird	Ecotone 2013	Outside monitoring area (southwest of Area 1)	1	
bird	Ecotone 2013	Outside monitoring area (southwest of Area 1)	1	near mound Niche FID9
bird	Niche 2015	Outside monitoring area (southwest of Area 1)	1	
footprint	Niche 2015	Outside monitoring area (southwest of Area 1)	1	
footprint	Niche 2015	Area 3	1	on road
footprint	Niche 2015	Outside monitoring area (south of Area 2)	1	
footprint	Niche 2015	Outside monitoring area (south of Area 2)	1	
bird	EMM 2023	Haul Road	1	near Mound 22
footprint	EMM 2023	Haul Road	1	near Mound 19
feather	EMM 2023	Haul Road	1	near Mound 22
footprint	EMM 2023	Haul Road	1	

3.3 Cameras

The seven cameras resulted in more than 13,000 images and 600 videos (Table 4). All six of the mounds monitored by cameras shows signs of Malleefowl activity. All images of Malleefowl were of adult birds rather than chicks. At every mound, up to two birds were seen attending the mounds and moving sand and leaf litter around; representative images are shown in Table 5.






No chick hatching was observed.

All six of the mounds monitored by cameras shows signs of feral predator activity – cats, foxes, pigs. Mound 4 (Area 2) showed particularly high activity of foxes.

Table 4 Results of cameras deployed at mounds

Camera #	Mound ID	Location /area	# images	Malleefowl detected?	Red Fox detected?	Cat detected?	Pig detected?	Goat detected?	Other native species
1	1	2	2641	Y	Y		Y	Y	Kangaroo
2	4	2	1042	Y	Y (high activity)				
3	5	2	3002	Y	Y			Y	
4	7	3	2655	Y	Y	Y			Emu
5	10	3	264	Y	Y		Y		Kangaroo
6 and 7	18	Haul Road	1851 plus 617 videos (6) 1719 (7)	Y	Y			Y	

Table 5 Images of malleefowl from motion-sensing cameras

<p>Mound 1</p>  <p>2024-10-11 09:57:26 M 2/3 15°C HYPERFIRE 2 COVERT</p>	<p>Mound 4</p>  <p>041F 05C 13/10/2024 07:33:26</p>
<p>Mound 5</p>  <p>2024-10-31 09:11:54 M 1/3 19°C HF2 PRO COVERT</p>	<p>Mound 7</p>  <p>2024-10-27 08:45:57 M 2/3 19°C 35404</p>
<p>Mound 10</p>  <p>044F 06C 19/10/2024 08:01:25</p>	<p>Mound 18</p>  <p>2024-11-05 06:42:53 M 2/3 4°C A</p>

3.4 Sightings of other threatened fauna

Two other threatened species were observed during the Malleefowl monitoring (Table 6).

Table 6 Other threatened fauna observed during monitoring

Observation	location	Date	count
Chestnut Quail-thrush	Area 2	8/10/2024	1
Mallee Worm-lizard	Area 2	9/10/2024	1

3.5 Weather

The weather during the monitoring was appropriate for mound assessment, with clear skies, no rainfall and mild to warm temperatures. The two-week period prior to the monitoring saw 11 mm of rainfall at Balranald, none of which fell in the week prior to monitoring (last rain: 2.8 mm on September 30th).

Table 7 Temperature and rainfall during the monitoring (recorded at Mildura)

Date	Min temp (C)	Max temp (C)	Rain (mm)
8	6.9	20	0
9	3.2	24	0
10	8.8	28.9	0
11	8.2	24.8	0

4. Discussion

This assessment report documents the number of breeding birds observed to be inhabiting selected sites across the project area, which is the primary aim of the monitoring program, in accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team, 2020). The sites selected for this monitoring program form part of the National Malleefowl Monitoring System.

The Malleefowl mound counts and the Malleefowl bird sightings made by GHD in October 2024 are similar to counts made in previous survey and monitoring events. The number of active mounds reported (6) is more than the three reported by EMM (2024), but the EMM (2024) monitoring did not include the haul road area.

It was beyond the scope of this monitoring to evaluate the survey design and adequacy of sample sizes, as obtained by using only three areas and the haul road. However, with only one active mound found along the haul road and five elsewhere, finding the haul road mound to be inactive in future may present a considerable challenge – determining that its inactivity is not due to the project disturbance is likely to be difficult to show convincingly.

The use of motion-sensing cameras at active mounds showed clearly that feral animals continue to be a threat to Malleefowl breeding success. Images of feral predators (foxes, pigs and cats) were common at all mounds, and are of greatest concern. This result indicates that the feral predator control efforts to date (fox baiting in February and May 2024 and pig baiting in March and May 2024, with 45 pig carcasses found thereafter; B. Isaacs, Iluka, pers. comm.) need to be continued and possibly increased to reduce the threat to acceptably low levels.

Monitoring questions:

As a result of the monitoring thus far, the research questions below can be responded to as follows:

- *Is vegetation clearing, increased noise and lighting resulting in a negative impact on Malleefowl breeding activity adjacent to the West Balranald Mine – Stage 1?*
Vegetation clearing resulted in the documented destruction of some Malleefowl mounds, which is certainly a

short-term negative impact during construction. However, no birds were known to be injured or killed, so all breeding pairs near the mine site retain the opportunity to re-build existing inactive mounds, or create new mounds. Of the known mounds that were not destroyed during construction, there is no clear evidence of negative impact during mine operation, in terms of numbers of Malleefowl and mounds detected in the general area during this monitoring. However, with only one active mound known/found along the haul road buffer area and five elsewhere (i.e., Areas 1, 2 and 3), finding the haul road mound to be inactive in future may present a considerable challenge – determining that its inactivity is not due to the project disturbance is likely to be difficult to show convincingly.

- *Is fox and feral predator control under the BMP having a positive impact on Malleefowl breeding activity?*
Despite control efforts to this point, feral predators continue to be prevalent at every mound that was monitored, and therefore continue to pose a threat to Malleefowl and their eggs and chicks. Increased control efforts, resulting in reduced numbers of feral predators, particularly foxes and pigs, are required before it can be concluded that control efforts are having a positive impact on Malleefowl breeding activity.
- *Are bushfires having a negative impact on Malleefowl breeding activity?*
Not applicable – no bushfires have been recorded in the area since mine construction.
- *Are Malleefowl constructing new nests in rehabilitation areas?*
Not applicable – no areas have yet reached the rehabilitation stage.

5. Recommendations

Future management and monitoring of the site for Malleefowl should include:

- *Continue or increase control efforts for the most prevalent feral predators – foxes and pigs.*
- *Consider targeted cat-control methods to reduce or eradicate the local population of cats, possibly shooting, or use of the Felixer trap.*
- *Implement control methods for goats, to reduce the vegetation damage they cause to Malleefowl habitat*
- *Enforce slow traffic speed limits on any roads that pass close to known mounds or through Malleefowl high-use areas.*
- *Continue to monitor known mounds and birds.*

6. References

Benshemesh, J.S. and Emison W.B. (1996). Surveying breeding densities of Malleefowl using an airborne thermal scanner. *Wildlife Research*, 23:121-141.

EMM (2024) Balranald Mineral Sands Project - West Balranald Mine (MOD1); Baseline Malleefowl Monitoring Report. Prepared for Iluka Resources. March 2024

National Malleefowl Recovery Team. (2020). National Malleefowl Monitoring Manual - Standards, Protocols and Monitoring Procedures.

National Malleefowl Recovery Team. (2020). National Malleefowl Monitoring Manual: Edition: v2020_01 (Revised June 2020).

Appendices

Appendix A

Field Data

Date	Site	observers	Nest number	Sought (V/x)	Found (V/x)	Staked (V/x)	Tagged (V/x)	Active (Y/N)	Profile	X sticks	Scrapped (Y/N)	Eggshell (n/s/l)	Fire since last monitored? (Y/N)	Prints - Malleefowl	Prints - Kangaroo	Prints - Fox	Scats - Malleefowl	Prints - other	Scats - other	outer nest - crust (n/s/l)	outer nest - moss (n/s/l)	outer nest - herb (n/s/l)	outer nest - shrub (n/s/l)	outer nest - tree (n/s/l)	inner nest - crust (n/s/l)	inner nest - moss (n/s/l)	inner nest - herb (n/s/l)	inner nest - shrub (n/s/l)	inner nest - tree (n/s/l)	Dimensions - Perimeter diameter (cm)	Dimensions - Rim diameter (cm)	Dimensions - Height North (cm)	Dimensions - Height South (cm)	Photo taken (Y/N)	x sticks replaced (Y/N)	Notes	crater depth
9/10/2024	Area 3	WW, EP	14	y	y	x	x	n	1			s	n		y		y (bird)			n	n	n	n	n						361	211	13	19	y	y		3
9/10/2024	Area 2	WW, EP	15	x	y	x	x	n	1			s	n							n	n	y	n	n	n	n	y	n	355	390	33	35	y	y	Fox appears to have dug in middle	8	
9/10/2024	Area 2	WW, EP	16	x	y	x	x	n	6			s	n							n	n	s	s	n	n	s	l	n	520	190	42	24	y	y		25	
10/10/2024	Haul Road	WW, EP	17	y	x																															potentially destroyed	
10/10/2024	Haul Road	WW, EP	18	y	y	y		y	2			s	n	y			y			n	n	n	n	n	n	n	n	n	380	105	60	55	y	n	two malleefowl present	25	
10/10/2024	Haul Road	WW, EP	19	y	y	x	x	n	6	present and undisturbed		s	n		y					n	n	n	s	n	n	n	n	n	500	190	21	24	y	n		0	
10/10/2024	Haul Road	WW, EP	20	y	y	x	x	n	6			n	n							l	n	n	l	n	l	n	s	n	445	205	24	24	y	y		0	
10/10/2024	Haul Road	WW, EP	21	y	y	x	x	n	6			n	n						y (goat)	l	n	n	s	n	l	s	n	s	n	480	210	0	0	y	y		5
11/10/2024	Haul Road	WW, EP	22	y	y	y	y	n	2			l	n							n	n	n	n	n	n	n	n	n	410	180	40	48	y	y	Iluka camera present	4	
11/10/2024	Haul Road	WW, EP	23	x	y	x	x	n	1			s	n							n	n	n	s	n	n	n	s	s	n	210	120	22	28	y	y		28

Appendix B

Mound Assessments - history

Mound ID	Location	Date visited (GHD 2024)	GHD 2024	EMM 2024	BWM 2023	EMM 2022	Niche 2015	Ecotone 2013	OEH 2013	Notes
1	Area 2	8-Oct-24	a				pa			two mounds from Niche? 27 and 32
2	Area 2	8-Oct-24	ina	a			pa			EMM 2024 Mound 1; fid 50
3	Area 2	8-Oct-24	lum	ina			pa	pa		EMM 2024 Mound 2; fid 51
4	Area 2	8-Oct-24	a	ina			pa	pa		EMM 2024 Mound 3; fid 52
5	Area 2	8-Oct-24	a	a			pa	pa		Malleefowl present. EMM 2024 Mound 4; fid 53
6	Area 2	8-Oct-24	ina							not recorded before GHD 2024
7	Area 3	8-Oct-24	a	ina						
8	Area 3	8-Oct-24	lum				pa			
9	Area 3	8-Oct-24	ina	ina						
10	Area 3	8-Oct-24	a				pa			
11	Area 1	9-Oct-24	ina	ina						EMM 2024 Mound 9
12	Area 1	9-Oct-24	ina	a				pa		EMM 2024 Mound 10
13	Area 1	9-Oct-24	not considered mound	ina (if Ecotone FID38)				pa (if Ecotone FID38)		Not mound. Likely to be Ecotone FID38.
14	Area 3	9-Oct-24	ina				pa			
15	Area 2	9-Oct-24	ina							not recorded before GHD 2024
16	Area 2	9-Oct-24	lum							not recorded before GHD 2024
17	Haul Road	10-Oct-24	not found, potentially destroyed							could this be BWM8?
18	Haul Road	10-Oct-24	a		ina					BWM9
19	Haul Road	10-Oct-24	lum		ina	a	pa			BWM6
20	Haul Road	10-Oct-24	lum		ina					BWM10
21	Haul Road	10-Oct-24	lum				pa			
22	Haul Road	11-Oct-24	ina		a	a	pa	pa		BWM2, active, protected
23	Haul Road	11-Oct-24	ina							not recorded before GHD 2024

Mound ID	Location	Date visited (GHD 2024)	GHD 2024	EMM 2024	BWM 2023	EMM 2022	Niche 2015	Ecotone 2013	OEH 2013	Notes
BWM7	oma	-			activity not noted		a	pa		avoided
BWM8	Haul Road	-	lum (if Mound 17)		ina					Potentially Mound 17
Ecotone FID22	oma	-					a			
Ecotone FID30	oma	-					a			
Ecotone FID31	oma	-					pa			
Ecotone FID38	Area 1	-	lum (if Mound 13)	ina				pa		Visited, but no waypoint made. Potentially Mound 13
Niche FID11	oma	-					pa			
Niche FID12 13	oma	-					pa			two mounds?
Niche FID20	oma	-					pa			
Niche FID9	oma	-					pa			
OEH FID33	oma	-							pa	

a active

pa potentially active

ina inactive

lum long-unused mound

oma outside monitoring area

Appendix C

Images of mounds



Mound 1



Mound 2



Mound 3



Mound 4



Mound 5



Mound 6



Mound 7



Mound 8



Mound 9



Mound 10



Mound 11



Mound 12

No photo

Mound 13

No photo

Mound 17



Mound 14



Mound 15



Mound 16



Mound 18



Mound 19



Mound 20



Mound 21



Mound 22



Mound 23

Appendix D

Images of other native and non-native species

Red Fox (Mound 7)



Feral Cat (Mound 7)



Pig (Mound 10)



Goat (Mound 5)



Emu (Mound 7)



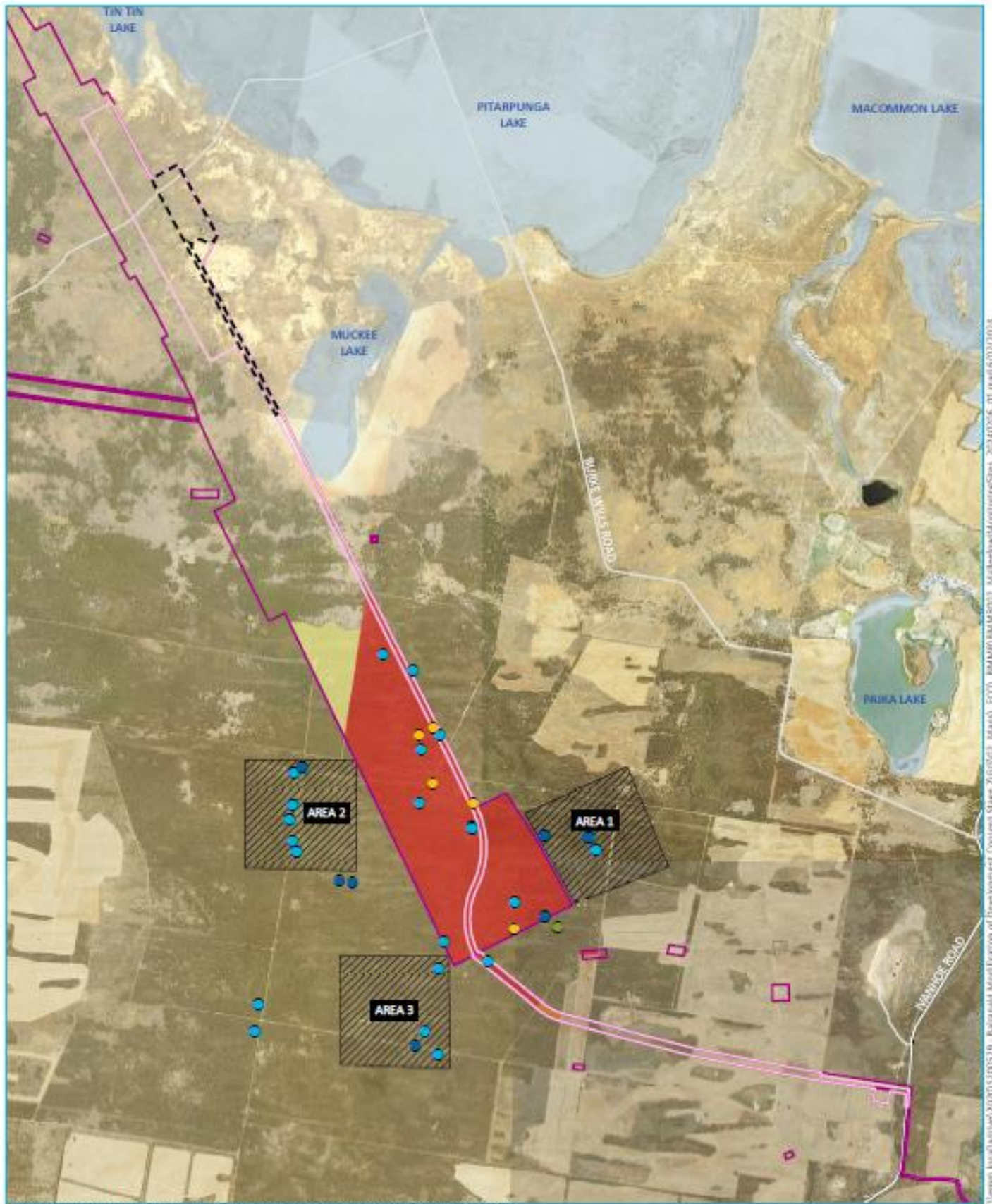
Kangaroo (Mound 1)



Appendix E

Historical map of mounds

(Figure 2.1 from EMM 2024)



Source: EMM (2024); Julia Resource (2022); Ecotone (2013); Niche (2015); ESA (2024); DFS (2017); GA (2012)

KEY

- Revised Balranald Project Area 2023
- Proposed MOD1 study area
- MOD1 additional disturbance area
- Drone area of interest
- Existing environment
- Major road
- Minor road
- Named watercourse
- Named waterbody
- Recorded Malleefowl locations
- Malleefowl location (Ecotone 2013, Niche 2015)
- Active Malleefowl mound (Niche 2015, EMM 2022)
- Potentially active Malleefowl mound (OEH 2013, Ecotone 2013, Niche 2015, EMM 2022)
- Track/print (Ecotone 2013, Niche 2015)
- Malleefowl habitat potential
- Very High
- High
- Moderate

Malleefowl monitoring sites

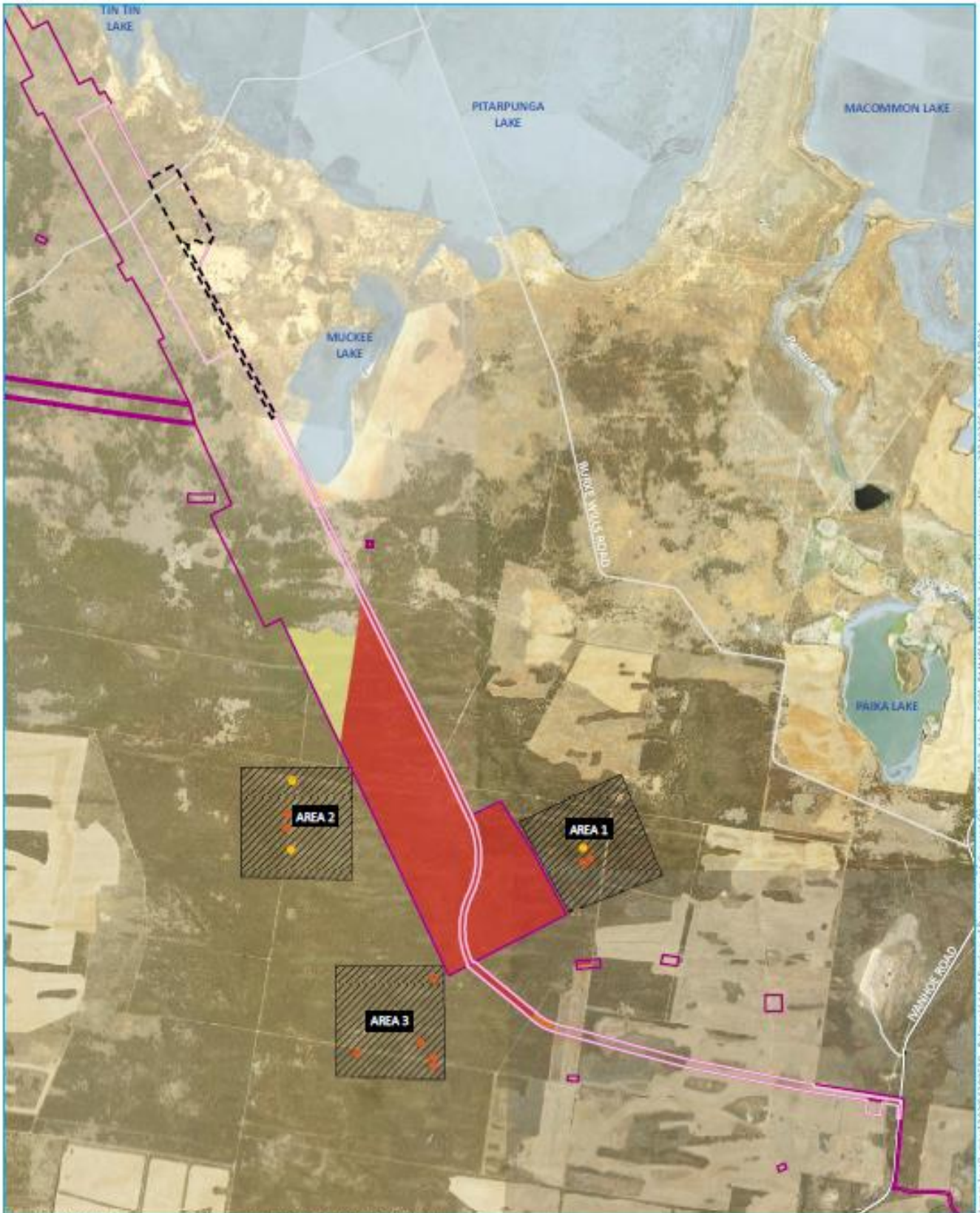
Balranald Mineral Sands Project
 Baseline Malleefowl Monitoring Report
 Figure 2.1



Verren Joseph/2024/03/05/03100519 - Balranald Mineral Sands Project of Development Consent Stage 2/05/03100519 - Maps/ECO - BMM/2024/03/05/03100519 - Malleefowl Monitoring Sites_2024/03/05_03100519

Appendix F

**Map of mounds from baseline monitoring
(Figure 4.1 from EMM 2024)**



Source: EMM (2024); Bulka Resources (2022); Niche (2015); ESR (2024); DFSI (2017); GA (2011)



- KEY**
- Revised Balranald Project Area 2023
 - Proposed MOD1 study area
 - MOD1 additional disturbance area
 - Drone area of interest
 - Existing environment
 - Major road
 - Minor road
 - Named watercourse
 - Named waterbody
 - Malleefowl mound location
 - Active
 - Not active
 - Malleefowl habitat potential
 - Very High
 - High
 - Moderate

Mound locations and status

Balranald Mineral Sands Project
Baseline Malleefowl Monitoring Report
Figure 4.1



I:\emv\local\air\mvd\2020\15\0005\19 - Balranald Mould Location of Development Consent Stage 2\GIS\ECV_Maps\ECV_BMM\BMM\F003_MoundLocationsandStatus_20240206_01.mxd 5/02/2024



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