



KEYSBROOK MINERAL
SANDS PROJECT

CONSERVATION AND
REHABILITATION
ENVIRONMENTAL
MANAGEMENT PLAN,
KEYSBROOK MINERAL SANDS
PROJECT, MS810

DOCUMENT REFERENCE

CONSERVATION AND REHABILITATION ENVIRONMENTAL
MANAGEMENT PLAN

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Doral Mineral Sands Pty
Ltd

ABN: 18 096 342

ACN: 096 342 451

Lot 7 Harris Road

Picton WA 6229

T: +61 8 9725 5444

F: +61 8 9725 4557

E: admin@doral.com.au

W: www.doral.com.au

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GLOSSARY

TERM	DEFINITION
BAM ACT	<i>Biosecurity and Agriculture Management Act 2007</i>
CAR	Compliance Assessment Report
CRMP	Conservation and Rehabilitation Environmental Management Plan
DBCA	Department of Biodiversity, Conservation and Attractions
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
EMP	Environmental Management Plan
EPBC ACT	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
KLPL	Keysbrook Leucoxene Pty Ltd
MS	Ministerial Statement
PER	Public Environmental Review
WDMP	Weed and Dieback Management Plan

SUMMARY

This Conservation & Rehabilitation Environmental Management Plan (CRMP) is prepared in accordance with Condition 8 of Ministerial Statement No. 810 (MS810) and Condition 2 of the *Environmental Protection and Biodiversity Conservation Act 1999* Approval 2005/2016 for the Keysbrook Mineral Sands Mine (the Project) as indicated in Table 1. The proponent for the Project is subsidiary Keysbrook Leucoxene Proprietary Limited (KLPL), a subsidiary of Doral Mineral Sands Pty Ltd (Doral).

TABLE 1: CRMP SUMMARY

Proposal Name	Keysbrook Mineral Sands Mine
Proponent Name	Keysbrook Leucoxene Proprietary Limited
Ministerial Statement No.	MS810
EPBC Approval No.	2005/2016
Purpose of the EMP	Fulfil the requirements of MS810 Condition 8 and EPBC 2005/2016.
EPA Key Environmental Factor/s, outcome/s and objective/s	Re-establish self-sustaining local provenance native vegetation cleared in the implementation of the proposal, at a ratio of not less than 1.4:1 (i.e. 1.4ha of re-vegetation per 1ha of vegetation cleared).
Implementation Condition Clauses	MS810 Condition 6.1, 6.2 and 7.2 MS810 Condition 8 EPBC 2005/2163 – Condition 2
Key Provisions of the Plan	<ol style="list-style-type: none"> 1. Return the land to its pre-mining use 2. Establish self-sustaining local provenance native vegetation appropriate to the underlying landform in planned areas including: <ol style="list-style-type: none"> 2.1. Establishing native vegetation corridors between local high value ecological areas. 2.2. Improving the ecological function of local major watercourses 2.3. Establishing native vegetation at a ratio of not less than 1.4 hectares of revegetation for every 1 hectare of native vegetation cleared. 3. Ensure a net gain in the extent and quality of breeding and foraging habitat for the Carnaby's Black Cockatoo, Baudin's Black Cockatoo and the Forest Red-tailed Black Cockatoo. <p>In mined areas:</p> <ol style="list-style-type: none"> 4. Re-establish a productive soil profile capable of supporting the target end land use.

	5. Re-establish functioning pasture suitable for productive grazing.
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1. CONTEXT, SCOPE AND RATIONALE

1.1. PROPOSAL

Doral Mineral Sands Pty Ltd (Doral) through its subsidiary Keysbrook Leucoxene Proprietary Limited (KLPL), operate a mineral sands mine and primary processing plant (the Project) within an area of rural land near the townships of Keysbrook and North Dandalup, 70 km south of Perth (Figure 1). The Project is within the Shire of Murray and the Shire of Serpentine-Jarrahdale.

The Keysbrook Mineral Sands Mine targets a deposit containing high grade leucoxene. Leucoxene is a fine, granular, weathered titanium mineral used as feedstock for titanium pigment plants. The surface mining operation migrates across the land, and the shallow mine void is backfilled to pre-disturbance contours and generally rehabilitated within two years of mining.

The Project is located on privately owned land, used for grazing and other rural land uses. The currently approved area of disturbance is 1532ha, within a 3015ha Development Envelope (Attachment 3, Figure 2 of MS810). Native vegetation approved for clearing ranges in condition from good to degraded. Doral has secured 75 hectares of native vegetation in two parcels through conservation covenants as per Condition 6 MS810. The area of mining approved under MS810, provides for 9 years of mining, which commenced in October 2015.

Based on the current mining schedule, the current ore reserve within the approved mine area as defined in (Attachment 3, Figure 2 of MS810), is due to be exhausted in 2023. In order for the continuation of the mine and workforce, KLPL seeks to amend the Project to include Part Lot 63 Hopeland Road under Section 45C of the *Environmental Protection Act 1986* (EP Act). The 'amendment area' is within the existing EPA Development Envelope and includes a disturbance (mine) area of ~140.52ha of cleared pasture and ~1.78ha of amenity plantings. No additional native vegetation clearing is proposed. Mining the amendment area will produce an additional ~65,000 tonnes of heavy mineral concentrate and result in ~18 months additional mining for the Project.

To support the request to EPA to amend the Project under Section 45C, KLPL has updated this Conservation and Rehabilitation Management Plan (CRMP) to incorporate the amendment area and demonstrate the amendment can be managed in accordance with existing Condition 8 of MS810.

1.2. KEY ENVIRONMENTAL FACTOR

The key environmental factors relevant to this CRMP are Flora and Vegetation and Terrestrial Fauna.

The Environmental Protection Authority (2015) describes the vegetation of the Perth and Peel region as being highly diverse in both structure and floristics including typical Australian plants such as the banksia, eucalypt and grevilleas. The highly cleared and fragmented landscape makes the diverse flora particularly vulnerable to extinction with many species confined to small remnants where weed invasion, disease and altered fire regimes add to the impacts of small population size. Similarly, the fauna of the Swan Coastal Plain has been significantly impacted since European Settlement. Three species of conservation significant black cockatoo use the region as foraging and breeding habitat including Carnaby's Black Cockatoo (*Zanda latirostris*), Baudin's Black Cockatoo (*Zanda baudinii*) and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*). While native fauna are able to persist in small isolated remnants of vegetation complexes; wetlands and waterways and the surrounding vegetation provide refuge habitat and allow fauna movement through the cleared landscape.

Although the majority of the approved mining area is cleared pasture, there are fragmented stands of remnant vegetation within some mine areas. Land rehabilitation and conservation actions will aim to return the land to the pre-mining land use and ensure a local net gain of native vegetation following mining activities. Potential risks to biological diversity and ecological integrity include degradation and fragmentation of habitat, introduction of invasive species and disease, altered fire regimes, grazing, altered water regimes and climate change.

Competition from weeds can impact the quality of remnant native vegetation and constitute a threatening process in the establishment of successful rehabilitation (pasture or native vegetation). Altered surface water regimes following mining and reinstatement of the land surface is a risk not only to water quality in water ways passing through the Project, but also in the potential for creating erosion on newly formed land surfaces and the loss of newly established vegetation. Similarly, the presence of *Phytophthora* infestations in the project area affects the design of native revegetation plans (i.e., plant translocations and species selection) and the potential spread of the pathogen offsite has the potential to threaten a range of native species and significant ecological communities on the Swan Coastal Plain.

Potential conservation and rehabilitation related risks arising from the Project which may impact on achieving success criteria are summarised in Table 2.

TABLE 2: POTENTIAL CONSERVATION AND REHABILITATION PROJECT RISKS

SOURCE	ACTIVITY	POTENTIAL IMPACT	INHERENT RISK
Mining and Exploration	Vegetation Clearing	Spread of invasive weed species to un-infested areas. Clearing of native vegetation outside of approved areas Loss of nesting and foraging habitat Fragmentation of remnant vegetation	High
	Topsoil removal and movement	Spread of invasive weed species to un-infested areas. Spread of <i>Phytophthora</i> dieback to un-infested areas.	Low
	Heavy and light vehicle movements	Loss of newly established native vegetation due to vehicle traffic	Medium
		Spread of invasive weed species to un-infested areas	Medium
		Spread of <i>Phytophthora</i> dieback to offsite un-infested areas.	Low
	Ore extraction and material replacement in pit	Altered surface water regime.	High
Reinstatement of land surface profile	Surface erosion	High	

SOURCE	ACTIVITY	POTENTIAL IMPACT	INHERENT RISK
	including surface drainage	Altered surface water regime Increased sediment movement into streams	
	Application of soil ameliorants when rebuilding soil profile in rehabilitation areas	Nutrient run-off into wetlands / streams / water ways	Medium
	Pasture re-establishment using purchased seed.	Introduction of new weed species in purchased seed spread in rehabilitation areas	Low
	Revegetation using seed and tube stock	Introduction of new weed species through planting tube stock in rehabilitation areas Native seed dormancy prevents germination Local provenance seed / seedlings not available for revegetation programs	Medium
	Translocation of native species	Spread of invasive weed species to uninfested areas. Spread of Phytophthora dieback to uninfested areas.	Low
Primary Production	Uncontrolled grazing	Degradation and further fragmentation of remnant vegetation Revegetation failure	Medium
	Application of fertilizer / soil ameliorants	Nutrient run-off into wetlands / streams / water ways	Medium
Natural events	Localised flooding	Introduction of new weed species Spread of Phytophthora dieback Erosion of rehabilitated areas Revegetation failure	Medium
	Altered fire regimes	Degradation and further fragmentation of remnant vegetation Loss of nesting and foraging habitat Revegetation failure	Medium
	Climate change	Degradation and further fragmentation of remnant vegetation	Medium

SOURCE	ACTIVITY	POTENTIAL IMPACT	INHERENT RISK
		Loss of nesting and foraging habitat Revegetation failure	

1.3. CONDITION REQUIREMENTS

The Project was assessed and approved under Part IV of the *Environmental Protection Act 1986* on 19 October 2009, with the issuing of Ministerial Statement 810. Revisions to the Project were approved via Section 46C in June 2011 and Section 45C in February 2013 and October 2019. A Section 46 amendment to extend the time limit for commencement of the Project was made in October 2014. A further request under Section 45C was requested in August 2022.

The Project was also approved by the Federal Minister for the Environment with *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval 2005/2163 issued on the 16 February 2011.

This CRMP has been prepared to address the following Conditions in MS810 and EPBC 2005/2163.

TABLE 3A: CRMP MINISTERIAL CONDITION REQUIREMENTS

CONDITION NO.	CONDITION	RELEVANT SECTION OF CRMP
8	Rehabilitation Management Plan	
8.1	<i>Prior to the commencement of operations, the proponent shall submit a Rehabilitation Management Plan to the requirements of the CEO.</i>	Completed: March, 2013. Revised, this document
8.2	<i>The objectives of the Plan are to:</i> <i>a. re-establish self-sustaining local provenance native vegetation cleared in the implementation of the proposal, at a ratio of not less than 1.4:1 (1.4 hectares of revegetation per 1 hectare of vegetation cleared); and</i> <i>b. re-establish functioning pasture.</i>	1.4.4 1.4.6
8.3	The Rehabilitation Management Plan shall: <i>a. describe measures to protect the areas to be revegetated from access, including grazing by stock;</i> <i>b. identify measures to translocate native plant species cleared for mining into revegetated areas;</i> <i>c. identify measures to eradicate weeds in the revegetation areas;</i> <i>d. identify measures to use dieback un-infested topsoil and dieback resistant species in the revegetation areas;</i> <i>e. describe a strategy to revegetate areas, including the use of local species of local provenance, and establishment of middle storey and understorey species;</i>	1.4.10 1.4.4 1.4.8 1.4.4, 1.4.9 1.4.4 1.4.12

CONDITION NO.	CONDITION	RELEVANT SECTION OF CRMP
	f. identify completion criteria for revegetation; g. outline a revegetation monitoring programme.	1.4.13
8.4	The proponent shall implement the Rehabilitation Plan.	This document
8.5	The proponent shall review and revise the Rehabilitation Plan as and when directed by the CEO.	3.2
8.6	The proponent shall implement revisions of the Rehabilitation Plan required by condition 8.5.	2
8.7	The proponent shall make the Rehabilitation Plan (including all amendments) publicly available in a manner approved by the CEO.	4
8.8	The proponent shall ensure grazing stock are excluded from areas described in condition 8.2(a)	1.4.10
6	Protection of native vegetation	
6.1	<i>Prior to the commencement of clearing the proponent shall, in consultation with the DEC, ensure that a minimum of 75 hectares of native vegetation within the area cross-hatched in Figure 2 is protected in perpetuity by an instrument or instruments approved by the CEO.</i>	1.4.4, Figure 2
6.2	<i>The instrument or instruments referred to in 6.1 shall include the following: b. measures which have the objective of maintaining a functioning and self-sustaining vegetation community</i>	1.4.4
7	Protection of watercourses and wetlands	
7.1	<i>The proponent shall not clear vegetation or undertake mining activities:</i> <i>a. within 20 metres of the banks of watercourses shown in Figure 9 of the PER document;</i>	
	<i>b. within 100 metres of the boundary of a conservation category wetland.</i>	
7.2	<i>The proponent shall implement management measures (including but not limited to weed and disease control, revegetation and monitoring) in respect to the areas under 7.1 to achieve a functioning and self-sustaining vegetation community.</i>	1.4.4

TABLE 3B: CRMP EPBC CONDITION REQUIREMENTS

EPBC Approval 2005/2163		
Condition No.	Condition	Relevant Section of CRMP
2	<p>For the better protection of the <i>Zanda latirostris</i> (Carnaby's Black-Cockatoo) and <i>Zanda baudinii</i> (Baudin's Black-Cockatoo), the person taking the action must prepare a conservation, offsets, and rehabilitation plan (the plan) to achieve the following outcomes in order of priority:</p> <ul style="list-style-type: none"> a. preservation of at least 75ha of existing remnant vegetation which contains foraging and/or breeding habitat for the above species in a secure tenure such as a conservation covenant; b. improvement in quality of existing remnant habitat areas on site through rehabilitation and weed management strategies; c. expansion of breeding and foraging habitat offsite; d. rehabilitation of foraging habitat areas on the mining area. <p>The plan must include:</p> <ul style="list-style-type: none"> - criteria for determining the success of the plan; - parameters to be monitored and frequency of monitoring; - an assessment of the risks to achieving the success criteria; - measures that will be used to manage risks, including contingency measures; - reporting arrangements to management, external stakeholders and the public. <p>The plan must be submitted to the Minister for approval. The action cannot commence until the plan is approved by the Minister. The approved plan must be implemented.</p>	<p>1.4.4, Figure 2</p> <p>1.4.4</p> <p>1.4.4</p> <p>1.4.4</p> <p>1.4.4</p> <p>1.4.12</p> <p>1.4.13</p> <p>1.2</p> <p>1.2.1</p> <p>4</p> <p>Completed March 2013.</p> <p>Revised plan 2019</p>

1.4. RATIONALE AND APPROACH

Land rehabilitation consists of the design and construction of landforms; and the establishment of sustainable ecosystems dependent on the final land use post-mining. Mine site rehabilitation must consider:

- The long-term stability and sustainability of the landforms, soils and hydrology of the site; and
- The re-establishment of ecosystem capacity to provide habitats for biota and services for people.

An adaptive management approach which incorporates a continuous improvement focus (based on site-specific knowledge, research and monitoring) facilitates successful outcomes in rehabilitation. Effective and early planning contribute to minimising rehabilitation costs, plus progressive rehabilitation can provide an

early indication as to whether site rehabilitation objectives are realistic and achievable in addition to reducing long term mine closure liability.

1.4.1. LAND MANAGEMENT

The mine and surrounding land is currently used for agricultural purposes. The dominant industry of the area is dairy and beef cattle farming, although there are also smaller landholdings with hobby farms, horticulture, and semi-rural partial bush blocks.

The land in the mine area is held in private ownership under pre-1898 titles. These titles impart ownership of the mineral rights to the landowner not the State, and as such KLPL undertakes agreements directly with landowners regarding land access and compensation in relation to mining activities. These agreements can also specify rehabilitation requirements including returning the land to pre-mining land use.'

Management Approach

Landowners will be engaged and identify areas to be returned to pasture; and agree to defined revegetation areas. Pasture areas will remain under KLPL management for two years post the first seeding or until it has met the criteria defined in the respective landowner agreement. Native revegetation areas will be fenced to exclude grazing and will be monitored for 5 years or until it has met the rehabilitation objectives. Fenced areas will need to allow for the implementation of the various landowner's management strategies post mining.

1.4.2. MINE PLANNING

Mine planning schedules and plans the mining operations to optimise the fleet, the design of the mine, and to ensure the ore delivered for processing meets the specified requirements. Within the land rehabilitation components of the mine plan this typically includes:

- Pre-mining landform (contour) survey;
- Preparation of areas pre-mining: scheduling clearing, vegetation downsizing, wood chipping and stockpiling, topsoil removal and stockpiling;
- Scheduling the return of non-economic materials to the void or open pit (oversize and tailings return from the processing plant);
- Developing the post mining rehabilitation landform design;
- Allocation of resources to re-establishing the final landform (to meet the rehabilitation landform design);
- Allocation of resources to re-spread topsoil;
- Post rehabilitation landform survey;
- Within the Project area liaison with specific landowners on the location of activities during the period is also conducted.

Management Approach

Final landform design is based on pre-mining contours and surface water flows, creating positive fall to minimise ponding where possible, and ensuring the post mining landform blends seamlessly with the adjacent unmined landform. Landform design ensures minor drainage lines are reinstated within the

constraints of the underlying bedrock (coffee-rock) and drain across cadastral boundaries in the same locations as pre-mining. Final landform design is informed by the agreed final land use with the landowner.

The mine plan schedules clearing of vegetation and topsoil stripping together with stockpiling of these materials ahead of the mining operations. Clearing constraints (including area open and noise considerations) are directed by the specific management plans or as specified in MS810.

Topsoil is identified as the top 10cm of the soil and is stockpiled separately to native vegetation material. All materials stockpiled for rehabilitation are stored outside of the mine area.

Rehabilitation planning and execution is integrated in the mine planning process including the allocation of adequate resources to meet the planned land rehabilitation targets.

1.4.3. LANDFORM DEVELOPMENT

Materials excavated from the pit void are processed through the wet concentrator plant where the sand and clay materials are separated as part of the process of extracting the heavy mineral. In the first two and a half years of operations, sand tails were used to construct dams where the finer clay slimes were pumped and later reintegrated through the top meter of the soil profile using heavy machinery to mix the sand and clay slimes. Since 2018 sand and clay tails have been recombined at the process plant and co-disposed directly into the mined void, eliminating the need for heavy machinery mixing and reducing the requirement for reworking the reinstated profile.

Co-disposal allows for the pumping of the combined sand and clay mixture directly into the void using the final landform design to inform placement.

Management Approach

Land reprofiling shall be executed to design ensuring surface drainage reinstatement. The reinstated landform shall be similar to pre-mining areas and will match existing contours on adjacent unmined lands. Final surface profiles will reinstate water flows to pre-mining regional drainage and shall not result in higher than background levels of sedimentation in water channels. Natural contours shall be reinstated to minimise the risk of erosion.

With the co-disposal method the final soil profile will have a homogeneous mix of sand and clay, with the water holding capacity of the reconstructed soil profile being similar or better than pre-mining.

1.4.4. REVEGETATION AREAS

There has been extensive clearing of the native vegetation on the Swan Coastal Plain for urban, industrial and agricultural purposes, with only 29% remaining of the original extent within the Perth and Peel Region. The quality of waterways and wetlands has similarly deteriorated, with many wetlands also having been filled or degraded.

Key threats to biodiversity are clearing, degradation and fragmentation of habitat, introduction of invasive species, disease, and altered fire regimes. Typically, both management and strategic rehabilitation will be required to address these threats. Proactive planning is necessary for the restoration of ecological communities and landscape rehabilitation, reconnecting the fragmented network of natural areas, improve water drainage functions, sequester carbon and provide specific habitat requirements for fauna adversely affected by development such as the black cockatoos.

Improving the condition in existing protected natural areas and buffering of key areas together with the re-establishment of links between natural areas will contribute towards replacing critical habitat for threatened fauna (EPA, 2015).

Management Approach

Revegetation works for the Project aim to improve ecological condition and function to an area that has been used for agriculture for many decades, with most of the existing native vegetation within the Project area in a degraded condition. As such it is recognised the planned revegetation areas are unlikely to achieve full ecological restoration within the life of the Project, however with measures to control feral pest species by exclusion and targeted baiting in addition to the creation and enhancement of revegetated areas will aim to establish a functional and sustainable ecosystem for indigenous fauna species.

Land clearing

Remnant vegetation within the approved mining footprint will be identified pre-clearing, and the area cleared of pasture or vegetation tracked. This process will ensure the area planned for revegetation meets the rehabilitation objectives and allows for any changes within the mine plan.

Conservation covenant

Two areas outside of the mining operations have been secured under Conservation Covenant and include remnant vegetation which is suitable for breeding and foraging habitat for the Carnaby's (*Zanda latirostris*), Baudin's (*Z. baudinii*), and Forest Red-Tailed (*Calyptorhynchus banksii naso*) Black Cockatoos (Figure 2):

- Northern Conservation Area – 50 ha (Lot 202 north of Elliott Road) and
- Southern Conservation Area – 27 ha (located on Lot 34).

A detailed spring flora and vegetation survey of the Conservation Covenant areas was undertaken in 2018 to establish a revegetation species list for the Northern and Southern Conservation Areas. This list has been used to plan and undertake revegetation efforts within the conservation areas and provides a reference list for the targeted revegetation species closure criteria.

Revegetation strategy

Revegetation areas are to cover at least 1.4ha for every 1ha of native vegetation cleared for the Project. Areas to be revegetated are required to be agreed with landowners to ensure they fit within the required management strategies of the land post mining.

Areas identified for revegetation aim to provide corridor linkages where possible between high value ecological areas such as conservation category wetlands, remnant vegetation, the Conservation Covenant areas, and the major creek lines passing through the Project footprint. The Conceptual Revegetation Plan (Figure 3) indicates planned revegetation areas, habitat enhancement areas (within remnant vegetation stands), and revegetation areas (already planted).

Planned revegetation areas will be habitat mapped to enable selection of suitable plant species for each area, according to the soil type and local hydrology.

Species selection

Species considered for revegetation shall be suitable for the various habitat types in the Keysbrook area including: wetlands, damplands, sandplain, low relief dunes, and drainage / creek lines; and shall be selected (where available) from the list compiled in Appendix B. They will include plant species which:

- Provide foraging and breeding habitat for the Carnaby's, Baudin's and Forest Red-Tailed Black Cockatoos;
- Are associated with the Bassendean Dunes and Pinjarra Plain on the Swan Coastal Plain;
- Include species typical of overstory, mid and lower strata from the Bassendean Dune and Pinjarra Plain systems; and
- Include *Phytophthora* dieback resistant species.

Species selection to allow for the development of strata to support suitable fauna habitat and diversity to blend and create corridors with other local bushland remnants will be targeted to achieve that indicated in Table 4.

TABLE 4: TARGET PLANTING RATES TO ACHIEVE STRUCTURAL DIVERSITY

	Low dunes / sandplain	Damplands / palusplain	Sumplands / Seasonal wetlands/ Creeks
Stems / Ha (planted)	4500	4500	5000
Overstory	30% (15-25)	20% (15-25)	5% (5-10)
Middle story	40% (45-55)	50% (45-55)	40% (35-45)
Understory	30% (25-40)	30% (25-40)	55% (40-60)

Transplanting

Where possible transplanting of mature plants otherwise difficult to establish (such as *Kingia australis* and *Xanthorrhoea preissii*) will be determined ahead of clearing remnant stands of vegetation. Translocation will be considered where these plants:

- Have been previously identified as having a reasonable level of success in being transplanted, including an understanding of the required level of care to ensure successful re-establishment;
- Can be readily accessed from good condition remnant vegetation that is not affected by *Phytophthora* dieback;
- Can be relocated to areas outside of the mine path, which can be accessed for the required maintenance period (to allow for successful re-establishment).

Black Cockatoo Nesting Habitat

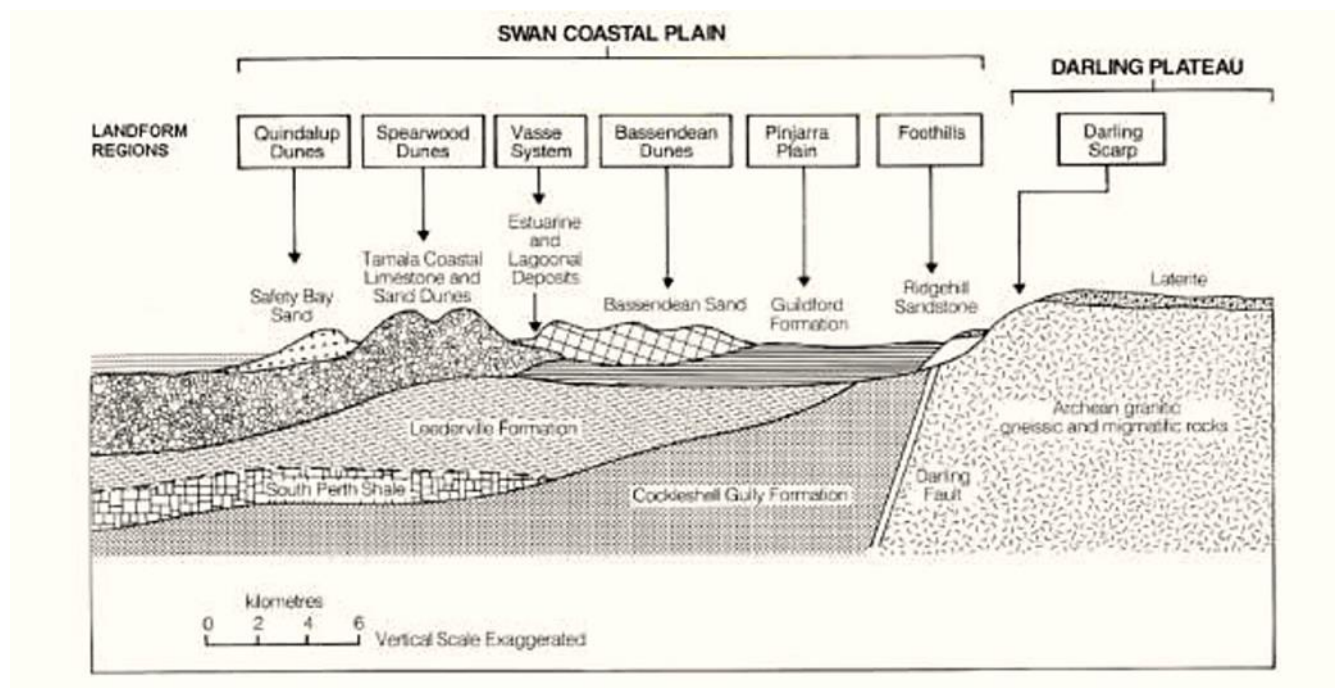
While there will be a net gain of native vegetation within the Project area post-mining, there will be a loss of mature trees containing potential nest hollows within the mine footprint. As it will take time for the revegetation areas to mature to the stage where they could provide nesting hollows, artificial nest boxes constructed to a proven design for large black cockatoos shall be installed in suitable areas.

30 artificially constructed nest boxes have been progressively installed by the Serpentine Jarrahdale Landcare Group within the Lot 202 Conservation Area since 2017 and monitored annually since installation. To date, monitoring results have shown no evidence of black cockatoo activity however annual monitoring shall continue for a minimum of 3 years post the cessation of mining.

1.4.5. SOILS

The Project occurs within the Peel-Harvey Catchment on the Swan Coastal Plain, predominantly within the Bassendean Zone. There are three soil-landscape zones identified within the Swan Coastal Plain as described by the Peel-Harvey Catchment Council (2015):

- Perth Coastal Zone – soils and landforms closest to the coast and include the Quindalup Dunes, Spearwood Dunes and Vasse Estuarine Deposits.
- Bassendean Zone – a complex of low dunes, sandplains and wetland depressions with pale deep sands. Bassendean sands are well draining, highly leached and have a very low nutrient holding capacity with a high risk of nutrient export. Superficial groundwater resources beneath the Bassendean Zone support a variety of uses, including public water supply and annual horticulture.
- Pinjarra Zone – comprised of the Pinjarra Plain and the Ridge Hill Shelf. The Pinjarra Plain is a flat, poorly drained alluvial plain with a variety of soils including grey deep sandy duplex soils, brown shallow loamy duplex soils and cracking clays.



SCHEMATIC 1: CROSS SECTION OF THE SWAN COASTAL PLAIN (adapted from Safstrom & Short, 2012)

While the Project footprint is mostly within the Bassendean Dunes, there are areas where the Bassendean sands are known to extend over the soils of the Pinjarra Plain.

Nutrient run-off into wetlands, streams and waterways from the application of fertilizers remains one of the largest contributors to the deterioration of water quality within the Peel-Harvey Catchment. The key land-use within the Project area is agriculture, and challenges of operating in this area are associated with the winter-saturated and highly permeable soils. These soils have a very low nutrient-holding capacity which is typically associated with the use of high levels of fertiliser.

The 2013 Report card on sustainable natural resource use in agriculture (DAFWA, 2013) provides a summary of the status of soil characteristics in the region. Key issues pertinent to the Project area soils are summarised in Table 5 and include:

- Soil acidity levels (pH) for the Swan Coastal Plain are generally poor to very poor and are considered likely to deteriorate further.
- Phosphorus Retention Index (PRI) for many of the soils on the Swan Coastal Plain is less than 10 which indicates a very low capacity to bind phosphorus to soil particles. The greater the PRI, the greater the phosphorus-holding capacity of the soil. This is particularly significant given the excessive nutrient levels entering the Peel-Harvey catchment and the various programs targeted at improving water quality in the waterways of the catchment. A soil's PRI can be increased with the application of ameliorants, such as natural clay.

TABLE 5: STATUS AND CONDITION TREND OF SOILS OF THE SWAN COASTAL PLAIN (DAFWA, 2013)

SOIL ASSET CHARACTERISTIC	STATUS/RISK	TREND
Soil acidity	Very poor	Likely deterioration
Wind erosion	Not assessed	
Water erosion	Low risk	Stable
Soil organic carbon levels	Good – very good	Measures not available
Water repellence	Very poor	Stable
Dryland salinity	Low risk	Stable
Nutrient status (phosphorus)	Excess	Stable
Nutrient export	Very high	Variable (mostly moderate to very high)

Management Approach

The Keysbrook Mineral Sands Project Nutrient Management Plan is a component of this Rehabilitation and Conservation Management Plan.

The reconstructed soil profile within the backfilled mine void consists of sand and clay co-disposal will include the amalgamation of sand tails and clay slimes returned to the mining void as part of the land forming process (Section 1.4.3). Stockpiled topsoil, removed from the mined area pre-mining, will be re-spread across the newly profiled landform.

Reconstructed soils will be sampled to determine nutrient and ameliorant input requirements, with a key focus on soil pH and on reducing the potential for nutrient export. This process is expected to contribute towards increasing the PBI of the soil and assist in improving the post mining soil profile.

Low pH values indicate soil acidity where the major elements required for plant growth (nitrogen, phosphorus and potassium) are less available to plants, with plant productivity falling when soil pH drops below 4.5. Within the reconstructed soil profile, both sub-soil and topsoil will be sampled to determine agricultural lime requirements to enable an average soil pH of 5.5 or greater. All reconstructed soils will have a pH above 4.5 within the pasture root zone of the soil profile.

Organic matter, or more specifically organic carbon is widely regarded as a vital component of a healthy soil, providing the energy source for soil microbes and as a reservoir of plant nutrients. As soil microbes break it down, nitrogen, phosphorus and sulphur are released and made available for plant uptake; organic matter also binds soil particles into aggregates necessary for soil structural stability. Soil carbon is involved in the adsorption of important plant nutrient cations (such as magnesium, calcium, sodium) that can significantly influence soil water holding capacity, especially in the sandy soils of the Project area; and it is important for the pH buffering capacity of the soil. Where possible, as part of the soil reconstruction process organic matter will be added to the newly established soil profile to improve the water holding, nutrient holding and the pH buffering capacity of the soil.

1.4.6. PASTURE RE-ESTABLISHMENT

Agriculture is the dominant land use in the Peel Harvey Catchment; according to DAFWA (2013) beef cattle and sheep grazing, and hay and pasture production, using clover and ryegrass-based pastures, are the most common activities, along with horticultural enterprises. Within the Project area the primary land-use is agriculture, the main commodities being beef, dairy and some horticulture, with much of the land within the project footprint under pasture.

According to DPIRD (2019) pastures play a major role in agricultural enterprises, with improved pastures increasingly taking on a more comprehensive role in farming systems to address emerging challenges for environment protection and food production.

Management Approach

To facilitate the return of productive mixed agriculture land use on existing freehold land commensurate with the surrounding areas. Considerations with establishing a pasture-based system sympathetic to future land use will include:

- Waterlogged sites may require improved surface water drainage (Section 1.4.3.1)
- Soil testing; status of major nutrients and soil pH to inform soil amendments and application rates (particularly in relation to potential for nutrient run-off; Section 1.4.5.1)
- Weed and pest control
- Pasture species selection
- Timing; where possible seed bed preparation should be completed to take advantage of early autumn rainfall so that seeding can be completed while the soil is still warm.

Weed and pest control

Effective Spring weed control to minimize weed seed set will assist with establishing a new pasture and ensure higher palatability of dry matter for summer grazing (upon handover to landowner). Where required topsoil stockpiles and new pasture rehabilitated areas will have weed control undertaken. Such control measures may include spraying with a non-selective herbicide about 3-4 weeks after weeds have germinated to reduce competition with pasture species (further detail refer Section 1.4.10.1).

Pest such as RLEM (redlegged earth mite) and Lucerne flea may require control measures to be undertaken. During emergence pasture seedlings should be inspected for damage from pests and spray as required.

Biomass control

While excessive biomass development in the pasture rehabilitation area can be seen as successful pasture establishment it can also create management issues such as increasing fire risk and can reduce the potential establishment of the pasture into the second season.

Newly established pasture may be lightly grazed 6-8 weeks after germination and once overall pasture height is 10-15cm and pasture is well anchored in the soil. An initial short intensive graze at this point will encourage further tillering and root development.

During the first summer dry pasture should be grazed with a short intensive grazing period, to remove the bulk of dry material allowing the seed to be exposed to high soil temperatures which assist in softening the seed, in turn encouraging germination at the break of the season in late autumn.

Where grazing is not an option due to a lack of infrastructure (e.g. fences, water) other options to remove the biomass excess may need to be implemented. This may include cutting for hay (September/October) or burning (usually in April). Removing this biomass from the rehabilitated pasture will contribute to the removal of potential organic carbon and associated nutrients from the soil, and additional nutrient supplementation is likely to be required prior to season 2 (informed by soil sampling; Section 1.4.5.1).

Pasture species selection

First year pasture rehabilitation is focused on soil development and the importance of choosing species with strong root systems to move through the new soil profile, encouraging soil microbes, and organic materials to develop through the upper profile. Forage oats are frequently used in renovating pastures and are seeded into the newly built soil due to their root vigor; clover is also a significant contributor to developing the new pasture due to its nitrogen fixation ability; and ryegrass an important contributor to a robust pasture also with strong root potential. The blend is chosen with the ability to develop in waterlogged soils common in the project area, and for rust and disease resistance.

If supplementary seeding is required in the second season, a pasture blend of ryegrass and clover will likely be used where this is compatible with the landowner's requirements.

Cover crops (such as cereal rye) will be sown on new land to assist with stabilization of the soil surface (and dust suppression) where areas are not competed in time for inclusion in the annual rehabilitation program.

Pasture program

Implementation of the pasture program will be largely driven by availability of the land, when it becomes available for rehabilitation post mining; and by seasonal conditions. Typically, a pasture development program might follow a similar outline as shown in Table 6. Approach to pasture re-establishment including seed mixes, fertilizers and application methods (and timing) will be undertaken in accordance with good agricultural practice in line with recommendations from the DPIRD for the Peel Harvey (Keysbrook) region

1.4.7. LOCAL PROVENANCE

To achieve the establishment of resilient, self-sustaining revegetation the use of known provenance plant material (seed and seedlings) is believed to reduce the risk of rehabilitation failure through:

- Using plants and seed genetically adapted to the local environment;
- Ability to adapt to changing environmental conditions;
- Increased survival rates.

While these are key to successful revegetation, it is also important to determine the risk of only using collections from small populations (in a fragmented landscape) as if too small and isolated they may also be suffering from reduced genetic diversity which in turn may result in reduced vigour and a poorer revegetation establishment.

Plants of local provenance tend to be better adapted to local conditions and prove to be more successful in revegetation works. The exception to this is revegetation of heavily impacted *Phytophthora* dieback areas where dieback-resistant strains sourced from other localities may need to be used.

Management Approach

A hierarchy of provenance will be applied:

1. Seed collected from the Project area or within the locality of the Project;
2. Seed collected from the Swan Coastal Plain within 20 km of the project;
3. Seed collected from the Swan Coastal Plain.

1.4.8. WEEDS

Weed surveys to date (2022) for the Project have recorded 34 weed species, excluding pasture species. The weed species are collectively known as environmental weeds (introduced plants that have established in a natural ecosystem and adversely contributing to a decline of natural communities).

There are a number of Declared Plants as listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) known to occur in the Shire of Serpentine – Jarrahdale and Shire of Murray. The Department of Primary Industries & Regional Development (DPIRD) (2017) has developed a Declared plant surveillance plan for the South West Land Division of Western Australia which lists 15 prioritised declared weeds for control across Western Australia (including Weeds of National Significance). Community, industry and biosecurity groups have selected another seven species as high priority surveillance targets:

- *Gomphocarpus fruticosus* (narrow leaf cotton bush)
- *Zantedeschia aethiopica* (arum lily)
- *Echium plantagineum* (Paterson's curse)
- *Solanum* species (silverleaf nightshade *S. elaeagnifolium* and apple of Sodom *S. linnaeanum*)
- *Emex australis* and *E. spinosa* (doublegee)
- *Moraea flaccida* and *M. miniata* (cape tulip)
- *Rubus laudatus* (blackberry)

These species have been selected as priority targets as they are agricultural weeds which have an adverse effect on agricultural production or systems and are likely to be found in the South West Land Division of Western Australia.

Management Approach

A Weed and Dieback Management Plan as per Condition 9 MS810 as approved by the EPA is in place and documents the Dieback management measures for the site. Key weed management measures as outlined within this plan include;

- Education of employees and contractors through site EHS Induction requirements,

- Ongoing observation and annual survey of known declared or priority weed locations,
- Using accredited seed collectors for the collection of local provenance seed for revegetation, and
- Vehicle inspections and wash down location.

1.4.9. PHYTOPHTHORA DIEBACK

A 2006 baseline survey identified *Phytophthora cinnamomi* in the Project area (Figure 3; MBS, 2006). Additional surveys undertaken in 2013 and 2016 confirmed the presence of the pathogen in an area of highly disturbed remnant vegetation (Terratree 2013 and 2016). The cleared, grazing areas that formed the majority of the 2013 and 2016 survey areas were determined to be unmappable (uninterpretable) given the absence of indicator species. Remnant vegetation in the area surveyed is classified as degraded, with few indicator species remaining. A 2017 Dieback risk assessment determined that these areas must be assumed to be infested and managed accordingly (Terratree, 2017). This determination can be applied to much of the project area given intensive and unrestricted livestock movement between areas of infested and excluded vegetation and periods of seasonal inundation across the lower areas. Similarly, the risk assessment concluded it is likely *P. cinnamomi* is present in the drainage lines and tributaries in the surrounding areas and hence the areas should be managed as if designated infested.

A *Phytophthora* Dieback survey was conducted by BARK Environmental (2023) to assess for the potential presence of *Phytophthora* Dieback within the proposed Lot 63 amendment area. This survey also included Lots 62 and 200, which do not form part of the amendment area. All of the proposed disturbance area within Lot 63 was mapped as excluded given it is cleared pasture with little to no vegetation or indicator species (Figure 3).

Management Approach

A Weed and Dieback Management Plan as per Condition 9 MS810 as approved by the EPA is in place and documents the Dieback management measures for the site. Key dieback management measures as outlined within this plan include;

- Site personnel and contractor education through EHS induction requirements;
- Vehicle inspections;
- Dieback signage;
- Limestone entrance road to site.

1.4.10. ACCESS

Access to rehabilitation areas within the mine footprint is controlled through the site entry gate, with all traffic on site restricted to established roads and tracks. Access into conservation covenant areas is also controlled.

All newly established rehabilitation areas will be excluded from livestock grazing to allow for plant development. Pasture areas will remain under KLPL management for at least a one-year period after seeding, and revegetation areas for at least 5 years or until rehabilitation objectives have been achieved. Vehicle access will be directed via firebreaks and established tracks.

Management Approach

Fencing will be maintained around all rehabilitation areas to ensure exclusion of stock. Revegetation areas will have a 20m buffer established where possible between boundary fences and the planting zone to designate areas where vehicle access is permitted; all access into revegetation areas will be gated.

Conservation covenant areas have controlled access, with gates into these areas locked to exclude unauthorised entry.

1.4.11. BUSHFIRE

Fire is an important part of the environment on the Swan Coastal Plain and has been present in Western Australia for millions of years, influencing the evolution of plants and animals. It also poses a very real risk to communities, homes, and businesses, particularly in the semi-rural environment in which the Project is located. Uncontrolled bushfires across the South-west of Western Australia have increased in frequency and intensity in recent years, causing significant damage to property, forests and loss of life. The risk of operating in such environments must be considered and proactively managed.

Fire management while aiming to protect human life and property also must protect and conserve biodiversity.

Management Approach

A Fire Management Plan has been prepared for the Project.

Where revegetation areas are to be established adjacent to a cadastral boundary a minimum 5m buffer will be maintained where possible between the planting zone and the boundary fence. This will allow for landowner vehicle access to undertake fence maintenance and ensure a cleared firebreak in accordance with Shire requirements and with minimal tree overhang as the vegetation matures.

1.4.12. COMPLETION CRITERIA

Completion criteria are the measures against which implementation of objectives can be assessed. The criteria aim to ensure rehabilitated areas will display self-sustaining characteristics of surrounding areas and provide Regulators and other key stakeholders confidence that, to the maximum possible extent, they can be managed in the long term according to the intended land use, using normal management practices without the input of additional resources.

Management Approach

The assessment of rehabilitation against the completion criteria is applied throughout the various stages of the rehabilitation operations and during the early years of ecosystem development (Table 6).

Completion criteria are subject to review and revision on a regular basis to allow for learnings from trials, monitoring, improved knowledge, industry practices and changes in standards.

TABLE 6: COMPLETION CRITERIA

Criterion	Criterion objective	Criterion Standard / Milestone	Verification
1. Final Land use			
1.1 Final land use	Agreed final land use has been determined in consultation with relevant stakeholders	End land use for the area is agriculture – grazing and it is expected that most areas will be returned to pasture. Agreement has been obtained from landowners as to locations of revegetation and pasture areas.	Land owner agreements identify revegetation zones, fences and pasture areas.
2. Safety			
2.1 Safety	There are no unsafe areas where community stakeholders could gain inadvertent access	All hazards that could endanger the safety of any person or animal have been identified and eliminated where practicable.	Inspections to ensure structures are safe and security is maintained.
2.1 Landform safety	Final landforms are safe	No unacceptable hazards to humans or wildlife have developed through erosion, subsidence, or otherwise	Inspections of rehabilitated landforms have been conducted to monitor their stability over time, including after significant rainfall events. Rehabilitation monitoring results.
3. Landforms			
3.1 Visual amenity	Visual amenity of rehabilitated areas is compatible with the local surrounding areas	Reinstated landforms blend into the surrounding landscape.	Landforms are consistent with the agreed final land use (criterion 1.1)
3.2 Surface stability	The reconstructed surface is stable and showing no signs of significant erosion	Reconstructed slope surfaces are stable. No areas exposed to risk of significant erosions defined as having: <ul style="list-style-type: none"> • Channelized flow resulting in extensive active gullies 	Visual assessment and monitoring results.

Criterion	Criterion objective	Criterion Standard / Milestone	Verification
		<ul style="list-style-type: none"> • Failure of drainage lines or banks • Evidence of ongoing significant sheet erosion 	
4. Hydrology			
4.1 Surface Water	Rehabilitation drainage patterns have been established and impacts on natural surface water flows are acceptable at key receptors.	<p>There are no significant physical off-site impacts as a result of the operations.</p> <p>Major creeks flowing through the project area show no significant increase in sedimentation or nutrient load when compared to baseline levels.</p>	Water monitoring records and reports.
5. Sustainability			
5.1 Sustainability	Rehabilitation is sustainable, and the land capability is suitable for the agreed end land use.	Monitoring inspections indicate that the rehabilitation will be sustainable, and will continue to fulfil rehabilitation objectives relating to the agreed final land use for pasture and revegetation areas	Documented in relevant monitoring reports
5.2 Resilience	Vegetation is sustainable and resilient to likely impacts such as drought, fire and Phytophthora Dieback	<p>Species selection for revegetation areas includes Phytophthora Dieback resistant species.</p> <p>Monitoring results demonstrate recruitment of native perennial species is occurring or is likely to occur on the site (e.g. evidence of flowering, fruiting, soil seed bank or second-generation seedlings).</p> <p>Monitoring has shown that the rehabilitation can survive one or more seasons of low rainfall (total annual rainfall <50% of average, or more than 2yrs of rainfall <75% of average).</p>	Documented in relevant monitoring reports

Criterion	Criterion objective	Criterion Standard / Milestone	Verification
5.3 Provenance	Revegetation species are of local provenance	Vegetation is endemic to the Swan Coastal Plain and sourced locally where possible, and typically are associated with the Bassendean Dunes and Pinjarra Plain.	Monitoring results confirm species colonizing revegetation areas are either known in the local area or are endemic to the Swan Coastal Plain
5.4 Weeds	Potential for rehabilitation to meet agreed post-mining land use is not limited by the presence of weeds	All requirements of the Weed and Dieback Management Plan have been implemented. No Declared Pests (as defined under the BAM Act) are present in greater abundance than baseline surveys indicate. Populations of environmental weeds have been monitored and controlled; weed abundance does not exceed 15% cover.	Review weed monitoring and control undertaken to ensure compliance with the approved Weed and Dieback Management Plan. Monitoring and visual inspection results.
5.5 Reconstructed soil profile	Soil profiles are shown to have the capacity to support mature plant communities to meet the agreed final land use requirements	Soil pH in the reconstructed soil profile will be higher than baseline. Soil pH is expected to be above pH4.5 with an average above pH5 across a rehabilitation area. No channelized flow resulting in gullies greater than 30cm deep and 25cm wide are evident.	Documented in Annual Compliance Assessment report. Monitoring and visual inspection.
5.6 Vegetation development	Vegetation is suited to the final land use	Pasture areas and revegetation areas are identified and planned according to the landowner agreements. Species selection for revegetation areas allow for natural variations in soil, landform and hydrology.	Documented in Annual Compliance Assessment report.
5.7 Early establishment revegetation (<2yrs)	Initial plantings provide sufficient numbers and diversity to allow for the development of endemic plant species from each stratum to establish.	Plantings include species typical of overstorey, mid and lower strata from the Bassendean Dune and Pinjarra Plain systems.	Documented in Annual Compliance Assessment report.

Criterion	Criterion objective	Criterion Standard / Milestone	Verification
		<p>Where seedlings are the primary revegetation, initial plantings to be an average of 4,500 stems/ha across all project areas.</p> <p>Monitoring of native plant abundance and species richness to ensure successful establishment at a survival rate of 75%.</p>	
5.8 Maturing revegetation (3-5+yrs)	Revegetation demonstrates sustainability trends, with similarities in structure and species richness to remnant vegetation.	<p>Monitoring results demonstrate recruitment of native perennial species is occurring or is likely to occur on the site (e.g. evidence of flowering, fruiting, soil seed bank or second-generation seedlings).</p> <p>Species richness is $\geq 60\%$ of the target seedling list (Appendix 1).</p> <p>Species density of maturing native plants is $\geq 2,000$ stems per hectare.</p>	Documented in Annual Compliance Assessment report.
5.9 Nutrient cycling	Soil nutrient cycling process evident.	<p>Developing leaf litter layer is evident (early establishment revegetation, maturing revegetation).</p> <p>Litter breakdown can be observed (maturing revegetation)</p>	Documented in Annual Compliance Assessment report.
5.10 Fauna habitat	Revegetation supports native fauna habitat and foraging habitat for the Black Cockatoo's.	<p>Species within revegetation areas meet foraging and habitat requirements for Black Cockatoo's.</p> <p>Key fauna habitat characteristics are present in revegetation areas including: vegetation structure, diversity of flowering species and a developing litter layer.</p>	Documented in Annual Compliance Assessment report.

Criterion	Criterion objective	Criterion Standard / Milestone	Verification
6. Closure – sign-off			
6.1 Land capability	Rehabilitation is sustainable, and the land capability is suitable for the agreed end land use.	Outcomes relating to soil, flora, fauna and water indicate that rehabilitation will be sustainable and fulfil the rehabilitation objectives.	Documented in Annual Compliance Assessment report.
6.2 Land management	Rehabilitated land management requirements return to pre-mining levels.	Long term management requirements will not be greater than those of areas prior to mining. Where additional management actions may be required, a mechanism has been established to support them.	Documented in Annual Compliance Assessment report.

1.4.13. MONITORING

Monitoring is required to evaluate the performance of rehabilitated landforms and to assess whether they have either met the Project completion criteria (objectives, goals and targets) or are showing satisfactory progress towards meeting these criteria.

Observing, recording and monitoring the results of various rehabilitation treatments is required to identify the success or otherwise of the treatments in order to inform changes and different approaches to improve the success for future work (adaptive management). These results also contribute to assessing and analysing progress to identify whether objectives, goals and targets are being attained.

Management Approach

Progressive rehabilitation and ongoing performance assessment will be carried out in areas where mining and related operations have been completed and further disturbance is unlikely. Monitoring results shall be used to assess whether initial establishment has been successful, rehabilitation is developing satisfactorily, and when it is ready for sign-off. Research activities such as field trials shall be undertaken where knowledge gaps or deficiencies in rehabilitation progress occur.

Monitoring events will be undertaken in line with the process outlined within this section, with the outcomes informing rehabilitation strategies, facilitating refinement in completion criteria and directing maintenance and remedial action plans consistent with the adaptive management approach (Section 3.1). Assessing whether an area has met all criteria will require compilation of all relevant site records of rehabilitation operations, monitoring data, photographic records and summarising these in a short report.

Should ongoing monitoring indicate risks to the achievement of established completion criteria then appropriate maintenance and/or remedial work will be undertaken. Further monitoring will be subsequently undertaken on repaired areas to demonstrate improved compliance with the relevant criteria.

Monitoring of rehabilitated areas will be undertaken during the period the rehabilitated land is managed by KLPL to demonstrate the rehabilitation objectives have been met. Where possible rehabilitated land shall be handed back to the landowner once criteria defined by landowner agreements and completion criteria have been achieved. The first monitoring event will be undertaken within 12 months following completion of the rehabilitation works. Monitoring will take into consideration reconstructed soil profile areas (mined areas) and be tailored to the designated end land-use of each area as indicated:

- Reconstructed soil profile;
- Pasture rehabilitation;
- Revegetation.

Reconstructed soil profile

Monitoring will be undertaken to assess parameters related to soil nutrient status and landform stability during the period the rehabilitated land is managed by KLPL (Table 7). Most reconstructed soil profile areas will be returned to pasture and it is expected these areas will be returned to the landowner within two years of rehabilitation being completed.

TABLE 7: MONITORING – RECONSTRUCTED SOIL PROFILE

ASPECT	PARAMETER	ASSESSMENT	FREQUENCY
Landform stability	Surface stability and erosion	Visual assessment	Annual, and after heavy rainfall events
Sustainable soil profile	Soil sample analysis including pH, EC, OC, available and total macro and micronutrients	Comparative analysis	Baseline (pre-mining) Annual (post-reconstruction)
Potential for nutrient leaching off site	Soil sample analysis including PBI	Comparative analysis	Baseline (pre-mining) Annual (post-reconstruction)
	Water sampling (Total N, nitrate, Total P) from creeks flowing through project area.	Comparative analysis	As per Water Monitoring Management Plan
	Particle size analysis (sub-soil sample 10-30cm depth)	Comparative analysis	Baseline (pre-mining) Year 1 (reconstructed soils)

Pasture rehabilitation

Monitoring will be undertaken to assess parameters related to pasture establishment during the period the rehabilitated land is managed by KLPL (Table 8). It is expected that pasture areas will be returned to the landowner within two years of rehabilitation being completed.

TABLE 8: MONITORING – NEW PASTURE

Aspect	Parameter	Assessment	Frequency
Productive pasture	Germination and establishment (plant health)	Visual assessment	Monthly after seeding for 4 months

Revegetation

Monitoring of revegetation areas (including conservation areas, habitat enhancement zones, shelter belts, revegetation plantings and revegetation corridors) and will be undertaken to assess:

- Initial establishment (first two years from planting) – early establishment monitoring will provide feedback on stability and erosion of revegetation areas plus an assessment of survival and growth of planted areas.
- Revegetation development (every second year from Year 3) – maturing revegetation monitoring will be working towards demonstrating completion criteria achievement.
- Fauna habitat– monitoring will ensure objectives towards providing suitable habitat for local fauna, with a particular focus on the Black Cockatoos is achieved.

Parameters monitored, as listed in Table 9, specifically relate to completion criteria (Section 1.4.12).

TABLE 9: MONITORING – REVEGETATION

ASPECT	PARAMETER	ASSESSMENT	FREQUENCY
Uncontrolled grazing	Fencing in place and maintained to excluded livestock	Visual assessment	Six monthly
Landform stability	Surface stability and erosion	Visual assessment	Annual, and after heavy rainfall events
Revegetation	Indicators that the site is establishing appropriately to maturing rehabilitation stage criteria: native plant abundance, species richness.	Early establishment monitoring	Annual (Year 1 and 2)
	Weeds	Visual assessment	As per Weed & Phytophthora Dieback Management Plan
	Vegetation establishment demonstrates drought resilience and sustainability trends; and similarities in structure, foliage cover and species richness to remnant vegetation stands in the Keysbrook area and wider Peel-Harvey catchment	Maturing revegetation monitoring	Every second year (e.g. Year 3, 5)
Nutrient cycling	Nutrient cycling process evident: developing leaf litter layer, litter breakdown	Visual assessment	Every second year (e.g. Year 3, 5)
Fauna habitat	Key fauna habitat characteristics are present in revegetation areas: vegetation structure; litter breakdown; presence of key forage species for Black Cockatoos	Maturing revegetation monitoring	Every second year (e.g. Year 3, 5)
	Cockatube nesting boxes assessed for evidence of nesting activity and any maintenance requirements	Visual assessment	Annually
	Black Cockatoo roosting numbers	Great Cocky Count	Annually

2. ENVIRONMENTAL MANAGEMENT PLAN PROVISIONS

Table 10 provides a summary of the objective based EMP to meet legal requirements of Condition 9 of MS810.

TABLE 10: OBJECTIVE BASED EMP PROVISIONS

Management Target 1.0	Return the land to its pre-mining use				
Item	Management Action	Performance Indicator	Reporting	Timing	Responsibility
1.1	Agreement with landowners to define pasture areas and revegetation zones.	<ul style="list-style-type: none"> Agreement recorded 	<ul style="list-style-type: none"> Internal records 	Ongoing	Mining Superintendent
1.2	Final landform design to be based on pre-mining contours, creating positive fall to minimise ponding where possible.	<ul style="list-style-type: none"> Final landform contour designs available 	<ul style="list-style-type: none"> Licensed surveyor Internal records 	Ongoing	Mining Superintendent
1.3	Mine plan schedules clearing of vegetation, topsoil stripping and stockpiling ahead of mining.	<ul style="list-style-type: none"> Not more than 30ha of cleared land open ahead of mining at any time. Topsoil and vegetated matter stockpiled separately outside mine area. 	<ul style="list-style-type: none"> Licensed surveyor Internal records 	Ongoing	Mining Superintendent
1.4	Rehabilitation planning is integrated in the mine planning process including allocating adequate resources.	<ul style="list-style-type: none"> Progressive rehabilitation of areas identified in the mine plan achieved 	<ul style="list-style-type: none"> Weekly mine plan Annual budget and rehab provision review Annual Compliance Assessment Report 	Ongoing	Mining Superintendent
1.5	Sand and clay material separated during processing	<ul style="list-style-type: none"> Soil sampling results pre-mining and post mining are 	<ul style="list-style-type: none"> Internal metallurgical records 	Ongoing	Mining Superintendent

Management Target 1.0		Return the land to its pre-mining use			
Item	Management Action	Performance Indicator	Reporting	Timing	Responsibility
	are recombined such that the water holding capacity of the soil is the same or better than it was prior to mining.	within a comparable range of sand and clay particles			
1.6	Land reprofiling executed to design ensuring drainage reinstatement.	<ul style="list-style-type: none"> Survey pick up of final surface (prior to topsoil spreading) provides confirmation of positive drainage across the rehabilitation areas except where otherwise planned (designed). 	<ul style="list-style-type: none"> Licensed surveyor Internal records 	Ongoing	Mining Superintendent

Management Target 2.0		Establish self-sustaining local provenance native vegetation appropriate to the underlying landform in planned areas			
Item	Management Action	Performance Indicator	Reporting	Timing	Responsibility
2.0.1	Baseline survey undertaken to define remnant vegetation communities and establish a census in Conservation Covenant areas.	<ul style="list-style-type: none"> Survey report available 	<ul style="list-style-type: none"> Internal records 	Prior to revegetation activities being undertaken	Environmental Coordinator
2.0.2	Revegetation plans allow for various habitats including creeklines/drainage,	<ul style="list-style-type: none"> Habitat species lists defined and available to inform revegetation plans 	<ul style="list-style-type: none"> Internal records 	Ongoing	Environmental Coordinator

Management Target 2.0		Establish self-sustaining local provenance native vegetation appropriate to the underlying landform in planned areas			
Item	Management Action	Performance Indicator	Reporting	Timing	Responsibility
	damplands, wetlands and low dunes.				
2.0.3	Soil survey of revegetation areas to inform planting requirements.	<ul style="list-style-type: none"> • Soil supports revegetation establishment • Soil ameliorants added where required (as directed by soil sampling results). 	<ul style="list-style-type: none"> • Internal records 	Ongoing	Environmental Coordinator
2.0.4	Revegetation material (seed/seedlings) to be of local provenance.	<ul style="list-style-type: none"> • Seed/propagation material collected for revegetation programs to be from the Swan Coastal Plain 	<ul style="list-style-type: none"> • Internal records 	Ongoing	Environmental Coordinator
2.0.5	Identify and plan for use of plant species resistant to Phytophthora Dieback in revegetation areas.	<ul style="list-style-type: none"> • Revegetation plans identify Phytophthora Dieback resistant species 	<ul style="list-style-type: none"> • Internal records • CAR • EPBC Compliance Report 	Ongoing	Environmental Coordinator
2.0.6	Prevent weeds smothering revegetation.	<ul style="list-style-type: none"> • Manual or chemical control activity to be recorded against the relevant population in the Weed Management Register 	<ul style="list-style-type: none"> • CAR • EPBC Compliance Report • Weed Management Register 	Ongoing	Environmental Coordinator
2.0.7	Fencing in place to protect revegetation zones	<ul style="list-style-type: none"> • Revegetation areas protected from stock grazing and 	<ul style="list-style-type: none"> • CAR 	Ongoing	Environmental Coordinator

Management Target 2.0	Establish self-sustaining local provenance native vegetation appropriate to the underlying landform in planned areas				
Item	Management Action	Performance Indicator	Reporting	Timing	Responsibility
		<ul style="list-style-type: none"> unauthorised vehicle movements Fences maintained 	<ul style="list-style-type: none"> EPBC Compliance Report 		
2.0.8	Firebreaks in place	<ul style="list-style-type: none"> 20m firebreak established between cadastral boundary fences and revegetation zones. Firebreaks maintained 	<ul style="list-style-type: none"> CAR EPBC Compliance Report 	Ongoing	Environmental Coordinator
2.0.9	Development and execution of completion criteria	<ul style="list-style-type: none"> Completion criteria (Section 1.4.12; Table 6) achieved 	<ul style="list-style-type: none"> Monitoring records CAR EPBC Compliance Report 	Ongoing	Environmental Coordinator
2.0.10	Rehabilitation Monitoring	<ul style="list-style-type: none"> Monitoring planned and undertaken as scheduled. Monitoring results used to inform the ratification of completion criteria metrics. 	<ul style="list-style-type: none"> Monitoring records CAR EPBC Compliance Report 	Ongoing	Environmental Coordinator

Management Target 2.1					
Establish native vegetation corridors between local high value ecological areas.					
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
2.1.1	Identify potential corridor linkage areas between conservation category wetlands and high value remnant vegetation	<ul style="list-style-type: none"> • Revegetation plans indicate potential landscape corridors linking areas of ecological value. • Landowner agreement in place to establish corridors of native vegetation. 	<ul style="list-style-type: none"> • Internal records 	Ongoing	Environmental Coordinator

Management Target 2.2					
Improve the ecological function on major creek lines.					
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
2.2.1	Creek bank stabilisation (where required)	<ul style="list-style-type: none"> • Improved water quality and habitat value with acceptable levels of erosion • Pool-riffle sequences installed 	<ul style="list-style-type: none"> • Internal records • Monitoring records • CAR • EPBC Compliance Report 	Ongoing	Environmental Coordinator

Management Target 2.3					
Establish native vegetation at a ratio of 1.4 hectares of revegetation for every one hectare cleared.					
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
2.3.1	Land clearing records identify area of native vegetation cleared	<ul style="list-style-type: none"> • Remnant vegetation within the mine footprint identified 	<ul style="list-style-type: none"> • Licenced surveyor internal records • CAR 	Ongoing	Environmental Coordinator

Management Target 2.3		Establish native vegetation at a ratio of 1.4 hectares of revegetation for every one hectare cleared.			
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
		<ul style="list-style-type: none"> Clearing of remnant vegetation tracked and recorded 	<ul style="list-style-type: none"> 		
2.3.2	Revegetation plans identify required area for native plant establishment	<ul style="list-style-type: none"> Land disturbance tracker used to determine required area of revegetation to meet 1.4:1 ratio. Revegetation plans (including potential landscape corridors and Conservation Covenant areas) identify a minimum of 1.4ha for every 1ha cleared area for native vegetation establishment 	<ul style="list-style-type: none"> Internal records CAR EPBC Compliance Report 	Ongoing	Environmental Coordinator

Management Target 3		Provide a net gain in the extent and quality of Black Cockatoo foraging and breeding habitat			
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
3.1	At least 75ha of remnant vegetation established under Conservation Covenant.	<ul style="list-style-type: none"> Conservation covenant areas established. Revegetation plans include Conservation Covenant areas. 	<ul style="list-style-type: none"> Internal records CAR EPBC Compliance Report 	Completed	Environmental Coordinator
3.2	The expansion of Black Cockatoo breeding and foraging habitat.	<ul style="list-style-type: none"> Revegetation plans include forage and habitat species suitable for Black-Cockatoos. 	<ul style="list-style-type: none"> Internal records CAR 	Completed	Environmental Coordinator

Management Target 3		Provide a net gain in the extent and quality of Black Cockatoo foraging and breeding habitat			
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
		<ul style="list-style-type: none"> 20 constructed nesting boxes suitable for the large Black-Cockatoos established within Conservation Covenant areas to provide suitable nesting habitat. Survey of remnant vegetation to be cleared from the mine footprint identifies potential nest hollows to be replaced with constructed nesting boxes within appropriate conservation / revegetation areas. 	<ul style="list-style-type: none"> EPBC Compliance Report 		

Management Target 4		Re-establish a productive soil profile capable of supporting the target end land use			
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
4.1	Soil survey pre- and post-mining to inform soil rebuilding ameliorant requirements.	<ul style="list-style-type: none"> Topsoil and subsoil samples from pre-disturbance mine areas analysed. Topsoil samples from stockpiles and subsoil samples from rehabilitation areas analysed. 	<ul style="list-style-type: none"> Internal records 	Ongoing	Environmental Superintendent

Management Target 4	Re-establish a productive soil profile capable of supporting the target end land use				
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
		<ul style="list-style-type: none"> Soil results used to inform fertilizer and soil ameliorant requirements (as advised by suitably qualified agronomist or soil scientist). 			
4.2	Pasture areas to be identified separately to revegetation areas and ensure appropriate soil ameliorants identified.	<ul style="list-style-type: none"> Revegetation areas identified in rehabilitation plans Soil sample analysis results used to inform soil-rebuilding ameliorant requirements specific for pasture or native revegetation. 	<ul style="list-style-type: none"> Internal records 	Ongoing	Environmental Superintendent
4.3	Topsoil respread following subsoil reinstatement (including mixing of required ameliorants)	<ul style="list-style-type: none"> Topsoil in place ready to seed 	<ul style="list-style-type: none"> Internal records 	Ongoing	Environmental Superintendent
4.4	Open level areas (post-mining) not planned to be fully rehabilitated in the current year stabilised to prevent dust lift-off.	<ul style="list-style-type: none"> Corn rye or similar stabilisation crop established prior to summer. 	<ul style="list-style-type: none"> Internal records 	Ongoing	Environmental Superintendent

Management Target 5	Re-establish functioning pasture suitable for productive grazing.				
Reference	Management Action	Performance Indicator	Reporting	Timing	Responsibility
5.1	Planned pasture rehabilitation areas seeded at the beginning of the growing season for both Year 1 and Year 2 rehabilitation where required.	<ul style="list-style-type: none"> Pasture mix seeded into completed rehabilitation areas at the beginning of the growing. Good establishment of pasture species (including root development). 	<ul style="list-style-type: none"> Internal records CAR 	Ongoing	Environmental Superintendent
5.2	Year 2 rehabilitation fertilizer requirements informed by soil sampling analysis	<ul style="list-style-type: none"> Soil sampling from pasture rehabilitation areas undertaken to inform application schedules prior to growing season (where required). 	<ul style="list-style-type: none"> Internal records CAR 	Ongoing	Environmental Superintendent
5.3	Rehabilitation areas erosion free.	<ul style="list-style-type: none"> No evidence of erosion in rehabilitation areas Remediation undertaken as required 	<ul style="list-style-type: none"> Internal records CAR 	Ongoing	Environmental Superintendent
5.5	Rehabilitation areas fenced.	<ul style="list-style-type: none"> Stock excluded from continuous grazing for at least 1 year or until land is returned to landowner management. 	<ul style="list-style-type: none"> Internal records CAR 	Ongoing	Environmental Superintendent

3. ADAPTIVE MANAGEMENT AND REVIEW OF THE EMP

This EMP applies the principles of adaptive management through monitoring, corrective actions and implementing changes. The EMP is intended to be dynamic and will be updated to reflect changes in management practices over the life of the Proposal. This will also allow flexibility to respond to new environmental impacts and adopt new technologies/management measures.

3.1. MONITORING TRIGGERS, THRESHOLDS AND CONTINGENCY

Triggers, thresholds and contingency for the rehabilitation are included in Table 11 based on the management targets and actions previously described.

If monitoring identifies a non-conformance/non-compliance with EMP targets, the incident will be assessed and corrective actions implemented. The corrective actions are aimed at preventing recurrences of the incident taking place.

TABLE 11: MONITORING TRIGGERS, THRESHOLDS AND CONTINGENCY ACTIONS

MANAGEMENT TARGET	MONITORING PARAMETER	TRIGGER	CONTINGENCY ACTION
Return land to its pre-mining land use	Land survey to ensure stability and reinstatement of surface water flows. Agronomy assessment to measure soil parameters and crop yield.	Monitoring results show soil parameters and crop yields have not met the final agreed land use.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.
Establish self-sustaining local provenance native vegetation in planned areas	Annual monitoring to ensure progression towards achieving revegetation closure criteria.	Monitoring results indicate risks to the ability to meet closure criteria.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.
Establish native vegetation corridors between local high value ecological areas	Annual monitoring to ensure progression towards achieving revegetation closure criteria.	Monitoring results indicate risks to the ability to meet closure criteria.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.
Improve the ecological function on major creek lines	Annual monitoring to ensure progression towards achieving revegetation closure criteria.	Monitoring results indicate risks to the ability to meet closure criteria.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.
Establish native vegetation at a ratio of 1.4 hectares of revegetation for	Annual planting schedule to ensure progression towards meeting closure criteria.	Monitoring results indicate risks to the ability to meet closure criteria.	Revisit onsite planting activities and conduct infill planting to achieve completion criteria.

MANAGEMENT TARGET	MONITORING PARAMETER	TRIGGER	CONTINGENCY ACTION
every one hectare cleared	Ongoing land management activities (eg weed control, fencing) to ensure success of revegetation program.		
Provide a net gain in the extent and quality of Black Cockatoo breeding and foraging habitat	Cockatoo installation and annual monitoring program. Annual monitoring to ensure progression towards achieving revegetation closure criteria.	Installed artificial hollows do not provide suitable additional breeding habitat. Monitoring results indicate risks to the ability to meet closure criteria.	Revisit onsite planting activities and conduct infill planting to achieve completion criteria.
Re-establish a productive soil profile capable of supporting the target end land use	Land survey to ensure stability and reinstatement of surface water flows. Agronomy assessment to measure soil parameters and crop yield.	Monitoring results show soil parameters and crop yields have not met the final agreed land use.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.
Re-establish functioning pasture suitable for productive grazing	Land survey to ensure stability and reinstatement of surface water flows. Agronomy assessment to measure soil parameters and crop yield.	Monitoring results show soil parameters and crop yields have not met the final agreed land use.	Revisit revegetation plan to ensure methods of action are able to progress to revegetation success.

3.2. EMP REVISIONS

This EMP will be reviewed on an annual basis during the life of the Project, or as required. The EMP review will take into account the adaptive management and continual improvement process, new or revised information relevant to weeds and dieback and/or changes to the Project.

3.3. REPORTING

This EMP will be reported annually in KLPL's Annual Compliance Assessment Report (CAR), to meet Condition 8 of MS810.

3.4. AUDITING

Doral (on behalf of KLPL) is committed to its environmental performance and has developed, implemented and continually improved its Environmental Management System (EMS) since it was established in 2001. Doral's EMS is in line with the requirements of the Australian/New Zealand Standard AS/NZS ISO 14001:1996 (ISO 14001).

Doral's EMS consists of the following key elements:

- Environmental Policy and Objectives;
- Environmental Planning;
- Implementation and Operation;
- Checking and Corrective Action;
- Management Review.

The Checking and Corrective Action component of Doral's EMS relates to the monitoring and evaluation of Doral's environmental performance and consists of the following elements:

- Monitoring and measurement;
- Non-conformance and corrective and preventive action;
- Records;
- EMS audits;
- Annual review and update of the Environmental Risk Assessment and management procedures for the Project.

Doral will achieve continuous improvement for the Project by conducting an annual review and update of the Environmental Risk Assessment, risk treatments and management plans/procedures. Any additional risks and/or alternative forms of treatment/management that result in an improved outcome for site activities will be adopted and the EMS will be updated accordingly.

4. STAKEHOLDER CONSULTATION

Stakeholders who have been identified as having an interest in the environment surrounding the proposed amendment within Lot 63 have been consulted and will continue to be consulted and informed through the approvals phase. KLPL has been engaging with all stakeholders since project commencement in 2012 and startup of operations in 2015. This consultation has been in the form of regular community updates (every 6 – 12 weeks), newsletters and meetings as required for specific development or operational updates. Communications and meetings with key stakeholders specific to the proposed amendment has been undertaken subject to environmental and landholder approval.

The existing stakeholder communications database and register has been utilised for the Lot 63 amendment, including the continued documentation of stakeholders issues/ concerns raised and the outcome of the consultation.

A summary of stakeholder engagements is outlined in Table 12.

TABLE 12: STAKEHOLDER CONSULTATION

STAKEHOLDER	DATE	TYPE OF CONSULTATION	RELEVANT DISCUSSION POINTS/KEY ISSUES	COMMENTS RECEIVED / OUTCOMES
Shire of Serpentine-Jarrahdale CEO and Planning Manager	23/02/2023	In person meeting. Receives copies of landholder updates and newsletters	45c proposal and Shire Development Application and timings	Development Application to be considered once EPA decision advised. Crossing of Elliott Road, subject to Traffic Management Plan. Query on road condition post mining completion. Commitment to ensure road condition in line with Shire's standards. Supportive of application, Council deputation planned for mid 2023.
Shire of Murray CEO and Director Planning	26/04/2023	In person meeting. Receives copies of landholder updates and newsletters	45c proposal and Shire Development Application and timings	Lot 63 sits within Shire of Serpentine Jarrahdale, conversation more broadly around future extensions into the Shire of Murray. New Councillors and staff to visit site October 2023. Supportive of project.
Hugh Jones MLA, Member	07/11/2022	In person meeting. Receives copies of Community	Extension proposals	Supportive of expansion plans, noted any community

STAKEHOLDER	DATE	TYPE OF CONSULTATION	RELEVANT DISCUSSION POINTS/KEY ISSUES	COMMENTS RECEIVED / OUTCOMES
for Darling Range		Update letters and newsletters		feedback received would be provided
Robyn Clarke MLA, Member for Murray Wellington	07/11/2022	In person meeting. Receives copies of Community Update letters and newsletters	Extension proposals	Supportive of expansion plans and general community support to date, noted any community feedback received would be provided to Doral.
Landcare SJ	Ongoing since 2012	In person and via discussions around commercial tree planting arrangements	Regular discussion regarding revegetation planning and planting. Annual monitoring of artificial Black Cockatoo hollows.	Active involvement in the Keysbrook revegetation and fauna habitat creation
Peel Development Commission	23/03/2023 Ongoing since 2012	In person meeting. Receives copies of Community Update letters and newsletters	Discussion around expansion proposal both Lot 63 and broader extensions.	Supportive of project and expansion, keep PDC informed of any extension plans in and around the Keralup vicinity.
Keysbrook Community Consultative Group (inc Shire and community representatives)	Held quarterly since 2012	Group meeting in person Lot 63 mine plan and broader western extension provided at 3 May 2023 meeting Copy of Lot 63 and western extension proposal letter dated 4 April 2023 sent	TBA	Supportive, interested in neighbour community engagement outcomes. Advised consultation undertaken with all close proximity neighbours and highlighted concerns raised to date and mitigation measures.
Lot 701, Morgan	04/04/2023	Letter + phone call	Summarised letter, meeting planned for week commencing 8 May 2023 to discuss in further detail.	Landholder amenity agreement signed, concerns predominantly around dust. Meeting in progress to discuss mitigation measures to address.

STAKEHOLDER	DATE	TYPE OF CONSULTATION	RELEVANT DISCUSSION POINTS/KEY ISSUES	COMMENTS RECEIVED / OUTCOMES
Lot 12, Stewart	04/04/2023	Letter + text message	Summarised letter, meeting planned for 3 May 2023, to discuss in further detail.	Landholder amenity agreement signed, concerns predominantly around dust. Meeting in progress to discuss mitigation measures to address.
Lot 700, Allspell Nominees	04/04/2023	Letter + phone conversation	Residence is a rental	Occupant Deed signed by tenant, owners signed amenity agreement, Lot 700 is the closest residence to Lot 63. Discussion around proximity and timing, no concerns raised, agreed to discuss in August 2024, when more certainty around timing and if the tenants remain the same.
Lot 503, Elliott Road			House is vacant, owner resides in Malaysia.	Currently ascertaining ownership details through neighbours, borderline 2km distance.
Lot 501, Elliott	04/04/2023 14/04/2023	Letter plus in person meeting	Water and dust.	Sits outside of 2km, interested landholder, concerns around water and dust. Environmental Manager met with landholder on 13 April 2023 to discuss mitigation measures and address concerns.
Lot 20, Doral owned property	04/04/2023	Letter	Mine life	Doral owned property, signed Occupant Deed. Queries around length of mining and term of tenancy. Communications ongoing. No further comments.
Lot 211, Doral owned property	04/04/2023	Letter	-	Doral owned property, signed Occupant Deed. No comments.
Linga Holdings (Rob Guira)	04/04/2023 29/04/2023	Letter plus in person meeting	One on one tour with Mine Manager on 29/04/2023	Landholder amenity agreement signed. No comments.

STAKEHOLDER	DATE	TYPE OF CONSULTATION	RELEVANT DISCUSSION POINTS/KEY ISSUES	COMMENTS RECEIVED / OUTCOMES
Lang	04/04/2023	Letter	Meeting planned for week commencing 8 May to discuss in further detail.	Currently in consultation in regard to common drain on Doral owned Lot 211, meeting in progress to discuss Lot 63 expansion in further detail. Amenity agreement required, borderline 2km distance.
Letter to closet neighbours 42 neighbours in total	04/04/2023 Near neighbours – within 2km zone – letter specific to Lot 63, Section 45c approval	Letter to all neighbours within 2km distance, detailed Company's plans to submit a 45c to extend mine life in relation to Lot 63	Letter includes offer to meet and discuss, follow up with landholders who wish to meet. Letter also more broadly referred to western extension. Detailed mitigation measures around noise, dust, water and approvals process.	No feedback received at this time.
Closest neighbours 85 neighbours in total	14/04/2023 Ongoing since 2012, issued every 10 – 12 weeks,	Community mailing list, ~ 85 neighbours within 3km – 4km radius	Targeted information in relation to Keysbrook mining operations, letters specifically referred to Lot 63 Section 45c application and broader extension proposal.	Site contact details provided for community feedback specific to extension proposal. No feedback received at this time.
Interested community and closest neighbours	Bi-annually	Newsletter Mailing list ~ 300	General Information, next edition planned for June 2023, will include Lot 63 and broader extension information.	Site contact details provided for community feedback specific to extension proposal. No feedback received at this time.

5. CHANGES TO AN EMP

TABLE 13: CHANGES TO EMP

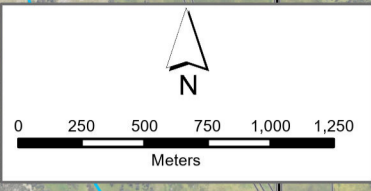
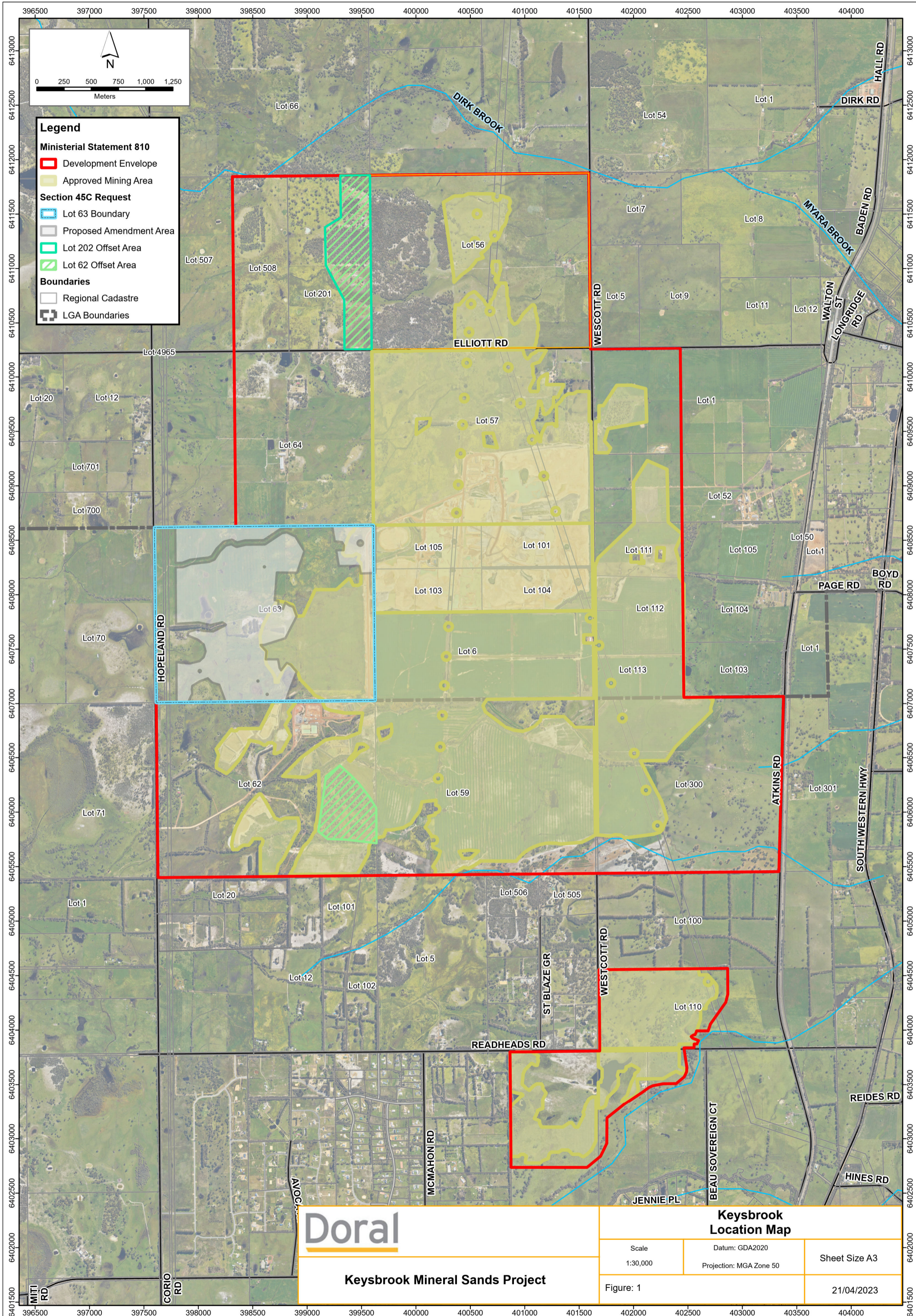
COMPLEXITY OF CHANGES		MINOR REVISIONS ✓	MODERATE REVISIONS	MAJOR REVISIONS
NUMBER OF KEY ENVIRONMENTAL FACTORS		One ✓	2-3	>3
DATE REVISION SUBMITTED TO EPA		Aug 2022 Apr 2023		
PROPONENT'S OPERATIONAL REQUIREMENT TIMEFRAME FOR APPROVAL OF REVISION		<1 month	<6 months ✓	>6 months
ITEM NO.	EMP SECTION NO.	EMP PAGE NO.	SUMMARY OF CHANGE	REASON FOR CHANGE
1	Content Scope and Rationale	1	Update of 2013 document to meet the revised EPA EMP Guideline	Layout and language for previous EMP did not meet the EPA Guideline
2	Content Scope and Rationale	1	Combined MS810 Rehabilitation Management Plan and EPBC 2005/2163 Conservation, Offsets and Rehabilitation Plan	Reduce duplication of documentation as environmental factor, impacts, triggers, mitigation and management measures are similar for both.
3	1.4.4 Revegetation Areas; Revegetation Strategy	9	Revised conceptual native revegetation plan (Figure 3)	Experience gained through several years of native revegetation planting has led to a better understanding of the site. As such a revision of the concept rehabilitation layout plan was undertaken using this knowledge to consolidate areas and improve effectiveness of actions (e.g. fencing, weed control) to improve the survival and ecological benefits of long term protection and connectivity.
4	1.4.12	17	Table 6, Criterion 5.7 Revised Closure Criteria plant densities	Revision of original revegetation density proposed in 2013 of 10,000 stems/ha was revised to be more reasonable and achievable at 4,500 stems/ha

COMPLEXITY OF CHANGES		MINOR REVISIONS ✓	MODERATE REVISIONS	MAJOR REVISIONS
NUMBER OF KEY ENVIRONMENTAL FACTORS		One ✓	2-3	>3
DATE REVISION SUBMITTED TO EPA		Aug 2022 Apr 2023		
PROPONENT'S OPERATIONAL REQUIREMENT TIMEFRAME FOR APPROVAL OF REVISION		<1 month	<6 months ✓	>6 months
ITEM NO.	EMP SECTION NO.	EMP PAGE NO.	SUMMARY OF CHANGE	REASON FOR CHANGE
				and a >2yr survival rate of 75%.
5	1.4.12 Completion Criteria	17	Table 6, Criterion 5.8 Revised Closure criteria reference target species list	Site objectives for species richness and density and likelihood for success were assessed and a target species list rather a previously general reference to offsite regional areas was developed. This will allow for a clear goal of species richness and density to be understood to assist in the planning activities for each of the ongoing annual native planting events.
6	4 Stakeholder table	36	Update Stakeholder consultation and table	Stakeholder table was updated to align with EPA guideline and include more relevant/recent information.
1	Content Scope and Rationale	1	Update of 2013 Rehab EMP to meet the revised EPA EMP Guideline	Layout and language for previous EMP did not meet the EPA Guideline

6. REFERENCES

- BARK Environmental (2021). *Phytophthora Dieback Occurrence Report for Lots 507, 508, 201 and 56 – Keysbrook*. Unpublished report prepared for Doral Mineral Sands Pty Ltd. August 2021.
- Bennett, E. (2004). *Vegetation and Flora of Exploration Licence 70/2407 Keysbrook Western Australia*. Unpublished report prepared by Bennett Environmental Consulting, Kalamunda.
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- KLPL Stakeholder Interaction and Policy Procedure. Radix Document Number: 9983
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- KLPL Weed Management Register. Radix Document Number: 150241
- KLPL Weed & Seed Vehicle Inspection Checklist. Radix Document Number: 108647
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- Terratree (2013). *Keysbrook Mineral Sands Project Phytophthora Dieback Assessment*. Unpublished report prepared by Terratree for MZI Resources Keysbrook Operations. Radix Document Number: 45457

FIGURE 1: SITE LOCATION



- Legend**
- Ministerial Statement 810**
 - Development Envelope
 - Approved Mining Area
 - Section 45C Request**
 - Lot 63 Boundary
 - Proposed Amendment Area
 - Lot 202 Offset Area
 - Lot 62 Offset Area
 - Boundaries**
 - Regional Cadastre
 - LGA Boundaries

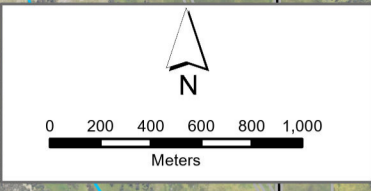
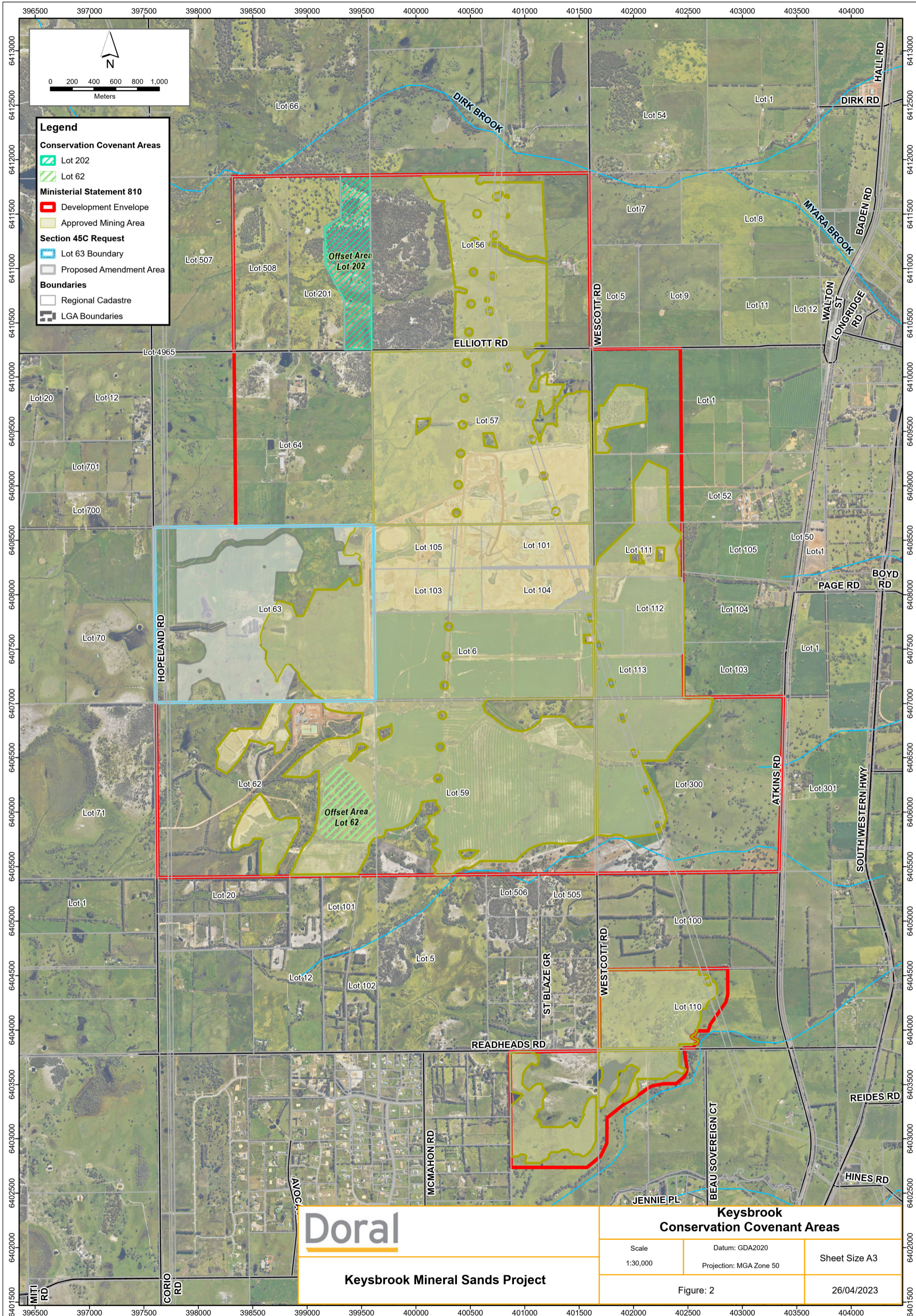
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Keysbrook Mineral Sands Project

Keysbrook Location Map

Scale 1:30,000	Datum: GDA2020 Projection: MGA Zone 50	Sheet Size A3
Figure: 1		21/04/2023

FIGURE 2: CONSERVATION COVENANT AREAS



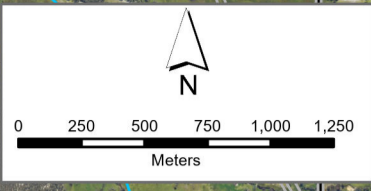
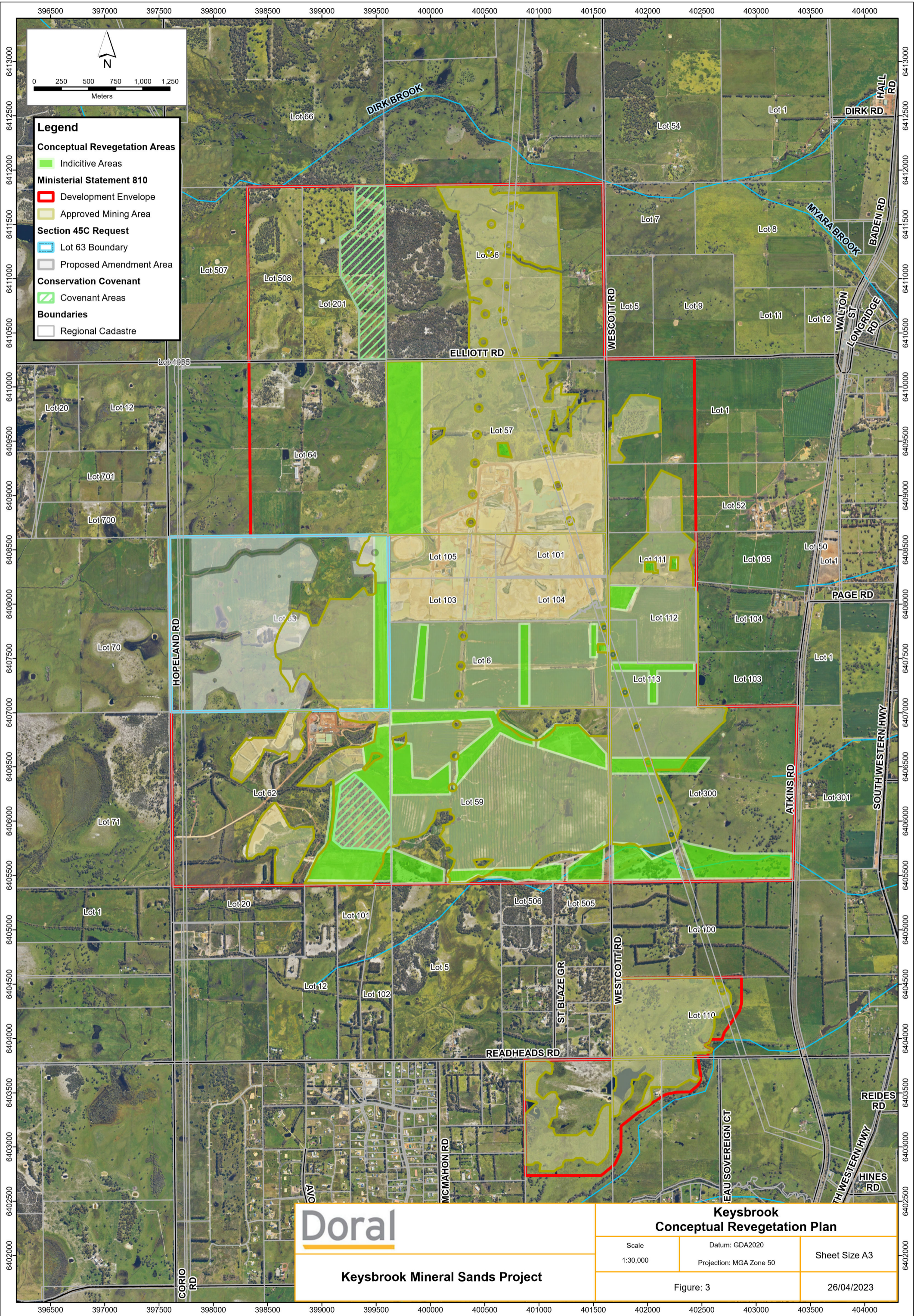
- Legend**
- Conservation Covenant Areas**
- Lot 202
 - Lot 62
- Ministerial Statement 810**
- Development Envelope
 - Approved Mining Area
- Section 45C Request**
- Lot 63 Boundary
 - Proposed Amendment Area
- Boundaries**
- Regional Cadastre
 - LGA Boundaries

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Keysbrook Mineral Sands Project

Keysbrook Conservation Covenant Areas		
Scale 1:30,000	Datum: GDA2020 Projection: MGA Zone 50	Sheet Size A3
Figure: 2		26/04/2023

FIGURE 3: CONCEPTUAL REHABILITATION PLAN



- Legend**
- Conceptual Revegetation Areas**
 - Indicative Areas
 - Ministerial Statement 810**
 - Development Envelope
 - Approved Mining Area
 - Section 45C Request**
 - Lot 63 Boundary
 - Proposed Amendment Area
 - Conservation Covenant**
 - Covenant Areas
 - Boundaries**
 - Regional Cadastre

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Keysbrook Mineral Sands Project

**Keysbrook
Conceptual Revegetation Plan**

Scale 1:30,000	Datum: GDA2020 Projection: MGA Zone 50	Sheet Size A3
Figure: 3		26/04/2023

APPENDIX 1: SPECIES LIST

Upland – dryer areas	
<i>Acacia extensa</i>	<i>Calothamnus quadrifidus</i>
<i>Acacia Pulchella</i>	<i>Corymbia calophylla</i>
<i>Adenanthos meisneri</i>	<i>Eucalyptus marginata</i> %
<i>Allocasuarina fraseriana</i> %	<i>Gastrolobium capitatum</i>
<i>Allocasuarina humilis</i> %	<i>Hibbertia hypericoides</i>
<i>Banksia attenuata</i> %	<i>Jacksonia sternbergiana</i>
<i>Banksia Grandis</i> %	<i>Kunzea glabrescens</i>
Lowland (mid)	
<i>Acacia extensa</i>	<i>Hakea varia</i>
<i>Acacia Saligna</i>	<i>Kunzea glabrescens</i>
<i>Anigozanthos manglesii</i>	<i>Kunzea recurve</i>
<i>Corymbia calophylla</i>	<i>Melaleuca laterita</i>
<i>Hakea lissocarpha,</i>	<i>Melaleuca thymoides</i>
<i>Hakea prostrata</i> %	
Riparian (Creek and flood plain)	
<i>Astartea scoparia</i>	<i>Melaleuca preissiana</i>
<i>Eucalyptus Rudis</i>	<i>Melaleuca raphiophylla</i>
<i>Hypocalymma angustifolium,</i>	<i>Melaleuca viminea</i>
<i>Juncus Pallidus</i>	<i>Pultenaea reticulata</i>
<i>Juncus subsecundus</i>	<i>Regelia ciliata/inops</i>
% - dieback susceptible	

Prepared by:

ABEC ENVIRONMENTAL CONSULTING PTY LTD
2/17 Inverness Avenue, Dunsborough WA 6281

admin@abecenv.com.au

www.abecenvironmental.com.au



For and on behalf of:

Doral Mineral Sands Pty Ltd
ABN 18 096 342 451
ACN 096 342 451
Lot 7 Harris Road, Picton WA 6229
T: +61 8 9725 5444
F: +61 8 9725 4557
E: admin@doral.com.au
W: www.doral.com.au

