KEYSBROOK MINERAL SANDS PROJECT

# APPLICATION FOR PLANNING APPROVAL AND PROPOSED EXTRACTIVE INDUSTRY (MINERAL SANDS)

Prepared For:

SHIRE OF SERPENTINE JARRAHDALE

Report Number:

AP179

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# 1. INTRODUCTION

## 1.1. PURPOSE

This report has been prepared in support of an Application for Development Approval and Extractive Industry (mineral sands). This application is being made to the Shire of Serpentine Jarrahdale (Shire) by the Proponent, Keysbrook Leucoxene Pty Ltd (KLPL), for the extraction of mineral sands within 63 Hopeland Road, Keysbrook WA (Figure 1). Relevant application forms are included as Appendix 1.

KLPL commenced mining the Keysbrook Mineral Sands Mine in 2015. Based on the mining schedule, the current ore reserve within the approved mine area is due to be exhausted by the end of 2023. In order for the continuation of the mine and workforce, KLPL seeks to amend the Project to include an additional mine area within Lot 63 Hopeland Road.

Specifically, it is requested that the Development Approval and Extractive Industry Application for the existing approved area of Lot 63 be renewed to allow for remining of the existing approved area, and also be inclusive of the additional area of Lot 63 which shall not be disturbed until approvals are granted by the EPA. The new mining area is in addition to the approved and previously mined and rehabilitated land and is the subject of this application and are referred herein as the Proposal.

The Proposal area is within the Shire of Serpentine Jarrahdale and occupies ~142.3, consisting of ~140.52ha cleared pasture and 1.78ha of amenity plantings and degraded native vegetation. The proposed area of disturbance is within the EPA approved mine area, as per Ministerial Statement 810 (MS810). Mining the Proposal area will produce an additional ~ 65,000 tonnes of heavy mineral concentrate and result in ~18 months additional mining for the Keysbrook Project.

Approval for the Proposal is required under Clause 5.1.1 of Shire of Serpentine Jarrahdale Town Planning Scheme No. 2 and relevant provisions of the Metropolitan Region Scheme.

This report provides information on the approval status, overview of the Proposal and the relevant considerations in relation to the state and local planning framework. It also presents a summary of potential environmental impacts and management actions associated with the mining activity. Detail is also provided on post mining decommissioning and land rehabilitation that are integral to successful mining operations.

## 1.2. PROPONENT

KLPL is a mineral sands company focused on producing the minerals zircon and leucoxene through its ownership and operation of the Keysbrook Mineral Sands Mine. Proponent details are provided in Table 1.

TABLE 1: THE PROPONENT

| | |
|---|---|
| **Proponent Name** | Keysbrook Leucoxene Proprietary Limited (KLPL), subsidiary of Doral Mineral Sands Pty Ltd |
| **ABN** | 49 137 091 297 |
| **Contact:** | Craig Bovell |
| **Position** | OHS&E Superintendent |
| **Ph:** | 0417 951 202 |
| **Email:** | craig.bovell@doral.com.au |

| | |
|---|---|
| Address | Mine Office<br>1424 Hopeland Road<br>North Dandalup WA 6207 |

# 1.3. BACKGROUND

## 1.3.1. KEYSBROOK MINERAL SANDS MINE

The Keysbrook Mineral Sands Mine (Mine) produces zircon and leucoxene heavy minerals for international markets. The mine commenced production in 2015 and is one of the largest primary producers of leucoxene in the world. The Mine spans a number of properties within the Shire of Murray and the Shire of Serpentine Jarrahdale, approximately 70km south of Perth and 2.5km west of Keysbrook (Figure 1). The mine area approved under the *Environmental Protection Act 1986* (EP Act) and also has existing development approvals issued by the Shire of Murray and the Shire of Serpentine Jarrahdale is 1532ha. An additional area of 142.3ha is currently under assessment by the EPA and has been included in this document for further Shire approvals.

The Project involves mining and primary processing of ore to produce a Heavy Mineral Concentrate (HMC). HMC is transported via the Forrest Highway to a mineral separation plant at Picton, approximately 130km south of Keysbrook, for separation into two leucoxene products and a zircon concentrate which are exported through the Bunbury and Fremantle Ports.

The Mine currently includes a workforce of around 75 KLPL employees and contractors, the majority of which reside locally within the Shire of Serpentine Jarrahdale, Shire of Murray and City of Mandurah.

## 1.3.2. ECONOMIC SIGNIFICANCE

The Proposal provides for an extension in the life of existing mining and processing operations by 1.5 year, extending the current expected life of mine from 9 years to 10.5 years.

The Project currently provides employment for approximately 75 people (employees and contractors).

The Project also provides flow-on economic benefits for the wider community. A study of the economic effect of the Project (Economic Impact of Keysbrook Mineral Sands Project, Acil Allen Consulting 2018) concluded the potential to deliver, over a 15 year period:

- A direct contribution to the West Australian economy of $352m at an average of $22m per annum;
- An indirect contribution to the WA economy of $468m;
- Therefore, a total economic contribution of $820m, of which $441m is the benefit to the Peel economy (average of $28m per annum).

## 1.3.3. FINANCIAL VIABILITY

Over $75m has been expended in the development of the Project and subsequent processing upgrades since commissioning in 2015. The additional investment associated with implementing the Proposal is $3m. In addition, over $20m has been expended in property acquisition to facilitate implementation of the Project.

Current market pricing is strong for the products of leucoxene and zircon minerals in the orebody on the Proposal area ensuring there financial viability of the project, which is planned to be mined over a 12 month

period. Labour and material costs incurred in accessing the ore, processing into separate product streams and in subsequent rehabilitation of mined areas is expended locally and contributes to the broader economic benefits detailed under Section 1.3.2 above.

The economic benefits of the Proposal will flow with capital expenditure and preparatory works in the three months leading to the commencement of mining. The majority of economic benefit will be realised in the five-year period commencing with the start of mining. This period will span the full cycle of mining, processing, rehabilitation and site decommissioning. Following the completion of ore excavation on the subject lot, mining will progress to nearby resources (subject to further approvals and landowner consents).

Based on rehabilitation performance achieved to date and associated studies, the economic benefits will extend for the medium- and long-term following mining (i.e. to beyond 15 years post the commencement of mining). Though not quantified in dollar terms and dependent on appropriate pastoral management, these benefits will be reflected in improved pasture productivity and reduced inputs such as fertilisers and soil ameliorants. Environmental benefits of a similar timescale may also be expected post mining with reduced nutrient export from rehabilitated areas.

## 1.4. PROPOSAL OVERVIEW

The Proposal is to extend the mine area of the Keysbrook Mineral Sands Mine. The Keysbrook Mine consists of a shallow, low grade ore deposit. The Mine operates 24 hours a day, 7 days a week, however during evening and night time periods (7pm-7am) all mining earthworks activities cease and only the feed prep screening plant fed by a front end loader and wet Concentrator plant remain in operation.

Specifically, the Proposal is to include an additional 142.3ha of mine area located on Lot 63 Hopeland Road, Keysbrook WA, which would increase the total mine area to ~1,675ha.

Ore from the deposit (Proposal area) will be mined progressively via a series of shallow open-cut pits using dry mining techniques to a maximum depth of ~6mbgl. The average depth of mining however for the proposed amendment area is ~1-2mbgl. Dewatering of groundwater inflows into the pit will be required to enable dry mining to occur during wetter times of the year. Mining will be staged in order to minimise the area of disturbance (at any one time) with the aim of achieving focused and effective management of the environmental factors at each pit location, prior to moving onto the next pit location.

Processing of ore will commence in-pit and then slurry will be pumped from the feed preparation plant to the wet concentration plant for further processing. Waste clay and sand materials from processing of this ore will be combined and backfilled into the mine voids using co-flocculation (co-disposal system) where possible. The mined area will be rehabilitated back to pasture, consistent with the post-mine land use requirements.

HMC produced at the wet Concentrator plant will be stockpiled on site prior to transport to Doral's Picton Dry Separation Plant, located ~120km south of the mine, for separation using magnetic and electrostatic processes. The Picton Dry Separation Plant has a licence to process HMC sourced from Doral's Mine's. Processing of HMC into products of zircon, ilmenite, and leucoxene has occurred since the Picton Dry Separation Plant was approved by Ministerial Statement No. 484 in 1998. Once processed, HMC products are hauled by truck to either the Bunbury Port or Fremantle Port for export. Processing activities at the Picton Dry Separation Plant and exporting of product remain unaffected by this proposal and thus are not part of this request under Section 45C.

# 2. SITE INFORMATION

## 2.1. SITE IDENTIFICATION

The Proposal involves the extraction of mineral sands from Lot 63 Hopelands Rd, Keysbrook WA (Figure 2). The legal description of the subject Site is detailed in the following table, with a copy of the Certificate of Title included in Appendix 2.

TABLE 2: LEGAL DESCRIPTION OF SUBJECT SITE

| PROPOSED ACTIVITY | LOT | ADDRESS | PLAN | VOLUME | FOLIO | OWNERSHIP | AREA (HA) |
|---|---|---|---|---|---|---|---|
| Mine | 63 | 1265 Hopeland Road, Kesybrook WA | 739 | 1015 | 594 | Private | 323.9 |

## 2.2. REGIONAL CONTEXT

The Proposal is located approximately:

- 55km south of the Perth Central Business District;
- 35km south of the Armadale Regional Centre;
- 25km south east of the Rockingham Regional Centre;
- 23km north east of the Mandurah Regional Centre.

The Proposal area is 3km west of the South West Highway, which is reserved as a 'Primary Regional Road' under the Metropolitan Region Scheme, connecting the Proposal area to the wider Perth Metropolitan Region, Peel Region, Greater Bunbury Region and the South West Region. Figure 1 depicts the regional context.

## 2.3. LOCAL CONTEXT

The Proposal area is located approximately 2.5km west of the Keysbrook town site and approximately 7.5km north west of the North Dandalup town site. The Proposal area is bound by Hopeland Road to the west, approved mining area to the east and south, and agricultural land to the north.

## 2.4. LANDUSE

The Proposal area currently accommodates agricultural land use comprising annual pasture, cattle grazing and horse agistment. Very limited remnant native vegetation occurs within the Proposal Area.

## 2.5. TOPOGRAPHY

The Proposal area slopes gently from east to west between ~36.5mAHD and ~32mAHD.

# 3. OTHER APPROVALS

## 3.1. ENVIRONMENTAL PROTECTION ACT 1986 (WA)

On 19 October 2009 the WA Minister for the Environment granted approval for the Keysbrook Mineral Sands Mine through the publication of Ministerial Statement 810 (MS810) under Part IV of the Environmental Protection Act 1986 (EP Act). 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.

All of the environmental factors relevant to this current Proposal were considered by the EPA in its assessment and recommendations to the Minister for Environment. Management plans prepared and implemented in accordance with the requirements of the Ministerial Approval included:

- Rehabilitation Management Plan;
- Weed and Dieback Management Plan;
- Nutrient Management Plan;
- Water Management Plan;
- Acid Sulphate Soils Management Plan;
- Noise Monitoring Plan;
- Air Quality and Dust Management Plan.

These management plans are being implemented as part of the current mining operations.

On 8 February 2019 the Minister for Environment issued Ministerial Statement 1089 (MS1089) which amended the original approval condition (in MS810) that applied to noise management (Condition 14). MS1089 is also included as Appendix 3.

KLPL also holds an Environmental Licence (L8918/2015/1) for the Keysbrook Mineral Sands Mine issued under Part V of the EP Act. The licence permits mining and processing of ore up to 5,250,000 tonnes per annum. KLPL's current Environmental Licence (L8918/2015/1) is provided in Appendix 4.

## 3.2. ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (CTH)

In July 2005 the Keysbrook Mineral Sands Mine was determined to be a controlled action under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Federal Minister granted approval for the project, under the EPBC Act on 16 February 2010 (EPBC 2005/2016).

## 3.3. LOCAL GOVERNMENT ACT 1995 (WA)

The Extractive Industry Licence and Development Approval for the initial stage of the project was granted on 15 March 2012. On 16 September 2019, the Development Approval for Stage 2 of the Project was granted.

The Shire of Serpentine Jarrahdale approved the initial application for an extractive industry licence for the project under the Shire of Serpentine Jarrahdale Extractive Industries Local Law 1999, through the powers conferred by the State Local Government Act 1995.

Development approval within the Shire is guided by the *Planning and Development Act 2005* and the Shire of Serpentine Jarrahdale Local Planning Scheme.

This document supports an application for Development Approval to enable the progression of mining of Lot 63 Hopeland Rd, Keysbrook as part of the ongoing implementation of the Keysbrook Mineral Sands Mine.

## 3.4. MINING ACT 1978 (WA)

The Proposal does not require approval under the State *Mining Act 1978* as the land title for Lot 63, pre-dates 1 January 1899 and consequently ownership of all minerals (except gold, silver and platinum) is vested in the freehold title owner.

## 3.5. RIGHTS IN WATER AND IRRIGATION ACT 1914 (WA)

The Proposal is within the Serpentine Groundwater Management Area, which is a proclaimed area under the State *Rights in Water and Irrigation Act 1914*. Four Groundwater Well Licences (GWLs) have been granted by the DWER for implementation of the project:

1. GWL 164007 – permits abstraction of up to 1,800,000kL per annum from the Lower Leederville aquifer (Murray Groundwater Area) for mining and mineral processing.
2. GWLs 177296, 176404 & 177336 – permit abstraction of up 200,000kL per annum from the Superficial Swan aquifer for mine pit dewatering.

No additional production bores or Groundwater Well Licences are required for the Proposal.

## 3.6. MAIN ROADS PERMITS

No haulage of heavy mineral concentrate will occur within the Shire of Serpentine Jarrahdale. The transport of heavy mineral concentrate from the Keysbrook site to the Mineral Separation Plant at Picton will not change. The haulage contractor responsible for transporting HMC to Picton holds permits issued by Main Roads WA for the use of roads along the transport route for Restricted Access Vehicles.

## 3.7. ABORIGINAL HERITAGE ACT 1972 (WA)

In consultation with the South West Aboriginal Land and Sea council, the proponent commissioned and had completed ethnographic and archaeological surveys of the overall project area in 2006, which included the Proposal area (Western Heritage Research Pty Ltd, 2006).

Five representatives from the Gnarla Kaala Booja native title claimant group were involved in the ethnographic survey. They indicated the survey area has been highly disturbed through farming and other activities. They also noted that any ethnographic sites, such as camping areas, would have been destroyed long ago. The Gnarla Karla Booja representatives did not consider the drain lines, as ethnographic sites and no sites appear on the Department of Indigenous Affairs database, nor in the Australian Interaction Consultants (2005) desktop study of the area. The Gnarla Karla Booja native title claimant group representatives had no objection to the Proposal because no ethnographic sites were identified (Western Heritage Research Pty Ltd, 2006).

The surveys did not identify any ethnographic or archaeological sites in the Proposal area. Consequently, no approval under the State *Aboriginal Heritage Act 1972* is required.

## 3.8. OTHER HERITAGE

The Proposal will not impact on the cultural or historical significance of the locality. The Proposal is not located within an area of historical significance and does not affect any place of heritage significance.

The Proposal is not listed within the Register of Heritage Places or the subject of a heritage agreement or a conservation order under the *Heritage of Western Australia Act 1990* (WA).

The Proposal will not affect any registered place or place that is the subject of a heritage agreement under the *Heritage of Western Australia Act 1990* (WA). The Proposal is not listed within the Shire's *Municipal Inventory under the Heritage of Western Australia Act 1990* (WA).

# 4. PROPOSED DEVELOPMENT

The Proposal seeks to access additional areas of Lot 63 Hopeland Rd for the extraction of heavy mineral sands from a low-grade orebody. The proposed maximum extraction area is 142.3ha. The temporary placement of infrastructure (e.g. pipelines, roads), visual bunds and stockpiles of topsoil from the excavation area will occur on pre and post mined areas within the Proposal area. Mining will take approximately 18 months, with a further 2 years to complete rehabilitation at the completion of the mining period.

The broader Project has been in operation since October 2015.

## 4.1. MINERALS

The Proposal involves the extraction of valuable heavy mineral sands from silica sand deposits across the subject site. The extracted mineral sands contain the titanium mineral leucoxene (FeTiO3) and zircon (ZrSiO4).

Leucoxene and zircon have a variety of commercial uses, as described in the following table.

TABLE 3: USE OF MINERALS

| Mineral | Common Use |
|---|---|
| Leucoxene | Feedstock for the production of titanium dioxide, a white pigment used in the manufacture of paper, paint, plastics and rubber and used as an inert filler in a variety of goods including toothpaste, sunscreens and some foodstuffs. |
| Zircon | Foundry sand<br>Ceramics |

## 4.2. STAGING OF MINING

### 4.2.1. STAGING

Mining within Lot 63 is proposed to occur for 18 months, starting in the first quarter (Q1) of 2024 (i.e. January 2024) and finishing in Q3 of 2025 (i.e. July 2025). The total extent of mining Lot 63 during this time, including the staged mining blocks is shown on Figure 2. The monthly Mining and Backfilling Schedule within Lot 63 is presented in the following Table.

TABLE 4: MONTHLY MINING AND BACKFILL SCHEDULE WITHIN LOT 63

| Mining Period/ Block Number | Jan 24 | Feb 24 | Mar 24 | Apr 24 | May 24 | Jun 24 | Jul 24 | Aug 24 | Sep 24 | Oct 24 | Nov 24 | Dec 24 | Jan 25 | Feb 25 | Mar 25 | Apr 25 | May 25 | Jun 25 | Jul 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | | | | | | | | | | | | | | | Mining period | Backfilling period | | | |
| 74 | | | | | | | | | | | | | | | | Mining period | Backfilling period | | |
| 75 | | | | | | | | | | | | | | | | Mining period | Backfilling period | | |
| 76 | | | | | | | | | | | | | | | | | Mining period | Backfilling period | |
| 77 | | | | | | | | | | | | | | | | | Mining period | Backfilling period | |
| 79 | | | | | | | | | | | | | Mining period | Backfilling period | | | | | |
| 80 | | | | | | | | | | | | | Mining period | Backfilling period | | | | | |
| 81 | | | | | | | | | | | | | | Mining period | Backfilling period | | | | |
| 82 | | | | | | | | | | | | | | Mining period | Backfilling period | | | | |
| 83 | | | | | | | | | | | | | | | Mining period | Backfilling period | | | |
| 86 | | | | | | | | | | | | Mining period | Backfilling period | | | | | | |
| 87 | | | | | | | | | | | | Mining period | Backfilling period | | | | | | |
| 88 | | | | | | | | | | | | Mining period | Backfilling period | | | | | | |
| 93 | | | | | | | | | | Mining period | Backfilling period | | | | | | | | |
| 94 | | | | | | | | | | Mining period | Mining period | Mining period | Backfilling period | | | | | | |
| 97 | | | | | | | Mining period | Backfilling period | | | | | | | | | | | |
| 98 | | | | | | | | Mining period | Backfilling period | | | | | | | | | | |
| 99 | | | | | | | | Mining period | Backfilling period | | | | | | | | | | |
| 100 | | | | | | | | | Mining period | Backfilling period | | | | | | | | | |
| 101 | | | | | | | | | | Mining period | Backfilling period | | | | | | | | |
| 104 | | | | | Mining period | Backfilling period | | | | | | | | | | | | | |
| 105 | | | | | | Mining period | Backfilling period | | | | | | | | | | | | |
| 106 | | | | | | Mining period | Backfilling period | | | | | | | | | | | | |
| 107 | | | | | | | Mining period | Backfilling period | | | | | | | | | | | |
| 108 | | | | | | | Mining period | Backfilling period | | | | | | | | | | | |
| 113 | | | Mining period | Backfilling period | | | | | | | | | | | | | | | |
| 114 | | | Mining period | Backfilling period | | | | | | | | | | | | | | | |
| 115 | | | Mining period | Backfilling period | | | | | | | | | | | | | | | |
| 116 | | | | Mining period | Backfilling period | | | | | | | | | | | | | | |
| 117 | | | | Mining period | Backfilling period | | | | | | | | | | | | | | |
| 118 | | | | | Mining period | Backfilling period | | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | | | | | Mining period | Backfilling period |
| 121 | | | | | | | | | | | | | | | | | | Mining period | Backfilling period |
| 122 | Mining period | Backfilling period | | | | | | | | | | | | | | | | | |
| 123 | Mining period | Backfilling period | | | | | | | | | | | | | | | | | |
| 124 | | Mining period | Backfilling period | | | | | | | | | | | | | | | | |
| 125 | | Mining period | Backfilling period | | | | | | | | | | | | | | | | |
| 126 | | Mining period | Backfilling period | | | | | | | | | | | | | | | | |
| 127 | | | Mining period | Backfilling period | | | | | | | | | | | | | | | |
| 129 | | | | | | | | | | | | | | | | | Mining period | Backfilling period | |
| 130 | | | | | | | | | | | | | | | | | | Mining period | Backfilling period |

Mining period
Backfilling period

### 4.2.2. MINE DURATION

Mining will progress at between 15ha to 20ha per month and will take up to 12 months in total. While a significant proportion of land rehabilitation post mining will also occur in this period, a further 2 years is provided for the completion of rehabilitation works.

### 4.2.3. OPERATION HOURS

A mobile in-pit mine feed unit (screening plant) will be located at various locations within Lot 63 for the duration of the Proposal. The locations and creations of earth bunding up to a height of 8m will be in accordance with the noise modelling and subsequent noise management plan for the Proposal. Mining earthworks activities will be operational for day time only (7am to 7pm) and the screening plant will be operational 24/7 and fed by front end loader in accordance with the noise management plan to ensure compliance.

Screened ore from the in-pit screening unit will be pumped from Lot 63 for further processing at the concentrator plant. Returned sand and clay tails will be similarly pumped back to the mined-out void and profiled for pit rehabilitation

## 4.3. MINING PROCESS

The mining operation involves four key stages, which are as follows:

- Native vegetation clearing (no native vegetation clearing is required for the Proposal);
- Topsoil stripping;
- Ore excavation;
- Rehabilitation.

Each of these stages is outlined below. The mining process seeks to minimise the open mine pit area, within safety and operational constraints.

The current earthmoving fleet and associated equipment will be utilised. This includes excavators, bulldozers, front end loaders, water trucks, a service truck (refuelling) and articulated haul truck. Associated equipment includes a field ore screening unit (Mine Field Unit), electric and diesel pumps and lighting plants.

### 4.3.1. LAND CLEARING

The Proposal area within Lot 63 predominantly comprises cleared pasture (~140.52ha), with only a small area of amenity plantings (1.78ha) to be impacted. It is also noted that within the area mapped as cleared pasture (Ecoedge, 2023), incidental clearing of 0.13ha of scattered isolated melaleuca trees is also required.

### 4.3.2. TOPSOIL STRIPPING

Topsoil will be removed (to a nominal depth of 100mm) using dozers, an agricultural 'land plane' or front-end loaders and hauled to stockpiles. The topsoil is stripped progressively to limit the open area ahead of the mine face. Some topsoil stockpiles will be positioned to act as visual and/or noise bunds along the boundaries of the mining area. The topsoil is returned to the mined areas later in the rehabilitation process.

Plate 1: GPS controlled land plane for topsoil removal and replacement

Plate 2: Stripped topsoil removal to stockpile

### 4.3.3. ORE EXTRACTION

Once the ore has been exposed by topsoil removal, the extraction (i.e. mining) of ore is undertaken using excavators that directly load haul trucks. The ore will be transported in articulated dump trucks to the Mine Field Unit, where it will be screened to remove coarse material greater than 2mm (e.g. roots, rocks, competent clay lumps) before being pumped as a slurry to the existing Wet Concentrator Plant (located in the Shire of Murray) for removal of non-economic material (i.e. clay, quartz sand). The coarse material will be returned to the mine void. The Mine Field Unit may be moved periodically to maintain proximity to the mine face (i.e. to minimise haul distances).

The area proposed to be excavated is depicted in Figure 2. The external boundaries of the excavation area are bunded to prevent inadvertent access. The average depth of the mine pits across the Proposal area is 1-2m and the maximum excavation depth is 6m, on sand dunes.

As the orebody is sand, no blasting is involved in mining (or any other aspect of the Proposal).

To manage variations in the grade of ore, mining may occur on several fronts, which enable blending of ore delivered to the Wet Concentrator Plant.

Plate 3: Ore extraction using excavator (note shallow depth of ore body)

### 4.3.4. PIT DEWATERING

Dewatering the shallow mine pit is sometimes necessary to ensure safe operating conditions. The requirements for pit dewatering are influenced by rainfall and localised runoff, and consequently vary with the season. In general:

- In summer and autumn, the groundwater level will usually be below the level of the pit floor and no dewatering is required.
- In winter and spring, the higher groundwater level may necessitate dewatering of the pit.

When dewatering is required, water will be pumped from in-pit sumps into the mining and processing circuits substituting for bore water, thus lowering demand on the extraction from the production bores (and Leederville aquifer).

Dewatering the mine pit is provided for by a Groundwater Licence that permits abstraction from the Superficial aquifer.

### 4.3.5. REHABILITATION

The rehabilitation process commences soon after ore excavation is completed. The process involves backfilling the mine void with sand and clay tailings returned from the Wet Concentrator Plant. The backfilling is a continuous process which trails the active mine front.

The heavy mineral sands constitute approximately 2.5% of the orebody in the Proposal area. With the removal of so little material the mined areas can be effectively returned to the pre-mining landform and contours. After the returned material is shaped to the desired final profile using GPS controlled dozers, graders and an agricultural land plane, stockpiled topsoil is spread over the surface.

KLPL's existing rehabilitation procedures also include the addition of significant quantities of lime (to improve soil pH) and compost (to improve soil carbon, nutrient retention and promote microbial activity). The addition of soil ameliorants is determined on the basis of soil sampling and the results of ongoing research and trials.

The reconstructed areas are then seeded with a carefully selected combination of pasture species to (i) generate further carbon in the soil (through root mass); (ii) increase nitrogen levels (key plant nutrient) in the soil profile; and (iii) stabilise the soil surface.

Plate 4: Final landforming post mining using a dozer

Plate 5: Pasture establishment on rehabilitation area (October 2018)

## 4.4. MINERAL PROCESSING

Mineral processing is not part of the Proposal. The Proposal does not involve any change to existing arrangements for the processing of ore, which is undertaken at the Wet Concentrator Plant on Lot 34 Hopeland Road, North Dandalup (Shire of Murray), approximately 2km south west of the Proposal area.

For context, ore will be delivered to the mobile in-pit mine feed unit (screening plant), located in various locations within Lot 63, before being pumped in slurry form to the Wet Concentrator Plant for further processing. The Wet Concentrator Plant received development approval as part of the initial development application for the Keysbrook Mineral Sands Mine Project in 2012 with the Shire of Murray.

The wet concertation plant operates at a nominal 600 tonnes per hour using water and spirals to separate the ore, based principally on particle size and specific gravity differences, into: 1) heavy mineral concentrate; 2) fine clay and silt particles; and 3) quartz sand. The fine clays, silts and quartz sand are the non-economic materials which are subsequently combined and pumped back to the mine void, as outlined in section 4.3.4.

The heavy mineral concentrate (HMC) is pumped to a stockpile and then transported to Picton for further processing in a Dry Separation Plant to produce leucoxene and zircon products using electrostatic and magnetic separation. Approximately 52,000 tonnes of HMC will be produced from the Proposal area. Approximately 15,000 tonnes of non-economic sand material is backhauled annually from the Dry Separation Plant and returned to the mine void.

The final separated products are exported to customers in China and the USA. Leucoxene is exported through the Bunbury Port and the zircon concentrate is exported in containers through the Port of Fremantle.

## 4.5. PUBLIC ROAD USE

No road closures are required for the Proposal.

# 4.6. MINE INFRASTRUCTURE

## 4.6.1. MINE AREA

A mobile in-pit mine feed unit (screening plant) will be located at various locations within Lot 63 for the duration of the Proposal. The locations and creations of earth bunding up to a height of 8m will be in accordance with the noise modelling and subsequent noise management plan for the Proposal. Mining earthworks activities will be operational for day time only and the screening plant will be operational 24/7 and fed by front end loader in accordance with the noise management plan to ensure compliance.

Screened ore from the in-pit screening unit will be pumped from Lot 63 for further processing at the Wet Concentrator Plant. Returned sand and clay tails will be similarly pumped back to the mine void and profiled for pit rehabilitation.

## 4.6.2. PIPELINES

Pipelines to transport water and ore slurry will traverse the Proposal area to (i) connect the mobile in-pit mine feed unit (screening plant) to the wet concentrator plant; and (ii) return sand and clay tailings from the wet concentrator plant to the mine void. Pumps and electric substations will be located along the pipeline at approximately 1km intervals. The pipelines will be located on approved disturbance areas within Lot 63.

## 4.6.3. POWER SUPPLY

The main electrical power for the screening plant and transfer pumps will be provided from the state grid via temporary overhead power lines. Power consumption is around 27 gigawatt hours per annum. Small stand-alone diesel generators will be used to supply power to moveable pumps used for recovering water into the processing circuit.

## 4.6.4. HYDROCARBON AND CHEMICAL STORAGE

No bulk volumes of dangerous goods or hazardous substances will be stored within the Proposal area. Oils, lubricants and diesel will continue to be stored at existing facilities adjacent to the Wet Concentrator Plant.

## 4.6.5. WASTE DISPOSAL

There will be no on-site disposal of waste. A commercial waste disposal company is used to remove waste for recycling or disposal at licenced landfill facilities.

# 4.7. MINE OPERATIONS AND AMENITY

## 4.7.1. BUFFERS AND SETBACKS

In accordance with cl 6.1 of the *Shire of Serpentine Extractive Industries Local Law 1999,* the extraction area will not extend within 20m of another boundary (should the adjacent property not be approved for mining); or within 40m of any thoroughfare or watercourse. This provides for the following setbacks:

- North: A minimum of 20m setback is required from the northern boundary;
- East: No setback is required as adjacent Lots are approved for mining;
- South: A partial 20m setback is required as part of the adjacent Lot is approved for mining;
- West: A minimum of 20m setback is required from the western boundary.

### 4.7.2. VISUAL IMPACT MANAGEMENT

A Mine Visual Management Plan continues to be implemented at the site to meet Condition (f) of the preceding Development Approval for the Keysbrook Mine Application and with the objectives;

- For the long-term reinstatement of the broader visual landscape character (as a minimum benchmark);
- To minimise visual intrusion of the extraction operations on the broader visual landscape character; and,
- To minimise views to the operations of the extractive development during the period of extractive works

The performance of the Mine Visual Management Plan is reported annually to the Shire of Serpentine Jarrahdale and the Shire of Murray in the Annual Compliance Report.

### 4.7.3. NOISE AND VIBRATION

Mining the Proposal area will extend the duration of mining in the order of 12 months and consequently the duration of exposure to potential noise emissions, for nearby residences. Noise management will continue to be applied in accordance with MS1089 Condition 14-1, which requires the use of amenity agreements for any noise sensitive premise within 2km of the mining operations. KLPL currently have amenity agreements in place for affected residents.

In accordance with MS1089 Condition 14-3 to 14-7, a noise management and monitoring plan will be prepared to demonstrate compliance with the *Environmental Protection (Noise) Regulations 1997*, if amenity agreements are not in place.

(Wood, 2023) undertook noise modelling to determine the nearest sensitive receptors to the amendment area and to demonstrate how mining and rehabilitation operations for the Lot 63 amendment can be managed to achieve compliance with the Regulations.

The noise modelling results demonstrate that mining, tails and rehabilitation activities can be undertaken at the Site while maintaining compliance with the project noise limits for all receivers with amenity agreements within the 2km buffer zone surrounding the mining operations (Wood, 2023). Compliance was demonstrated assuming implementation of the following noise mitigation measures:

- Noise bunds at mobile screening plants oriented to attenuate sound propagation towards the nearest affected receptors.
- Noise barriers at field pumps oriented to attenuate sound propagation towards the nearest affected receptors.

No specific noise management measures are required for mobile equipment, other than not exceeding the sound power levels and numbers of equipment items operating simultaneously assumed in the modelling scenarios.

Predicted noise levels do not exceed the Assigned Levels at any receptors beyond the 2km buffer zone surrounding the mining operations.

Mineral processing can be undertaken at all times; however, mining operations have been restricted to weekdays (Monday to Saturday 0700 to 1900hrs, excluding public holidays).

### 4.7.4. DUST

Dust management measures will focus on, but not be limited to, vehicle movement, ground preparation, ore extraction, the stabilisation of open ground and the extraction processes on site. Specific management measures are detailed in the Air Quality and Dust Environmental Management Plan, prepared to meet MS810 Condition 15.

### 4.7.5. FLORA AND VEGETATION

The Proposal area within Lot 63 predominantly comprises cleared pasture (140.52ha), with only a small area of amenity plantings (1.78ha) to be impacted. Within the cleared pasture some isolated scattered melaleuca trees (0.13ha) will also be cleared. In accordance with Condition 8 of MS810, cleared native vegetation will be replaced at a minimum of 1.4ha for every 1ha of vegetation disturbed. Following mining, Lot 63 will be rehabilitated back to pasture in accordance with the Rehabilitation Management Plan, as per MS810 Condition 8.

### 4.7.6. TERRESTRIAL FAUNA

The Proposal area within Lot 63 predominantly comprises cleared pasture (~140.53ha), with only a small area of amenity plantings (1.78ha) to be impacted. One dead tree (stag) containing a potentially suitable Black Cockatoo hollow will be avoided from disturbance. No impacts to fauna are predicted as a result of the Proposal.

### 4.7.7. WATER RESOURCES

The Site lies on the Swan Coastal Plain, approximately 3km west of the Darling Scarp, within the Serpentine and Murray groundwater management areas, west of the towns of Keysbrook and North Dandalup.

Two major aquifers, the Superficial and Leederville, have been identified within the Project area. A detailed description of the aquifers of the Project area is given by (Rockwater, 2006), (Rockwater, 2007) and summarised in the Groundwater Modelling Report prepared by (AQ2, 2023a) for the proposed amendment

#### Superficial Aquifer

The Bassendean Sand and Guildford Formation form an unconfined Superficial aquifer. The permeability of the superficial aquifer is variable and depends on sediment type, with saturated sands having higher permeability than clays. At the Site, the Bassendean Formation forms the main portion of the aquifer, with the upper 4 to 8m of this formation being moderately permeable, while the Guildford Formation is of lower permeability, owing to its more clayey nature. The high sand content in all the superficial units at the site mean they are in hydraulic connection and behave as a single aquifer unit.

The Bassendean Sand has a variable thickness (up to 5m), thickening to the west. Owing to the shallow base of the Bassendean Sand, this sand is in places fully unsaturated in summer/autumn, and partly-saturated in winter/spring; water levels fluctuate about 1m annually. In other areas, the formation extends below the summer water table and is partly to fully saturated year-round. The underlying Guildford Formation extends to 9 to 15m below ground level (mbgl) and is mostly saturated, with the exception of the upper one metre or so where the Bassendean Sand is thinnest.

The groundwater level within the Superficial Aquifer varies from 0 (surface level) to 5mbgl, with groundwater flow mainly to the west, under the prevailing hydraulic gradient. Groundwater salinity can be quite variable and is fresh to brackish, ranging from about 200 to 5,000mg/L total dissolved solids (TDS).

The groundwater in the Superficial aquifer is derived from recharge resulting from direct rainfall and the local stream runoff from ephemeral drainage networks.

### Leederville Aquifer

The Leederville aquifer is a confined groundwater system, separated from the overlying Superficial aquifer by the confining Guildford Formation. The Leederville aquifer comprises interbedded sandstones and siltstones, which extend to at least 130mbgl and have a modest to high permeability in the vicinity of the Project. The Leederville aquifer receives groundwater from the Superficial aquifer and transmits it mainly westwards.

The groundwater quality of the Leederville Formation is fresh to brackish, reporting a salinity of less than 1,500 mg/L TDS.

### Surface Hydrology

The following information on surface hydrology has been sourced from the Surface Water Assessment, completed by (AQ2, 2023b) for Lot 63. Surface water features are shown on Figure 3.

The majority of the Site, including the southern section of Lot 63, is located within the Nambeelup Brook sub catchment, which discharges to several lakes in the Serpentine River Catchment System. Nambeelup Brook North Tributary flows from Lot 64 into the northern section of Lot 63 in a south-westerly direction. A small unnamed stream flows through the southern half of Lot 63 and continues to the west to converge with other tributaries of Nambeelup Brook.

### Wetlands

One Conservation Category Wetland (CCW) (UFI 14780), as shown on Figure 4, is located on the western boundary of Lot 63. The CCW is completely degraded with no remnant vegetation characteristic of a wetland (Ecoedge, 2023b; Rockwater, 2022). The CCW is listed under the Geomorphic Wetlands, Swan Coastal Plains dataset (GWSCP, DBCA-019) as a palusplain (seasonally waterlogged flat) type wetland. The proposed disturbance for the Proposal will avoid the CCW, with a 100m buffer, in accordance with MS810 Condition 7.

## 4.8. ROADS AND TRANSPORT

### 4.8.1. ACCESS

There will be no change to the existing worker and commercial access to the site, which is gained from Hopeland Road. There will be no change to the routine haulage of heavy mineral concentrate product from the wet concentrator plant south to Picton, which is outside of the Shire of Serpentine Jarrahdale.

There may be occasional deliveries of rehabilitation materials (e.g. compost and lime) utilising Elliott Road during periods of seasonal rehabilitation works. This is consistent with current practise, delivering materials to rehabilitation areas to the south via Westcott Road.

The project operates 24 hours a day 7 days per week. Traffic flow peaks in the period 05.30am to 06.30am and 0530 pm to 0630 pm associated with the change of shift. The existing road network sustains the project related and general community related traffic without any issues of congestion or unacceptable safety risk.

Existing commitments to limit product haulage to after 7.00am and avoid school bus hours (7.30 am to 7.40 am 4.00 pm to 4.10 pm) will continue.

### 4.8.2. COMMUTER WORKFORCE

There will be no change to workforce traffic, with vehicles continuing to access the Site via the existing access from Hopeland Road.

## 4.9. COMMUNITY CONSULTATION

Stakeholders who have been identified as having an interest in the environment surrounding the Proposal have been consulted and will continue to be consulted and informed through the approvals phase. KLPL commenced stakeholder engagement at the start of 2021 in support of its plans to expand its Keysbrook mining operations within Lot 63. Consultation has been ongoing throughout the life of the Keysbrook operations. Targeted communications and meetings with key stakeholders specific to the Proposal has been undertaken subject to landholder approval.

KLPL will continue to maintain a stakeholder register, which documents communication with stakeholders, any issues/ concerns raised and the outcome of the consultation.

A summary of stakeholder engagement is outlined in Table 5.

## TABLE 5: STAKEHOLDER ENGAGEMENT

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| Shire of Serpentine-Jarrahdale<br>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.<br>Crossing of Elliott Road, subject to Traffic Management Plan.<br>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<br>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 for Darling Range | 07/11/2022 | In person meeting. Receives copies of Community Update letters and newsletters | Extension proposals | Supportive of expansion plans, noted any community 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.<br>Annual monitoring of artificial Black Cockatoo hollows. | Active involvement in the Keysbrook revegetation and fauna habitat creation |

APPLICATION FOR PLANNING APPROVAL AND PROPOSED EXTRACTIVE INDUSTRY (MINERAL SANDS)

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| | | | | |
| Peel Development Commission | 23/03/2023<br>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<br>04/04/2023<br>03/05/2023 | Group meeting in person<br>Lot 63 mine plan and broader western extension provided at 3 May 2023 meeting<br>Copy of Lot 63 and western extension proposal letter dated 4 April 2023 sent | Discussion around expansion proposal both Lot 63 and broader extensions. | Detailed information provided at community meeting in regard to Lot 63 and the broader western extension proposal provide by Project Manager Craig Bovell. Group has received project update letter and previously briefed on Lot 56 extension. Meeting focused on community consultation, noise, dust, water and mining of existing Doral owned property.<br>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<br>10/05/2023 | Letter + phone call<br>In person planned meeting | Project letter and follow up phone call on 04/04/23, meeting planned for 10 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 12, Stewart | 04/04/2023<br>10/05/2023 | Project letter<br>In person meeting<br>Included in all community update letters. | Project letter.<br>Meeting held to discuss in further detail. | Landholder amenity agreement signed. Meeting held on 3 May 2023 to discuss Lot 63 in further detail. Appreciated the updates and contact from Mine Manager regarding site developments. No concerns. |

APPLICATION FOR PLANNING APPROVAL AND PROPOSED EXTRACTIVE INDUSTRY (MINERAL SANDS)

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| Lot 700, Allspell Nominees | 04/04/2023 | Letter + phone conversation<br>Included in all community update letters. | 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<br>14/04/2023 | Letter plus in person meeting | Water and dust. | Sits outside of 2km, interested landholder, consults to and regularly participates in rehabilitation projects on Keysbrook site with SJ Landcare. Most recently Environmental Manager met with landholder on 13 April 2023 to discuss proposed mining activities, rehabilitation plan for 2023 and into the near future and current dust mitigation measures. |
| Lot 508, Dawson, Elliott Road | 04/04/2023 | Project letter plus various phone conversations in regard to enviro survey access. | Signed Mining and Compensation Agreement dated 17 May 2019 and Extension dated 23 March 2023. | Regular conversations in regard to Lot 508, environmental surveys and timing for mining of property. Keen for mining to occur, no issues raised. |
| Lot 201, Hill \| Green \| King, Elliott Road | 04/04/2023 | Project letter plus various phone conversations in regard to enviro survey access. | Signed Mining and Compensation Agreement dated 17 June 2019. | Regular conversations in regard to Lot 201, environmental surveys and timing for mining of property. No issues raised. Property is currently under Offer with Doral Mineral Sands, signed 21 April 2023. |
| 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. |

APPLICATION FOR PLANNING APPROVAL AND PROPOSED EXTRACTIVE INDUSTRY (MINERAL SANDS)

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| Linga Holdings (Rob Guira) | 04/04/2023<br>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. |
| 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<br><br>42 neighbours in total | 04/04/2023<br>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.<br>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<br>85 neighbours in total | 14/04/2023<br>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<br>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. STATE PLANNING FRAMEWORK AND STRATEGIC PLANNING

## 5.1. STATE PLANNING POLICIES

### 5.1.1. STATE PLANNING STRATEGY

The Western Australian Planning Commission (WAPC) prepared and adopted the State Planning Strategy 2050 (2014) pursuant to Section 14(b)(i) of the Planning and Development Act 2005. It sets out the key principles relating to environment, community, economy, infrastructure, regional development and governance which should guide the way in which future planning decisions are made.

The State Planning Strategy provides the overall vision and is further articulated and applied by strategies, policies and plans dealing with particular planning issues or regions of the State.

### 5.1.2. STATE PLANNING POLICY NO. 1 – STATE PLANNING FRAMEWORK

The State Planning Policy No. 1 (Variation 3) (SPP1) expands upon the key principles of the State Planning Strategy in planning for sustainable land use and development. It brings together existing State and regional policies, strategies, and guidelines within a central State Planning Framework and provides a context for decision-making on land use and development in Western Australia.

The SPP1 sets out the key principles relating to environment, community, economy, infrastructure and regional development, which guide the way in which planning decisions are made.

SPP1 aims to assist in the creation of regional wealth, the development of new industries and the encouragement of economic activity. SPP1 also encourages ecologically sustainable land use and development through the wise use and management of resources, including minerals.

Clause 3.1(a) of SPP1 requires local government and all decision-making authorities to have regard to the provisions that form part of the SPP1 framework in making decisions on planning matters.

The proposed development is consistent with the general principles for land use planning and development as outlined in SPP1 and described below in other relevant state planning policies.

### 5.1.3. STATE PLANNING POLICY NO. 2 – ENVIRONMENT AND NATURAL RESOURCES POLICY

State Planning Policy No. 2 – Environment and Natural Resources Policy (SPP2) applies to the Proposal, given it involves extraction of a naturally occurring resource. The objectives of SPP2 are:

- To integrate environment and natural resource management with broader land use planning and decision – making;
- To protect, conserve and enhance the natural environment;
- To promote and assist in the wise and sustainable use and management of natural resources.

The Proposal seeks to limit the environmental impact of the extraction process through (1) limiting the mine area to cleared pastoral land only (no clearing required); (2) a systematic approach to environmental monitoring, review and management; (3) rehabilitation techniques that restore pasture land of improved productivity and nutrient retention capacity; (4) ongoing implementation of on-site and off-site weed control measures; and (4) ongoing implementation of offset native conservation initiatives. Given this approach, and

based on implementation of the Project to date, implementation of the Proposal is likely to result in a net benefit to the natural environment.

The Proposal is consistent with the purpose, objectives and strategies of SPP2. The extraction of heavy mineral sands is short term, will be closely managed and will not have a significant impact on the surrounding natural environment during or after completion of mining

### 5.1.4. STATE PLANNING POLICY NO. 2.1 – THE PEEL-HARVEY COASTAL PLAIN CATCHMENT

The Proposal area is within the Peel-Harvey Coastal Plain Catchment, as defined by the Western Australia Statement of Planning Policy No. 2.1 – The Peel-Harvey Coastal Plain Catchment (SPP2.1). The Purpose of SPP2.1 is to provide a planning framework to control the use and development within the Peel-Harvey Estuarine system in order to avoid environmental damage to the Estuary. The objectives of SPP2.1 include:

- To improve the social, economic, ecological, aesthetic, and recreational potential of the Peel-Harvey Coastal Plain Catchment.
- To ensure that changes to land use within the Catchment to the Peel-Harvey Estuarine system are controlled so as to avoid and minimise environmental damage.
- To balance environmental protection with the economic viability of the primary sector.
- To increase high water-using vegetation cover within the Peel-Harvey Coastal Plain Catchment.
- To prevent land uses likely to result in excessive nutrient export into the drainage system.

The Proposal, as part of the broader Keysbrook Mineral Sands Mine Project, will maintain employment for around 90 employees and contractors. A sponsorship program administered by KLPL provides further local recreational and social benefits for community groups in the Shire of Serpentine Jarrahdale. Environmental considerations covered by this policy have been considered and addressed through MS810 as part of the approvals process.

Consequently, the proposed development is consistent with the objectives and provisions of SPP2.1.

### 5.1.5. STATE PLANNING POLICY NO. 2.4 – BASIC RAW MATERIALS

The purpose of the WAPC's Statement of Planning Policy No. 2.4 – Basic Raw Materials (SPP2.4) is to describe the matters to be considered by the WAPC and local governments when assessing development applications for extractive industries. The stated objectives of SPP2.4 are as follows:

- Identify the location and extent of known basic raw material resources;
- Protect Priority Resource Locations, Key Extraction Areas and Extraction Areas from being developed for incompatible land uses which could limit future exploitation;
- Ensure that the use and development of land for the extraction of basic raw materials does not adversely affect the environment or amenity in the locality of the operation during or after extraction;
- Provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.

*Relevant Considerations in Determining Applications*

Clause 6.3 of SPP2.4 deals with the relevant considerations in determining applications for an extractive industry. Clause 6.3.1 outlines a number of matters to be considered by the WAPC and/or Local Government when determining applications, which are addressed in detail below.

### Resource Significance

*"The significance of the resource in terms of its positioning in a priority resource location, key extraction area, or extraction area."*

Although the Proposal area is not situated within a priority resource location, key extraction area or extraction area, the site is considered adequate and appropriate for extraction purposes. It is also noted in Clause 6.2.3 of SPP2.4 that extraction of basic raw materials from other areas is not precluded:

> *This policy does not preclude the extraction of basic raw materials on land which is not identified as a Priority Resource Location, Key Extraction Area or Extraction Area subject to the extraction proposal complying with planning and environmental requirements*

SPP2.4 also states that proposals in local Planning Schemes (and therefore local Planning Policies) that seek to prohibit extractive industries in Rural areas will not be supported. As such, proposals which meet with the requirements of SPP2.4, properly considered on the planning merits of the proposal should accordingly be approved.

### Natural, cultural and historic values

*"The effect of the proposed extractive industry on any native flora and fauna, the natural landscape, groundwater quality, quantity and use, surface drainage and surface water quality, and sites of cultural and historic significance on and near the land. An application in an environmentally significant area may require referral to the Department of Environmental Protection (refer to the Environmental and Conservation Reference Chart located on each of the Resource Protection Working Plans)"*

Natural values

The Proposal area has been the subject of detailed environmental and hydrological studies. These studies formed part of the environmental impact assessment, assessed by the EPA that lead to environmental approval by the Minister for the Environment under the *Environmental Protection Act 1986*. The areas on Lot 56 proposed to be mined are cleared and used for cattle grazing. No removal of native vegetation is required for the Proposal and consequently the studies concluded that the effect on land and heritage by the Proposal was not significant.

European Heritage

The Proposal will not adversely impact on the cultural or historical significance of Keysbrook and surrounds. A search of the Shire of Serpentine-Jarrahdale Municipal Inventory indicated the Proposal is not located within an area of historical significance and does not affect any place of heritage significance.

Indigenous Heritage

Ethnographic and archaeological surveys completed across the Project area with the involvement of the Gnarla Kaala Booja native title claimant group (for the ethnographic component) did not identify any sites on the subject lots.

Based on the ethnographic survey, the Gnarla Karla Booja native title claimant group representatives had no objection to the Project.

During the archaeological survey of the broader Keysbrook Mineral Sands Mine Project, five sites were identified as containing artefact scatters, all considered of low to moderate importance. None of these sites occur within the Proposal area.

### Agricultural Land

*"The effect of the proposed extractive industry on agricultural land"*

Agricultural activities on land adjacent to the Proposal will be able to continue unaffected by nearby mining, as has been demonstrated by implementation of the Project to date.

The Proposal will temporarily restrict the opportunity for agricultural pursuits within Lot 63 in the short-term (i.e. ~4 years). Sequential mining and progressive rehabilitation may result in parts of the Proposal area being returned to agricultural land use well within this timeframe.

The Proposal will improve the agricultural capability of the mined areas. Rehabilitation completed to date has significantly improved the capacity to retain moisture and nutrients and therefore soil productivity. Rehabilitation is undertaken in accordance with a Rehabilitation Management Plan, as per MS810 Condition 8.

### Amenity (traffic, noise, blasting/vibrations, dust)

"*The effect of vehicular traffic, noise, blasting, dust and vibration on the amenity of the surrounding area having regard to existing and future uses".*

Traffic

Existing vehicle movements to the Project area will be unchanged. All employees, contractors, suppliers and product transport access and depart the site via the established access from Hopeland Road.

Noise

Noise associated with the Proposal will be managed to ensure compliance with the *Environmental Protection (Noise) Regulations 1997* and conditions imposed by the Minister for Environment through MS810, as amended by MS1089 (February 2019).

KLPL has developed a detailed understanding of the noise profile of the mining and processing operations and the local noise environment through a number of comprehensive studies completed in the period 2016 to 2018. A number of these studies were undertaken to inform an inquiry by the EPA into the regulation and management of noise from the Keysbrook operations under Section 46 of the *Environmental Protection Act 1986*. The EPA issued its report of this inquiry on 17 December 2018 (Environmental Protection Authority, December 2018 Keysbrook Mineral Sands Mine – Inquiry Under Section 46 of the *Environmental Protection Act 1986* to Amend MS810 Report No 1627), which included recommendations to the Minister for the Environment as to how noise conditions in MS810 may be amended to improve the regulation and management of operational noise emissions. The Minister for Environment issued a statement (MS1089) that amended Condition 14 (Noise) of MS810 on 8 February 2019 (Appendix 3).

Key provisions of the amended noise condition include:

- After 12 months from the publication of the amended conditions (i.e. from February 2020):

  - A separation distance of 2 kilometres from residences for mining and mineral processing activities will apply during the day and evening periods (7am-10pm) and on Sundays (9am - 10pm).
  - A separation distance of 3.3 kilometres for mining activities will apply during the night period (10pm-7am, Mon – Sat & 10pm - 9pm Sun)

- The separation distances will not apply to residences where a written agreement exists between KLPL and the owner and occupier of the particular residence.
- The separation distances may also be varied or substituted where the Chief Executive of DWER approves a Noise Management and Monitoring Plan (NMMP) submitted by the Company that demonstrates compliance with the Noise Regulations can be maintained at other distances as nominated in the NMMP.
- KLPL must continue to monitor noise and will be required to submit a report to the Department of Water and Environmental Regulation (DWER) annually.

Mining operations are expected to be undertaken solely in the day period, with ore processing during the evening (Sunday excepted) and night periods.

Through the combination of adherence to the specified separation distances, the establishment of amenity agreements with surrounding residents where necessary and ongoing noise management measures as per the Noise Management and Monitoring Plan (NMMP), KLPL will ensure compliance with regulatory requirements and minimise the risk of impact on local amenity.

Blasting/Vibrations

No blasting will occur as part of the Proposal.

Dust

Dust will continue to be managed through the implementation of an Air Quality and Dust Management Plan as required my MS810 Condition 15.

The purpose of the Air Quality and Dust Management Plan is to:

- Minimise dust emissions from implementation of the Proposal;
- Ensure compliance with National Environmental Protection Measure Standards for particulates, as set in MS810 Condition 15;
- Ensure emissions do not harm or adversely affect the environmental values of the health, welfare and amenity of the people and land uses.

Key dust management measures include:

- Use of weather forecasts to identify potentially high-risk conditions conducive to dust generation and initiation of proactive dust management (e.g. increasing water truck activity, reducing or suspending mining activity;
- Restriction of mining within 300m of a residence without agreement with the owner and occupier of the residence. Any mining within 300m of a residence will occur in accordance with the agreement, which will include provisions for minimising dust emissions (such as seasonal mining, in periods of appropriate soil moisture and weather conditions and with dust suppression measures applied);

- Use of water trucks over exposed areas susceptible to dust generation;
- Limiting vehicle speeds on unsealed roads and tracks;
- Limit the area open ahead of mining and at the mine front;
- Prompt and progressive rehabilitation to reduce the duration of land exposed and susceptible to dust generation;
- Stabilisation of disturbed areas and topsoil stockpiles using a clay/water slurry (which dries to a thin clay veneer resistant to wind erosion) or other stabilising agents;
- Growing of temporary 'stubble' crops to bind soil and decrease wind velocity at ground level where appropriate, where groundworks for rehabilitation are partially completed;
- Regular housekeeping to remove spilled product or materials conducive to dusting;
- Covering heavy mineral concentrate product prior to despatch from site.

The transient nature of mining within the Proposal area means the risk of impact on local amenity is short term. Through ongoing implementation of the Air Quality and Dust Management Plan the risk of impact on the amenity of local residents during implementation of the proposal will continue to be minimised.

### Rehabilitation

"*The ability to rehabilitate the land to a form or for a use which is compatible with the long-term planning for the site and surrounding area"*

Rehabilitation of mined areas within the Project area to date has demonstrated the ability to re-establish agricultural land with an enhanced ability to retain nutrients and moisture, which is consequently of improved agricultural productivity, consistent with government strategic planning objectives for the development of the Peel Food Zone. As a result of the improved soil properties, the rehabilitated land offers potential for more intensive agricultural and horticultural activities.

Under MS810, KLPL is obligated to replace 40% more native vegetation than that removed, which will lead to increased vegetation cover within the Peel-Harvey Catchment.

The objectives and methodologies for pasture and native vegetation are detailed in a Rehabilitation Management Plan as per MS810 Condition 8.

### Road Access

*"The availability and suitability of road access"*

There will be no change to the existing worker and commercial access to the Site, which is gained from Hopeland Road. Access to and from the Proposal area will require a road crossing across Elliot Road from the existing approved project area and infrastructure corridor. There will be no change to the routine haulage of heavy mineral concentrate product from the Wet Concentrator Plant south to Picton, which is outside of the Shire of Serpentine Jarrahdale.

Consequently, the existing road network is suitable for implementation of the Proposal with no modification.

Further details on access are provided within Section 4.9.1 of this report.

### Staging Extraction

*"The ability to stage the extraction operations to avoid conflicts with adjacent land uses"*

Subject to a number of mining and logistical constraints, there is some flexibility within the Proposal to adjust mining location and sequencing within the Proposal area. However, the short-term nature of mining, ensuing rehabilitation and absence of any incompatibility with existing surrounding land uses suggest the need for staging implementation of the Proposal will be minimal.

Further details on staging are provided within Section 4.2 of this report.

### 5.1.6. STATE PLANNING POLICY NO. 2.5 – RURAL PLANNING

The objective of WAPC State Planning Policy No. 2.5 – Agricultural and Rural Land Use Planning (SPP2.5) is to "protect and preserve Western Australia's rural land assets due to the importance of their economic, natural resource, food production, environmental and landscape values."

The policy applies to the Proposal, given existing land use of the subject lot and surrounding properties.

Mining under the Proposal is complementary with the objectives of the policy given that it is temporary and returns the land to an improved capacity for primary production, and through associated native revegetation and conservation initiatives that will enhance the local natural environment.

The Proposal area is not located within an Agricultural Priority Management Area (as set out in SPP2.5) for the Perth and Peel Regions.

Clause 5.4.3 of SPP2.5 states provisions for Mineral and Basic Raw Material Resource Areas. These include:

a) Town planning schemes should make provisions for the protection of basic raw materials, mineral and energy resources identified in the local planning strategy.

The Shires Rural Strategy 2013 Review (December 2017) (Rural Strategy) references Basic Raw Materials in the context of SPP2.4. The Rural Strategy also includes Figure A9: Titanium – Zircon Deposits. Whilst the Rural Strategy does not specifically reference the mineralisation or its protection from development prior to extraction it should be noted that its extraction is an activity capable of approval in a Rural zone under the Shire's Town Planning Scheme.

Town planning schemes should include provisions for the extraction of basic raw materials, mineral and energy resources. These provisions should include the development of appropriate local policies and requirements, particularly buffer requirements, that the extraction industries will be subject to; sequential land use proposals; and environmental management measures.

There are currently no existing development standards or provisions within the Shire of Serpentine Jarrahdale Town Planning Scheme 2 to guide mineral sand extraction beyond it being capable of approval in a Rural zone. The Scheme does allow for the making of local planning policies to guide decision making with respect to extractive industries.

The Proposal is consistent with the provisions and requirements of WAPC and State Government policies addressing buffers and environmental management. The Proposal has been granted approval under the *Environmental Protection Act 1986* (MS810) subject to implementation in accordance with a number of management plans that collectively protect and enhance the use of the land for primary production post mining.

Overall, the Proposal is compliant with the relevant statutory and strategic planning provisions is consistent with the provisions of SPP 2.5.

### 5.1.7. STATE PLANNING POLICY NO. 2.9 – WATER RESOURCES

SPP 2.9 seeks to protect water resources of significant value to the community and/or the environment. As demonstrated by implementation of the Project to date, the Proposal presents limited risk of compromising existing local groundwater resources (refer to Section 7.3.1) and provides an opportunity to extend the area from which nutrient export is reduced after rehabilitation is completed (refer to Section 7.3.6), contributing to a reduction in nutrient loading to the Peel Harvey Estuary.

### 5.1.8. STATE PLANNING POLICY NO. 3.7 – PLANNING IN BUSHFIRE PRONE AREAS

SPP 3.7 provides direction on land use planning in areas designated by the Fire and Emergency Services Commissioner as bushfire prone.

The Proposal area is within a bushfire prone area.

A Fire Management Plan as required under the original Development Approval for the project and revised from time to time in response to changing fire risk, policies and standards, which will apply to the Proposal is included as Appendix 5. The most recent revision of the plan has been undertaken in consultation with staff of the Shire of Serpentine Jarrahdale and with the advice of a Bushfire Planning and Design Accredited Practitioner. This plan is attached at Appendix 5.

### 5.1.9. STATE PLANNING POLICY NO. 4.1 –INDUSTRIAL INTERFACE

State Planning Policy 4.1: Industrial Interface provides for the protection of industry and infrastructure facilities from encroachment of incompatible land uses.

The Proposal temporarily utilises the subject site for Extractive Industries purposes whilst ensuring the protection of surrounding land uses and amenity. As the land use is short term and the pre-existing rural land use is restored the risk of an incompatible land use encroaching on the subject lot that the policy serves to protect against is low. Furthermore, required separation distances to residences that will be in effect through Conditions of MS810 at the time of implementation of the Proposal, will ensure sufficient buffers to limit any conflict in land use

## 5.2. METROPOLITAN REGION SCHEME

The Proposal is zoned 'Rural' under the Metropolitan Region Scheme (MRS). A review of MRS mapping indicates the subject site is not affected by any regional reserve.

The proposed development incorporates the extraction of mineral sands from the subject site. The proposed development is consistent with the provisions of the MRS and is appropriate to service the surrounding locality.

Figure 5 details the rural zoning of the subject site and surrounds under the MRS.

## 5.3. SHIRE OF SERPENTINE-JARRAHDALE – RURAL STRATEGY

Developed in consultation with government agencies and the local community, the Rural Strategy focuses on protecting a majority of the Shire while allowing for development in urban town centres. The Strategy gives the Shire and interested investors a guide for planning and development within rural areas. Key themes within the Strategy include protection of natural assets, protection of rural character and facilitation of productive rural areas.

Among a range of broad strategy aims the strategy was to implement government land use planning and management policy, provide land release to accommodate population growth, whilst maintaining a healthy rural living lifestyle close to Perth and protect the Shire's agricultural lands and their productivity, rural character and lifestyle.

The Proposal area is identified as Rural (minimum 40ha lots). The policy objectives within the Rural Policy Area are:

- To retain and maintain traditional agricultural uses in this Policy Area;
- To promote alternative agricultural uses, particularly those that have less land degradation and higher commercial viability;
- To prevent the further fragmentation of land through subdivision and thus retain the remaining large lots for future rural use;
- To retain and enhance the rural lifestyle and character of the area;
- To protect Local Natural Areas and encourage revegetation.

Principally the strategy intent is to maintain the integrity of the Shire's rural and agricultural character. The Proposal is not in conflict with the Shire's strategy as the Proposal is temporary in nature (approximately 3 – 5 years) and will restore, through rehabilitation, the Proposal area to better than existing agricultural land use conditions.

Figure 6 depicts the rural zoning of the area around the Proposal site as detailed in the Shire of Serpentine-Jarrahdale Rural Strategy.

# 6. SHIRE OF SERPENTINE-JARRAHDALE TOWN PLANNING SCHEME 2

## 6.1. ZONING

The subject site is zoned 'Rural' under the provisions of the Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2 (TPS2) (Figure 6). The purpose and intent of the Rural zone in accordance with Clause 5.10.1 of TPS2 is:

> *To allocate land to accommodate the full range of pursuits and associated activities conducted in the Scheme Area.*

The Proposal utilises rural land for the extraction of heavy mineral sands. The Proposal incorporates an extensive rehabilitation plan that will return this land back to rural pastoral land at the conclusion of mining. The Proposal is considered to be consistent with the intent of the Rural zone under the provisions of TPS2.

## 6.2. PROPOSED USE

The Proposal is classified under the provisions of TPS2 as Industry Extractive, which is defined in Appendix 1 of TPS2 as:

> *Industry Extractive – means an industry which involves -*
>
> *a) The extraction of sand, gravel, clay, soil, rock, stone, minerals, or similar substance from the land, and also includes the management of products from any of those materials when the manufacture is carried out on the land from which any of the materials so used is extracted or on the land adjacent thereto, and the storage of such materials or products;*
>
> *b) The production of salt by the evaporation of salt water.*

The proposed use incorporates the extraction of heavy mineral sands and is therefore considered consistent with Industry Extractive use under the provisions of TPS2.

## 6.3. PERMISSIBILITY OF USE

In accordance with Table 1 - Zoning Table of TPS2 an Industry Extractive is an 'AA' use within the Rural zone.

Clause 3.2.2 of TPS2 defines an 'AA' use:

> *"Means that Council may, at its discretion, permit the use."*

The Proposal is consistent with the provisions of Rural zone in accordance with TPS2. For the reasons outlined in this report it is considered the proposed use should be approved on the subject site.

## 6.4. DEVELOPMENT STANDARDS AND REQUIREMENTS

Part V – Development Requirements of TPS2 outlines the various standards and requirements applicable to the development of land. Clause 5.10 of TPS2 does not impose any specific development standards or requirements relevant to the Proposal as applicable in a Rural zone. There are no other specific development standards or requirements outlined in Part V of TPS2 applicable to the Industry Extractive proposal.

## 6.5. MATTERS TO BE CONSIDERED

Clause 67 – Part 2 – Schedule 2 (deemed provisions) of the *Planning and Development (Local Planning Schemes) Regulations 2015* (LPS Regulations) details the matters to be given due regard by local government when considering development applications. Table 6 below provides an assessment against matters relevant to this proposal.

TABLE 6: LPS REGULATIONS SCHEDULE 2: ASSESSMENT AGAINST RELEVANT MATTERS

| RELEVANT MATTERS TO BE CONSIDERED | COMMENT |
|---|---|
| *(a) the aims and provisions of this Scheme and any other local planning scheme operating within the Scheme area;* | The objectives and provisions of the 'Rural' zone as they relate to the proposed development are considered to be met. The land use is capable of approval, temporary and will return the land to a more productive agricultural condition. |
| *(b) the requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Schemes) Regulations 2015 or any other proposed planning instrument that the local government is seriously considering adopting or approving;* | The proposed land use and activity is capable of approval under the current planning framework. There are no amendments proposed to the scheme that would impact on the orderly and proper consideration of the development under the current planning framework. |
| *(c) any approved State Planning Policy* | Several SPPs have overarching relevance, as addressed under Section 5.1 of this report. |
| *(d) any environmental protection policy approved under the Environmental Protection Act 1986 section 31 (d);* | The subject site is within an area covered by the Peel Inlet-Harvey Estuary Environmental Protection Policy (Peel-Harvey EPP). Matters relating to this policy have been considered and addressed through Ministerial Statement 810. |
| *(e) any policy of the Commission* | There are no development control or operational policies of the WAPC that would impact on the proposed mineral sand mining operation. |
| *(g) any local planning policy for the Scheme area;* | The Shire's Local Planning Policy 4.10 – Extractive Industries (Including Extraction of Mineral Sand and Other Minerals) (LPP4.10) is a key consideration in the assessment of the proposal. The proposed development addresses the requirements of LPP4.10 as outlined in this report. |
| *(m) the compatibility of the development with its setting including the relationship of the development to development on adjoining land* | The proposed development is entirely compatible with its setting for the following reasons: |

| RELEVANT MATTERS TO BE CONSIDERED | COMMENT |
|---|---|
| *or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development;* | • The subject site is zoned 'Rural' under the Region and Local Planning Schemes, with the extraction of mineral sands being a use capable of approval.<br>• The use is a continuation of an already existing and approved land use on the adjoining sites which are currently being mined or rehabilitated.<br>• The land use is transitional in that once mining is complete the land is rehabilitated back to agricultural pasture. The returned soil is blended which results in improved cropping success rates.<br>• Buildings, including plant and equipment associated with the development are set well into land subject to existing approvals and do not cause a visual amenity impact.<br>• The visual impact of mining is carefully managed as rehabilitation follows behind the excavation and extraction process with rehabilitation being completed within ~2 years of disturbance (depending on the season).<br>Having regard to the above, the nature of the proposed development is compatible with its surroundings and poses no undue impact on the locality. |
| *(n) the amenity of the locality including the following —*<br>*(i) environmental impacts of the development;*<br>*(ii) the character of the locality;*<br>*(iii) social impacts of the development;* | (i) Environmental Impact<br>The environmental impacts of the development have been considered in detail through the environmental approvals process. The conditions of Ministerial Statement 810 ensure the development is undertaken in a way that mitigates the environmental impacts.<br>(ii) Character of the Locality<br>The locality is characterised as a typical rural setting with large, flat, open paddocks. The proposed land use causes a temporary disturbance of the land through the mining process before being returned to its pre-development state and land use.<br>(iii) Social Impacts<br>The proposed development will not have any adverse social impacts on the surrounding locality. The proposed development will extend the mine life and ensure that locally based employment opportunities are maintained in the region. The proponent has also made a significant investment in the community, including: |

| RELEVANT MATTERS TO BE CONSIDERED | COMMENT |
|---|---|
| | • In kind donations to various local groups, including hay, pipe, machinery use, and labour.<br>• Establishment of the Keysbrook Community Consultation Group (CCG)<br>• Administration, through the CCG, of community grants scheme of up to $25,000 per annum in the Shire of Serpentine Jarrahdale |
| *(o) the likely effect of the development on the natural environment or water resources and any means that are proposed to protect or to mitigate impacts on the natural environment or the water resource;* | The environmental impacts of the development on the natural environment and water resources have been considered in detail through the environmental approvals process. The conditions of Ministerial Statement 810 ensure the development is undertaken in a way that mitigates these impacts. |
| *(p) whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved;* | Existing remnant vegetation is minimal. Rehabilitation procedures will ensure the reinstatement of the land close to the pre-disturbance landform, and a targeted native revegetation programme. |
| *(q) the suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bush fire, soil erosion, land degradation or any other risk;* | The land is suitable for the proposed development, noting the land use is temporary in the sense mined areas will be rehabilitated to their pre-mined state. Issues relating to the risk of bushfire and soil erosion are addressed through management plans. |
| *(s) the adequacy of —*<br>*(i) the proposed means of access to and egress from the site; and*<br>*(ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles;* | The site will be accessed internally via the existing and approved mining areas. |
| *(t) the amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety;* | The amount of traffic generated by the development will remain unchanged from the existing approval. Key transport routes are within the Shire of Murray operating under existing approvals. |
| *(w) the history of the site where the development is to be located.* | The subject site is rural land and, in a locality, where mineral sand mining currently takes place. |
| *(y) any submissions received on the application;* | Any submission received will be addressed during the assessment of the application by the Shire. |

| RELEVANT MATTERS TO BE CONSIDERED | COMMENT |
|---|---|
| *(za) the comments or submissions received from any authority consulted under clause 66;* | Any submission received will be addressed during the assessment of the application by the Shire. |
| *(zb) any other planning consideration the local government considers appropriate.* | We are not aware of any other planning consideration that has not been addressed by this application. |

## 6.6. GENERAL PROVISIONS

### 6.6.1. NUISANCE

Clause 7.2 of TPS2 deals with Nuisance associated with development, and states:

> *No lot, building or appliance shall be used in such a manner as to permit the escape therefrom of smoke, dust, fumes, odour, noise, vibration or waste products in such quantity or extent or in such a manner as to create or be a nuisance to any inhabitant of the neighbourhood or such land or to traffic or persons using roads in the vicinity.*

No material fume or odour emissions will be generated by the Proposal. No noxious waste products will be emitted by the Proposal.

The risk of dust emissions is limited through implementation of an Air Quality and Dust Management Plan, as required under Condition 15 of MS810. Key dust minimisation measures include:

- Stabilisation of open ground using a cover crop, or by sheeting with woodchips or sand/clay;
- Prompt rehabilitation and pasture re-establishment;
- Daily risk reviews during dry periods and fleet planning;
- Real-time dust monitoring data from field monitors and adjustment to activities where appropriate; and
- Use of two 30,000 L water carts for dust suppression.

Noise and vibration emissions are minimised through the following measures:

- Maintenance of minimum 2km (day) and 3.3km (night) separation distances to nearby residences for which no amenity agreement is in place or implementation of a Noise Monitoring or Management Plan in accordance with Condition 14 of MS1089 (where no amenity agreement is in place);
- Conduct mining during day periods only (provision for contingency mining outside of this period under appropriate, low risk weather conditions);
- Real-time noise monitoring and adaption of mining activities in the event of elevated noise levels attributable to mining;
- Review of weather conditions and planning of the size and location of the mining fleet;
- Utilisation of noise bunds;
- Attenuation of equipment using customised mufflers, engine modifications; and shielding.

## 6.6.2. TREE PRESERVATION AND PLANTING

Cl. 7.13 of TPS 2 details the preservation of trees and tree planting requirements. No part of the subject site has been declared under cl. 7.13.3(2) of TPS2. No written notice has been served under cl. 7.13.3(4) of TPS2 to require the preservation of a particular tree or species of tree or group of trees.

Cl. 7.13.3 (1) states that:

> *No person shall remove, destroy or damage any tree or cause or suffer to permit the removal or destruction of or damage to any tree within the District having at least one well defined stem or trunk of a height greater than 4 metres or diameter greater than 150mm measured at a height of 1.2m above the natural ground level, except with the prior planning consent of the Council given on an application under sub-clause 6.1.1, or unless the tree is exempted pursuant to subclause 7.13.4.*

Under cl. 7.13.3 (2) of TPS2 no tree or other natural growing vegetation shall be removed, destroyed or damaged within 120 metres of a watercourse or where there is a slope in excess of 1 in 5 except with the prior planning consent of the Council.

The Proposal addresses the objectives of the tree preservation and planting provisions as identified within cl. 7.13.2 of TPS 2:

*a) to preserve the landscape attributes within the District and to protect significant and sensitive areas from the negative effects of clearing of the naturally growing vegetation;*

Ministerial Statement 810 requires the preservation of significant and sensitive areas through the preservation of vegetation within 20m of an ephemeral watercourse through the subject lot, as discussed under Section 4.8.7.2.

*(b) to enhance the amenity, convenience and natural beauty of various parts of the District by facilitating:*

*(i) reduction in soil salinity;*

*(ii) prevention of erosion;*

*(iii) provision of habitats for native fauna;*

*(iv) provision for aesthetic pleasure; and*

*(v) retention of the landscape quality.*

The temporary nature of the development and the management plans required as part of the Ministerial Approval (MS810) will ensure the land is returned to pre-development contours and condition, at a minimum. Rehabilitation to date has re-established pasture land of greater moisture and nutrient retention capacity than pre-development. No tree or vegetation community will be cleared for the Proposal, however it is reiterated that native revegetation obligations for the remainder of the Project will ensure more native vegetation exists post mining and that the quality of two designated natural conservation areas is enhanced. Further, the rehabilitation program aims to significantly improve the overall ecological function of native vegetation areas through native vegetation corridors providing linkages between natural areas.

*(c) to encourage or require planting or replanting of areas considered by the Council to deficient in tree cover;*

MS810 requires the replacement of self-sustaining native vegetation at a ratio of 1.4:1 (1.4 hectares of revegetation per 1 hectare of vegetation cleared, resulting in a 40% increase in tree cover on completion of mining. It is noted that no clearing of any tree or vegetation community is required for the Proposal.

*(d) where appropriate to provide for visual screening of buildings or other development;*

Visual screening will be achieved through the use of temporary soil bunds. Given the short-term nature of the Proposal, soil bunds will be the more immediate means of visual screening. The bunds will be removed during the course of post mining rehabilitation works.

# 7. LOCAL PLANNING POLICY 4.10 – EXTRACTIVE INDUSTRIES (INCLUDING EXTRACTION OF MINERAL SAND AND OTHER MINERALS)

Local planning policies are tools to assist the Responsible Authority to arrive at the correct planning decision and cannot replace statutory planning provisions; nor should they be elevated to the level of a statutory planning instrument when assessing a planning proposal. In this regard LPP's should not be expressed in absolute terms or be applied inflexibly.

The Shire's Local Planning Policy 4.10 Extractive Industries (Including Extraction of Mineral Sand and Other Minerals) (LPP4.10) is applicable to the Proposal. LPP4.10 is used as a guide under TPS2 to set the development requirements to inform extractive industries proposals, including mineral sands which is the subject of this application.

The policy identifies the circumstances when it should be applied, sets out a series of policy objectives, outlines the application requirements, and includes in Table 1 a series of 'Performance Criteria' and 'Acceptable Development' provisions against which applications are to be assessed (LPP4.10-Table 1). The policy also contains Appendix 2 which has 84 items (excluding sub-points) to be addressed.

There appears to be a considerable amount of overlap between the items in Table 1 of the LPP and items in Appendix 2 of the LPP. Appendix 2 also contains items that are not relevant town planning considerations or are matters that are addressed by Ministerial Statement 810.

## 7.1. APPLICATION OF THE POLICY

As outlined in LPP4.10, the Policy is to be used in the following circumstances:

a) when proponents are preparing applications for development approval or a license under the applicable Local Law for extractive industry;

b) when the Shire is assessing and ultimately determining an application for development approval under Town Planning Scheme No. 2 or license application under the Local Law;

c) when the Shire is assessing and ultimately providing a recommendation on applications for development approval under the Metropolitan Region Scheme;

d) when the Shire is commenting on a Mining Proposal.

Whilst the development proposal is an extension of an existing approved mining operation which has already received all the relevant environmental approvals, LPP4.10 remains a relevant planning instrument as (a), (b) and (c) apply to this application.

## 7.2. POLICY OBJECTIVES

LPP4.10 requires that development should result in the following objectives being met:

- *Extractive industries do not adversely affect the environment or amenity of the locality during or after extraction;*
- *Extractive industries are located in the most appropriate areas of the Shire;*
- *Extractive industries are sited and operated to meet the varied needs of the community;*

- *Extraction occurs where the available haulage routes and road hierarchy are satisfactory or can be upgraded to support an extractive industry without affecting the sustainability of the transport resource;*
- *To maintain a general presumption against the extraction of minerals including mineral sands within the Shire of Serpentine Jarrahdale, unless the proponent has demonstrated that net social, economic and environmental benefits will be delivered in the short, medium and long term;*
- *To clearly outline the matters that are required to be addressed by proponents that are seeking approval for general extraction and more detailed matters for mineral extraction within the Shire;*
- *To ensure that the assessment of mineral extraction proposals is comprehensive and consistent with orderly and proper planning principles;*
- *To provide clarity of the development assessment process for proponents and the broader community;*
- *To inform the community/stakeholders of the importance of a rigorous assessment process and the reasoning for the Shire's policy stance.*

As outlined in this application report and considering the mineral sand mining operation already exists on the adjoining sites and has received the relevant environmental approvals, the proposed development meets the policy objectives.

## 7.3. CONSOLIDATED RESPONSE TO LPP 4.10 CONSIDERATIONS

### 7.3.1. WATER RESOURCES

#### *Public Drinking Water Source Areas*

The Proposal area is not in a current or proposed Underground Water Pollution Control Area and consequently no additional regulatory requirements for the protection of the water resource are in place.

The Proposal constitutes negligible risk of compromising the quality of the groundwater resource. No hazardous materials will be stored on the Proposal area and no adverse impact on groundwater quality has occurred as a result of implementation of the Project to date.

#### *Aquifers*

The aquifers within the Proposal area include the Superficial Bassendean Sand aquifer and the deeper Leederville Aquifer.

#### *Superficial Aquifer*

The Superficial aquifer is an unconfined aquifer up to 15m deep. Recharge to the Superficial aquifer is from direct rainfall on the ground surface, and local stream runoff from ephemeral drainage networks flowing from the Darling Plateau. Recharge occurs mainly between May and September.

The Bassendean Sand Formation is generally unsaturated in summer and autumn, and partly saturated in winter and spring with water levels fluctuating approximately one metre annually. However, in some areas (not within the Proposal area) the Bassendean Sand Formation extends below the summer water table and is partly to fully saturated all year.

Mining the surface 1 to 6m (average 2m) within the Proposal area will disturb the upper part of the Superficial aquifer, which experiences seasonal saturation. Minor interruptions to local gradients will occur during wet periods while a mine void exists but is localised and transient (as the mine void migrates).

To enable mining to occur during winter, water will be removed from the pit using drains and sumps. The groundwater will be temporarily lowered to the base of the Bassendean Sand Formation in and around individual mining cells. Local groundwater levels recover within months as the mine void is backfilled with pumped tailings in slurry form, which is approximately 70% water

*Leederville Aquifer*

The deeper Leederville aquifer is a confined groundwater system, separated from the overlying Superficial aquifer by the confining Guildford Formation and occurring generally between 50 metres and 130 metres depth in the area of the project. The groundwater quality of the Leederville Formation is fresh to brackish, reporting a salinity of less than 1,500 mg/L TDS. Recharge to the Leederville aquifer is from the Superficial Aquifer where the intervening confining strata is more pervious, typically east of the Proposal area.

Implementation of the Proposal is unlikely to impact on the Leederville aquifer. Abstraction from two established production bores several kilometres south during the summer months to support the transport and processing of ore and tailings from and to the Proposal area which will not change from current practise, and has proved sustainable, and without impact, to date

*Existing Groundwater Users*

Superficial Aquifer

The localised and temporary dewatering of the shallow aquifer is only required during the wetter months and consequently is unlikely to affect superficial groundwater levels on surrounding properties. Monitoring of the current Project has indicated that on an annual basis there is net recharge of the Superficial aquifer arising from water seepage from tailings placement

Leederville Aquifer

There is no change to existing approved groundwater abstraction from the Leederville aquifer.

As stated under Section 3.5, ongoing abstraction from two licenced production bores drawing from the Leederville aquifer in the Shire of Murray, a minimum of several kilometres away from the Proposal will not change from current practise.

Calculated water level drawdowns in the Leederville Aquifer indicate that the operation of any other Leederville bores in the area will not be significantly affected. By installing the production bores into the lower (Marginiup) member of the aquifer, any impact on deep neighbouring bores, which are all screened into the upper (Wanneroo) member of the aquifer, is unlikely. A comprehensive groundwater monitoring program is in place to fulfil regulatory obligations under MS810, the Project environmental licence and groundwater licence. The program extends to private neighbouring bores where landowners have taken up the offer from KLPL. Remedial actions will be taken if any existing supply is significantly reduced as a result of mining (none required since project commencement).

Watercourses

The majority of the Proposal, including the southern section of Lot 63, is located within the Nambeelup Brook subcatchment, which discharges to several lakes in the Serpentine River Catchment System. A minor,

unnamed stream flows through the southern half of Lot 63 and continues to the west to converge with other tributaries of Nambeelup Brook.

Nambeelup Brook North Tributary flows from Lot 64 into Lot 63 in a south-westerly direction through the northern part of Lot 63. No mining activity will occur within 20 metres of this drainage line, in accordance with Condition 7 of MS810.

The Proposal will also be implemented in accordance with a Water Management Plan, as required by Condition 11 of MS810 and a Groundwater Licence Operating Strategy, as required under a condition of a Groundwater Licence. These documents provide for extensive monitoring and management measures to prevent adverse impacts to local groundwater and surface water.

### 7.3.2. SOIL PROFILE

The soils of the Proposal area are predominantly mildly undulating Bassendean Sands which are highly leached, infertile quartzose sands, typically 1-2m depth.

### 7.3.3. VEGETATION

The Proposal area within Lot 63 comprises predominantly cleared pasture (~140.52ha) and 1.78ha of amenity plantings. Although mapped as cleared pasture by (Ecoedge, 2023), 0.13ha of incidental scattered melaleuca trees will also require removal to facilitate mining. In accordance with Condition 8 of MS810, cleared native vegetation will be replaced at a minimum of 1.4ha for every 1ha of vegetation disturbed.

A *Phytophthora* Dieback assessment completed by BARK Environmental (2023) for the amendment area, reiterated earlier conclusions by Terratree (2017b; 2013) that due to historical disturbance activities, there is an overall absence of suitable native indicator plants necessary to enable assessment, which resulted in the entire subject area (Lots 62, 63, & 200) being mapped as excluded (BARK Environmental, 2023). The DBCA methodology for Dieback Assessment notes that in areas where Keighery disturbance ratings of 5 or greater occurs, such as Degraded or Completely Degraded areas (i.e. all vegetation within Lot 63), that assessment is not possible (DPaW, 2015). Under *Dieback Interpreter Guidelines* (DPaW, 2015), excluded areas are assumed to be infested and managed accordingly. The unrestricted movement of stock and seasonal inundation of large parts of the local landscape, both of which can cause the spread of *Phytophthora*, underpins this assumption for the local environment. The assessment concluded that the amendment poses no significant risk to flora and vegetation as there is no significant vegetation remaining to be at risk (BARK Environmental, 2023). Implementation of the Weed and Dieback Management Plan (MS810 Condition 9) will continue to be applied for the amendment area.

Vegetation surveys recorded 34 weed species across the original Proposal area, of which 28 species are considered invasive (Bennett Environmental Consulting, 2006). These weeds occur throughout the locality and KLPL implement an ongoing weed program within and around the Project area with the primary objectives of controlling/eliminating declared species and reducing the weed burden in target native revegetation areas. No Declared Pest Plants were observed within the amendment area, however Cape tulip (*Moraea flaccida*) has been recorded in the surrounding Lots (Ecoedge, 2023). KLPL will continue to implement the Weed and Dieback Management Plan (MS810 Condition 9) and no additional environmental impacts are likely to occur.

### 7.3.4. TERRESTRIAL FAUNA

The Proposal area within Lot 63 comprises cleared pasture (~140.52ha) and amenity plantings (1.78ha) to be impacted. In additional several isolated scattered paddock trees present within the Proposal area will also be avoided. No impacts to fauna are predicted as a result of the Proposal.

### 7.3.5. WETLANDS

There is one Conservation Category Wetland (CCW) (UFI 14780) located on the western boundary of the Proposal area (Figure 4). This CCW is classified as a paluspain wetland, however, the CCW is in a completely degraded state due to agricultural land use and has no wetland characteristic vegetation or ecological value (Ecoedge, 2023b; Rockwater, 2022). The proposed disturbance for the Proposal will avoid the CCW, with a 100m buffer, in accordance with MS810 Condition 7. No direct disturbance to any CCW will occur as part of the Proposal.

The remainder of the Lot 63 survey area is mapped as palusplain wetlands that have been cleared for agriculture and classified as Multiple Use Wetlands (MUW). All proposed disturbance for the Proposal is located within the MUW.

Impacts to the CCWs in proximity to the Proposal area from groundwater drawdowns were modelled and assessed by (AQ2, 2023a). A summary of the key outcomes is provided as follows:

- The magnitude of drawdowns along the CCW adjacent to Lot 63 vary depending on the proximity of the active mining pits.
- Groundwater modelling suggests that there will be drawdowns of generally less than 0.5m around the CCWs. However, there is one CCW (UFI 14870), where maximum drawdowns of up to 1.5m over a period of one month only are predicted, due to their close proximity to the proposed Lot 63 mining area. However, all drawdowns will be localised and temporary. It's noted (Rockwater, 2022) concluded that the management category of UFI 14870 appears to be incorrect, as there is no evidence of wetland vegetation within the CCW and the remnant vegetation is in completely degraded condition.
- The potential impact to the CCW's from the original approved mining area was assessed using groundwater flow modelling (Rockwater, 2007). A number of shallow bores were drilled by (Rockwater, 2007) to assist in gaining a better understanding of the hydrological processes present in the CCW wetland areas. This assessment concluded that:
    - The natural wetlands are not considered groundwater dependent, instead being surface water dependent.
    - The wetlands are generally recharged during the wet season (winter) and sporadically during the rest of the year as a result of storm runoff and direct rainfall.
    - The wetlands probably represent a source of recharge to the shallow groundwater system, rather than the reverse.
- The CCW and associated vegetation is likely to be resilient and cope with the proposed changes due to mining of Lot 63, as long-term hydrogeological and environmental monitoring data, most recently reported for 2020 (Rockwater, 2021) suggests that mining activities for the Project to date have not resulted in changes to the water regime that have the potential to impact the health of groundwater dependent vegetation at wetland monitoring sites.

- Results of the Flora and Vegetation Survey (Ecoedge, 2023) concluded that the CCW identified in Lot 63, were in a Degraded to Completely Degraded Condition and as such consideration may need to be given to revising the conservation status of the Cleared and Completely Degraded portions of the Resource Enhancement wetland and CCW as these areas would be regarded as scoring poorly on both natural and human use attributes.

### 7.3.6. REHABILITATION AND CLOSURE

As per current practise, rehabilitation of areas disturbed in implementing the Proposal will be undertaken in accordance with a Rehabilitation Management Plan, as is required by MS810 Condition 8. The plan is revised in light of ongoing data and experience gained from rehabilitation completed to date.

#### *Rehabilitation Process*

The rehabilitation process commences soon after ore excavation is completed. The process involves backfilling the mine void with sand and clay tailings returned from the Wet Concentrator Plant. The backfilling is a continuous process which trails the active mine front.

The heavy mineral sands constitute approximately 2.5% of the orebody in the Proposal area. With the removal of so little material the mined areas can be effectively returned to the pre-mining landform and contours. After the returned material is shaped to the desired final profile using GPS controlled dozers, agricultural land planes or scrapers, stockpiled topsoil is spread over the surface.

KLPL's existing rehabilitation procedures include the addition of significant quantities of lime (to improve soil pH) and compost (to improve soil carbon, nutrient retention and promote microbial activity). The addition of soil ameliorants is determined on the basis of soil sampling and the results of ongoing research and trials. Cleared vegetation is chipped/mulched and used for weed and dust suppression and integrated into the re-constructed soil profile in select areas to improve carbon content.

The re-constructed areas are seeded with a carefully selected combination of pasture species to (i) generate further carbon in the soil (through root mass); (ii) increase nitrogen levels (key plant nutrient) in the soil profile; and (iii) stabilise the soil surface.

The newly seeded areas are closely monitored during the winter and spring period to check crop growth and soil stability. After the first growing season rehabilitation areas are inspected and any remedial works associated with settlement or erosion undertaken prior to the following growing season.

#### *Closure and Decommissioning*

On the completion of mining activity all related infrastructure (e.g. mobile screen plants, pipelines, power lines etc) are removed. As the disturbed land is re-instated, pre-mining infrastructure such as stock fencing, water troughs etc will be re-installed in accordance with agreements with the landowner.

Progressive rehabilitation limits the extent of closure work required at the completion of mining. Annual plans and budgets set out the financial, labour, equipment and material resources required to acquit the plan. In accordance with required accounting standards, financial provision is made for mine closure. The provision is reviewed annually at a minimum.

### *Rehabilitation and Closure Requirements as per Shire of Serpentine Jarrahdale Extractive Industries Local Law 1999*

Clause 2.3(1)(c) of the *Shire of Serpentine Extractive Industries Local Law 1999* requires a rehabilitation and decommissioning program to be provided as part of all extractive industry licence applications. Table 7 has been prepared in response to the specific requirements of Clause 2.3(1)(c).

TABLE 7: DECOMMISSIONING AND REHABILITATION PROGRAM

| Shire of Serpentine Extractive Industries Local Law 1999 provision | Response |
|---|---|
| (i) the objectives of the program, having due regard to the nature of the surrounding area and the proposed endues of the excavation site; | Overall objectives:<br>• Re-establish agricultural areas with an equal or greater productivity capacity than existed pre-mining.<br>• Establish soils with improved nutrient retention capacity.<br>• Establish native vegetation to a design that:<br>o enhances ecological function and improves connectivity between existing areas of remnant vegetation; and<br>o improves habitat values for black cockatoos.<br>o totals at least 40% more than the native vegetation removed. |
| (ii) whether restoration and reinstatement of the excavation site is to be undertaken progressively or upon completion of excavation operations; | Rehabilitation is undertaken progressively, commencing soon after the completion of mining by the backfilling of the mine void with sand and clay tailings. The majority of rehabilitation works will be completed by the first June after the completion of mining, with provision for a subsequent year and 2nd growing season for performance monitoring and any remedial works (pasture rehabilitation).<br>Where the timing of backfilled areas becoming available for rehabilitation is too late in the season for the completion of all works, a cover crop is sown to stabilise the surface, which also serves to enhance rehabilitation performance in the subsequent year (through incorporation of additional organic matter). |
| (iii) how each face is to be made safe and batters sloped; | No residual mine pit slopes will exist at the completion of mining. Mined areas are reinstated to the pre-existing landform through the backfill using sand and clay tails (mining will remove in the order of 2.5% of sand profile). |
| (iv) the method by which topsoil is to be replaced and revegetated; | Topsoil will be removed from mine areas and replaced on rehabilitation areas through a combination of pushing with a dozer, and stripping/delivery using a scraper or agricultural land plane.<br>Current rehabilitation procedures involve the addition of lime and compost to improve soil pH, carbon content and soil structure and promote microbial activity for soil health.<br>Fertiliser applications are determined based on soil analyses. A blend of pasture species is used that includes nitrogen fixing species, perennial species, deep rooted and water tolerant species to ensure good vegetation establishment. |

| Shire of Serpentine Extractive Industries Local Law 1999 provision | Response |
|---|---|
| | The vastly improved nutrient and moisture retention properties of the soil profile enhances productivity and limits nutrient loss. Significant yields have been achieved in pasture rehabilitation completed to date. |
| (v) the numbers and types of trees and shrubs to be planted and other landscaping features to be developed; | Native revegetation initiatives associated with the Proposal are managed through a Rehabilitation Management Plan. On the basis ~1ha of degraded native vegetation is removed in the course of mining 1.4ha of native vegetation will be re-established.<br><br>Species considered for revegetation areas are tailored for various habitat types in the Keysbrook area including: wetlands, damplands, low relief dunes, and drainage / creek lines. Species will include:<br>• meet the foraging and habitat requirements for the Carnabys, Baudins and Forest Red-Tailed Black Cockatoos;<br>• are associated with the Bassendean Dunes and Pinjarra Plain on the Swan Coastal Plain;<br>• include species typical of overstory, mid and lower strata from the Bassendean Dune and Pinjarra Plain systems; and<br>• include Phytophthora dieback resistant species.<br><br>The current revegetation program is targets the planting of around 150,000 native seedlings per year. |
| (vi) how rehabilitated areas are to be maintained; and | Rehabilitated areas are closely monitored following the completion of rehabilitation works and regularly inspected during the first growing season. Soil and crop samples are analysed to track key soil parameters.<br><br>Remedial or maintenance works may include:<br>• Correction of erosion and excessive settlement.<br>• Addition of further soil ameliorants (e.g. follow up lime applications).<br>• Custom fertiliser application (e.g. to address any trace element deficiencies).<br>• Spraying to control any fungal or insect impacts or weed infestations.<br>• Crop slashing, harvesting or temporary grazing to incorporate organic matter into the soil and manage fire risk.<br><br>The frequency of monitoring and maintenance will decrease as rehabilitation progresses. |
| (vii) the programme for the removal of buildings, plant, waste and final site clean-up; | As mining will move swiftly across the subject lot, all infrastructure is temporary and transportable. At the completion on mining and tailing (backfilling the mine void) pipelines, pumps and power lines will be relocated to the next substantive mining area. |

| Shire of Serpentine Extractive Industries Local Law 1999 provision | Response |
|---|---|
| | Any hardstand areas will be removed. Final inspections will be undertaken to ensure any residual rubbish, pipe fittings etc are removed.<br><br>Fences, gates, water troughs etc will be re-instated/replaced. Closure activities are undertaken in close consultation with the landowner to facilitate hand back of the land. |

### 7.3.7. ABORIGINAL HERITAGE AND SIGNIFICANCE

The Proposal area was within the area included in heritage surveys undertaken in 2006 as part of the original environmental assessment and approval. No ethnographic sites or archaeological sites were identified within the Proposal area. The highly disturbed nature of the Proposal area all but eliminated the prospect of identifying any heritage sites.

Five representatives from the Gnarla Kaala Booja native title claimant group participated in the ethnographic survey. They indicated that the survey area has been highly disturbed through farming and other activities with any ethnographic sites, such as camping areas, destroyed long ago. The Gnarla Karla Booja representatives do not consider the drain lines, as ethnographic sites and no sites appear on the Department of Indigenous Affairs (now Department of Aboriginal Affairs) database, nor in the Australian Interaction Consultants (2005) desktop study of the area. The Gnarla Karla Booja native title claimant group representatives have no objection to the Proposal because no ethnographic sites were identified.

### 7.3.8. VISUAL IMPACT

As with the current Project, operations within the Proposal area will be visible from certain locations around the mine site, most notably from elevated positions along the Darling Scarp approximately 5km to the east. Closer to the Proposal area, the short-term visual impact will be managed under the Mine Visual Management Plan and minimised through a combination of vegetation screens, soil bunds and minimisation of light spill (through the positioning and orientation of lighting).

### 7.3.9. COMMUNITY

Implementation of the Proposal will enable continuation of a community grants scheme funded by KLPL and administered by a Community Consultative Group that comprises nominated local residents, Shire Council representatives and KLPL personnel. The scheme provides funds for many local initiatives undertaken by not-for-profit organisations. In addition, the use of earthmoving equipment and materials associated with the operation have been donated for community initiatives from time to time.

KLPL maintains an active community engagement program through regular community newsletters and updates. A 24-hour number is provided for any feedback or enquiries regarding the operations.

No change in the existing local workforce is associated with the proposal and consequently no change in the demand for, or utilisation of, local services will occur.

### 7.3.10. EMPLOYMENT OPPORTUNITIES

Implementation of the Proposal will enable maintenance of employment for approximately 90 people (employees and contractors), the majority of which reside locally.

The workforce comprises a range of vocations, skilled and unskilled, extending from trades (e.g., electrical, mechanical) to multiple disciplines (e.g. clerical/administrative, accounting, environmental, engineering, mining, safety, planning, metallurgy, geology and management).

### 7.3.11. HEALTH IMPACTS

No adverse health effects have been identified through implementation of the Project to date (2023). While the Proposal constitutes an extension in mining of ~18 months, no new public health risks are introduced and there will be no increase in existing, managed risks.

The risk of soil, water or airborne contamination will remain minimal. No chemicals are employed in the mining and processing of the heavy minerals (other than a biodegradable flocculant used as part of process water and clay tailings management).

Dust emissions will continue to be managed through implementation of an existing, approved dust management plan (as per MS810 Condition 15) to ensure ongoing compliance with the requirements of the Project environmental licence.

Radiation monitoring data gained since commencement of operations has confirmed the negligible risk of radiation exposure. This is due to the very low levels of radioactive minerals (principally monazite) within the orebody. Calculations of employee radiation exposure, using conservative assumptions (i.e., tending to over-estimate exposure) are in the order of 50% of the exemption level for mandatory licencing and management in accordance with the requirements of Section 16 of the *Mines Safety and Inspection Act 1994*. Nevertheless, KLPL maintains a Radiation Management Plan to ensure that any exposure to employees and the public is as low as possible.

To limit mosquito breeding and the risk of mosquito borne disease, KLPL implements a Mosquito Management Plan as approved by the Shire of Serpentine-Jarrahdale under the terms of the existing Development Approval for the Project. This plan will continue to be applied for mining the subject area in this Proposal.

The EPA has considered the risk of impact of noise exposure on human health in the course of an inquiry undertaken during 2017 and 2018. Compliance with separation distances and indoor levels imposed by Condition 14 of MS810 (as amended by MS1089) will continue to ensure noise emissions are minimised and the risk to human health is managed.

### 7.3.12. AMENITY

As has been demonstrated since the implementation of the Project to date, through compliance with existing approval conditions and regulations, the risk of impact on the amenity and lifestyle of the local community is minimised. The constant migration of mining means that the potential for localised, offsite impacts through noise and dust emissions and effect on visual amenity is transient. The duration of the Proposal reflects this, with mining to occur over a period of ~18 months and lower intensity rehabilitation activity (similar in scale to normal agricultural activity) following for up to two years.

### 7.3.13. ECONOMIC IMPACTS

The Proposal is within an agricultural area and the subject lot is currently leased for broad scale beef cattle grazing. KLPL are the current owner of Lot 63. Once the land is rehabilitated post-mining, the grazing value, and consequently carrying capacity, of the land is likely to be significantly increased.

Based on experience to date, the rural enterprises of surrounding properties will be unaffected by the Proposal.

The Proposal constitutes an extension of mining activity, immediately adjacent to the currently EPA approved area, that provides employment for approximately 90 people (employees and contractors), the majority of which reside locally (nominally within 30 minutes' drive time of the mine site).

The mine also provides flow-on economic benefits to the wider community. Based on the conclusions of an economic study of the Project (Economic Impact of Keysbrook Mineral Sands Project, Acil Allen Consulting 2018) implementation of the Proposal is likely to contribute, directly and indirectly, in the order of $56m to the economy of the Peel Region during the mining phase.

### 7.3.14. LANDSCAPE PLANNING

The proposed development is consistent with the existing State and local planning framework as detailed in this report.

The proposed land use will not adversely affect the long-term land use planning or inter-generational equity as within five years the site will be rehabilitated to a higher land capacity than pre-mining

### 7.3.15. CLIMATE CHANGE

The Proposal will generate the equivalent of around 9,000 tonnes per annum of carbon dioxide, mostly from the combustion of diesel fuel on site, which is approximately 0.003% of national reported corporate emissions.

Through the consumption of electricity generated off-site, the Proposal is responsible for around 19,000 tonnes of carbon dioxide equivalent emissions per annum.

Though not quantified, the revegetation and additional tree planting (40% more than pre-mining) initiatives that are part of the proposal will serve to provide a long-term offset to greenhouse gas emissions associated with mining and processing.

Climate change induced by anthropogenic greenhouse gas emissions is predicted to lead to a drier climate in the south west of Western Australia. Rainfall data over the last 40 years or so is generally consistent with this prediction. No impact or increase in risk is likely to be discernible over the 1.5 to 3.5 year life of the Proposal. Post mining the improved land capability achieved (increased moisture and nutrient retention) will contribute to a more resilient and productive soil against a backdrop of reducing rainfall.

### 7.3.16. ENERGY CONSUMPTION

Energy consumed in the extraction of processing ore is generated from diesel combustion (mining and some generators for pumps, lighting plants etc) and drawn from the South West Interconnected System (SWIS) electricity grid (mineral processing). Approximately 4,000kL of diesel and 27,000 GWh of electricity is consumed per annum. The relatively short-term nature of the Proposal limits the opportunity for the utilisation of renewable energy sources, which currently have a longer pay-back period than the Project life.

## 7.4. POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT

Potential environmental impacts and management strategies have been evaluated based on the data and experience gained in the implementation of the project since 2015.

Table 8 describes the environmental factors of the Proposal area, potential/actual impacts to these factors as a result of the Proposal and the management strategies developed to avoid or minimise potential impacts.

## TABLE 8: POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Vegetation Communities | Over 99% of the Proposal area is cleared grazing land, with some remnant native paddock trees.<br><br>Remnant native vegetation is degraded due to an extended history of grazing by cattle.<br><br>No threatened flora or matters of National Environmental Significance (vegetation communities) occur within the Proposal area. | Limited degraded remnant native vegetation (<1ha)- predominantly singular paddock trees - will be cleared in implementing the Proposal. | Cleared native vegetation will be replaced at the ratio of 1.4:1. The native revegetation will occur to a plan that enhances the ecological function of local remnant vegetation (such as through planting drainage lines and establishing native vegetation corridors). |
| Flora | No declared rare flora, priority species occur in the Proposal area.<br><br>The remnant vegetation areas in the proposed mine area are predominantly mature trees with no understorey.<br><br>No threatened flora or matters of National Environmental Significance (flora) occur within the Proposal area. | Negligible risk of impacting on species of conservation significance or functional natural ecosystem. | No specific management required for the Proposal. |
| Fauna | There is no significant native fauna habitat within the Proposal area. Remnant native paddock trees may serve as forage trees for black cockatoos (protected under state and federal legislation) but are insignificant relative to adjacent native vegetation and nearby conservation area.<br><br>No black cockatoo nesting habitat present. | Negligible risk of impact on native fauna. | No specific management required for the Proposal.<br><br>Maintenance and re-establishment of habitat continues to be implemented for the Project, aimed at improving black cockatoo habitat. To date 30 artificial hollows (cockatubes) installed in partnership with Serpentine Jarrahdale Landcare to enhance nesting site availability (30 cockatubes installed to date). |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Wetlands | One Conservation Category Wetland (CCW) UFI14780 is located on the western boundary of the Proposal area of Lot 63). | No wetland will be disturbed directly by mining.<br><br>Reduction in surface water yields to CCW UFI14870 may occur during mining due to temporary reduction in the catchment area. | Groundwater and surface water monitoring programs will be maintained. Contingency action, such as supplementary recharge can be implemented in the event of any discernible impact to the CCWs. |
| Surface Water | The Proposal area is mildly undulating with little to no gradient and is prone to inundation during winter and spring. Shallow drainage line and overland flow occurs from east to west across the subject lot often in constructed agricultural drains. | Minor risk of a contribution to naturally occurring elevated turbidity within the watercourses during periods of high rainfall and runoff. | No excavation will occur within 20m of the designated Nambeelup Brook North Tributary, as required under existing Condition 7 of MS810.<br><br>Proposal designed such that there is no direct runoff from mined areas into the watercourses. All mined areas are bunded and internal drainage retained and incorporated into process water. Other minor watercourses that traverse the Proposal are temporarily diverted around mine pits into the same catchment as pre- diversion. |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Groundwater Levels | Mining will intersect the upper part of the shallow Superficial aquifer within the Proposal area. This part of the aquifer is seasonally saturated.<br><br>Temporary dewatering of the upper part of the aquifer may be necessary during winter and spring.<br><br>Supplementary process water will continue to be sourced from the Lower Leederville aquifer via two existing bores at least ~2km to the south. There has been no impact on Superficial aquifer water levels through utilisation of these bores since commencement in 2015. | Localised and temporary depression in groundwater levels in the Superficial aquifer may occur around the mine pit during winter and spring months.<br><br>Given that the land is predominantly cleared, there are no groundwater dependent ecosystems reliant on the temporarily dewatered areas of the Superficial aquifer during the wetter months. | Monitoring to date has shown no discernible impact on the groundwater levels in the Superficial aquifer.<br><br>The prompt backfill of the mine void with tailings conveyed in slurry form (i.e. 70% water) rapidly replenishes local groundwater. |
| Groundwater Quality | The seasonal Superficial aquifer water quality is variable but generally characterised by elevated nutrient levels and pockets of lower pH and elevated salinity. | Improvement in quality through reduced nutrient loading, improved nutrient retention and improved pH.<br><br>Low risk of generation of acidic leachate from disturbance of acid sulfate soils (no instances encountered to date). | Reconstructed soil profile has improved nutrient retention capacity and addition of agricultural lime raises soil pH.<br><br>Regular sampling of ore face (in pit) and groundwater. Rapid backfill of mine void with tails limits exposure of any potential ASS material. |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Soil | The majority of the Proposal area is cleared pasture.<br><br>The orebody occurs in the Bassendean sand unit. horizon profile.<br><br>Dieback disease (*Phytophthora cinnamomi)* has been identified in locations across the Project area and given the highly disturbed condition, is assumed for management purposes to be broadly present across the Proposal area (though may not persist in the absence of host material in long term cleared areas).<br><br>The Proposal area was investigated by ABEC (2022) for the presence of ASS, which identified very little acidity within the mining area. | Alteration of the soil profile in mined areas leading to improved nutrient and moisture retention.<br><br>No change in dieback status. No exacerbation of existing dieback impacts.<br><br>Low risk of disturbance of ASS material and consequent increase in soil acidity. | Topsoil will be stripped, re-used or stockpiled for later re-use in rehabilitation.<br><br>Rehabilitation procedures will enhance productivity of reconstructed soil profile<br><br>Native re-vegetation procedures will continue to focus on local dieback resistant species.<br><br>Rehabilitation procedures include correction of any pre-existing low soil pH through addition of lime.<br><br>Contingency measures in place for unlikely event of acid generation following mining disturbance (as per the ASSMP, MS810 Condition 12). |
| Landform | The heavy minerals are hosted in the Bassendean sand unit. | Alteration of the local topography due to mining. | Unless there is agreement to alter the contours for improved drainage and land capability the post-mining landform shall be returned as close as possible to the pre-mining contours and pre-existing drainage patterns maintained. Erosion control measures are integrated with rehabilitation procedures. |
| Rehabilitation | Rehabilitation will restore agricultural land and enhance local native vegetation areas.<br><br>(Refer also to the above sections on vegetation, flora, soils and landforms). | Less than 1 ha of degraded native vegetation may be cleared as part of the Proposal. | Rehabilitation Plans in place, and implementation underway for both pasture and native vegetation rehabilitation. Procedures are continually reviewed and improved and will be applied to rehabilitation of areas disturbed within the Proposal area.<br><br>Rehabilitation performance to date has demonstrated significantly improved pasture productivity. |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Weeds | The majority of the Proposal area is open pasture. Numerous weed species occur locally. | Weed infestation can affect agricultural productivity and inhibit performance of pasture and native vegetation. | Ongoing implementation of approved Weed and Dieback Management Plan.<br>Appropriate ground preparation and selective application of herbicides, if required, as part of native re-vegetation initiatives.<br>Targeted control of declared weeds will continue on and around the project area.<br>Hygiene measures for equipment brought to site. |
| Conservation Areas | These are no conservation or nature reserves in proximity of the Proposal area.<br>KLPL has established 75 ha of local, higher value remnant native vegetation protected by conservation covenants. | Increase in security of good quality remnant native vegetation. | Ongoing enhancement of conservation areas through fencing, planting, weed control and monitoring.<br>Implementation of program to enhance ecological value of native vegetation through establishment of linkages and revegetation of drainage lines. |
| Air Quality | The Proposal area is in a rural environment. Localised emissions of dust and smoke occur occasionally. | Localised elevated dust levels during periods of strong winds and dry soil conditions.<br>Minor release of greenhouse gases from mining equipment. | Ongoing implementation of an Air Quality and Dust Management Plan. Key dust suppression procedures include use of water carts, sowing of cover crops, stabilisation with clay slurry, and prompt rehabilitation of disturbed areas.<br>Ongoing optimisation of mine design and practices to minimise energy consumption. |
| Surface Water Quality | The mine area is in a rural environment. There are no existing issues of deterioration in surface water quality from a major contributor. Elevated turbidity occurs in periods of high rainfall and runoff. Elevated nutrient runoff contributes to eutrophication of the Peel Harvey estuary. | Low risk of deterioration in the quality of surface runoff by sediments and hydrocarbon spillages. | Drainage is managed to retain runoff from disturbed areas within the mine void/tailings areas and process water circuit.<br>Nutrient export is reduced from mined areas through improved soil properties and suspension of significant applications of fertiliser. |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Groundwater Quality | The mine area is in a rural environment. There are a number of licensed users of both the Superficial and Leederville aquifers in the local area. | Low risk of localised contamination of the Superficial aquifer by diesel spillage. | Ongoing implementation of approved Water Management Plan.<br>No deterioration in groundwater quality around mining operations has been observed to date. Contingency measures to retain/recover any significant spillage. |
| Soil Quality | The existing land use over the mine area is agriculture, predominantly cattle grazing. | Low risk of localised contamination of by diesel spillage.<br>Deterioration in nutrient and water holding capacity after mining. | Contingency measures to remove/remediate any contaminated soils.<br>Improvement in soil quality through the addition of lime, in accordance with rehabilitation procedures. |
| Noise | The mine area is in a rural environment with noise from agricultural activities, nearby South West Highway and railway evident. | Mining and processing operations introduce new noise source. | Implement a mine plan to ensure compliance with Noise Regulations and MS1089 Condition 14. Ongoing monitoring and planning in response to weather conditions and noise data.<br>Use of amenity agreements with nearby residents.<br>Ongoing implementation of noise attenuation program.<br>Location of noise-generating equipment within enclosed structures.<br>Placement of topsoil and mulch vegetation stockpiles to buffer emissions. |
| Road Transport | The Proposal area is in a rural environment with a network of minor roads. | No change to existing pattern of HMC product haulage, which does not occur in the Shire of Serpentine Jarrahdale. | Maintenance of existing procedures. |

| ISSUE | DESCRIPTION | POTENTIAL IMPACT | PROPOSED MANAGEMENT |
|---|---|---|---|
| Light | The Proposal area is in a rural environment with no significant local light sources. | 24-hour lighting will be required to ensure a safe operating environment.<br><br>Potential for light spill in the immediate area and ongoing visibility from elevated positions along the Darling Scarp. | Orientation of lighting and use of bunding to minimise impacts on nearby residences. |
| Heritage | The Proposal area is in a rural environment that is mostly cleared. | There are no known heritage sites in the Proposal area. | No specific management measures warranted for activities within the Proposal area.<br><br>As always, procedures require the immediate cessation of work in the unlikely event suspected human bones are uncovered in the course of mining activities.<br><br>Induction ensures staff and contractors are aware of their obligations and responsibilities under relevant heritage protection legislation. |
| Visual Amenity | The mine area is located in a gently undulating to flat landscape. | Some local residents and passing traffic will have partial views of some mine related activities. Residents along the Darling Scarp will have more distant, uninterrupted views of the mine area. | Topsoil and vegetative mulch stockpiles placed as bunds will serve to obscure visibility of mining operations.<br><br>Rapid mining and rehabilitation will restore rural outlook with 2 – 4 years. |

# 8. LANDSCAPE

## 8.1. WAPC – VISUAL LANDSCAPE PLANNING IN WESTERN AUSTRALIA A MANUAL FOR EVALUATION, ASSESSMENT, SITING AND DESIGN

In 2007, WAPC released the Visual Landscape Planning in Western Australia – A manual for evaluation, assessment, siting and design. The manual is an acknowledgement of the community's interest in the preservation of landscapes and the need to integrate the evaluation of the landscape into the planning process.

The policy identifies that over time landscapes change through human and natural intervention. It is the management of the change that is most critical. How the community receives the change is based on a range of values. The manual attempts to provide a process to ensure conflicts are resolved between the environment, cultural and economic return. The document details the difference between landscapes, (for example wheatbelt verses coastal landscapes) and acknowledges that rural landscapes are highly modified.

As with the project implemented to date, KLPL manages the short-term visual impact through a combination of vegetation screens, soil bunds and minimisation of light spill. For the Proposal, which constitutes around 1 year of mining operations before land progressively reverts to rehabilitated pasture land, visual screening for the operational phase will be predominantly achieved through the temporary use of soil bunds. As the land is returned to the pre-mining contours, there is no long-term impact on landform or visual amenity.

A Visual Impact Assessment is completed annually in accordance with a requirement of a Visual Management Plan (EPCAD Pty Ltd, 2011) and included in compliance reports submitted to the Shire of Serpentine Jarrahdale. Consistent with the findings of a visual impact assessment within the EPCAD report, impact on visual amenity to date has been minimal given the implemented mitigation measures, limited public viewing areas and temporary land use

## 8.2. LOCAL PLANNING POLICY 4.13: REVEGETATION

Local Planning Policy No. 4.13 (LPP4.13) aims to promote landscape protection, the preservation of biodiversity and revegetation. The policy applies to all strategic and statutory planning proposals on all zonings, land uses and development types within the Shire. Its main objectives are the:

- Revegetation of land within the Shire;
- Encouragement of the use of local native flora for revegetation;
- Raising awareness of the importance of revegetation as a relevant planning consideration; and
- Provision of guidance for landowners, developers and Council on the requirements of TPS2 Clause 7.13 Tree Preservation and Planting.

The rehabilitation of the site will occur in a sequential manner in accordance with the Rehabilitation Management Plan prepared in accordance with Condition 8 of MS810, which has stated objectives to:

- Replace native vegetation cleared in the implementation of the Proposal with self-sustaining local provenance vegetation, at a ratio of not less than 1.4:1 (i.e. 1.4ha of revegetation per 1ha of vegetation cleared);

- Re-establish functioning pasture.

Key actions of the Rehabilitation Management Plan as it relates to revegetation include:

- Describe measures to protect the areas to be revegetated from access, including grazing by stock;
- Identify measures to translocate native plant species cleared for mining into revegetated areas;
- Identify measures to eradicate weeds in the revegetated areas;
- Identify measures to use dieback resistant species in the revegetated areas;
- Describe a strategy to revegetate areas, including the use of local species of local provenance, and establishment of middle storey and understorey species;
- Identify completion criteria for revegetation;
- Outline a revegetation monitoring program.

The Proposal seeks to limit the environmental impact of the extraction process through progressive rehabilitation, which allows for mine pits to be backfilled and rehabilitated soon after ore extraction. The Proposal involves extraction and rehabilitation being undertaken simultaneously to ensure the land is restored to its pre-mine status relatively quickly, and community impacts are minimised by minimising the mine footprint. This also provides for the earliest return to the pre-mining land use which is predominantly pasture for the Proposal.

## 8.3. LOCAL PLANNING POLICY 4.16 – LANDSCAPE AND VEGETATION

The purpose of the Local Planning Policy 4.16: Landscape and Vegetation (LPP4.16) is:

- Provide guidance to stakeholders regarding the consideration of landscape and the standard of landscaping expected by the Shire;
- Ensure the effective integration of landscape and vegetation into land use planning processes, so that the right level of information and detail is provided and assessed, at each stage in the planning process;
- Facilitate the effective integration of both state government and Shire planning and environmental documents, in a way that facilitates efficient and effective decision-making;
- Contribute towards achievement of vegetation and landscape outcomes that meet the expectations of stakeholders and contribute towards the achievement of biodiversity and water use targets and the creation of vibrant places for our communities.

Development is often associated with the clearing and loss of native vegetation, which has an impact on the biodiversity of the region as well as on the landscape values of the area. Landscaping provides an opportunity to enhance environmental amenity and civic pride and, retention and return of biodiversity to local areas. The Shire of Serpentine Jarrahdale Plan for the Future recognises the importance of landscape and vegetation to the community, noting the first community value identified as part of the Plan's development is that:

> *"the community appreciates the contribution of the natural environment to sense of place, the attraction of new residents and its landscape amenity."*

To reduce the short-term visual impacts of the Proposal on surrounding properties and roads, any vegetation within the 20-40m buffer area (depending on boundary) will be retained and temporary soil bunds used to obscure the mining area from Hopeland Road.

Progressive rehabilitation at the extraction site will also occur immediately following mining, which also serves to limit any the visual impact.

## 8.4. LOCAL PLANNING POLICY 2.7 – BIODIVERSITY PLANNING

The objectives of Local Planning Policy 2.7: Biodiversity Planning (LPP2.7) are:

- To protect maintain and improve the viability of habitats, ecological communities, flora and fauna, and genetic diversity;
- To ensure that any land use or development in proximity to, or contains a natural area, is compatible with the long-term maintenance and conservation of that area, and will not have detrimental impacts on biodiversity;
- Assist in achieving the conservation goals and targets as established in the Shire's Local Biodiversity Strategy.

The Proposal area is not identified as a Natural Area under LPP2.7. Nevertheless, native revegetation and conservation measures, which are an integral part of the Proposal, will have a positive impact on local biodiversity and conservation values.

# 9. OTHER PLANNING ISSUES AND CONSIDERATIONS

## 9.1. RELEVANT STATE PLANNING GUIDANCE

### 9.1.1. EPA GUIDANCE STATEMENT 3: SEPARATION DISTANCES BETWEEN INDUSTRIAL AND SENSITIVE LAND USES (2005)

Guidance Statement No. 3 (GS3) provides for separation distances between industry and sensitive land uses, which are listed as follows:

> *Residential developments, hospitals, motels, hostels, caravan parks, school, nursing homes, child care facilities, shopping centres, playgrounds, and some public buildings. Some commercial, institutional and industrial land uses which required high levels of amenity or are sensitive to particular emissions may also be considered sensitive land uses. Examples include some retail outlets, offices and training centres, and some types of storage and manufacturing facilities.*

Generic separation distances for different industrial categories are listed in Guidance Statement No.3 (within Appendix 1 of GS3). These are intended as a guide to minimise possible land use conflict by recognising the need for a buffer and providing general guidance regarding its size.

The recommended separation distance for sand extraction operations to sensitive land uses is 300m to 500m depending on size. Separation distances for mining imposed through MS810 (as amended by MS1089) are 2km (days) and 3.3km (nights), which are well in excess of the EPA Guidance Statement 3 recommended separation distances.

The Proposal, therefore, is consistent with the provisions of the EPA Guidance Statement 3.

Figure 8 identifies the key 2km buffer distance associated with the Proposal and nearby sensitive land uses.

## 9.2. RELEVANT LOCAL PLANNING CONSIDERATIONS

### 9.2.1. SHIRE OF SERPENTINE-JARRAHDALE STRATEGIC COMMUNITY PLAN 2017-2027

The Strategic Community Plan is the highest-level planning document in the Integrated Planning and Reporting Framework process. The Plan is designed to guide the development of the Shire of Serpentine Jarrahdale community for at least the next five years.

The Proposal will contribute positively to a number of objectives/outcomes articulated under the plan:

- Rehabilitation and conservation initiatives will contribute to a sustainable natural environment (2.2);
- Improved soil capacity following rehabilitation will contribute to a productive rural environment (2.3);
- The mining and processing operation will contribute to a commercially diverse and prosperous economy (3.1).

### 9.2.2. SHIRE OF SERPENTINE-JARRAHDALE EXTRACTIVE INDUSTRIES LOCAL LAW (1999)

The Shire of Serpentine Extractive Industries Local Law 1999 requires a licence be issued for all extractive industry operations within the Shire, with a 21-year maximum time-limit.

The local law stipulates additional requirements regarding advertising, the submission of plans, the clearing of vegetation and the preparation of excavation and rehabilitation programmes regarding the operation.

This report is a supporting document for an extractive industry licence. Compliance with the requirements of, and for, a licence are addressed within this report.

# 10. CONCLUSION

The Proposal for mining on Lot 63 Hopeland Road to extract heavy minerals represents an extension of mining and processing that has occurred east of the subject lot since October 2015, in accordance with current development approval and extractive industries licences issued by the Shire of Serpentine Jarrahdale and Shire of Murray.

It is requested that the Development Approval and Extractive Industry Application for the existing approved area of Lot 63 (i.e. EPA approved) be renewed to allow for remining of the existing approved area, and also be inclusive of the additional area of Lot 63 which shall not be disturbed until approvals granted by the EPA. The additional proposed mine areas within Lot 63 are currently under assessment via a Section 45C application to the EPA under the *Environmental Protection Act 1986.*

A high degree of confidence in the evaluation of the Proposal and associated economic, social and environmental impacts can be gained on the basis of the performance and record of the Project in the period 2015 to present (2023).

The Application for Approval to Commence Development should be approved on the following basis:

1. The Proposal is consistent with the provisions of the Metropolitan Region Scheme;
2. The Proposal is consistent with all relevant Western Australian Planning Commission Statement of Planning Policies;
    a. Statement of Planning Policy No. 1 – State Planning Framework;
    b. Statement of Planning Policy No. 2 - Environment and Natural Resources Policy;
    c. Statement of Planning Policy No. 2 .1 – The Peel-Harvey Coastal Plain Catchment;
    d. Statement of Planning Policy No. 2 .4 – Basic Raw Materials;
    e. Statement of Planning Policy No. 2 .5 – Agriculture and Rural Land Use Planning;
    f. Statement of Planning Policy No. 4.1 – State Industrial Buffer Policy;
    g. Visual Landscape Planning in Western Australia a manual for Evaluation, assessment, siting and design.
3. The proposed Industry Extractive use is consistent with the objectives and provisions of the Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2 and associated local planning policies;
4. The Proposal has been granted environmental approval under Part IV of the *Environmental Protection Act 1986*;
5. The Proposal is consistent with the Shire or Serpentine Jarrahdale Extractive Industry By-Law;
6. The Proposal is temporary and will not adversely impact on the surrounding environment, community or amenity of the locality; and
7. Rehabilitation following mining will enhance pasture productivity and reduce nutrient export to the Peel Harvey estuary. Native revegetation programmes will provide a net environmental benefit through improvements in the extent, quality and function of remnant native vegetation, improved connectivity between native vegetation conservation areas and improved stabilisation of unstable drainage lines.

# 11. REFERENCES

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# FIGURES:

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Meters

DIRK BROOK
MYARA BROOK
DIRK RD
ELLIOTT RD
WESCOTT RD
BADEN RD
WALTON ST
HOPELAND RD
ATKINS RD
PAGE RD
READHEADS RD
ST BLAZE GR
WESTCOTT RD
MCMAHON RD
BEAU SOVEREIGN CT
JENNIE PL
SOUTH WESTERN HWY
MITI RD
CORIO RD

Offset Area Lot 202
Offset Area Lot202

Lot 2, Lot 66, Lot 67, Lot 4964, Lot 1, Lot 2, Lot 507, Lot 508, Lot 201, Lot 56, Lot 54, Lot 1, Lot 7, Lot 8, Lot 5, Lot 9, Lot 11, Lot 12, Lot 4965, Lot 20, Lot 12, Lot 701, Lot 700, Lot 64, Lot 57, Lot 1, Lot 52, Lot 105, Lot 101, Lot 111, Lot 50, Lot 1, Lot 63, Lot 103, Lot 104, Lot 112, Lot 6, Lot 113, Lot 70, Lot 62, Lot 59, Lot 300, Lot 301, Lot 71, Lot 1, Lot 20, Lot 101, Lot 506, Lot 505, Lot 100, Lot 5, Lot 12, Lot 102, Lot 110

## Legend

**Ministerial Statement 810**
- Development Envelope
- Approved Mining Area
- Lot 202 Offset Area
- Lot 62 Offset Area

**Development Application**
- Lot 63 Boundary
- Proposed Amendment Area

**Regional Cadastre**
- Regional Cadastre

Doral

**Keysbrook Mineral Sands Project**

**Regional Location**
**Extractive Industry Licence Application**

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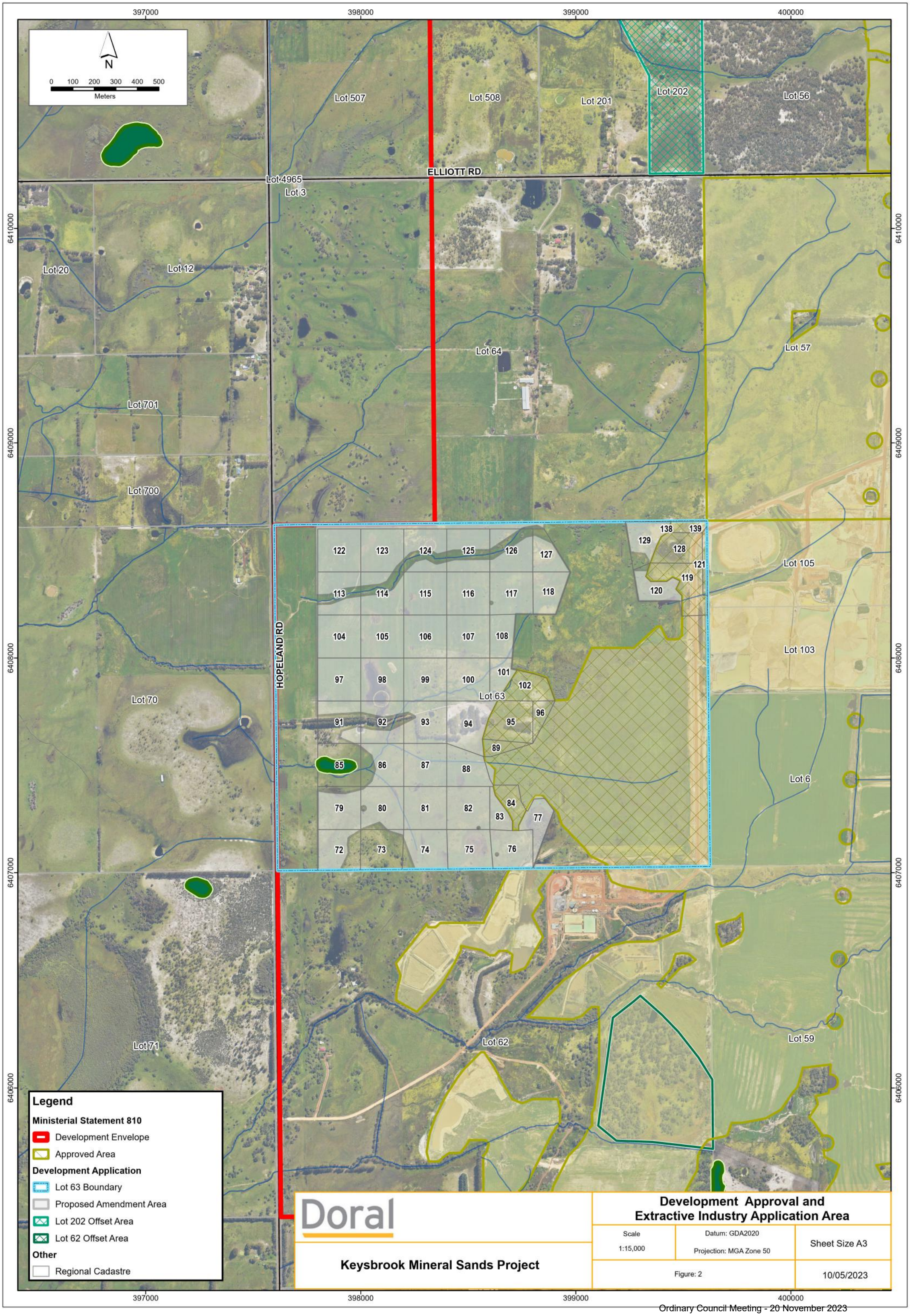
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Ministerial Statement 810
Development Envelope
Approved Area
Development Application
Lot 63 Boundary
Proposed Amendment Area
Lot 202 Offset Area
Lot 62 Offset Area
Other
Regional Cadastre
Doral
Keysbrook Mineral Sands Project
Development Approval and Extractive Industry Application Area
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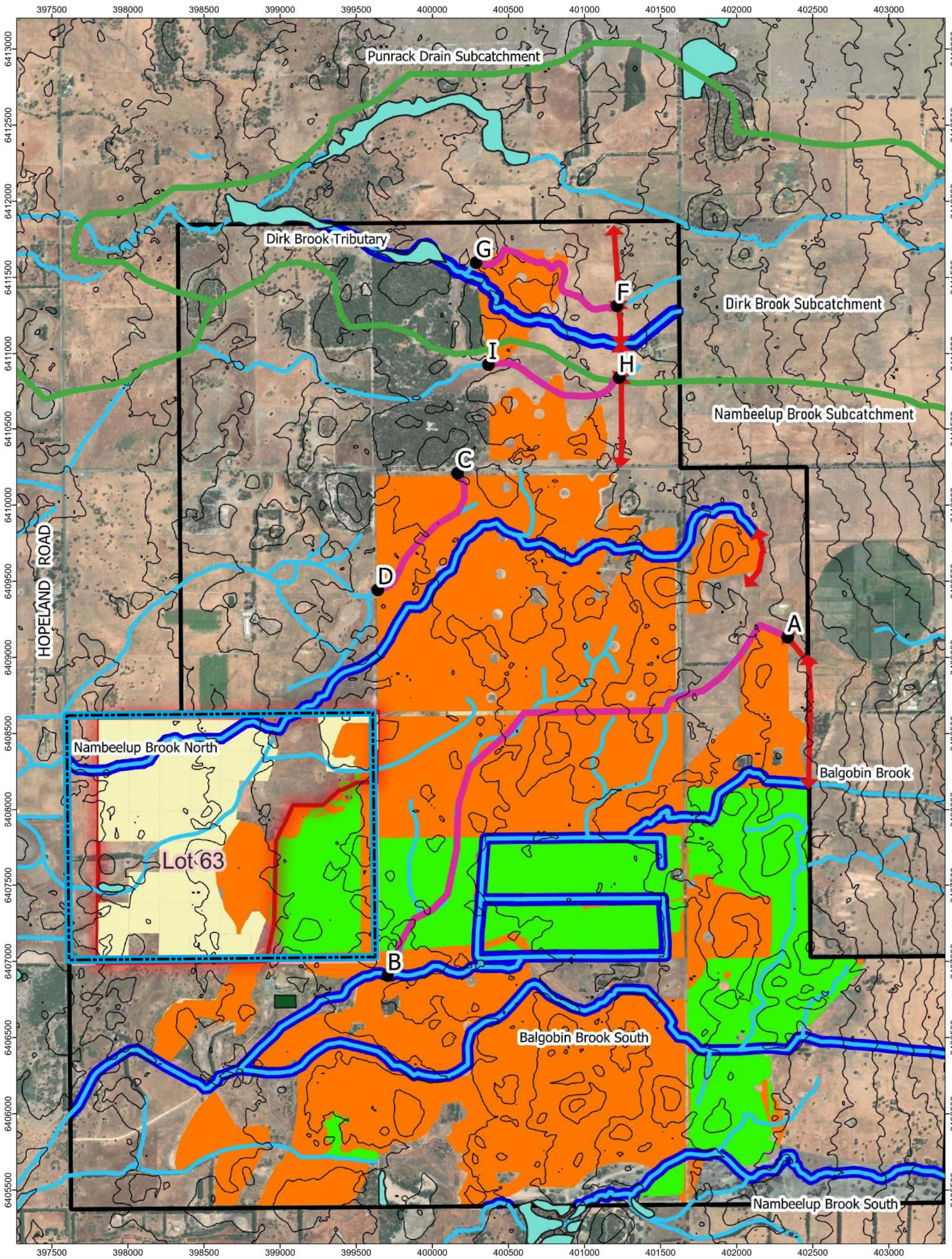


**Legend**

- Site Extent
- Approved Mining Area
- Rehabilitation Area
- Subcatchment Boundary (DWER)
- Conservation Category Wetlands
- Watercourse
- Protected Watercourse With Buffer
- Plant Water Ponds (Discharge Location)
- Flexible Diversion Around Disturbance Footprint
- Proposed Diversion Around Disturbance Footprint
- 2m Topographic Contours
- Lot 63 Outline
- Lot 63 Extension Outline
- Proposed Lot 63 Extension Area
- Development Application Boundary

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**Keysbrook Mineral Sands Project**

**Surface Water Features**
**Extractive Industry Licence Application**

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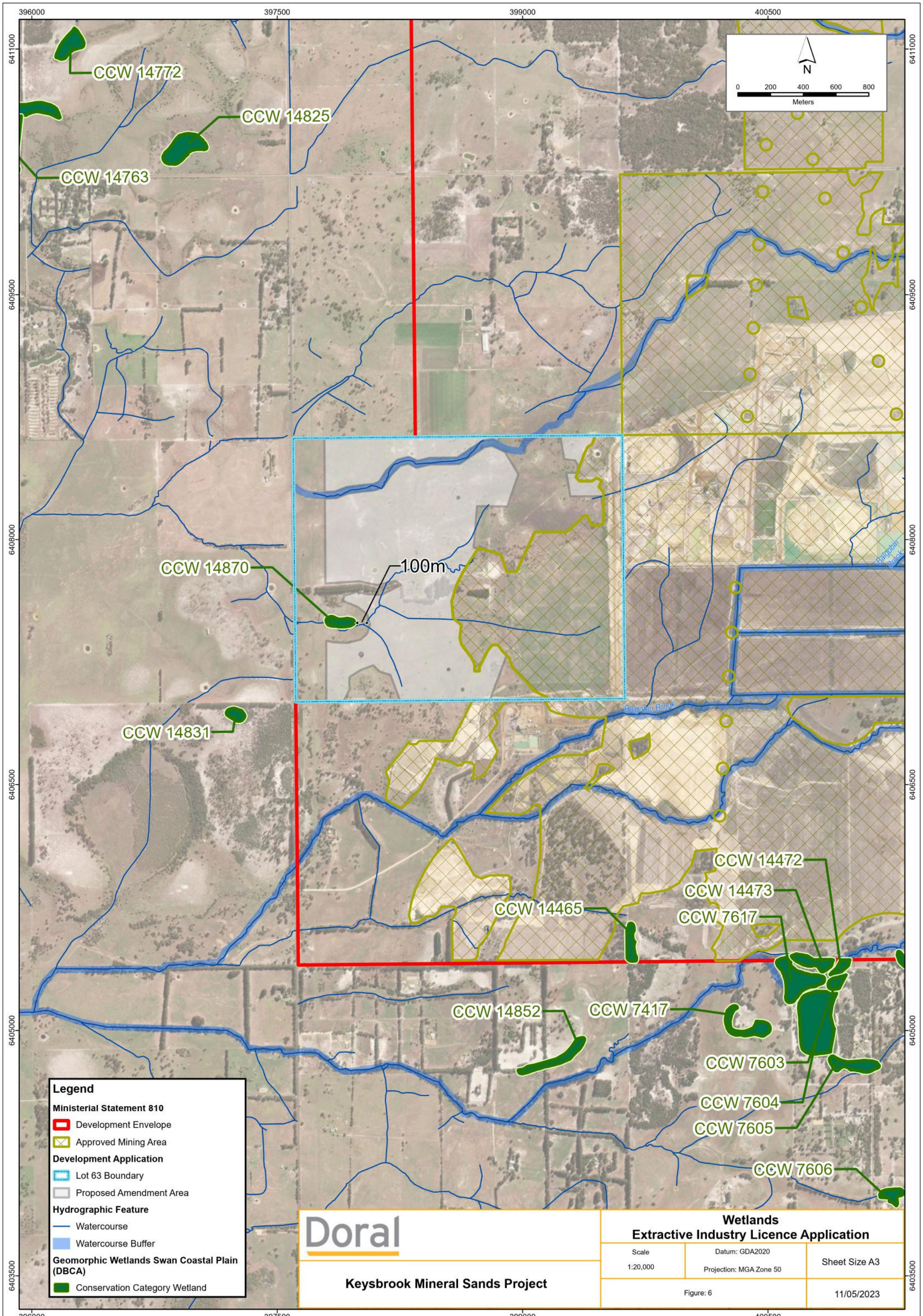
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Legend
Ministerial Statement 810
Development Envelope
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Development Application
Lot 63 Boundary
Proposed Amendment Area
Hydrographic Feature
Watercourse
Watercourse Buffer
Geomorphic Wetlands Swan Coastal Plain (DBCA)
Conservation Category Wetland
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Keysbrook Mineral Sands Project
Wetlands
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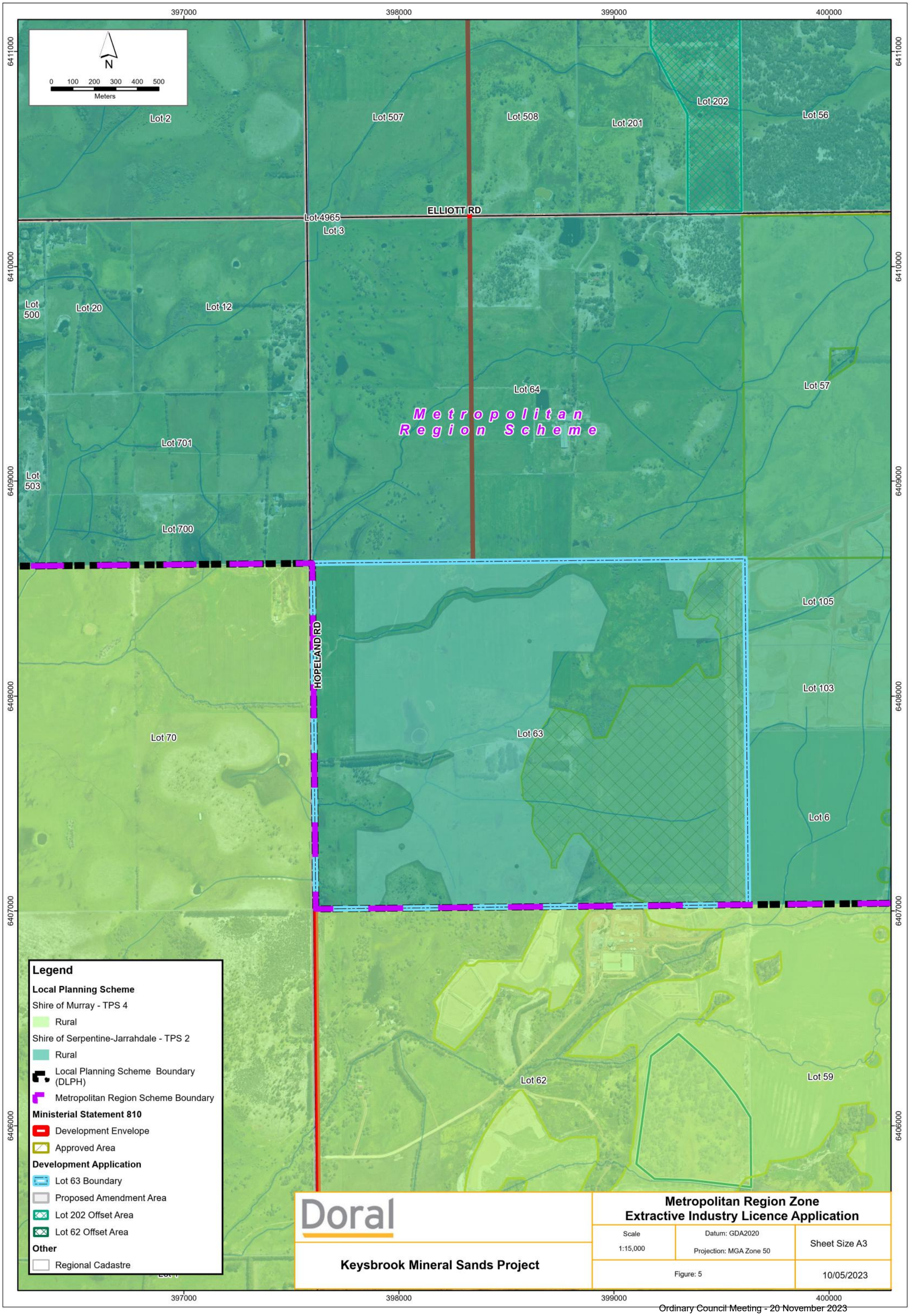
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Lot 64
Metropolitan Region Scheme
Lot 57
Lot 701
Lot 503
Lot 700
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Lot 105
Lot 103
Lot 70
Lot 63
Lot 6
Lot 62
Lot 59
Legend
Local Planning Scheme
Shire of Murray - TPS 4
Rural
Shire of Serpentine-Jarrahdale - TPS 2
Rural
Local Planning Scheme Boundary (DLPH)
Metropolitan Region Scheme Boundary
Ministerial Statement 810
Development Envelope
Approved Area
Development Application
Lot 63 Boundary
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Lot 202 Offset Area
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Other
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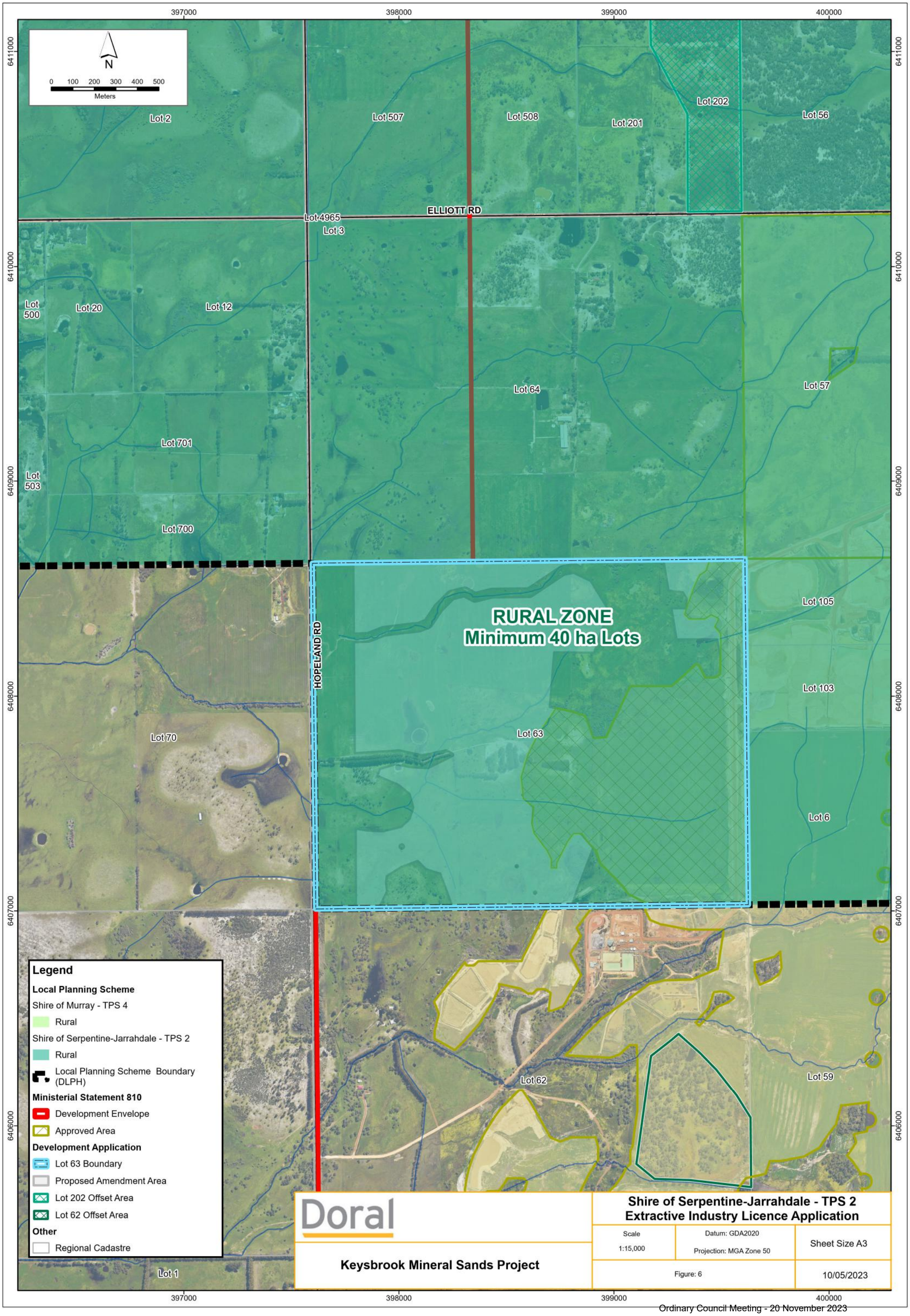
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RURAL ZONE
Minimum 40 ha Lots
Lot 105
Lot 103
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Lot 63
Lot 6
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Lot 1
Legend
Local Planning Scheme
Shire of Murray - TPS 4
Rural
Shire of Serpentine-Jarrahdale - TPS 2
Rural
Local Planning Scheme Boundary (DLPH)
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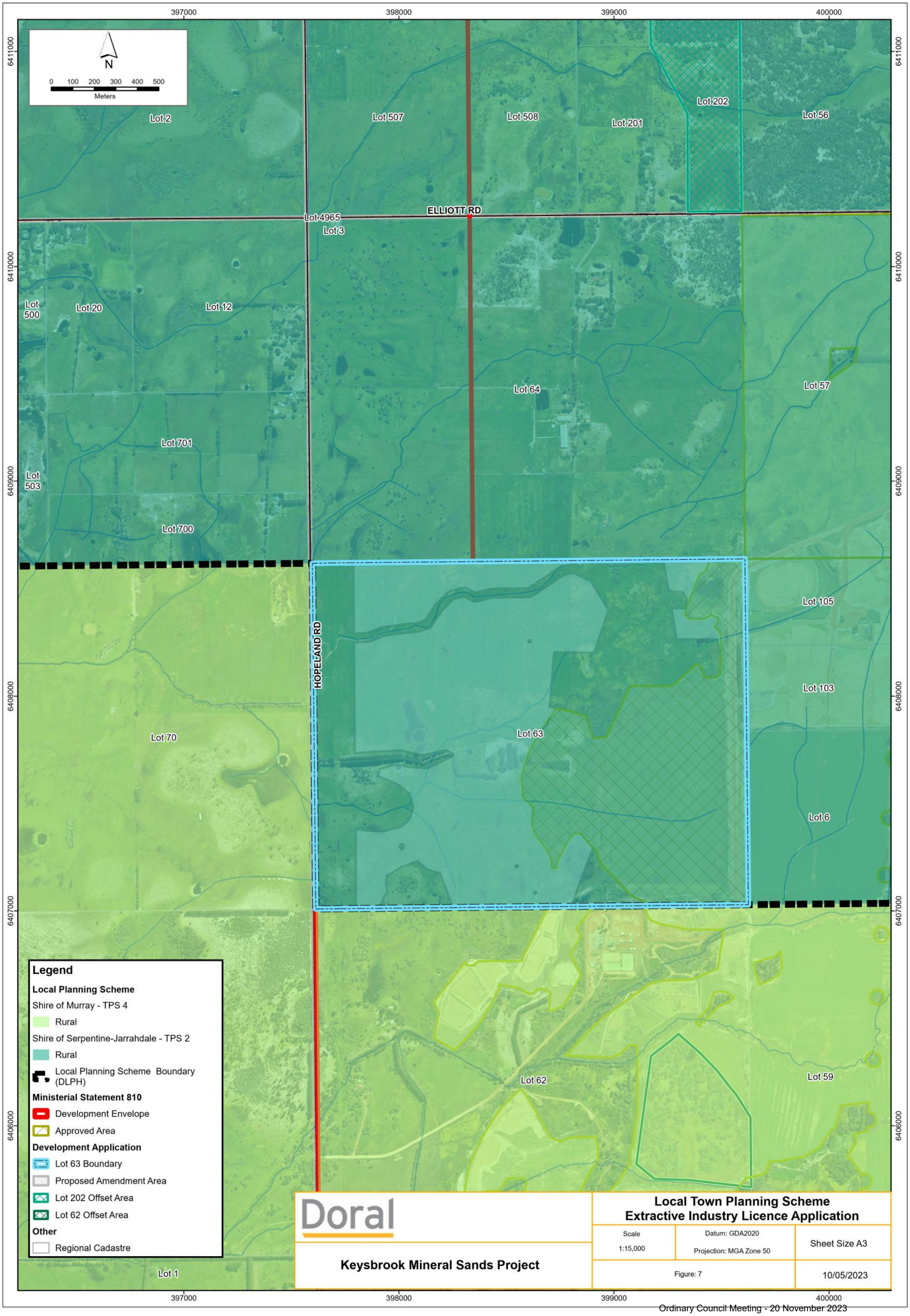
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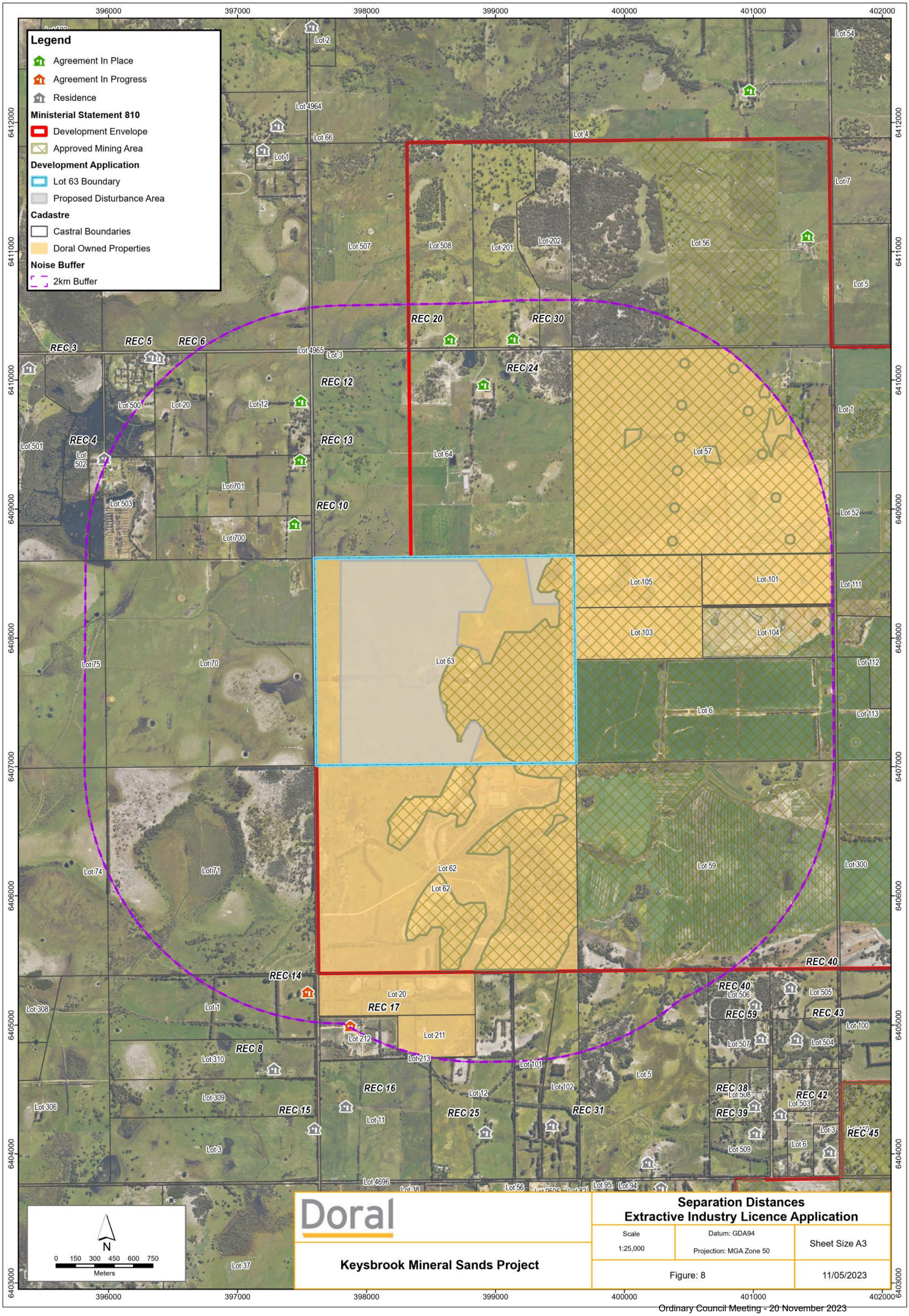
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Published on 19 October 2009 Statement No. 810

# STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986

KEYSBROOK MINERAL SANDS MINE
SHIRE OF SERPENTINE-JARRAHDALE AND SHIRE OF MURRAY

**Proposal:** To develop a mineral sands mine near the Keysbrook township. The proposal involves the excavation and processing of a low-grade heavy mineral sands deposit. The proposal is described further in schedule 1 of this document.

**Proponent:** Matilda Zircon Ltd (formerly Olympia Resources Ltd)
(ACN: 077 221 722)

**Proponent Address:** 1st Floor, 143 Hay Street, Subiaco Western Australia

**Assessment Number:** 1580

**Report of the Environmental Protection Authority:** Bulletin 1269

**Appeal Numbers:** 99-109 of 2007

The proposal referred to in the report of the Environmental Protection Authority may be implemented subject to the following conditions and procedures:

## 1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

## 2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister under sections 38(6) or 38(7) of the Act is responsible for the implementation of the proposal.

2-2 The proponent shall notify the CEO of any change of the name and address of the proponent for the serving of a notice or other correspondence within 30 days of such change.

Date published:

## 3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

## 4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the requirements of the CEO.

4-2 The proponent shall submit to the CEO the compliance assessment plan required by condition 4-1, at least six months prior to the first compliance report required by condition 4-6, and prior to ground-disturbing activity, whichever is sooner.

The compliance assessment plan shall indicate:

a. the frequency of compliance reporting;

b. the approach and timing of compliance assessments;

c. the retention of compliance assessments;

d. reporting of potential non-compliances and corrective actions taken;

e. the table of contents of compliance reports; and

f. public availability of compliance reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within two business days of that non-compliance being known.

4-6 The proponent shall submit a compliance assessment report annually from the date of issue of this Implementation Statement addressing the previous twelve month period or other period as agreed by the CEO. The compliance assessment report shall:

a. be endorsed by the proponent's Managing Director or a person, approved in writing by the CEO, delegated to sign on the Managing Director's behalf;

b. include a statement as to whether the proponent has complied with the conditions;

c. identify all potential non-compliances and describe corrective and preventative actions taken;

d. be made publicly available in accordance with the approved compliance assessment plan; and

e. indicate any proposed changes to the compliance assessment plan required by condition 4-1.

## 5 Performance Review and Reporting

5-1 The proponent shall submit to the CEO a Performance Review Report at the conclusion of the first year after the start of implementation and then, at a minimum of triennial intervals, which addresses:

a. the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to management of the major risks and impacts;

b. the level of progress in the achievement of best practice environmental performance, including industry benchmarking, and the use of best available technology where practicable; and

c. improvements gained in environmental management which could be applied to this and other similar projects.

## 6 Protection of native vegetation

6-1 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 red in Figure 3 is protected in perpetuity by an instrument or instruments approved by the CEO.

6-2 The instrument or instruments referred to in 6-1 shall include the following:

a. measures to protect the area from grazing stock; and

b. measures which have the objective of maintaining a functioning and self sustaining vegetation community.

6-3 The proponent shall not clear any native vegetation within the proposal area unless the land to be cleared is required for the extraction of mineral ore within six months of the date of the clearing.

## 7 Protection of watercourses and wetlands

7-1 The proponent shall not clear vegetation or undertake mining activities:

a. within 20 metres of the banks of watercourses shown in Figure 9 of the PER document;

b. within 100 metres of the boundary a conservation category wetland.

7-2 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.

## 8 Rehabilitation management plan

8-1 Prior to the commencement of operations, the proponent shall submit a Rehabilitation Management Plan to the requirements of the CEO.

8-2 The objectives of the Plan are to:

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

b. re-establish functioning pasture.

8-3 The Rehabilitation Management Plan shall:

a. describe measures to protect the areas to be revegetated from access, including grazing by stock;

b. identify measures to translocate native plant species cleared for mining into revegetated areas;

c. identify measures to eradicate weeds in the revegetated areas;

d. identify measures to use dieback un-infested topsoil and dieback resistant species in the revegetated areas;

e. describe a strategy to revegetate areas, including the use of local species of local provenance, and establishment of middle storey and understorey species;

f. identify completion criteria for revegetation; and

g. outline a revegetation monitoring programme.

8-4 The proponent shall implement the Rehabilitation Plan.

8-5 The proponent shall review and revise the Rehabilitation Plan as and when directed by the CEO.

8-6 The proponent shall implement revisions of the Rehabilitation Plan required by condition 8-5.

8-7 The proponent shall make the Rehabilitation Plan (including all amendments) publicly available in a manner approved by the CEO.

8-8 The proponent shall ensure grazing stock are excluded from areas described in condition 8-2(a)

## 9 Weed and Dieback Management

9-1 Prior to the commencement of operations, the proponent shall prepare and submit a Dieback and Weed Management Plan to the requirements of the CEO.

9-2 The proponent shall implement the Plan.

## 10 Nutrient mobilisation

10-1 Prior to the commencement of operations, the proponent is to submit a Nutrient Management Plan to the requirements of the CEO.

10-2 The objective of the Plan is to ensure the proposal assists in meeting the water quality objectives of the Peel-Harvey Water Quality Improvement Plan.

10-3 The Plan shall:

a. outline a programme to monitor nutrient levels within the proposal area and at the downstream boundary of the proposal area;

b. identify nutrient trigger levels consistent with the Peel-Harvey Water Quality Improvement Plan; and

c. identify management actions should a trigger level be reached.

10-4 The proponent shall implement the Nutrient Management Plan.

10-5 The proponent shall make the Nutrient Management Plan available to the public in manner approved by the CEO.

## 11 Water Management

11-1 The abstraction of any groundwater required for the implementation of this proposal shall not materially effect on the quality or quantity of groundwater available to other users in the area, or adversely effect the health and condition of native vegetation and ecosystems in the area.

11-2 Prior to the commencement of operations, the proponent shall revise the Water Management Plan to the requirements of the Department of Water.

11-3 The objective of the Plan is to comply with condition 11-1.

11-4 The Plan shall:

a. outline a programme to monitor groundwater quality and quantity, including monitoring of bores located on surrounding properties, and at the downstream boundary of the project area;

b. monitor the health and condition of native vegetation within the project area to ensure that it is not affected by groundwater drawdown associated with the proposal;

c. identify groundwater trigger levels and management actions should a trigger level be reached;

d. identify measures to provide an alternative source of water, particularly to surrounding groundwater users, where monitoring in item (a) indicates that mining activities has adversely affected water quality to the point where it cannot be used for its intended purpose or ecosystem maintenance;

e. identify measures to ensure that the quality and quantity of groundwater is maintained post-mining;

f. identify measures to minimise impacts associated with the discharge of excess water;

g. outline a monitoring programme to detect any adverse impacts to the water quality, water levels or vegetation health of the conservation category wetlands adjacent to the mine area; and

h. identify management measures in the event that monitoring in item (g) detects adverse impacts to conservation category wetlands adjacent to the mine area as a result of the proposal.

11-5 The proponent shall implement the Water Management Plan.

11-6 The proponent shall review and revise the Water Management Plan as and when directed by the CEO.

11-7 The proponent shall implement revisions of the Water Management Plan required by condition 11-6.

11-8 The proponent shall make the Water Management Plan (including amendments) publicly available in a manner approved by the CEO.

## 12 Acid Sulphate Soils Management

12-1 The proponent shall not:

a. lower the depth of the watertable to below that required for accessing the orebody;

b. cause acid sulphate soil contamination either within the proposal area or elsewhere.

12-2 The proponent shall implement the Acid Sulphate Soils Management Plan.

12-3 Upon identifying monitoring results indicating exceedance of trigger levels specified in the Acid Sulphate Soils Management Plan the proponent shall:

a. report the monitoring results to the CEO within seven days;

b. submit details of the management measures proposed to be implemented to address the exceedance results to the CEO within seven days; and

c. implement the management measures proposed to address the exceedance..

12-4 Details of any reports under the Management Plan or condition 12-3 shall be publicly available in a manner approved by the CEO.

## 13 Performance Bond

13-1 As security for the due and punctual observance and performance by the proponent of the requirements of conditions 6, 7, 8, 9, 10, 11, 12 and 15, the proponent shall, prior to commencement of operations, provide to the CEO, to be replaced every five years in accordance with 13-2, a financial assurance for the benefit of both the Minister and the CEO and which is in the form of an unconditional and irrevocable bank guarantee, from a guarantor acceptable to the CEO and in a form acceptable to the CEO, in the amount specified in condition 13-2.

13-2 The financial assurance shall be for an initial amount of AU$3 million and shall be substituted on 1 July every year of operations in accordance with the following schedule:

a. $5.568 million for the year commencing on 1 July after a minimum of 12 months from the commencement of operations (year 2);

b $6.356 million for the subsequent year commencing on 1 July (year 3);

c. $7.552 million for the subsequent year commencing on 1 July (year 4);

d. $8.304 million for the subsequent year commencing on 1 July (year 5);

e. $6.772 million for the subsequent year commencing on 1 July (year 6);

f. $5.584 million for the subsequent year commencing on 1 July (year 7);

g. $3.795 million for the subsequent year commencing on 1 July (year 8),

with the fixed initial amount of each successive guarantee being indexed to inflation (being the Consumer Price Index, Perth).

13-3 In the event that the guarantor referred to in condition 13-1 terminates its liability under the bank guarantee by paying to the Minister or the CEO the balance of the financial assurance remaining unpaid, the CEO will hold the financial assurance (being the amount paid by the guarantor upon termination), as security for the due and punctual observance and performance by the proponent of the requirements of conditions 6, 7, 8, 9, 10, 11, 12 and 15, in an interest bearing account nominated by the CEO, with the interest accruing for the benefit of the Minister or the CEO.

13-4 The financial assurance may be called on or used in accordance with section 86E of the Act if the proponent fails to implement the proposal in accordance with conditions 6, 7, 8, 9, 10, 11, 12 and 15.

13-5 The financial assurance shall be discharged by the CEO and the Minister when the CEO has given the proponent written notice pursuant to section 86F(1) of the Act.

## 14 Noise Management

14-1 Unless otherwise agreed in writing between the proponent and the owner and any occupier of noise sensitive premises:

a. the proposal must comply with the Noise Regulations at any building associated with a noise sensitive use at any noise sensitive premises; and

b. outside the hours 0700 to 1900 Monday to Saturday, or on public holidays, no mining activity is to be undertaken within 1,500 metres of any building associated with a noise sensitive use at any noise sensitive premises.

14-2 Prior to an agreement being executed under 14-1, the proponent is to ensure owners and occupiers obtain independent legal advice on the meaning and effect of any such agreement.

14-3 Unless registered on the relevant land title, an agreement obtained under 14-1 does not bind successive owners or occupiers.

14-4 Noise monitoring shall be undertaken in a manner consistent with the Noise Monitoring Plan, and shall include monitoring of noise levels at a location or locations representative of the noise sensitive premises closest to the active mining area for which the proponent does not have written agreement in place under 14-1.

14-5 The proponent shall submit quarterly reports to the CEO, prepared by an independent acoustic expert, which include the following:

a. reviews noise monitoring methodology and results for the quarter;

b. an assessment of the extent to which noise emissions from the proposal comply with the Noise Regulations; and

c. details of any management or other measures that the proponent has implemented, or proposes to implement, to abate emissions, and to prevent non-compliance with the Noise Regulations, and the effectiveness of any measures that have been implemented.

14-6 The report referred to in 14-5 is to be provided to the CEO within four weeks of the end of the quarter to which it relates, with the first report due within four months of the commencement of operations.

14-7 Within six weeks of the end of the first 12 months following the commencement of operations, the proponent is to submit a report to the CEO, prepared by an independent acoustic expert, which includes the following:

a. an assessment of the extent to which noise emissions from the proposal comply with the Noise Regulations;

b. details and effectiveness of management or other measures the proponent has implemented to reduce or abate noise emissions;

c. details of what, if any, modifications are recommended to these conditions to more effectively manage noise emissions from the proposal.

14-8 The reports referred to in condition 14-5 and 14-7 shall be made available to the public in a manner approved by the CEO.

## 15 Air Quality and Dust Management

15-1 Prior to the commencement of operations, the proponent shall revise the Air Quality and Dust Management Plan to the requirements of the CEO.

15-2 The objectives of the Plan are to:

a. ensure dust emissions from activities undertaken in implementing the proposal do not cause ambient dust concentration levels outside the boundary of the proposal area that are

i. higher than 1 ug/$m^3$ of Total Suspended Particulates as a 15 minute average; or

ii. higher than 50 ug/$m^3$ of Particulate Matter smaller than 10 microns as a 24 hour average, in excess of five times per year;

b. identify measures to reduce dust emissions; and

c. ensure that dust emissions do not harm or adversely affect environmental values or the health, welfare and amenity of people and land uses.

15-3 The Plan shall:

a. outline the results of on-site baseline dust monitoring and modelling;

b. identify dust management measures for a range of predicted weather forecasts, including avoiding, ameliorating and protecting from dust impacts;

c. identify dust management measures according to actual winds experienced at the site;

d. identify a plan for each pit, which details the times of day and weather conditions under which parts of the pit could be mined;

e. identify a monitoring program, incorporating trigger values for the implementation of management measures to ensure dust emissions from activities undertaken in implementing the proposal do not cause ambient dust concentration levels outside the boundary of the proposal area that are:

i. higher than 1 ug/$m^3$ of Total Suspended Particulates as a 15 minute average; or

ii. higher than 50 ug/$m^3$ of Particulate Matter smaller than 10 microns as a 24 hour average, in excess of five times per year;

e. identify management measures to ensure dust emissions from activities undertaken in implementing the proposal do not cause ambient dust concentration levels outside the boundary of the proposal area that are:

   i. higher than 1 ug/$m^3$ of Total Suspended Particulates as a 15 minute average; or

   ii. higher than 50 ug/$m^3$ of Particulate Matter smaller than 10 microns as a 24 hour average, in excess of five times per year;

f. identify a complaint management procedure; and

g. describe the outcomes of landowner agreements when mining in close proximity to occupied residences.

15-4 The proponent shall implement the Air Quality and Dust Management Plan.

15-5 The proponent shall review and revise the Air Quality and Dust Management Plan as and when directed by the CEO.

15-6 The proponent shall implement revisions of the Air Quality and Dust Management Plan required by condition 15-5.

15-7 The proponent shall make the Air Quality and Dust Management Plan (including any revisions) and the results of monitoring publicly available in a manner approved by the CEO.

15-8 To the extent that the proposal is subject to a licence issued under Part V of the Act, that licence may impose conditions which are different from, or additional to, the requirements of this Statement.

## 16 Definitions

In these conditions, unless the contrary intention appears:

"Acid Sulphate Soils Management Plan" means the *Keysbrook Mineral Sand Project Acid Sulfate Soils Management Plan,* prepared for Olympia Resources Ltd by MBS Environmental, May 2007, and referred to in Appendix 2 of EPA Report 1269;

"Act" means the *Environmental Protection Act 1986;*

"CEO" means the chief executive officer of the Department of Environment and Conservation;

"commencement of operations" means the date on which the first ground disturbing activities commence for the implementation of the proposal, but does not include minor preliminary works such as erection of fencing and undertaking sampling;

"conservation category wetland" has the meaning given in regulation 6(7)(c) of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004;*

"DEC" means the Department of Environment and Conservation;

"Minister" means the Minister for Environment;

"Noise Monitoring Plan" means the *Noise Monitoring Plan, Keysbrook Titanium Minerals Proposal*, prepared for Olympia Resources Ltd by Lloyd George Acoustics, October 2008;

"Noise Regulations" means the *Environmental Protection (Noise) Regulations 1997;*

"noise sensitive premises" has the same meaning as in Schedule 1 of the Noise Regulations;

"Peel-Harvey Water Quality Improvement Plan" means the *Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System - Phosphorus Management*, EPA, November 2008;

"PER document" means the *Keysbrook Minerals Sand Project, Keysbrook Western Australia Public Environmental Review*, prepared for Olympia Resources Ltd by MBS Environmental, West Perth, WA, June 2006;

"proposal area" means the boundaries of the mining area shown in Figure 2;

"revegetated areas" refers to those areas that have been revegetated by the proponent following clearing, or as replacement for clearing done, by the proponent during the implementation of the proposal;

"watercourse" has the meaning given in section 3 of the *Rights in Water and Irrigation Act 1914*;

"Water Management Plan" means the *Keysbrook Mineral Sand Project Water Management Plan*, prepared for Olympia Resources Ltd by MBS Environmental, May 2007, and referred to in Appendix 2 of EPA Report 1269.

**Notes**

1. Where a condition for a Management Plan states "to the requirements of the CEO", the proponent shall consult with the DEC during preparation of the Management Plans.

2. The Minister will determine any dispute between the proponent and the CEO over the fulfilment of the requirements of the conditions.

Hon Donna Faragher JP MLC
MINISTER FOR ENVIRONMENT; YOUTH

# Schedule 1

**Keysbrook Mineral Sands Mine (Assessment No. 1580)**

The proposal is to develop a mineral sands mine near the Keysbrook township. The proposal involves the excavation and processing of a low-grade heavy mineral sands deposit. Local roads would be upgraded to facilitate the transport of the heavy mineral concentrate to South Western Highway.

An area of 30 hectares will be progressively mined at any time. Waste from the processing will be used as backfill in the mined areas. Backfilled areas will be progressively re-contoured and stabilised prior to topsoil replacement and return to pasture or native vegetation. The wet concentrator plant will be relocated three times throughout the life of mine. Support infrastructure, such as pipelines, offices and workshops will also be relocated with the wet concentrator plant. A site dam will be constructed at each of the three locations.

The main characteristics of the proposal are summarised in Table 1 below.

**Table 1 - Key Proposal Characteristics (Assessment No. 1580)**

| Element | Description | |
|---|---|---|
| Land tenure over the mining area | Keysbrook | North Dandalup |
| | Part Lot 56 Westcott Rd<br>Part Lot 57 Elliott Rd<br>Part Lot 1 Elliott Rd<br>Part Lot 52 Westcott Rd<br>Part Lot 111 Westcott Rd<br>Lot 112 Westcott Rd<br>Lot 113 Westcott Rd<br>Part Lot 6 Westcott Rd<br>Part Lot 63 Hopeland Rd | Part Lot 62 Hopeland Rd<br>Part Lot 59 Westcott Rd<br>Part Lot 300 Westcott Rd<br>Part Lot 49 Readheads Rd<br>Part Lot 7 Readheads Rd<br>Part Lot 6 Readheads Rd<br>Part Lot 44 Readheads Rd |
| Life of mine | Approximately 8 years | |
| Product quantity | approximately 920,000 tonnes of heavy mineral concentrate | |
| Pit depth | average 2 metres below ground level, and up to 6 metres on sandy dunes | |
| Proposal area | 1366 hectares | |
| Dewatering | in-pit sumps to dewater the superficial Bassendean Sand aquifer at 0.2 gigalitres per annum | |
| Bore abstraction | up to 1.8 gigalitres per annum from two bores into the deep Leederville aquifer | |
| Road upgrades | upgrades of existing roads; Westcott Rd, Atkins Rd, Readheads Rd and intersection of Readheads Rd and South Western Hwy | |

**Figures**
Figure 1 – Regional location
Figure 2 – Mine Boundaries
Figure 3 – Area within which minimum of 75ha of native vegetation to be retained


***Figure 1 – Regional location***

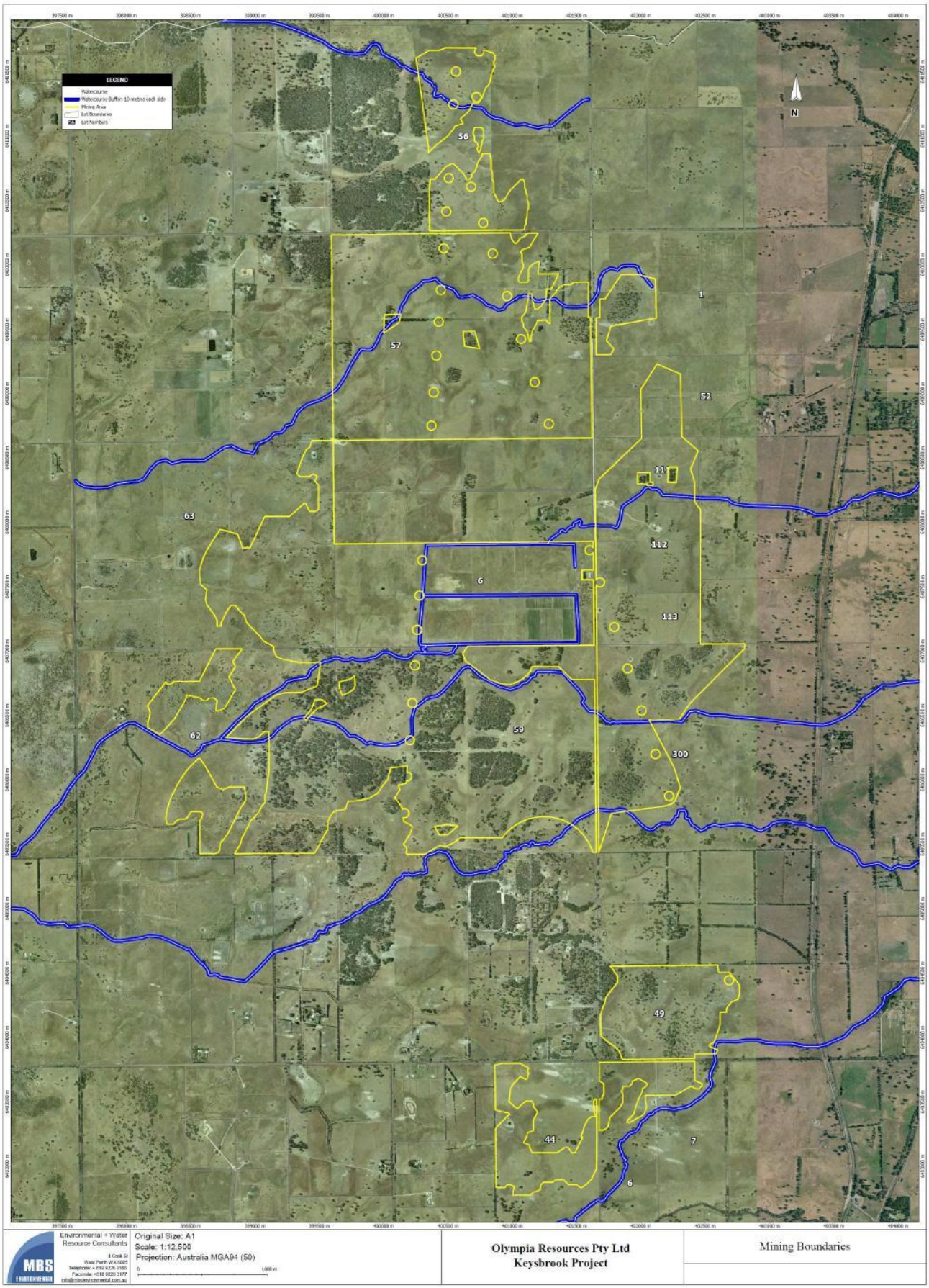


***Figure 2 – Mine boundaries***

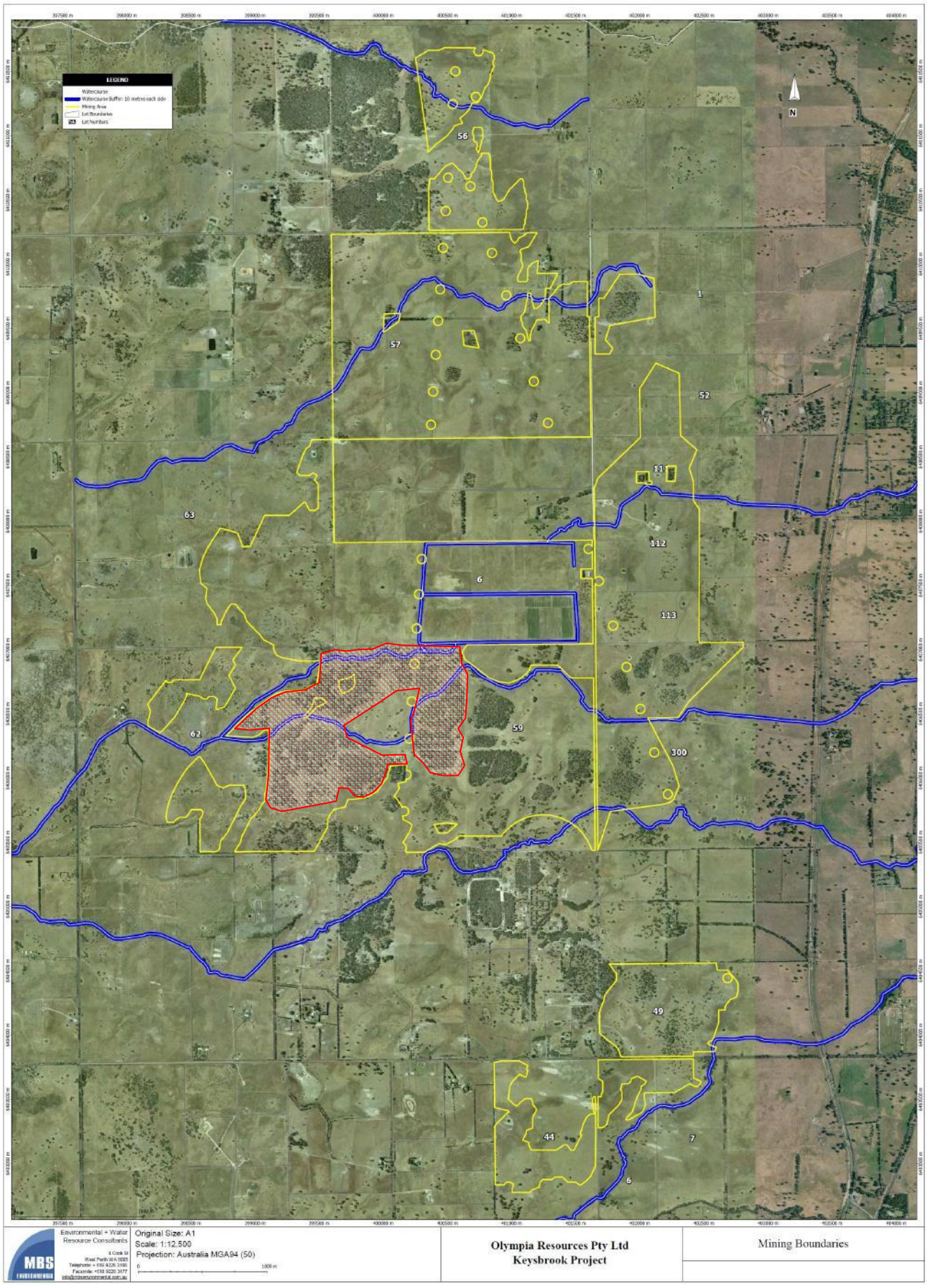


***Figure 3 – Area within which minimum 75ha native vegetation to be retained (condition 6-1)***

# ATTACHMENT 1 TO MINISTERIAL STATEMENT 810

Section 46C
Environmental Protection Act 1986

## NOTICE OF CHANGES TO IMPLEMENTATION CONDITIONS MINISTERIAL STATEMENT 810

KEYSBROOK MINERAL SANDS MINE
SHIRE OF SERPENTINE-JARRAHDALE AND SHIRE OF MURRAY
MATILDA ZIRCON LTD

Pursuant to section 46C(1)(b)(i) of the *Environmental Protection Act 1986,* the implementation conditions applying to the above proposal are changed in accordance with the Schedule to this Notice. I consider these changes to be of a minor nature which are necessary or desirable to correct a clerical mistake or unintentional error.

Hon Bill Marmion BE MBA MLA
**MINISTER FOR ENVIRONMENT; WATER**

**19 June 2011**

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## Schedule

**1 Condition 15 amended**

Condition 15 of Ministerial Statement 810 is amended as follows:

(a) The figure '1 ug/$m^3$' is replaced with '1000 ug/$m^3$'

(b) The lettering of the second '(e)' in Condition 15-3 will be replaced by '(f)' and thereafter; '(f)' with '(g)' and '(g)' with '(h)'

# Attachment 2 to Ministerial Statement 810

## Change to proposal under s45C of the *Environmental Protection Act 1986*

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**Proposal:** Keysbrook Mineral Sands Mine

**Proponent:** MZI Resources Ltd

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**Change:** Increase in proposal area to accommodate wet processing plant adjacent to the mining area, and change to area of vegetation to be protected.

**The following text replaces the proposal description in Schedule 1:**
The proposal is to develop a mineral sands mine near the Keysbrook township. The proposal involves the excavation and processing of a low-grade heavy mineral sands deposit.

An area of up to 30 hectares will be progressively mined at any time. Waste from the processing will be used as backfill in the mined areas. Backfilled areas will be progressively re-contoured and stabilised prior to topsoil replacement and return to pasture or native vegetation.

**Key Characteristics Table:** This table replaces Table 1 in Schedule 1

| Element | Description of proposal | | Description of approved change to proposal | |
|---|---|---|---|---|
| Land tenure over the mining area | Keysbrook | North Dandalup | Keysbrook | North Dandalup |
| | Part Lot 56 Westcott Road<br>Part Lot 57 Elliott Rd<br>Part Lot 1 Elliott Rd<br>Part Lot 52 Westcott Rd<br>Part Lot 111 Westcott Rd<br>Lot 112 Westcott Rd<br>Lot 113 Westcott Rd<br>Part Lot 6 Westcott Rd<br>Part Lot 63 Hopeland Rd | Part Lot 62 Hopeland Rd<br>Part Lot 59 Westcott Rd<br>Part Lot 300 Westcott Rd<br>Part Lot 49 Readheads Rd<br>Part Lot 7 Readheads Rd<br>Part Lot 6 Readheads Rd<br>Part Lot 44 Readheads Rd | Part Lot 56 Westcott Road<br>Part Lot 57 Elliott Rd<br>Part Lot 1 Elliott Rd<br>Part Lot 52 Westcott Rd<br>Part Lot 111 Westcott Rd<br>Lot 112 Westcott Rd<br>Lot 113 Westcott Rd<br>Part Lot 6 Westcott Rd<br>Part Lot 63 Hopeland Rd | Part Lot 62 Hopeland Rd<br>Part Lot 59 Westcott Rd<br>Part Lot 300 Westcott Rd<br>Part Lot 49 Readheads Rd<br>Part Lot 7 Readheads Rd<br>Part Lot 6 Readheads Rd<br>Part Lot 44 Readheads Rd |

| | | |
|---|---|---|
| Life of mine | Approximately 8 years | Approximately 8 years |
| Product quantity | Approximately 920 000 tonnes of heavy mineral concentrate | Approximately 920 000 tonnes of heavy mineral concentrate |
| Pit depth | Average 2 metres below ground level, and up to 6 metres on sandy dunes | Average 2 metres below ground level, and up to 6 metres on sandy dunes |
| Proposal area | 1366 hectares | **Up to 1379 hectares** |
| Dewatering | In-pit sumps to dewater the superficial Bassendean Sand aquifer at 0.2 gigalitres per annum | In-pit sumps to dewater the superficial Bassendean Sand aquifer at 0.2 gigalitres per annum |
| Bore abstraction | Up to 1.8 gigalitres per annum from two bores into the deep Leederville aquifer | Up to 1.8 gigalitres per annum from two bores into the deep Leederville aquifer |
| Road upgrades | Upgrades of existing roads; Westcott Rd, Atkins Rd, Readheads Rd and intersection of Readheads Rd and South Western Hwy | **Deleted – not an environmental factor** |

Note: Text in **bold** in the Key Characteristics Table, indicates change/s to the proposal.

**List of Replacement Figures:**

Figure 2 of Schedule 1 is replaced with Figure 2 of this attachment.

Figure 3 of Schedule 1 is replaced with Figure 3 of this attachment.

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**Dr Paul Vogel**
CHAIRMAN
Environmental Protection Authority
under delegated authority

Approval date: 4 February 2013

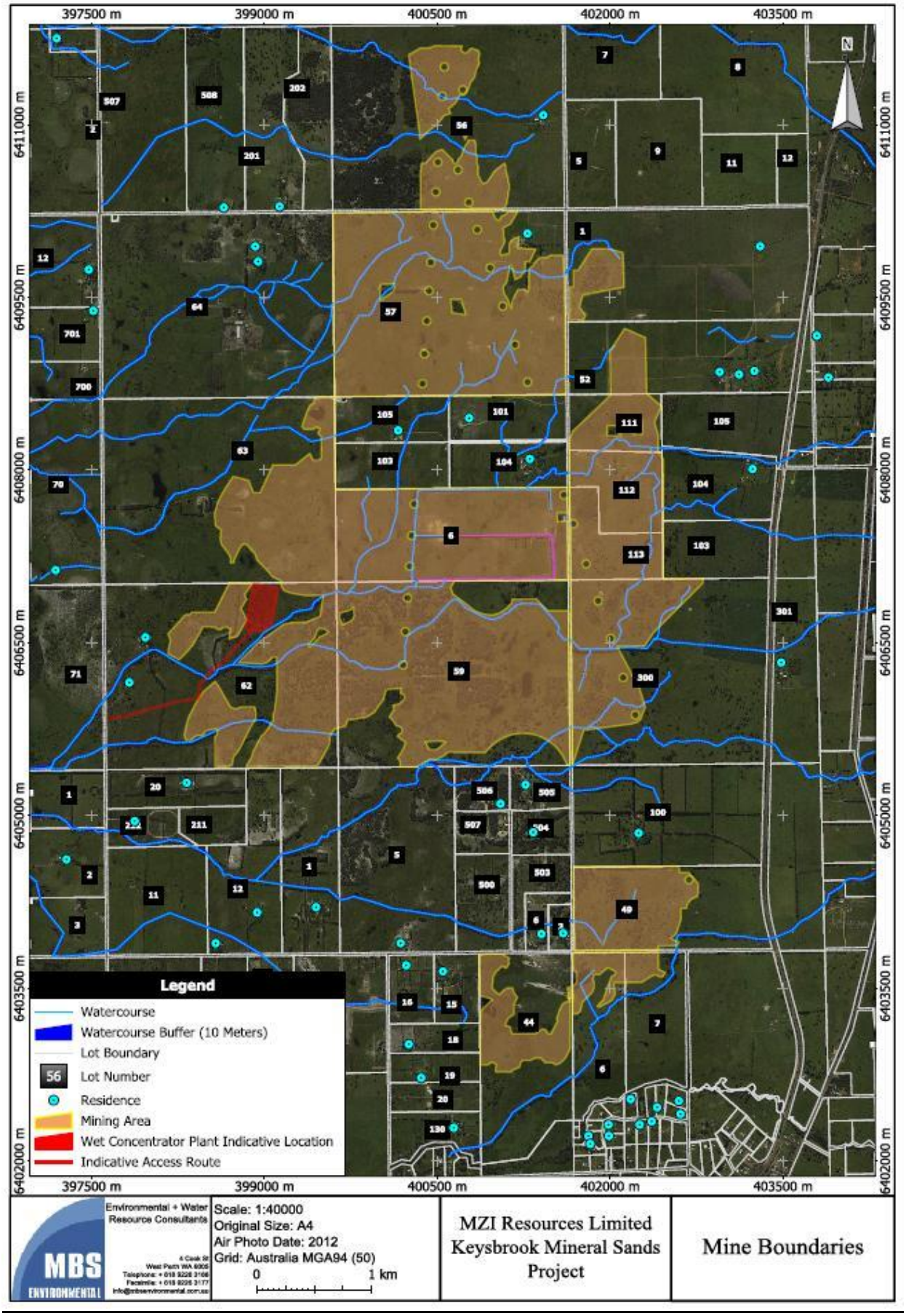


**Figure 2.** Mine boundaries

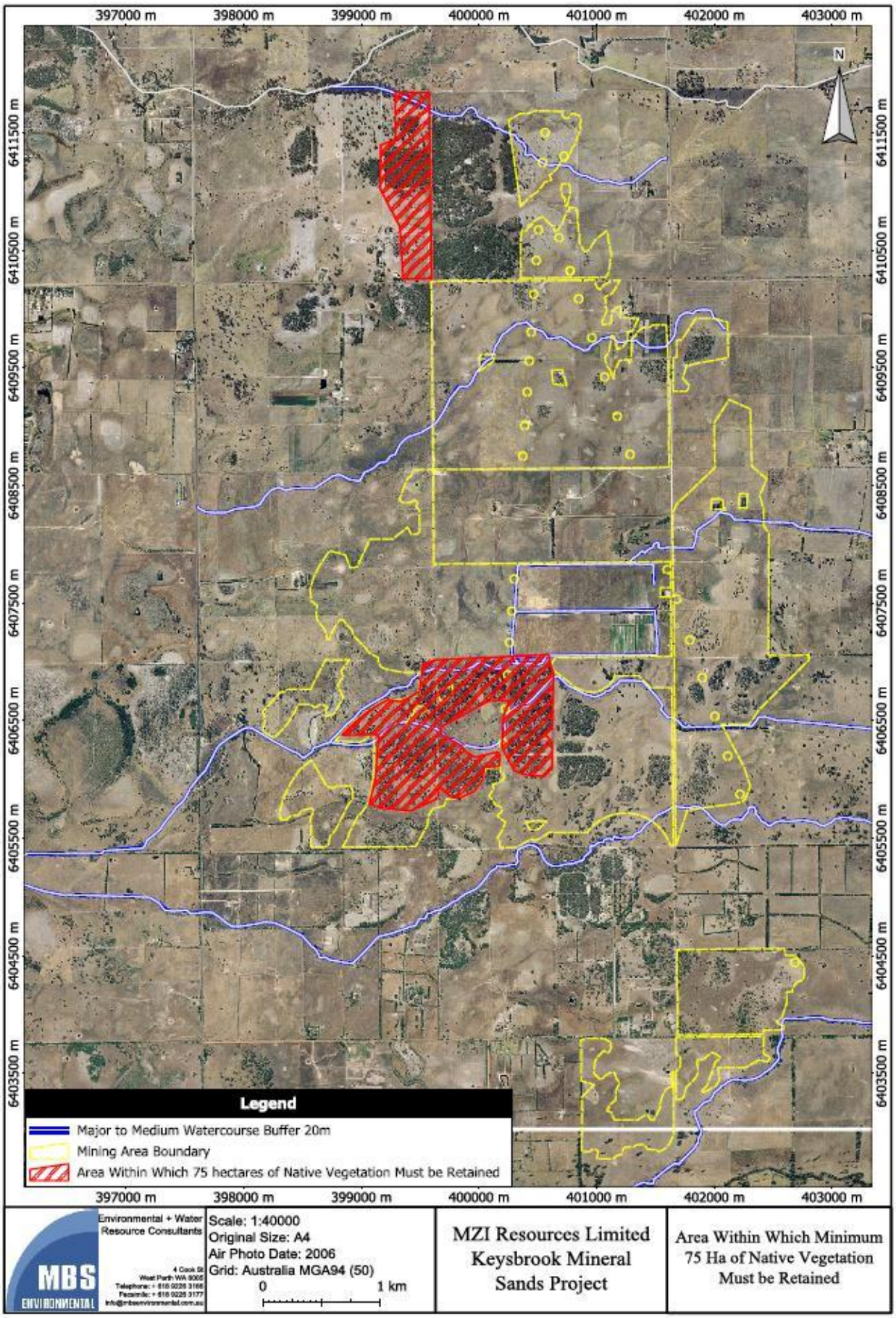


**Figure 3.** Area Within Which Minimum 75 hectares of Native Vegetation Must be Retained (Condition 6-1).

# Attachment 3 to Ministerial Statement 810

## Change to proposal approved under section 45C of the *Environmental Protection Act 1986*

This Attachment replaces Schedule 1 and Attachment 2 of Ministerial Statement 810

**Proposal: Keysbrook Mineral Sands Mine**

**Proponent: Keysbrook Leucoxene Pty Ltd**

**Changes:**

- Amend the approved mining area from 1379 hectares to 1532 hectares and include all of Lots 101, 103, 104 and 105 Westcott Road, Keysbrook.
- Relinquish several minor areas from the approved mining area totalling 7.2 ha.
- Increase the Life of Mine from 8 to 9 years (approx.)
- Increase product quantity from 920,000 tonnes to 1,020,000 tonnes of heavy mineral concentrate.
- Amend the figures of MS 810 to include the Development Envelope and additional mining area.

**Table 1: Summary of the Proposal**

| | |
|---|---|
| Proposal Title | Keysbrook Mineral Sands Mine |
| Short Description | The proposal is to develop a mineral sands mine near the Keysbrook township. The proposal involves the excavation and processing of a low-grade heavy mineral sands deposit. An area of up to 30 hectares will be progressively mined at any time. Waste from the processing will be used as backfill in the mined areas. Backfilled areas will be progressively re-contoured and stabilised prior to topsoil replacement and return to pasture or native vegetation. |

**Table 2: Location and authorised extent of physical and operational elements**

| **Element** | **Description of Proposal** | | **Proposed Description** | |
|---|---|---|---|---|
| Land tenure over the mine area | **Keysbrook** | **North Dandalup** | **Keysbrook** | **North Dandalup** |
| | Part Lot 56 Westcott Rd<br>Part Lot 57 Elliott Rd | Part Lot 62 Hopeland Road<br>Part Lot 59 Westcott Rd | Part Lot 56 Westcott Rd<br>Part Lot 57 Elliott Rd | **Part Lot 31 Hopeland Rd**<br>**Part Lot 32 Hopeland Rd** |

| Element | Description of Proposal | | Proposed Description | |
|---|---|---|---|---|
| | Part Lot 1 Elliott Rd<br>Part Lot 52 Westcott Rd<br>Part Lot 111 Westcott Rd<br>Lot 112 Westcott Rd<br>Lot 113 Westcott Rd<br>Part Lot 6 Westcott Rd<br>Part Lot 63 Hopeland Rd | Part Lot 300 Westcott Rd<br>Part Lot 49 Readheads Rd<br>Part Lot 7 Readheads Rd<br>Part Lot 6 Readheads Rd<br>Part Lot 44 Readheads Rd | Part Lot 1 Elliott Rd<br>Part Lot 52 Westcott Rd<br>Part Lot 111 Westcott Rd<br>Lot 112 Westcott Rd<br>Lot 113 Westcott Rd<br>Part Lot 6 Westcott Rd<br>Part Lot 63 Hopeland Rd<br>**Lot 101 Westcott Rd**<br>**Lot 103 Westcott Rd**<br>**Lot 104 Westcott Rd**<br>**Lot 105 Westcott Rd** | **Part Lot 33 Hopeland Rd**<br>**Part Lot 34 Hopeland Rd**<br>Part Lot 59 Westcott Rd<br>Part Lot 300 Westcott Rd<br>Part Lot 49 Readheads Rd<br>Part Lot 7 Readheads Rd<br>Part Lot 6 Readheads Rd<br>Part Lot 44 Readheads Rd |
| Life of Mine | Approximately 8 years | | **Approximately 9 years** | |
| Product quantity | Approximately 920,000 tonnes of heavy mineral concentrate | | **Approximately 1,020,000 tonnes of heavy mineral concentrate** | |
| Pit depth | Average 2 metres below ground level, and up to 6 metres on sandy dunes | | Average 2 metres below ground level, and up to 6 metres on sandy dunes | |
| Proposal Area | Up to 1379 hectares | | **Up to 1532 hectares** | |
| Dewatering | In-pit sumps to dewater the superficial Bassendean Sand aquifer at 0.2 gigalitres per annum | | In-pit sumps to dewater the superficial Bassendean Sand aquifer at 0.2 gigalitres per annum | |
| Bore abstraction | Up to 1.8 gigalitres per annum from two bores into the deep Leederville aquifer | | Up to 1.8 gigalitres per annum from two bores into the deep Leederville aquifer | |

Note: Text in **bold** in Table 2 indicates a change to the proposal.

**Table 3: Abbreviations**

| Abbreviation | Term |
|---|---|
| CEO | Chief Executive Officer |
| GL | gigalitre |
| ha | hectare |
| km | kilometre |

**Figures (attached)**

Figure 1 Keysbrook Mineral Sands Mine - Regional Location
Figure 2 Keysbrook Mineral Sands Mine - Development Envelope and Mining Area

[Signed 14 October 2019]

**Dr Tom Hatton**
CHAIRMAN
Environmental Protection Authority
under delegated authority

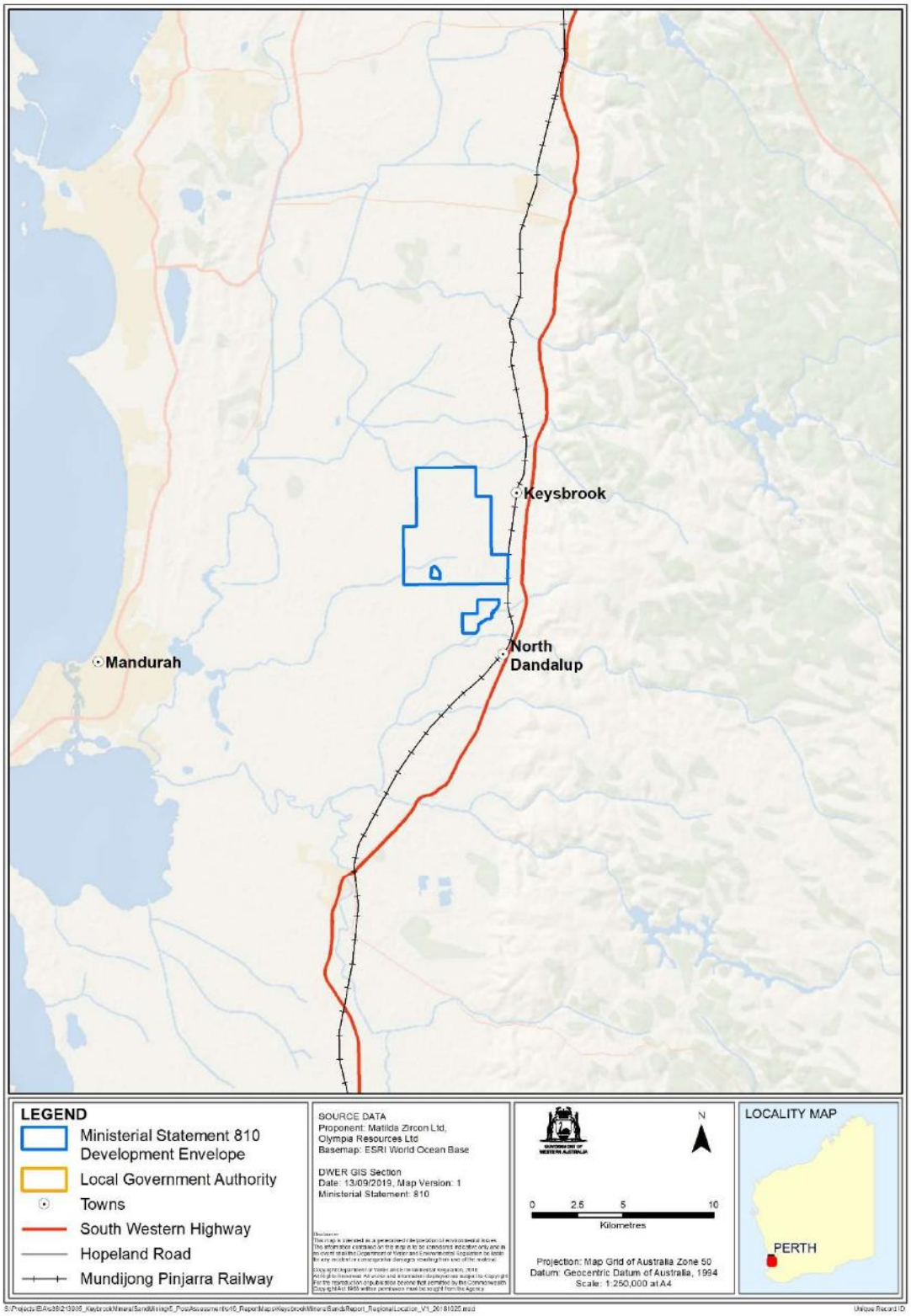


**Figure 1: Keysbrook Mineral Sands Mine - Regional Location**

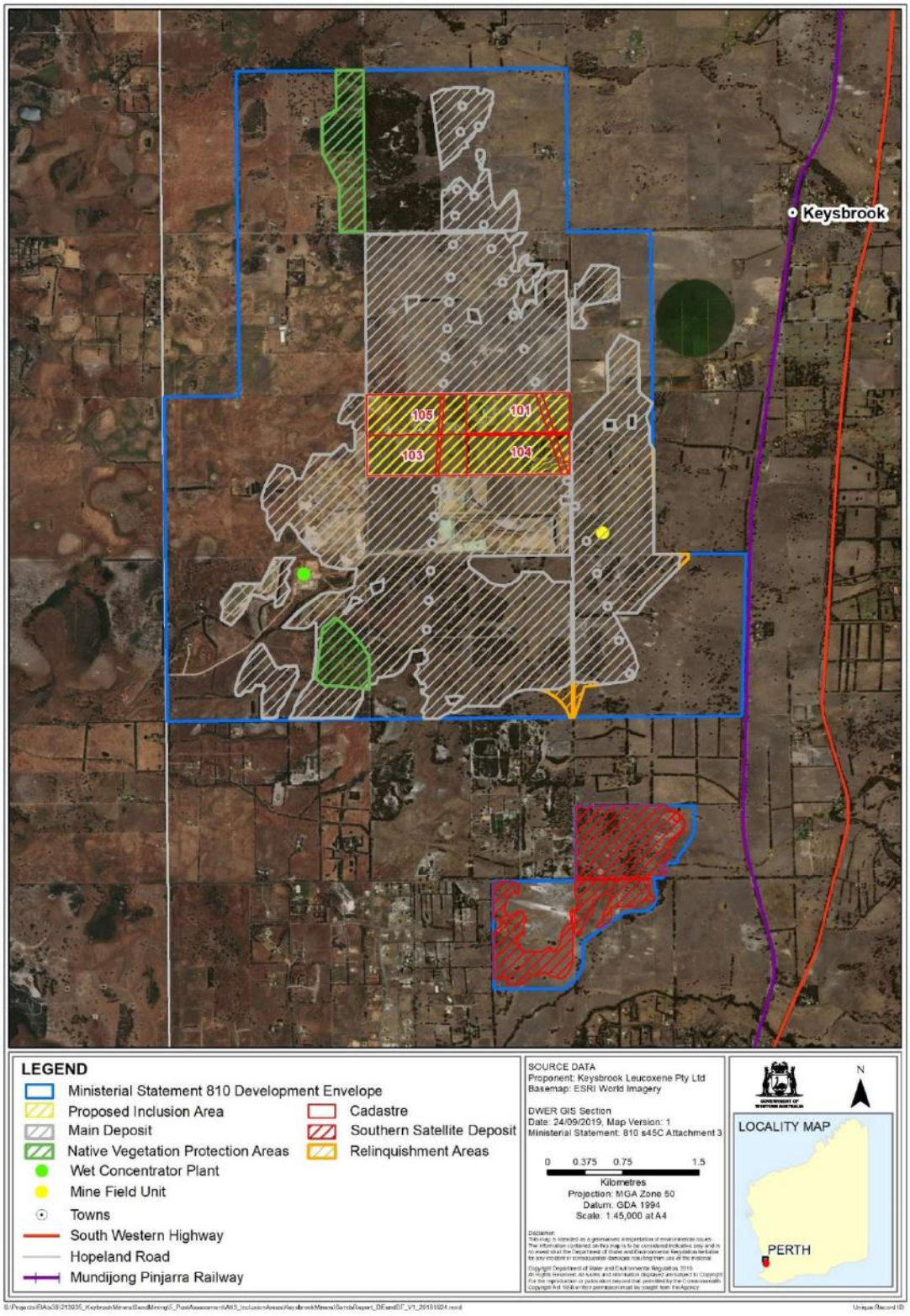


**Figure 2: Keysbrook Mineral Sands Mine - Development Envelope and Mining Area**

Published on: 8 February 2019 Statement No. 1089

# STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE *ENVIRONMENTAL PROTECTION ACT 1986*)

KEYSBROOK MINERAL SANDS MINE
SHIRE OF SERPENTINE JARRAHDALE AND SHIRE OF MURRAY

**Proposal:** To develop a mineral sands mine near the Keysbrook township. The proposal involves the excavation and processing of a low-grade heavy mineral sands deposit. The proposal is described further in Schedule 1 of Statement 810.

**Proponent:** MZI Resources Ltd
Australian Company Number 077 221 722

**Proponent Address:** Level 2, 100 Royal Street
EAST PERTH WA 6004

**Assessment Number:** 2110

**Report of the Environmental Protection Authority:** 1627

**Previous Assessment Numbers:** 1580, 2020

**Previous Report Numbers:** 1269, 1528

**Preceding Statements Relating to this Proposal:** 810, 984

Pursuant to section 45 of the *Environmental Protection Act 1986*, as applied by section 46(8), it has been agreed that the implementation conditions set out in Ministerial Statement No. 810 (as amended by Ministerial Statement 984) be changed as specified in this Statement.

**Condition 14 of Ministerial Statement 810 is deleted and replaced with:**

## 14 Noise Management

### Interim Period

14-1A During the period up to twelve (12) months from the date of this Statement, the proponent shall manage the proposal as follows:

(1) Unless otherwise agreed in writing between the proponent and the owner and any occupier of noise sensitive premises:

(a) the proposal must comply with the Noise Regulations at any building associated with a noise sensitive use at any noise sensitive premises; and

(b) outside the hours 0700 to 1900 Monday to Saturday, Sunday, or on public holidays, no mining activity is to be undertaken within 1,500 metres of any building associated with a noise sensitive use at any noise sensitive premises.

(2) The requirement in condition 14-1A(1) does not apply in respect of noise sensitive premises that are not being used for a noise sensitive purpose.

### Separation Distances

14-1 After the period up to twelve (12) months from the date of this Statement, the proponent shall manage the proposal as follows, unless varied by condition 14-2 or 14-3:

(1) no Mineral Processing Activity is to be undertaken at any time within two (2) kilometres of a highly sensitive area;

(2) during the Day and Evening periods, no Mining Operations are undertaken within two (2) kilometres of a highly sensitive area; and

(3) during the Night period, no Mining Operations are undertaken within three point three (3.3) kilometres of a highly sensitive area.

### Amenity Agreements

14-2 The requirements in condition 14-1 do not apply in respect of a particular highly sensitive area if:

(1) the proponent and the landowner and occupier of that highly sensitive area have agreed otherwise in writing; and

(2) notwithstanding any agreement referred to in condition 14-2(1):

(a) Noise Emission levels received Indoors during the Evening period do not exceed 30 dB $L_{A10}$ + Influencing factor (Tonal adjustment is applicable).

(b) Noise Emission levels received Indoors during the Night period do not exceed 25 dB $L_{A10}$ + Influencing factor (Tonal adjustment is applicable).

(c) The proponent shall ensure that highly sensitive areas have appropriate acoustic attenuation to demonstrate that Noise Emission levels received Indoors as defined in conditions 14-2(2)(a) and 14-2(2)(b) can be met at all times.

(d) The proponent shall assume worst case conditions for modelling and attenuation, to be verified by an Independent acoustic expert, and reported in accordance with condition 14-9.

**Noise Management and Monitoring Plan**

14-3 The requirements in condition 14-1 may be varied or substituted if:

(1) the proponent prepares and submits a Noise Management and Monitoring Plan (NMMP) to the CEO, in accordance with condition 14-4, which demonstrates that reduced distances will achieve compliance with the Noise Regulations;

(2) the CEO approves in writing the NMMP for the purpose of varying condition 14-1; and

(3) the proponent implements the provisions of the approved NMMP.

14-4 The NMMP submitted under condition 14-3(1) must include:

(1) a calibrated noise model that assumes worst case meteorological conditions for noise propagation and tonal characteristics at all times, that is validated by an independent acoustic expert;

(2) noise monitoring to include noise levels at a location or locations representative of the highly sensitive area closest to the area for which varied distances to those defined in condition 14-1 are proposed to apply;

(3) details of management measures, including but not limited to, any actions undertaken to reduce noise emissions from the proposal, monitoring, and reporting;

(4) community consultation that has been undertaken, including any agreement on implementation of noise mitigation measures with residents; and

(5) the procedure and data reporting to demonstrate compliance in the event of a community complaint regarding operational noise, or at the request of the CEO.

14-5 The proponent shall review and revise the NMMP as and when directed by the CEO.

14-6 Any approved NMMP shall be made available to the public in a manner approved by the CEO.

14-7 Any changes to management measures, including actions, monitoring and reporting in the NMMP must be approved by the CEO in writing, including any scheduled movements of the Wet Concentrator Plant and Mine Field Unit elements of the proposal.

**Noise Monitoring and Reporting**

14-8 The proponent shall monitor noise and submit annual noise reports to the CEO from the issue of this Statement that shall be submitted as part of the proponent's compliance assessment reporting process, conditioned under 4-6 of Statement 810.

14-9 The report referred to in condition 14-8 shall address operations, noise management, and noise emissions for each time period (Day, Evening, and Night) for the purpose of demonstrating compliance with condition 14-1A and 14-1, 14-2 and 14-3 (as applicable) and shall include the following:

(1) a description of the equipment and methods used for monitoring and modelling of operational noise emissions, to a level of detail that would enable them to be independently reproduced by an acoustic expert;

(2) an assessment prepared by an independent acoustic expert which demonstrates to a reasonable and practical extent (or otherwise satisfactorily to the CEO) the level of compliance with applicable noise levels at all nearby noise sensitive premises; and

(3) a description of the noise management measures employed during the period.

14-10 In the event of a potential breach of these conditions, the proponent shall investigate the incident(s) and report the exceedance in writing to the CEO within two (2) business days of the breach being identified.

[signed on 8 February 2019]

Hon Stephen Dawson MLC
**MINISTER FOR ENVIRONMENT**

## Table 1: Abbreviations and definitions

| Acronym or abbreviations | Definition or term |
|---|---|
| CEO | The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or its delegate. |
| Day period | Monday to Saturday between the hours of 0700 to 1900 Australian Western Standard Time. |
| dB | decibels |
| Evening period | Monday to Saturday between the hours of 1900 to 2200 Australian Western Standard Time; and Sundays and public holidays between the hours of 0900 and 2200 Australian Western Standard Time. |
| Highly sensitive area | Has the same meaning as defined by regulation 8(1) of the *Environmental Protection (Noise) Regulations 1997*. |
| Independent acoustic expert | A person qualified and experienced in the area of environmental noise assessment and who by their qualifications and experience is eligible to hold membership of the Association of Australasian Acoustical Consultants. The acoustic expert must be without conflict of interest or any business or financial relationship with the proponent or its associates other than being recompensed for professional services rendered to the proponent. |
| Indoors | Locations which reasonably represent human occupation of an enclosed space within a highly sensitive area as defined in regulation 8 of the *Environmental Protection (Noise) Regulations 1997*, with all windows and doors in their closed position. |
| Influencing factor | Determined under Schedule 3 of the *Environmental Protection (Noise) Regulations 1997*. |
| $L_{A10}$ | Has the same meaning as defined by regulation 8(1) of the *Environmental Protection (Noise) Regulations 1997*. |
| Mineral Processing Activity | Use of equipment in the processing of minerals, which includes:<br>• loading of ore to the Mine Field Unit;<br>• operation of the Mine Field Unit;<br>• associated motors delivering ore from the Mine Field Unit to the Wet Concentrator Plant and movement of tailings and water between the Wet Concentrator Plant and mine void;<br>• operation of the Wet Concentrator Plant; and<br>• fixed equipment associated with the Wet Concentrator Plant (cyclones and thickener). |
| Mining Operations | Use of equipment in the extraction and haulage of earth bearing minerals, including:<br>• the removal of overburden by mechanical or other means and the stacking, deposit, and storage of any substance considered to contain any mineral;<br>• field pumps, including production bores with surface mounted motors/pumps;<br>• the use of mobile mining fleet (graders, bulldozers, excavators and haul trucks within the disturbance footprint); and<br>• any works associated with rehabilitation of land disturbed in the extraction and processing of the mineral resource, except land disturbed prior to 31 December 2019. |

| Acronym or abbreviations | Definition or term |
|---|---|
| Night Period | Monday to Saturday between the hours of 2200 to 0700 Australian Western Standard Time; and Sundays and public holidays until 0900 Australian Western Standard Time. |
| Noise Emissions | Noise emitted from premises occupied by the Keysbrook Mineral Sands Mine. |
| Noise Regulations | *Environmental Protection (Noise) Regulations 1997.* |
| Noise sensitive premises | Has the same meaning as defined by regulation 2(1) of the *Environmental Protection (Noise) Regulations 1997*. |
| Noise sensitive purpose | Has the same meaning as defined by regulation 2(1) of the *Environmental Protection (Noise) Regulations 1997*. |
| Tonal adjustment | Determined under regulation 9 of the *Environmental Protection (Noise) Regulations 1997*. |

# APPENDIX 4: DWER LICENCE

Government of Western Australia
Department of Water and Environmental Regulation

# Amended Licence

| | |
|---|---|
| **Licence number** | L8918/2015/1 |
| **Licence holder** | Keysbrook Leucoxene Pty Ltd |
| **ACN** | 137 091 297 |
| **Registered business address** | 1391 Hopeland Road<br>NORTH DANDALUP WA 6207 |
| **DWER file number** | DER2015/001866 |
| **Duration** | 19/11/2015 to 29/06/2023 |
| **Date of amendment** | 24/01/2020 |
| **Premises details** | Keysbrook Mineral Sands Mine<br>1391 Hopeland Road<br>NORTH DANDALUP WA 6207<br><br>Legal description -<br>Part of Lot 1 on Diagram 8916, Lots 101, 103, 104 & 105 on Diagram 92169, Lots 111, 112 & 113 on Diagram 94183, Lot 300 on Plan 31012, Lots 31, 32, 33 & 34 on Plan 408493, part of Lot 52 on Plan 739, Lots 56, 57, 59 & 63 on Plan 739 and Lot 6 on Diagram 52395 |

| **Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)** | **Assessed production capacity** |
|---|---|
| Category 6: Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore. | 150,000 tonnes per annual period |
| Category 8: Mineral sands mining or processing: premises on which mineral sands ore is mined, screened, separated or otherwise processed. | 5,250,000 tonnes per annual period |

This licence is granted to the licence holder, subject to the attached conditions, as amended on 24 January 2020, by:

**Tim Gentle**
**MANAGER, RESOURCE INDUSTRIES**
**REGULATORY SERVICES**
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

# Licence history

| Date | Instrument | Summary of changes |
|---|---|---|
| 27/03/2014 | W5386/2013/1 | Works approval issued to MZI Resources for mine establishment. |
| 19/11/2015 | L8918/2015/1 | Initial licence issued to Keysbrook Leucoxene Pty Ltd to authorise mining operations. |
| 03/11/2016 | L8918/2015/1 | Amendment Notice 1 – upgrades to WCP to include additional spiral circuit. |
| 24/01/2020 | L8918/2015/1 | Licence amendment to expand the premises boundary to align with the approved mining area under MS 810, and other administrative changes (this amendment). |

# Interpretation

In this licence:

(a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;
(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
(c) where tables are used in a condition, each row in a table constitutes a separate condition;
(d) any reference to an Australian or other standard, guideline, or code of practice means the version of the standard, guideline, or code of practice in force at the time of granting of this licence and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the licence;
(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and
(f) unless specified otherwise, all definitions are in accordance with the EP Act.

**NOTE:** This licence requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this licence.

# Licence conditions

The licence holder must ensure that the following conditions are complied with:

## Construction works

**1.** The licence holder must ensure that where infrastructure listed in Table 1 is required to be constructed, it is done so in a manner that meets or exceeds the design and construction requirements specified in that table.

**2.** The licence holder must not depart from the requirements specified in Table 1 except:

(a) where such departure does not increase risks to public health, public amenity or the environment; and
(b) all other conditions in this licence are still satisfied.

**Table 1: Works infrastructure requirements table**

| Infrastructure | Requirements (design and construction) |
|---|---|
| In-pit tailings storage facilities | • Must be constructed within previous mine voids or on-mine-path;<br>• Embankment walls must be constructed with clayey sand or similar with angle of repose for the outer pond wall being minimum 1:2 (V:H);<br>• Height of embankment walls must not exceed 2.0 metres above natural |

| Infrastructure | Requirements (design and construction) |
|---|---|
| | ground level; |
| Pipelines carrying clay slimes, sand tailings and return water | Must be constructed with:<br>• Automatic cut-outs in the event of a pipe failure; OR<br>• Secondary containment sufficient to contain any spill for a period equal to the time between routine inspections; OR<br>• Telemetry systems and pressure sensors along pipelines to allow detection of leaks and failures; |

## Infrastructure and equipment

**3.** The licence holder must ensure the infrastructure specified in Table 2 is maintained in good working order and operated in accordance with the requirements specified in that table.

**Table 2: Infrastructure and equipment controls table**

| | Infrastructure / equipment | Operational requirements |
|---|---|---|
| | **Mining infrastructure and equipment** | |
| 1 | Process plant / WCP | • Design capacity of plant – 600 tph;<br>• Cladding must be maintained to ground level on all facades;<br>• All pumps must be enclosed; |
| 2 | Mining unit / MUP | • None specified; |
| 3 | Pipelines carrying HMC | • Must be equipped with telemetry systems and pressure sensors along pipelines to allow the detection of leaks and failures; |
| 4 | Process water pond(s) | • Must be lined to achieve a permeability of at least $1x10^{-9}$ m/s (or equivalent);<br>• pH and EC probes must be installed on overflow point; and<br>• flow metering device must be installed on overflow point; |
| 5 | HMC stockpile pad | • Must be constructed with compacted overburden or similar;<br>• Drainage must be designed to divert surface water runoff for collection and return to the process water pond. |
| | **Tailings infrastructure** | |
| 1 | In-pit tailings storage facilities | • Supernatant water must be collected and pumped to the process water pond(s);<br>• Water levels must be maintained at least 500 mm below the top of the wall; and<br>• Must maintain a safety bund around the perimeter of active pits being tailed, as containment redundancy; |
| 2 | Pipelines carrying tailings and return water | • Must be equipped with telemetry systems and pressure sensors along pipelines to allow the detection of leaks and failures; |
| | **Stormwater infrastructure** | |
| 1 | Diversion channels and drains | • Must maintain a network of diversion channels and drains to divert all stormwater runoff from disturbed areas within the Premises to allow for collection and reuse in processing; |
| | **Rehabilitation** | |
| 1 | Overburden/topsoil stockpiles | • Must be stabilised to prevent dust lift-off where there is a risk of dust affecting sensitive receptors. |

4. The licence holder must undertake inspections of the scope and type and at the corresponding frequency specified in Table 3.

5. Where any inspection required by condition 4 identifies that an appropriate level of environmental protection is not being maintained, the licence holder must:

   (a) take corrective action to mitigate adverse environmental consequences as soon as practicable; and
   (b) maintain a written log of all inspections undertaken, with each inspection signed off by the person who conducted the inspection.

**Table 3: Inspection of infrastructure requirements table**

| Column 1 | Column 2 | Column 3 |
|---|---|---|
| **Scope of inspection** | **Type of inspection** | **Frequency of inspection** |
| Pipelines carrying HMC and tailings | Visual integrity and leak assessment | Daily whilst operating; Monthly if not operating |
| Return water pipelines | | |
| In-pit tailings storage facilities | Visual integrity, leak assessment and freeboard capacity | |

## Disposal of mine tailings

6. The licence holder must ensure that tailings are deposited in accordance with the requirements and at the location(s) specified in Table 4.

**Table 4: Tailings disposal requirements table**

| Emission | Disposal requirements |
|---|---|
| Sand tailings from the WCP | Must be:<br>• deposited directly into mined pits using cyclone stackers; or<br>• blended with clay slimes and pumped as a wet slurry to mined pits; |
| Clay slimes from the thickener | Must be:<br>• thickened and blended with sand tailings and pumped as a wet slurry to mined pits; or<br>• used as dust suppressant on exposed areas within the Premises; |
| Picton tails | Must be blended with WCP tailings for disposal in mined pits as a wet slurry. |

7. The licence holder must ensure the radioactivity of tailings deposited in accordance with condition 6, as averaged over each processing campaign at Picton, does not exceed the following:

   (a) 244 ppm Thorium; and
   (b) 79 ppm Uranium.

## Disposal of process water

8. The licence holder must ensure that where excess mine water is required to be discharged to the environment, it is done so in accordance with the requirements specified in Table 5.

**Table 5: Process water disposal requirements table**

| Source | Emission point ref | Description | Discharge limit |
|---|---|---|---|
| Process water pond(s) | W1 – overflow point from process water pond(s) | Water flows into Balgobin Brook South, via a lined spillway | 150,000 tonnes per annual period |

## Monitoring (general)

**9.** The licence holder must ensure that:

(a) all water samples are collected and preserved in accordance with AS/NZS 5667.1;
(b) all surface water sampling is conducted in accordance with AS/NZS 5667.6;
(c) all groundwater sampling is conducted in accordance with AS 2531 and AS/NZS 5667.11; and
(d) all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured, unless indicated otherwise in the relevant table.

**10.** The licence holder must ensure that:

(a) weekly monitoring is undertaken at least 5 days apart;
(b) monthly monitoring is undertaken at least 15 days apart;
(c) quarterly monitoring is undertaken at least 45 days apart;
(d) 6-monthly monitoring is undertaken at least 4 months apart; and
(e) annual monitoring is undertaken at least 9 months apart.

**11.** The licence holder must ensure that all monitoring equipment used on the premises to comply with the conditions of this licence is calibrated in accordance with the manufacturer's specifications.

## Emissions monitoring

**12.** The licence holder must undertake monitoring of discharges to surface water at the locations and for the parameters listed in Table 6, in the corresponding units, over the averaging period and at the frequency specified in that table.

**Table 6: Mine dewatering monitoring table**

| Monitoring point reference | Parameter | Units | Frequency[1] |
|---|---|---|---|
| SW1 – process water pond(s) overflow point | Volumetric flow rate[2] | $m^3/d$ | Daily when discharging[3] |
| | pH[2] | - | Weekly when discharging |
| | Total dissolved solids[2] | mg/L | |
| | Total suspended solids | | |
| | Total titratable acidity | | Monthly when discharging |
| | Sulfate | | |
| | Aluminium, arsenic, chromium, copper, lead, manganese, nickel, zinc, total recoverable hydrocarbons, ammonium | | |

*Note 1: Sampling must occur on the first day of discharge, then weekly/monthly thereafter.*
*Note 2: In-field, non-NATA accredited analysis permitted.*
*Note 3: Availability ≥90% of the measurement intervals on a monthly basis.*

## Process monitoring

**13.** The licence holder must undertake monitoring of the parameters for the process listed in Table 7, in the corresponding units and the frequency specified in that table.

**Table 7: Process monitoring table**

| Process description | Parameter | Units | Frequency |
|---|---|---|---|
| Disposal of Picton tails | Amount and location of Picton tails disposed on the Premises | Wet tonnes | Monthly |

## Ambient environmental monitoring

**14.** The licence holder must undertake monitoring of ambient surface water quality at the locations and for the parameters listed in Table 8, in the corresponding units, over the averaging period and at the frequency set out in that table.

**Table 8: Surface water monitoring table**

| Monitoring point and reference location | Parameter | Units | Averaging period | Monitoring frequency |
|---|---|---|---|---|
| WQ1[2]<br>WQ2<br>WQ3[3] | pH[1] | - | Spot sample | Monthly, when flowing |
| | Electrical conductivity @ 25°C[1] | µS/cm | | |
| | Total dissolved solids[1] | mg/L | | |
| | Total suspended solids | | | |
| | Sulfate | | | |

*Note 1: In-field, non-NATA accredited analysis permitted.*
*Note 2: Upstream of the discharge location W1.*
*Note 3: Downstream of the discharge location W1.*

**15.** The licence holder must undertake monitoring of ambient groundwater at the locations and for the parameters listed in Table 9, in the corresponding units, over the averaging period and at the frequency set out in that table.

**Table 9: Groundwater monitoring table**

| Monitoring point and reference location | Parameter | Units | Averaging period | Monitoring frequency |
|---|---|---|---|---|
| KS1 – KS26 | Standing Water Level[1] | mbgl | Spot sample | Quarterly |
| | pH[1] | - | | |
| | Electrical conductivity @ 25°C[1] | µS/cm | | |
| | Total dissolved solids[1] | mg/L | | |
| | Total titratable acidity | | | 6-monthly |
| | Sulfate | | | |
| | Aluminium, arsenic, chromium, copper, lead, manganese, nickel, zinc, total recoverable hydrocarbons, ammonium | | | Annual |
| | Gross alpha activity, gross beta activity | Bq/L | | |

*Note 1: In-field, non-NATA accredited analysis permitted.*
*Note 2: Must be monitored in bores where total titratable acidity exceeds 40 mg/L.*

## Records and reporting

**16.** The licence holder must maintain accurate and auditable books including the following records, information, reports, and data required by this licence:

(a) the calculation of fees payable in respect of this licence;
(b) any maintenance of infrastructure that is performed in the course of complying with condition 3 of this licence;
(c) monitoring programmes undertaken in accordance with conditions 12, 13, 14 and 15 of this licence; and
(d) complaints received under condition 18 of this licence.

**17.** The books specified under condition 16 must:

(a) be legible;
(b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;
(c) be retained by the licence holder for the duration of the licence; and
(d) be available to be produced to an inspector or the CEO as required.

**18.** The licence holder must record the following information in relation to complaints received by the licence holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:

(a) the name and contact details of the complainant, (if provided);
(b) the time and date of the complaint;
(c) the complete details of the complaint and any other concerns or other issues raised; and
(d) the complete details and dates of any action taken by the licence holder to investigate or respond to any complaint.

**19.** The licence holder must:

(a) undertake an audit of their compliance with the conditions of this licence during the preceding annual period; and
(b) prepare and submit to the CEO, by no later than 1 March in each year, an Annual Audit Compliance Report in the approved form.

### *Annual environmental report*

**20.** The licence holder must submit to the CEO, no later than 1 March in each year, an annual environmental report which includes, but is not limited to:

(a) details of the calculation of fees payable in respect of this licence;
(b) a summary of the amount of topsoil removed, ore processed, HMC produced, tailings returned to mine voids, and Picton tails returned to the mine for blending and disposal;
(c) a summary of maintenance of infrastructure performed in the course of complying with condition 3;
(d) monitoring reports required by conditions 12, 13, 14 and 15 for the preceding annual period;
(e) a summary of any complaints received and management actions taken for each complaint; and
(f) a summary of any environmental incidents and any action(s) taken.

**21.** The licence holder must ensure the report required by condition 20 includes an appraisal and trend analysis of the results against any baseline data and previous monitoring results.

## Definitions

In this licence, the terms in Table 10 have the meanings defined.

**Table 10: Definitions**

| Term | Definition |
|---|---|
| Annual Audit Compliance Report (AACR) | means a report submitted in a format approved by the CEO (relevant guidelines and templates may be available on the Department's website). |
| ACN | Australian Company Number |
| AHD | Australian Height Datum |
| annual period | means a 12 month period commencing from 1 January until 31 December in the same year |
| AS 2531 | means the Australian Standard AS 2531 *Waters – Determination of gross alpha and gross beta activities* |
| AS/NZS 5667.1 | means the Australian Standard AS/NZS 5667.1 *Water Quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* |
| AS/NZS 5667.6 | means the Australian Standard AS/NZS 5667.6 *Water Quality – Sampling – Guidance on sampling of rivers and streams* |
| AS/NZS 5667.11 | means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters* |
| averaging period | means the time over which a limit is measured or a monitoring result is obtained |
| books | has the same meaning given to that term under the EP Act |
| Bq/L | Bequerels per litre |
| CEO | means Chief Executive Officer of the Department.<br>CEO for the purposes of notification means:<br>Director General<br>Department Administering the *Environmental Protection Act 1986*<br>Locked Bag 10<br>JOONDALUP DC WA 6919<br>info@dwer.wa.gov.au |
| condition | means a condition to which this licence is subject under s.62 of the EP Act |
| Department | means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act |
| discharge | has the same meaning given to that term under the EP Act |
| emission | has the same meaning given to that term under the EP Act |
| EP Act | means the *Environmental Protection Act 1986* (WA) |
| EP Regulations | means the *Environmental Protection Regulations 1987* (WA) |
| freeboard | means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point. |
| HMC | Heavy Mineral Concentrate |
| licence | refers to this document, which evidences the grant of a licence by the CEO under s.57 of the EP Act, subject to the Conditions |
| licence holder | refers to the occupier of the premises being the person to whom this licence has been granted, as specified at the front of this licence |

| | |
|---|---|
| NATA | National Association of Testing Authorities, Australia |
| NATA accredited | means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis |
| Picton tails | means 'trash' material (gangue) from secondary off-site processing at the Picton mineral separation plant |
| Premises | refers to the premises to which this licence applies, as specified at the front of this licence and as shown on the map in Schedule 1 to this licence |
| prescribed premises | has the same meaning given to that term under the EP Act |
| quarterly | means the 4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September and 1 October to 31 December in the same year |
| 6-monthly | means the two inclusive periods from 1 January to 30 June and 1 July to 31 December in the same year |
| spot sample | means a discrete sample representative of the time and place at which the sample is taken |
| WCP | Wet Concentrator Plant |

**END OF CONDITIONS**

# Schedule 1: Maps

## Premises map and map of emission points

The boundary of the prescribed premises is shown in the map below (Figure 1). The locations of the emission points defined in Tables 2.2.1 and 2.3.1 are also shown below. The orange shaded areas depict the mine voids.

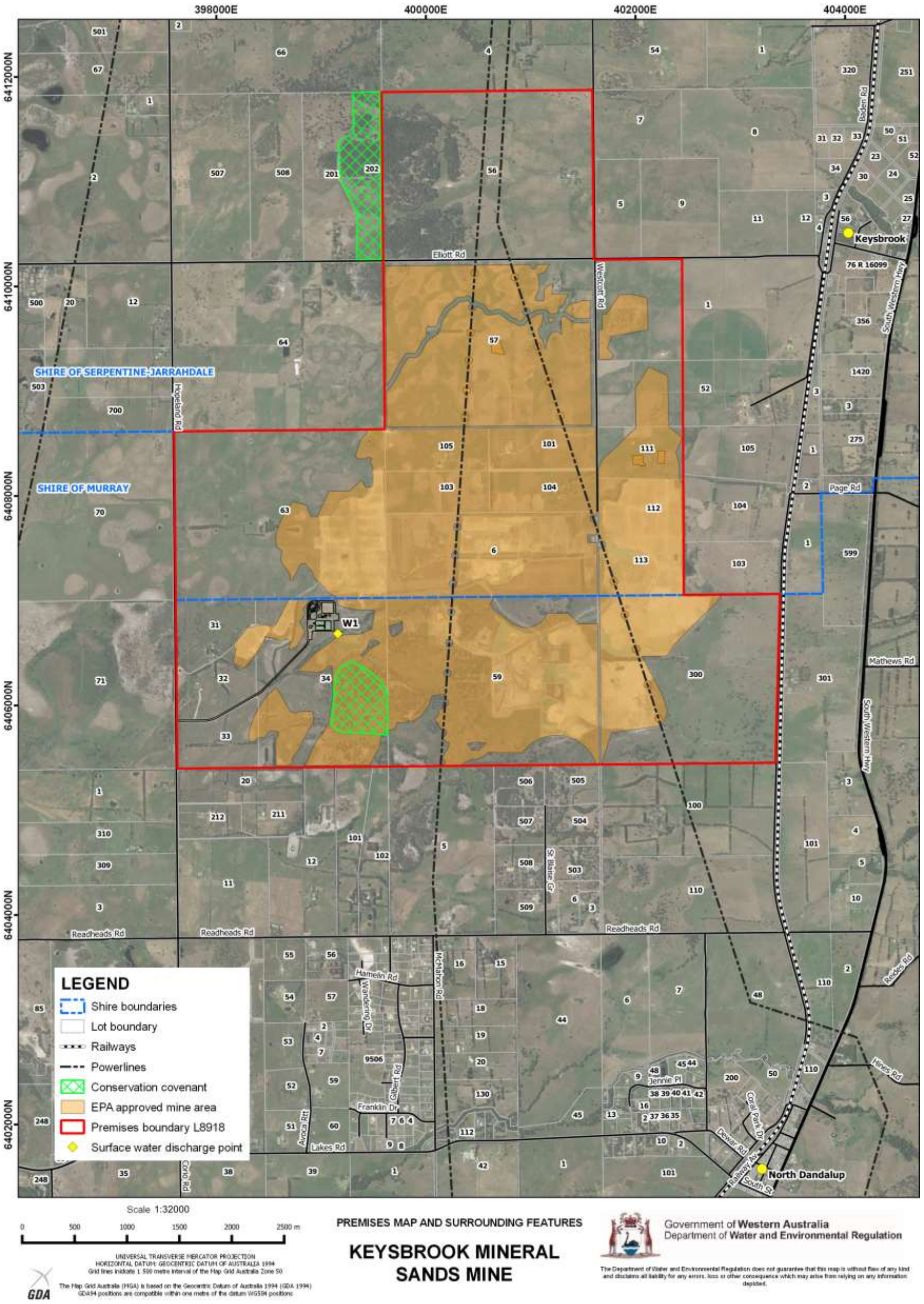


**Figure 1: Map of the boundary of the prescribed premises**

# Schedule 1: Maps

## Monitoring locations

The surface and groundwater monitoring locations are shown in the map below (Figure 2).

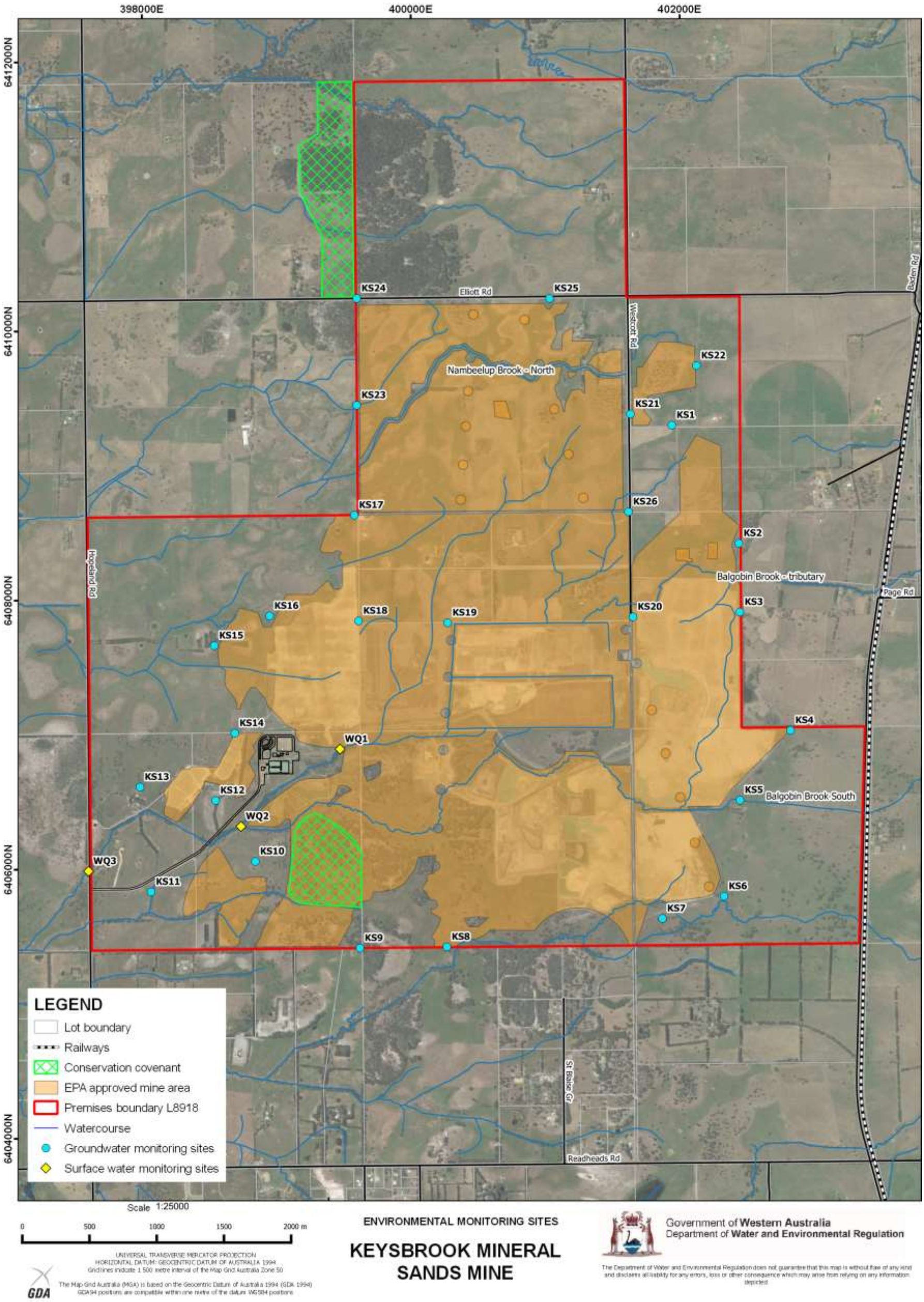


**Figure 2: Monitoring locations**

# APPENDIX 5: FIRE MANAGEMENT PLAN

HEALTH & SAFETY DEPARTMENT

# FIRE MANAGEMENT PLAN

| | |
|---|---|
| Point of Contact | OSH & E Superintendent |
| Document Owner | OSH & E Superintendent |
| Audit Frequency | Biennial |

| Version | Description | Originator | Approved | Date |
|---|---|---|---|---|
| A | Initial Plan | FirePlan WA | | November 2010 |
| 2 | Draft | MZI | - | July 2016 |
| 3 | Revision for operational relevance | PG | DL | 23/11/2017 |
| 4 | Revision following consult with Shire of SJ | Smith Consulting | PG | 26/01/19 |
| 5 | Updated based on legislation changes and approvals | PC | DO'H | 18/11/2020 |

# Fire Management Plan

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# Fire Management Plan

## 1. Purpose

The purpose of this Fire Management Plan is to detail provisions and resources to ensure Keysbrook operations (i) minimise the risk of bushfires; and (ii) are prepared for potential bushfire events.

This plan is a revision of the Fire Management Plan prepared prior to the commence of operations and referenced in planning/development approvals issued by the Shire of Murray and the Shire of Serpentine Jarrahdale (Fire Management Plan, FirePlan January 2011). The plan has been updated to reflect actual operating conditions, site management procedures and the progression of mining, and in so doing now serves as an operational management plan.

The provisions of the Guidelines for Planning in Bushfire Prone Areas (Department of Planning, Lands and Heritage and Department of Fire and Emergency Services, Version 1.3, December 2017) and Guidelines for Plantation Fire Protection (Fire and Emergency Services Authority, 2011) were considered in the review and update of the plan. The advice of the Shire of Serpentine Jarrahdale staff was sought and applied to this review.

## 2. Scope

This plan applies to the operational footprint of the Keysbrook Mineral Sands Mine operated by Keysbrook Leucoxene Pty Ltd (KLPL), which is a wholly owned subsidiary of Doral Mineral Sands.

Excluded from the scope are land holdings which KLPL own or lease which buffer mining operations and on which non-mining rural land uses occur in accordance with local government fire management requirements.

## 3. References

- Emergency Management Plan.
- Emergency Response Procedures.
- Guidelines for Planning in Bushfire Prone Areas (Department of Planning, Lands and Heritage and Department of Fire and Emergency Services, Version 1.2, August 2017).
- Bush Fire Regulations 1954 – Total Fire Ban Activities.

## 4. Goals/Aims/Targets

- Operations bushfire ready by 1 November each year
- Site adequately resourced with fire suppression vehicles including earth moving machinery to deal with the initial attack of an emergency event involving bushfire. See Section 7 for a full list of fire suppression vehicles and machinery.
- Site adequately resourced to deal with a localised fire which has the potential to cause a widespread bushfire event. The resources available to support the localised fire suppression is restricted to licensed fire suppression pumpers and unlicensed earth moving machinery if legally able to travel on the road.
- Positive relationship established with local bushfire brigades
- Positive relationship established with Shire representatives
- Be trained and prepared should a bushfire arise.

# Fire Management Plan

## 5. Location and Details

Entry to the site is via the access road which intersects 1424 Hopelands Road, North Dandalup. Figure 1 details the location of the Keysbrook Mine.

The general site overview includes the following fixed areas:

- Administration office and carpark area
- Production office and carpark area
- Wet Concentrator Plant
- Workshop and laydown yards

The active mining area and location of the Mine Field Unit changes as the operation progresses into the mine plan.

Mining occurs 12 hours a day 7 days a week and processing occurs 24 hours a day, 7 days a week.

# Fire Management Plan

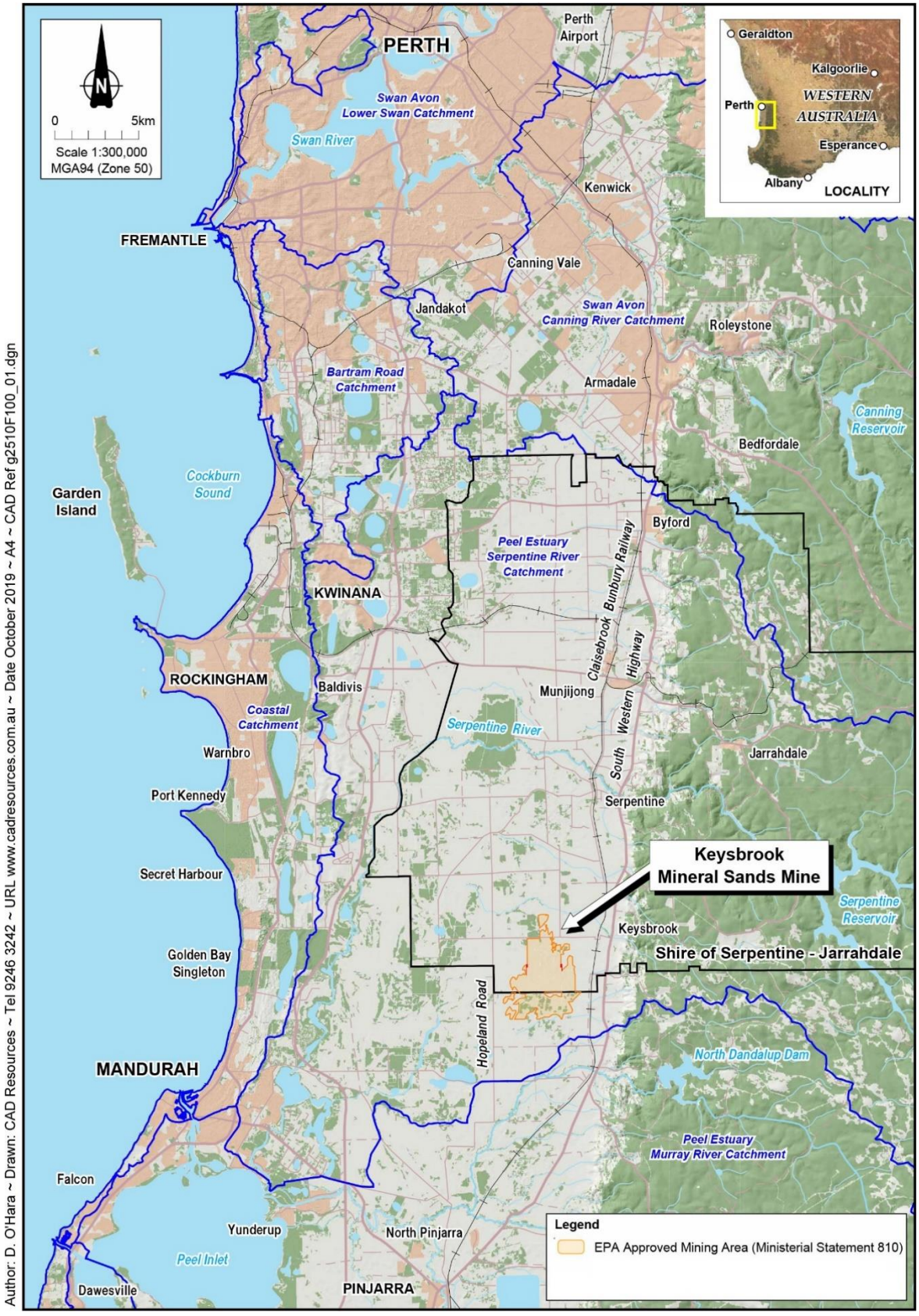


**Figure 1: Keysbrook Mineral Sands Mine Location**

# Fire Management Plan

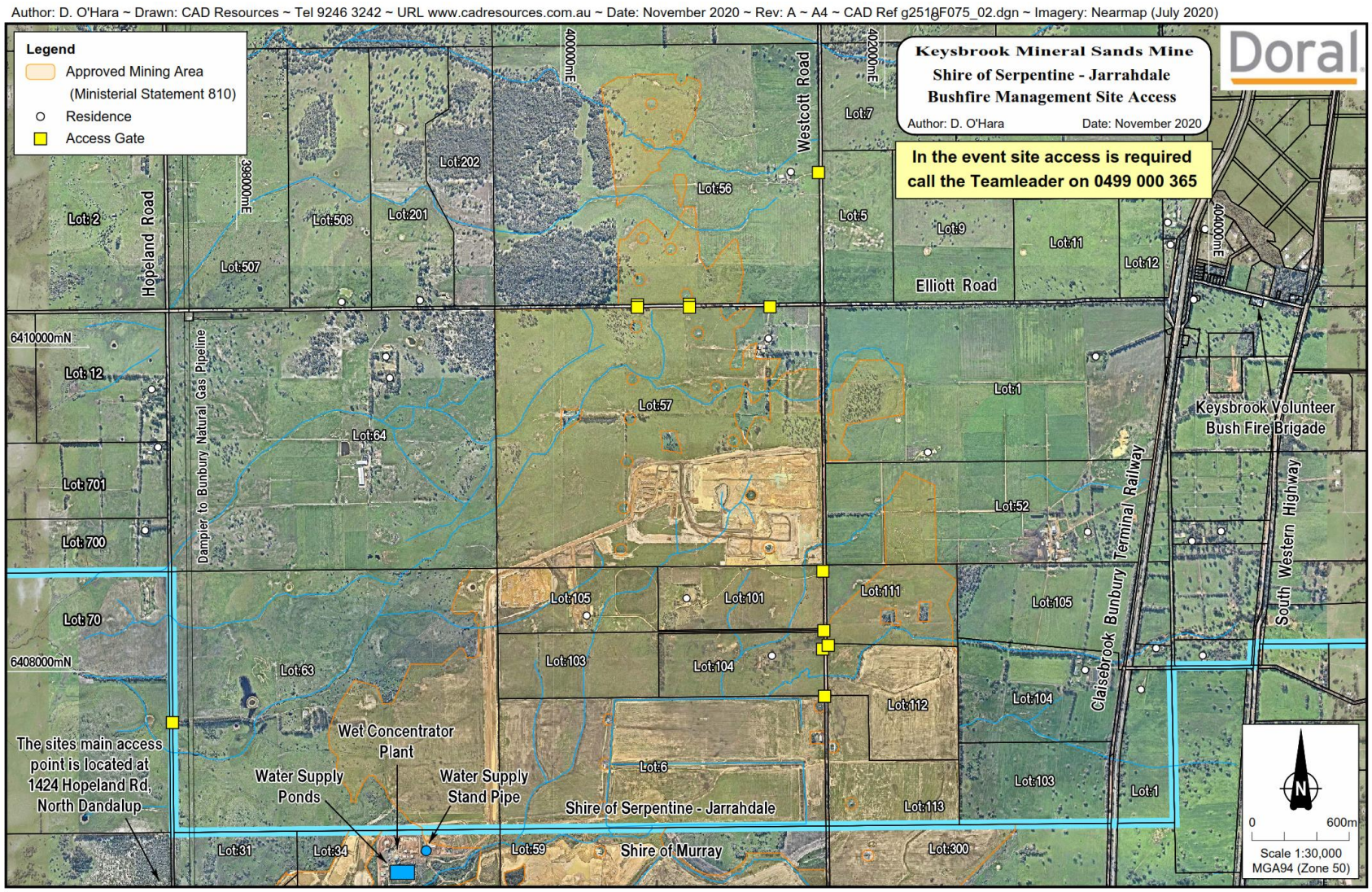


**Figure 2: Site Access Map Shire of Serpentine Jarrahdale**

# Fire Management Plan

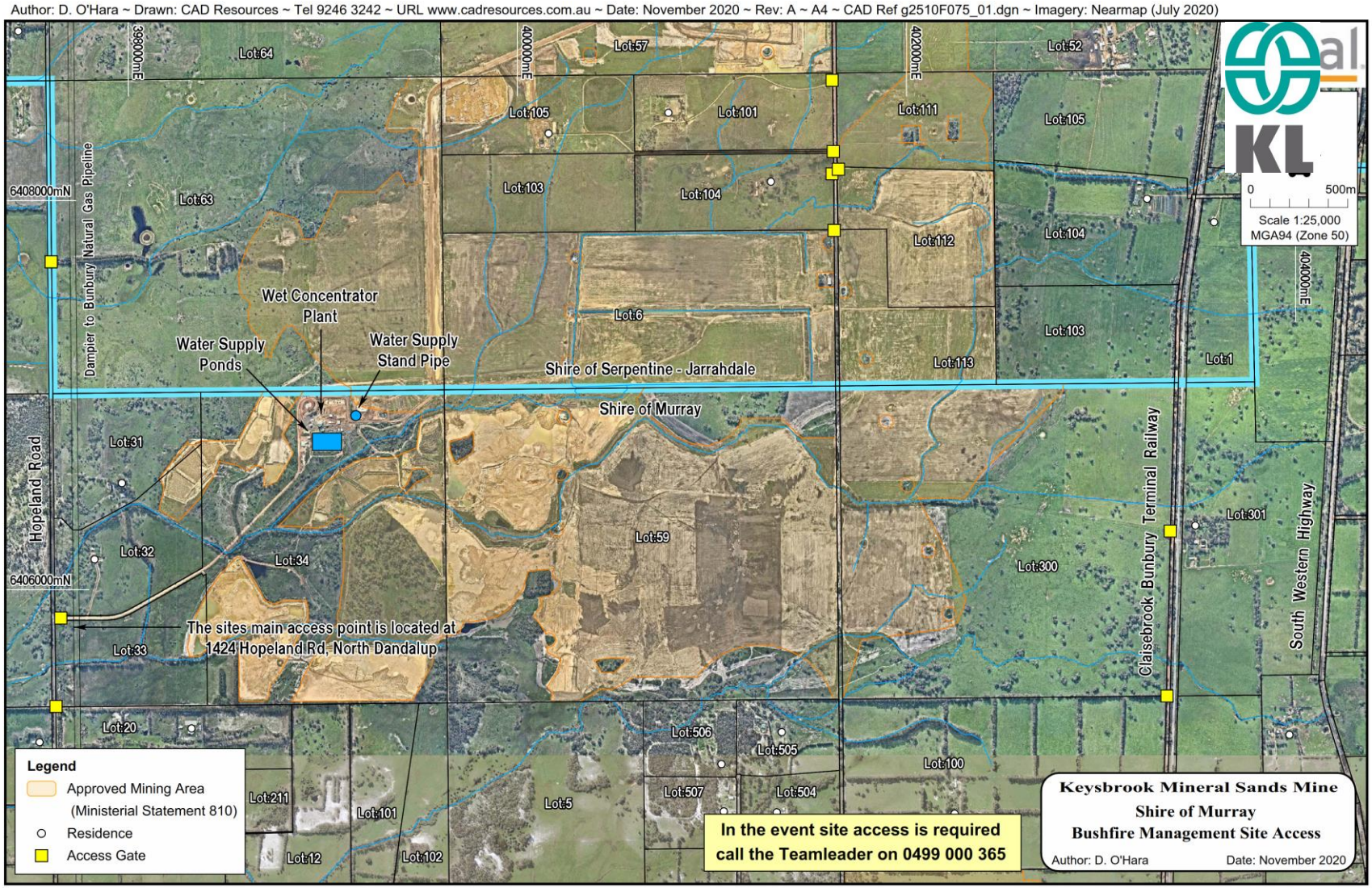


**Figure 3: Site Access Map Shire of Murray**

## 6. Keysbrook Mine Key Risks and Mitigation

KLPL applies a risk assessment process for all operational activities. The bushfire risk assessment is based on the nature of mining activities (risk of ignition) and hazard assessment based on site characteristics as determined by FirePlan 2010 (Section 12) and as modified to reflect progression of the mine path. This hazard assessment is based on the vegetation present prior to clearing for mining operations.

Bushfire is identified as a major external hazard item to the Keysbrook Mine and resources and controls commensurate with this rating are applied to mitigate the risk. The potential bushfire ignition on the mine site is restricted through the work being undertaken only on appropriate locations, and with the appropriate internal permits, fire suppression and mitigation. The current key access points in the event of a bushfire are detailed in Figures 2 and 3.

### 6.1 Hot Works

Hot works such as welding, cutting and grinding are the primary source of ignition across our operations.

A dedicated hot works area has been established at the Workshop and laydown area as this location holds fixed infrastructure to immediately respond to a fire source. Where possible, all hot works will be undertaken at this location.

All other hot works onsite are deemed a high-risk activity and only permitted under the sites High Risk Permit. The Hot Works Permit is signed off by a competent KLPL representative who has received training in hot works and permit issuing and will ensure the mandatory controls are implemented before works commence.

### 6.2 Vegetation clearing

Native vegetation clearing and pastoral land clearing is undertaken sequentially based on the mining plan. KLPL only disturb areas which are required for operations in the next 6-12 months. Where possible, vegetation clearing is undertaken outside of bushfire season. Vegetation clearing ultimately serves to reduce bushfire risk.

Milling grade timber and firewood is salvaged from the cleared vegetation. Remaining cleared vegetation is used in rehabilitation (as is or mulched/chipped) or removed from site for composting. No vegetation is burnt on the mine site.

The ground being cleared is generally sandy clay which poses minimal fire risk during clearing when compared to hard rock mining operations. Much of the land is rural agriculture with potential for buried rubbish, steel posts, fencing etc. which has the potential to cause a spark when cleared with earthmoving machinery.

Topsoil is pushed up into a perimeter bund to separate mining operations from non-cleared areas.

### 6.3 Mining, Tailings and Rehabilitation

Apart from vegetation clearing and topsoil removal, all other heavy vehicles operate within previously cleared areas inside of our mining footprint. Vehicles are inspected daily for defects as a safety precaution which also includes fire emergency devices.

All heavy vehicles are fitted with approved exhaust systems and fire extinguishers and contractor's heavy vehicles are fitted with fire suppression.

### 6.4 Processing

Once mined and initially screened at the Mine Field Unit, the ore is combined with water and pumped as a slurry to the Wet Concentrator Plant. The slurry greatly reduces the fire potential of processing operations. Various pieces of infrastructure, such as pumps, electrical substations and

pipework transport the material back to mining voids. This infrastructure is within a previously cleared footprint to reduce fire risk.

### 6.5 General Workforce

Employees of KLPL who smoke are only authorised to do so in designated smoking areas. These areas have butt bins for the safe disposal of cigarette butts.

### 6.6 Total Fire Bans

In the event of a Total Fire Ban, Hot Work and Off-Road prescribed activities may only be undertaken in accordance with the Bush Fires Act 1954 without an exemption, provided:

- A Hot Works Permit has been completed; and,
- Mine Manager approval is obtained; and
- The fire danger rating is not Catastrophic; and
- There is no Harvest and Vehicle Movement Ban; and
- Notification is forwarded to DFES and local government authority at least 30 minutes prior to the activity using the online notification form https://dfeswa.tod.net.au/incidents/new/3d2fd2f6598ce7bb63b923363ef6a04b.

### 6.7 Harvest and Vehicle Movement Bans

The Mine Manager will be notified by the local shires of a Harvest and Vehicle Movement Ban. In the event of a Harvest and Vehicle Movement Ban the operation of heavy and light vehicle and mobile plant will not occur on or within 30m of land where there is bush, crop, pasture, stubble or grassland.

## 7. Resources at Hand

In the event of a localised fire onsite or a bushfire, KLPL have the following resources available to assist:

- A fleet of heavy machinery, including Trucks, Front End Loaders, Dozers, Graders and Excavators.
- One permanent 32,000 litre watercart
- One additional 30,000 litre watercart for the summer season
- Overhead standpipes to refill watercarts
- Two Fire tender trailers, which each include a 1000L water tank, pump and hoses.
- Process water dams which hold 26,000kL litres and are maintained at a full capacity during normal operations
- Diesel fire pump system which operates independently of electricity which feeds:
    - Fire hoses within the Wet Concentrator Plant
    - Hydrants at the Workshop, Wet Concentrator Plant and Administration Offices.

The resources listed above are available in the event of a localised fire or a bushfire (onsite). The heavy machinery and water carts are not licenced and will therefore require escorts and/or transport to travel on public roads, if required.

Subject to site operational requirements a water cart may be available for a period after initial suppression efforts to assist in ongoing suppression and mop up.

## 8. Emergency Response

The site operates under an Emergency Response Procedure. The document outlines how to deal with an emergency relating to fire.

In the event of a bushfire onsite, KLPL have a legal responsibility to immediately call 000 and extinguish or attempt to extinguish the fire. KLPL will assist all external agencies with a bushfire emergency, including access to our site resources.

KLPL employees are periodically trained in Emergency Management and Emergency Response.

Refer to the Emergency Response Procedure.

## 9. Bushfire Prevention

Prior to the bushfire season commencing (described as the restricted burning season and prohibited burning season declared by the Shire of Serpentine Jarrahdale), KLPL is committed to ensuring the site is 'fire ready'.

### 9.1 Firebreaks

#### 9.1.1 Mining Area

Mine areas are fenced from surrounding agricultural land. Trafficable firebreaks clear of all flammable material to a minimum of 4 metres wide are constructed inside all fenced active mineral extraction areas, with all overhanging branches and trees trimmed or pruned with a clear vertical axis over the firebreak. The company is to provide access into the site through the provision of 4.2-metre-wide gates and suitable hard stands. During a bushfire emergency the Volunteer Bush Fire Brigade or Shire employees can cut the fence to provide access to the site if this is deemed a safer or better option to assist the fire suppression activities. If the fence is cut by the Volunteer Bush Fire Brigade or Shire employees, they must notify the company as soon as practical so the fence can be repaired.

***Mine Areas on Lot 56 Westcott Rd and Lot 57 Elliot Road***

The approved mine areas on Lot 56 Westcott Rd and Lot 57 Elliot Road abut and are south and north respectively of Elliott Road. When operational, emergency access will be provided from Elliott Road to the mine areas on both lots. The access will be hard stand and gated in accord with safety requirements. The actual location of the gates (north and south) will be determined in advance of mining these areas in consultation with the Shire of Serpentine Jarrahdale.

#### 9.1.2 Remnant Vegetation Areas

Remnant native vegetation areas comprising woodland overstorey on pasture occurs on Lot 59 Westcott Road and Lot 62 Hopelands Road. Much of this area will be progressively cleared, mined and rehabilitated in accord with environmental approvals and landholder agreements.

Firebreaks shall be maintained on the perimeter of applicable lots. A fire break of minimum 4 metres shall be established around the perimeter of the active excavation area.

#### 9.1.3 Conservation Areas

Two areas subject to conservation covenants and associated revegetation obligations are associated with the project. The areas comprise:

1. 25ha on Lot 62 (within the current approved mine area); and
2. Lot 202 - 50ha partially vegetated (remote from the currently approved mine area).

A trafficable (4x4) firebreak 4 metres wide is to be installed within 15 metres of the fence demarcating the conservation area (Lot 62) and immediately inside the boundary of Lot 202.

### 9.2 Building Protection Zone

A 30-metre-wide building protection zone is to be maintained around all buildings whether operations, administrative, processing plant or other structures. Any building protection zone is to comply with the following specifications:

- Bushfire fuels (<6mm diameter dead material and <3mm diameter for live material) to be maintained at or below 2 tonnes per hectare and dry grass must be maintained below a height of 50mm;
- The first 5 metres around all building is to be cleared of all flammable material. Reticulated gardens may be located in this zone;
- The spacing of trees should be 15-20 metres apart to provide for a separation of 10 metres between crowns;
- Trees are to be under/low pruned, to a height of 2 metres;
- There are no tree crowns over hanging the building;
- Shrubs within the building protection zone have no dead material within the plant;
- Fences and sheds within the Building Protection Zone are to be constructed using non-combustible materials (e.g. colour bond iron, brick, limestone);
- Branches must be removed to at least 2 metres back from the eaves of all buildings;
- All leaves, twigs, logs, branches must be removed from within the building protection zone. Annual falls of leaf litter must be raked up and removed or burnt.

Additional clearing is not required if the buildings requiring protection are located on cleared land.

A production bore and field pumps for which hay bales have been or may be deployed as noise bunding, is considered ancillary equipment and not subject to the building protection zone requirement.

### 9.3 Site Familiarization with Local Brigades

Each year prior to the bushfire season, KLPL will arrange an invitation to the local Bush Fire Brigades to familiarise themselves with access, firebreaks, water supplies, equipment available and contact details.

## 10. Shire Notices

Local Authorities have powers under the Bush Fires Act and Regulations to control the movement of vehicles and the undertaking of activities which have the potential to create ignition sources. Any notice given by a Local Authority must be complied with.

The communication of such notices is by means of:

- Emails to KLPL representatives
- SMS messages to KLPL representatives
- Local radio

Upon receipt of a vehicle movement ban notice issued by the Shire, KLPL will cease all vehicle activities in uncleared areas.

Upon receipt of a total fire ban issued by the Shire, KLPL will cease all non-business critical tasks which have the potential to be a source of ignition.

With all notices, KLPL will work with the local authorities to reduce the fire risk of operations.

# Fire Management Plan

## 11. Contacts

| Position | Organisation | Name | Contact details |
|---|---|---|---|
| Mine Manager | KLPL | Bruce Trepp | 6557 5341 |
| Senior Environmental Officer | KLPL | Dan O'Hara | 6557 5311 |
| OSH&E Superintendent | KLPL | Craig Bovell | 9725 5416 |
| Reception | KLPL | N/A | 6557 5340 |
| Captain | North Dandalup volunteer bushfire brigade | Michael Webster | 0448 135 671<br>9530 1038 |
| Captain | Keysbrook volunteer bushfire brigade | Chris Burgess | 0417 173 410<br>9525 2551 |
| Fire Control Officers | Shire of Murray | N/A | 9531 7777 |
| Fire Control Officers | Shire of Serpentine Jarrahdale | N/A | 9526 1111 |
| | Department of Fire and Emergency Services | | 000 |

## 12. Bush Fire Hazard Assessment (after FirePlan, 2010)

The assessment of fire risk takes into account existing site conditions which include:

- Topography with particular reference to ground slopes and accessibility;
- Vegetation cover – both remnant and likely revegetation; and
- Relationship to surrounding development.

The Bush Fire Hazard Assessment across the approved mine area is extreme in remnant native vegetation and low-moderate in the remainder. Similarly, the bushfire hazard assessment in adjoining lots is rated extreme in remnant vegetation and low-moderate in cleared areas.

The Mediterranean climate experienced by this area is such that the majority of rain falls in late autumn through to early spring. This rainfall supports substantial vegetation growth which dries off in Summer/Autumn, contributing to the fire risk.

## 13. Site Revegetation Post Mining

The area approved for mining is predominantly pasture, with some sections of remnant native vegetation. Areas disturbed by mining are, or will be, rehabilitated to pasture. Under the conditions of approval for the mine, KLPL will also be reinstating native vegetation in some areas and enhancing the quality of several other designated native conservation areas. These native vegetation areas are considered outside the scope of the Guidelines for Plantation Fire Protection (Fire and Emergency Services Authority, 2011).

## Appendix A – Examples of Moderate Bushfire Hazard

**Figure 3: Sample Photographs of Moderate Bush Fire Hazard**

## Appendix B – Examples of Extreme Bushfire Hazard

**Figure 4: Sample Extreme Bush Fire Hazards**

# APPENDIX 6: ANNUAL SHIRE REPORT FOR DEVELOPMENT APPLICATION

# DORAL MINERAL SANDS PTY LTD (DORAL)

**KEYSBROOK MINERAL SANDS PROJECT**

**COMPLIANCE ASSESSMENT REPORT – AUDIT TABLE**

**Shire of Serpentine-Jarrahdale, Shire of Murray Development Approval**

**Dated: 20 October 2022**

| 1.0 | FIRE MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| **1.1** | **Firebreaks** | | | | | | |
| **1.1.1** | **Mineral Sand Extraction Site** | | | | | | |
| 1.1.1.1 | Install bare mineral earth trafficable firebreaks clear of all flammable material to a minimum of 4 metres wide and unlimited vertical clearance immediately inside all external boundaries of the mineral extraction area with all overhanging branches, trees, limbs etc to be trimmed back or pruned with a clear vertical axis over the firebreak. | Completed by the date shown in the local government fire control notice. | Yes | October 2022 | Firebreaks installed. Maintenance scheduled for November 2022 | Ongoing | Firebreaks are installed prior to 30 November annually |
| 1.1.1.2 | Install bare mineral earth trafficable firebreak to a minimum of 4 metres wide and unlimited vertical clearance externally around the bounded of mineral sand extraction areas where mining is in progress. | Completed by the date shown in the local government fire control notice. | Yes | October 2022 | Firebreaks installed. | Ongoing | Perimeter access tracks around all active mining and rehabilitation areas. Perimeter bunding in some areas also serves as impediment to fire spread. |

| 1.0 | FIRE MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| **1.1.2** | **Building Protection Zone** | | | | | | |
| 1.1.2.1 | A 30-metre wide building protection zone is to be installed around all operations, administrative, plant or other structures whether temporary or semi-permanent in accordance with the fire management plan. | Completed by the date shown in the local government fire control notice. | Yes | 18/10/22 | Building protection zones established. Maintained during reporting period. | Ongoing | Completed on lots with infrastructure. |
| 1.1.2.10 | Fences and sheds within the Building Protection Zone are to be constructed using non-combustible materials (e.g. colourbond iron, brick, limestone). | On Construction | Yes | 18/10/22 | Steel fencing used on site. Storage is via sea containers. | | Completed. |
| **1.2** | **Significant Vegetation Area (Approx. 75 ha)** | | | | | | |
| 1.2.1 | A trafficable firebreak 4 metres wide and unlimited vertical clearance is to be installed within 15 metres of the edge of the significant vegetation area. | Ongoing | Yes | October 2022 | Firebreaks established around conservation covenant areas. Maintained during reporting period. | October 2022 | |
| 1.2.2 | Firebreaks and building protection zones are to be installed. | Completed by the date shown in the local government fire control notice. | Yes | October 2022 | Firebreaks maintained during reporting period. | October 2022 | |
| **1.4** | **Bushfire Risk Management** | | | | | | |
| | Stockpiling of coarse mulch and vegetation from the site of mining operations will be restricted to stockpiles measuring 20 metres long by 6 metres wide and 3 metres high. | Ongoing | Yes | 18/10/22 | Mulch stockpiles maintained to specification. | Ongoing | |
| | Each stockpile is to be cleared for 10 metres around if free of flammable material and is to be | Ongoing | Yes | 18/10/22 | | Ongoing | |

| 1.0 | FIRE MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| | located 20 metres from any standing vegetation. | | | | | | |
| **1.5** | **Contacts** | | | | | | |
| 1.5.1 | A list of names, telephone numbers and radio frequencies of earth moving plant that may be used in firefighting within the mine operation area to be provided to the Local Authorities. | As minimum annually, and as details change. | Yes | Ongoing | Contact details provided to Shires and local volunteer Fire Brigades. | Ongoing | |
| **1.6** | **Brigade Familiarisation of site** | | | | | | |
| 1.6.1 | Resident Manager will provide the local Bush Fire Brigade with details relating to access, firebreak, water supplies, equipment available and contact details. | Each year prior to summer wildfire season in October/ November | Yes | Ongoing | Invitations sent to Keysbrook and North Dandalup volunteer bush fire brigades for site visit on 8 November 2022 | 8th November 2022 | |

Fire Management Plan Endorsed By: Refer to Compliance Report 2013

Signature:_____N/A_____

Date:_____N/A_____

| 2.0 | VISUAL MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | **Yes / No** | **Date** | **Action Taken** | **Date** | |
| **2.1** | **Views from Elliot Road, Hopeland Road, Atkins Road and Westcott Road** | | | | | | |
| 2.1.1 | R1.1 — Weed clearance and supplementary planting in existing verge-side plantings | Prior to extraction operations on site. | Yes | Ongoing | Weed spraying and planting undertaken along Hopeland Road frontage in October 2017. Maintenance ongoing. Weed spraying completed October 2021. | October 2022 | |
| 2.1.2 | R1.2 — Planting of native tree and shrubs species. | Prior to extraction operations on site. | Yes | Ongoing | Native species used. Local area seed collection completed November – March 2016, and July – August 2017<br>Native vegetation shelter belt planted June 2018 parallel with Hopeland Road across Lots 31, 32, and 33.<br>600 Native seedlings were planted in Lot 202 adjacent to Elliot Road in 2022. | Ongoing | |
| **2.2** | **Views from roads directly adjacent to extraction operations** | | | | | | |
| 2.2.1 | R1.3 — Creation of 2m high bunds from overburden and spoil material. Located between the excavation area and the development site boundary. | In accordance with operational staging. | Yes | Ongoing | Perimeter earthen bunds established adjacent to operational areas. | Ongoing | Topsoil bunds fronting Westcott Road, eastern perimeter of mining on Lots 104, 101 & 57. |
| **2.3** | **Views new extraction operations, where extraction operations are not directly adjacent to a road** | | | | | | |

| 2.0 | VISUAL MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | **Yes / No** | **Date** | **Action Taken** | **Date** | |
| 2.3.1 | R1.4 — 2 m high bunds do not disrupt general access and circulation of personnel. | In accordance with operational staging. | Yes | Ongoing | Perimeter earthen bunds established adjacent to operational areas. | Ongoing | |
| **2.4** | **Where extraction operations occur adjacent to Westcott Road** | | | | | | |
| 2.4.1 | R1.5 — Where 2 m high bund not possible, provide a visually impermeable fence consisting of post and wire configuration, shade cloth, hessian or similar material. Colour of material to reflect tones of the landscape. | In accordance with operational staging. | N/A | - | | - | 3m topsoil bunds fronting Westcott Road and Elliot road. |
| **2.5** | **Plant buildings and structures** | | | | | | |
| 2.5.1 | R1.7 — External colours of the site office, processing plant, water tanks workshops, lunchrooms to match Dulux colours PG1-H6, PG1-G6, PG1-F6, PG1-E6, PG1-E7, PG1-D7, PG1-B6, PG1-B7. | Prior to or on Installation of Structures on site. | Yes | October 2015 | Infrastructure coloured accordingly. | - | |
| **2.6** | **Lighting** | | | | | | |
| 2.6.1 | R1.8 — Lighting associated with the plant designed by qualified lighting engineer and meet Health and Safety Standards. | On Installation | Yes | November 2015 | Lighting design completed by competent persons.<br>Light spill audit completed March 2019. | - | |

| 2.0 | VISUAL MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | **Yes / No** | **Date** | **Action Taken** | **Date** | |
| **2.7** | **Off-site commercial signage (excluding safety signage)** | | | | | | |
| 2.7.1 | R1.10 — Signage to meet the standards and approvals of local authority | On Application | Yes | October 2021 | Signage installed as per requirements | 2015 | Completed |
| **2.8** | **Concerns expressed by neighbouring properties to the south of the extractive development** | | | | | | |
| 2.8.1 | R1.11 — Vegetative buffer and overburden bunds along the southern boundary of the extractive development to be planted in accordance with Figure 6. | Vegetation to be planted prior to Extraction of operations on site. Bunding constructed in accordance with operational staging. | Yes | October 2022 | Trees planted. Maintenance and infill planting continues October 2016.<br>Infill planting undertaken on Southern Boundary in July 2017<br>Perimeter earthen bunds established adjacent to operations<br>A further 7 ha of perimeter native vegetation planting completed in 2019 in accord with plan agreed with landowner.<br>Planting of 189,181 of biodiverse native seedlings have been planted in Lot 300 and Lot 59.<br>25ha of Lot 300 has also been sown with local provenance native seed mix to enhance the native rehabilitation. In accordance with the Rehabilitation Management Plan. | | |
| **2.9** | **Key Performance Indicators and Monitoring** | | | | | | |

| 2.0 | VISUAL MANAGEMENT PLAN | | | | | |
|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | **Comments** |
| | | | **Yes / No** | **Date** | **Action Taken** | **Date** |
| 2.9.1 | Review success of Visual Management Plan (VMP) in accordance with key performance indicators in Part 5.2 of the VMP and produce visual management report. | Annually | Yes | October 2022 | Boundary assessment completed:<br>• September 2016<br>• October 2017<br>• October 2018<br>• October 2019<br>• October 2020<br>• October 2021<br>• October 2022 | - | Assessment report attached. |
| 2.9.2 | Monitoring visits to evaluate success of VMP | Bi-annually | Yes | October 2022 | Visual assessments undertaken on ongoing basis in the course of environmental monitoring. Formal boundary assessment completed September 2016, October 2017, October 2018, October 2019, October 2020, October 2021. | - | Formal October 2022 assessment report attached. |

Visual Management Plan Endorsed By: Refer to Compliance Report 2013

Signature:_____N/A_____

Date:_____N/A_____

| 3.0 | MOSQUITO MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| 3.1 | Any depressions created within the extractive area, the ground surface will be filled or drained, where possible, to prevent the ponding of water, in conjunction with the outcome of the Rehabilitation Management Plan. | Ongoing | Yes | October 2022 | Continual water recovery from mine voids as part of operations. Mine voids promptly backfilled with sand and clay tailings in preparation for rehabilitation | Ongoing | |
| 3.2 | Storage containers capable of ponding water will be either discarded after use or stored in an inverted position (care will be taken to ensure that ponding does not occur in rubbish storage areas). | On cease of use. | Yes | October 2022 | No such storage containers routinely deployed on site. Ongoing practice of housekeeping. | Ongoing | |
| 3.3 | Inspect stagnant ponds within the extractive area filled with water for the presence of mosquito larvae. If larvae are detected, the Medical Entomology Branch of the Department of Health will be consulted on what actions should be taken. | After a significant rainfall event between the months of August to May. | Yes | - | No persistent stagnant ponds in active extractive area. | - | |
| 3.4 | • During the induction process staff and contractors will be: | Induction of new staff and contractors | | - | | | |
| | • Made aware of the potential risk of mosquito borne disease and the high risk periods. | | Yes | October 2022 | Induction includes mosquito risks | Ongoing | |
| | • Advised to wear long sleeved shirts and trousers, avoid going outside at sundown, and to use insect repellent. | | Yes | October 2022 | Site Standard. | Ongoing | |
| | • Educated about the early symptoms associated with exposure to mosquito-borne | | Yes | October 2022 | Site standard to report all incidents and illness to supervisors. | Ongoing | |

| 3.0 | MOSQUITO MANAGEMENT PLAN | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| | arbovirus and will be instructed on the need to report any symptoms to a medical officer. | | | | | | |
| 3.5 | Insect repellent will be provided at work sites. | Ongoing | Yes | October 2022 | Insect repellent available to personnel | Ongoing | |
| 3.6 | On-site facilities will be screened and air conditioned.<br>Lights will be fitted with yellow bulbs to discourage mosquitoes. | On Construction | Yes | October 2022 | Facility screened and air conditioned. Yellow bulbs fitted. | 27/10/15 | Completed |

Mosquito Management Plan Endorsed By: Refer to Compliance Report 2013

Signature:_____N/A_____

Date:_____N/A_____

| 4.0 | COMMUNITY CONSULTATION FRAMEWORK FOR THE KEYSBROOK PROJECT | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| 4.1 | Sign – at Shire of Murray and Serpentine Jarrahdale Admin offices | Prior to commencement of operations at site | - | - | Advised by Shires sign not required. | - | |
| 4.2 | Public briefing | Beginning of each phase | - | - | Construction and Operational Phase Briefings held 2014, 2015 and 2016.<br><br>Next public briefing will be for closure phase. | - | |
| 4.3 | Site visit – (in addition to the requirements to access the site detailed within any approved management plan) | Annually | Invitation sent to SOM / SOSJ | Tour scheduled for SOM / SOSJ | Keysbrook CCG site tour held for the Group on 5 October 2022. | 2022 | Tours offered as part of ongoing operations |
| 4.4 | Community Consultation Group – comprised of 8 individuals plus Doral management | Meetings held quarterly given steady state operations phase. | Yes | 2022 | Attendance at meetings, Minutes of Meeting circulated to both Shires and on Doral website | 03/11/2021<br>02/02/2022<br>04/05/2022<br>03/08/202<br>02/11/2022 | 2023 dates to be advised |
| 4.5 | Newsletter / letter drop | Minimum of once each 6 months | Yes | Newsletter & community updates (Dec 21, March, 22, June 22, Northern Ext letter to nearest neighbours Oct 2022 | Nearest neighbour communications sent every ~ 12 weeks. Newsletter distributed July 2022. | 2022 | Newsletter due 2023. |

| 4.0 | COMMUNITY CONSULTATION FRAMEWORK FOR THE KEYSBROOK PROJECT | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| 4.6 | Web-site updates | Ongoing | Yes | October 2022 | Newsletters uploaded, sponsorship application form and commitments, environmental management plans, CCG Minutes etc | 2022 | |
| 4.7 | Council Briefings | Annually | | | Site | | |
| | - Shire of Murray (execs) | | No | Was planned for site tour but postponed. | Meeting held at Council offices. | | Ongoing |
| | - Shire of SJ (execs) | | Yes | 20 July 2022 | Meeting with Planning Manager, update on northern extension program | 2022 | Ongoing |
| 4.8 | Local members of Parliament | Annually | Yes | Copies of site update letters provided. | Robyn Clarke MLA and Hugh Jones MLA – meeting confirmed for November 2022 | 2022 | Ongoing |
| 4.9 | Meeting with community groups: | Annually and the beginning of each phase | - | | | | |
| | - Landcare State | | N/A | October 2022 | Landcare State advised it is sufficient for Doral to meet just with local Landcare groups | - | |
| | - Landcare each local authority (Landcare SJ) | | Yes | Ongoing 2022 | | 2022 | Engagement ongoing through various partnership |

| 4.0 | COMMUNITY CONSULTATION FRAMEWORK FOR THE KEYSBROOK PROJECT | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| | | | | | | | agreements and event participation. |
| | - North Dandalup and Districts Community Association | | Yes | October 2022 | Ongoing communication, sponsor of various projects. Member of Group is the new Shire of Murray community representative on Keysbrook CCG. | 2022 | Engagement ongoing |
| | - Peel-Harvey Catchment Forum | | No | October 2022 | Receives Keysbrook newsletter and community updates as relevant. No face to face meeting held in 2022, planned for 2023. | 2022 | Engagement ongoing. |
| | **Groups in addition to Framework** | | | | | | |
| | - Peel Development Commission | Annually | Yes | 2022 | Project Updates provided including Keysbrook newsletter. | 2022 | Ongoing |
| | - North Dandalup Volunteer Bush Fire Brigade | Annually | Yes | October 2022 | Invitation sent requesting site visit, awaiting confirmation. | 2022 | Ongoing |
| | - Keysbrook Volunteer Bush Fire Brigade | Annually | Yes | October 2022 | Invitation sent requesting site visit, awaiting confirmation. | 2022 | Ongoing |
| 4.10 | Provide details of number and nature of complaints from the previous 12 months | Annually | Yes | October 2022 | 24/7 mobile number provided to all neighbours to call should immediate assistance be required from site – 0499 000 365, included on all updates and newsletters | 2022 | Doral Stakeholder Interaction guidelines followed for all complaints. |

| 4.0 | COMMUNITY CONSULTATION FRAMEWORK FOR THE KEYSBROOK PROJECT | | | | | | |
|---|---|---|---|---|---|---|---|
| **Audit Code** | **Assessment Task** | **Timing** | **Compliance** | | **Action** | | **Comments** |
| | | | Yes / No | Date | Action Taken | Date | |
| | | | | Oct 2022 | Neighbour – comment sent through Keysbrook CCG with regard to general observance of noise, no specific day or time, possibly from the loader. Machinery inspected, noise modelling investigated, no exceedances observed, crew requested to be vigilant on still days. | 2022 | Follow up provided to complainant. |
| | | | | Jan 2022 | Neighbour – light pollution into house. Crew notified, lighting tower angled in different direction, matter resolved. | 2022 | Follow up provided to complainant. |
| | | | | Aug 2022 | Neighbour – noise seemed loud, not sure of type of noise. Site relocated noise monitor closer to property for monitoring purposes. | 2022 | Follow up provided to the complainant. |

| SPONSORSHIP FOR REPORTING PERIOD | | | | |
|---|---|---|---|---|
| **Date** | **Organisation** | **Event / Project** | **Term** | **Shire** |
| Jan 22 | The Art Corner | Ongoing funding for art supplies | 1/3 years | Shire of Murray |
| Feb 22 | North Dandalup Primary School | Library refurbishment | 1/1 year | Shire of Murray |
| Feb 22 | Shire of Murray | Pinjarra Festival | 1/3 years | Shire of Murray |
| March 22 | Serpentine Ladies Golf Club | Ladies Open Day | 1/1 year | Shire of SJ |
| May 22 | River Wren Rescue | ICU units x 3 | 1/1 year | Shire of Murray |
| May 22 | Lions Club of Pinjarra | Proceeds towards a BBQ trailer | 1/1 year | Shire of Murray |
| May 22 | Dwellingup Razorback ladies football club | Training equipment | 1/1 year | Shire of Murray |
| July 22 | Pinjarra Bowling Club | Shade shelter | 2/3 years | Shire of Murray |
| Oct 2022 | Byford Carols | Byford Xmas Carols (1 Dec) | 1/1 Year | Shire of SJ |
| Oct 2022 | Friends of Edenvale Inc. | Pinjarra Garden Day | 1/1 year | Shire of Murray |
| Oct 22 | Keysbrook Community Hall | Children's xmas party | Ongoing | Shire of SJ |
| | **$50,000 (period of funding, 1 January 2022 to 31 December 2022).** | | | |

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# ATTACHMENT

## Visual Assessment of the Keysbrook Project

| Visual Assessment 1 | | | |
|---|---|---|---|
| Location Description: 20m north of the intersection of Page Road and Atkins Road, along the western railway access track.<br>Photo Orientation: West North West in line with stone retaining wall, view across Lot 105. | | | |
| Coordinates: | MGA94 Zone 50 | 403496mE | 6408076mN |
| **Date and Description** | | **Photo** | |
| 28th September 2016<br>Mining Activities Visible:<br>• None | |  | |
| 5th October 2017<br>Mining Activities Visible:<br>• None | |  | |
| 4th October 2018<br>Mining Activities Visible:<br>• None | |  | |

## Visual Assessment 1

Location Description: 20m north of the intersection of Page Road and Atkins Road, along the western railway access track.

Photo Orientation: West North West in line with stone retaining wall, view across Lot 105.

| Coordinates: | MGA94 Zone 50 | 403496mE | 6408076mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• None |  |
| 14th October 2020<br>Mining Activities Visible:<br>• None |  |
| 12th October 2021<br>Mining Activities Visible:<br>• None |  |

| Visual Assessment 1 | | | |
|---|---|---|---|
| Location Description: 20m north of the intersection of Page Road and Atkins Road, along the western railway access track.<br>Photo Orientation: West North West in line with stone retaining wall, view across Lot 105. | | | |
| Coordinates: | MGA94 Zone 50 | 403496mE | 6408076mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>• None | |  | |
| | | | |
| | | | |

## Visual Assessment 2

Location Description: 300m south of the intersection of Page Road and Atkins Road, in line with the yellow underground cable post.

Photo Orientation: West in line with the Telstra yellow underground cable post, view across Lot 104.

| Coordinates: | MGA94 Zone 50 | 403428mE | 6407701mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• Glimpse of earthworks through the trees. |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Glimpse of earthworks through the trees. |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Glimpse of perimeter noise/visual bunds through the trees. |  |

## Visual Assessment 2

Location Description: 300m south of the intersection of Page Road and Atkins Road, in line with the yellow underground cable post.

Photo Orientation: West in line with the Telstra yellow underground cable post, view across Lot 104.

| Coordinates: | MGA94 Zone 50 | 403428mE | 6407701mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Glimpse of perimeter noise/visual bunds through the trees. |  |
| 14th October 2020<br>Mining Activities Visible:<br>• None. |  |
| 12th October 2021<br>Mining Activities Visible:<br>• None |  |

## Visual Assessment 2

Location Description: 300m south of the intersection of Page Road and Atkins Road, in line with the yellow underground cable post.

Photo Orientation: West in line with the Telstra yellow underground cable post, view across Lot 104.

| Coordinates: | MGA94 Zone 50 | 403428mE | 6407701mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 10th October 2022<br>Mining Activities Visible:<br>• None |  |
| | |
| | |

## Visual Assessment 3

Location Description: 1.7 km south of the intersection of Page Road and Atkins Road (2.4km North of Readhead Road), in line with the gate into a cattle yard and fence corridor running east-west.

Photo Orientation: West North West in line with cattle yard gate, view across Lot 300.

| Coordinates: | MGA94 Zone 50 | 403359mE | 6406305mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• None |  |
| 5th October 2017<br>Mining Activities Visible:<br>• MFU Noise Bund visible now clearing on Lot 300 has been undertaken ahead of mining.<br>• Construction of perimeter bund is evident as part of pre-mining activities.<br>• Mobile plant. |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Perimeter bunds<br>• MFU<br>• Mobile plant<br>• Some distant views of earthworks, predominantly noise/visual earthen bunds. |  |

## Visual Assessment 3

Location Description: 1.7 km south of the intersection of Page Road and Atkins Road (2.4km North of Readhead Road), in line with the gate into a cattle yard and fence corridor running east-west.

Photo Orientation: West North West in line with cattle yard gate, view across Lot 300.

| Coordinates: | MGA94 Zone 50 | 403359mE | 6406305mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Perimeter bunds<br>• Some distant views of earthworks, predominantly noise/visual earthen bunds. |  |
| 14th October 2020<br>Mining Activities Visible:<br>• None |  |
| 12th October 2021<br>Mining Activities Visible:<br>• None |  |

## Visual Assessment 3

Location Description: 1.7 km south of the intersection of Page Road and Atkins Road (2.4km North of Readhead Road), in line with the gate into a cattle yard and fence corridor running east-west.

Photo Orientation: West North West in line with cattle yard gate, view across Lot 300.

| Coordinates: | MGA94 Zone 50 | 403359mE | 6406305mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 10th October 2022<br>Mining Activities Visible:<br>• None |  |
| | |
| | |

## Visual Assessment 4

Location Description: Intersection of Readhead road and McMahon Road, looking north along the powerline corridor.

Photo Orientation: North in line with street sign, view across Lot 5.

| Coordinates: | MGA94 Zone 50 | 400068mE | 6403807mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September, 2016<br>Mining Activities Visible:<br>• None |  |
| 5th October 2017<br>Mining Activities Visible:<br>• None |  |
| 4th October 2018<br>Mining Activities Visible:<br>• None |  |

## Visual Assessment 4

Location Description: Intersection of Readhead road and McMahon Road, looking north along the powerline corridor.

Photo Orientation: North in line with street sign, view across Lot 5.

| Coordinates: | MGA94 Zone 50 | 400068mE | 6403807mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Construction of perimeter bund is evident as part of pre-mining activities |  |
| 14th October 2020<br>Mining Activities Visible:<br>• None |  |
| 12th October 2021<br>Mining Activities Visible: None. |  |

## Visual Assessment 4

Location Description: Intersection of Readhead road and McMahon Road, looking north along the powerline corridor.

Photo Orientation: North in line with street sign, view across Lot 5.

| Coordinates: | MGA94 Zone 50 | 400068mE | 6403807mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 10th October 2022<br>Mining Activities Visible:<br>None. |  |
| | |
| | |

## Visual Assessment 5

Location Description: South western corner of Lot 62 at access gate located on Hopelands Road.

Photo Orientation: North east in line with gate, view across Lot 62.

| Coordinates: | MGA94 Zone 50 | 397628mE | 6405402mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible: None. |  |
| 5th October 2017<br>Mining Activities Visible: None |  |
| 4th October 2018<br>Mining Activities Visible: None |  |

## Visual Assessment 5

Location Description: South western corner of Lot 62 at access gate located on Hopelands Road.

Photo Orientation: North east in line with gate, view across Lot 62.

| Coordinates: | MGA94 Zone 50 | 397628mE | 6405402mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible: None |  |
| 14th October 2020<br>Mining Activities Visible: None |  |
| 12th October 2021<br>Mining Activities Visible: None. |  |

| Visual Assessment 5 | | | |
|---|---|---|---|
| Location Description: South western corner of Lot 62 at access gate located on Hopelands Road.<br>Photo Orientation: North east in line with gate, view across Lot 62. | | | |
| Coordinates: | MGA94 Zone 50 | 397628mE | 6405402mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>None. | |  | |
| | | | |
| | | | |

## Visual Assessment 6

Location Description: Approximately 5m south of the driveway into Lot 63 along Hopelands Road.

Photo Orientation: East South East looking towards the WCP, view across Lot 63.

| Coordinates: | MGA94 Zone 50 | 397602mE | 6407680mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• Wet Concentrator Plant<br>• Workshop<br>• pre-mining workings<br>• mobile plant |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds |  |
| 4th October 2018<br>Mining Activities Visible:<br>Glimpses through trees of<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds |  |

## Visual Assessment 6

Location Description: Approximately 5m south of the driveway into Lot 63 along Hopelands Road.

Photo Orientation: East South East looking towards the WCP, view across Lot 63.

| Coordinates: | MGA94 Zone 50 | 397602mE | 6407680mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>Glimpses through trees of<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds |  |
| 14th October 2020<br>Mining Activities Visible:<br>Glimpses through trees of<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds |  |
| 12th October 2021<br>Mining Activities Visible:<br>Glimpses through trees of<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds |  |

| Visual Assessment 6 | | | |
|---|---|---|---|
| Location Description: Approximately 5m south of the driveway into Lot 63 along Hopelands Road.<br>Photo Orientation: East South East looking towards the WCP, view across Lot 63. | | | |
| Coordinates: | MGA94 Zone 50 | 397602mE | 6407680mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>Glimpses through trees of<br>• Wet Concentrator Plant<br>• Workshop<br>• Perimeter bunds | |  | |
| | | | |
| | | | |

## Visual Assessment 7

Location Description: North west access gate to Lot 63 off Hopelands Road.

Photo Orientation: South west in line with access gate, view across Lot 63.

| Coordinates: | MGA94 Zone 50 | 397595mE | 6408614mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• pre-mining workings<br>• mobile plant (PC1250) |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Perimeter bunds<br>• Early stage rehabilitation works |  |
| 4th October 2018<br>Mining Activities Visible:<br>Glimpses of perimeter bunds through the trees. |  |

## Visual Assessment 7

Location Description: North west access gate to Lot 63 off Hopelands Road.

Photo Orientation: South west in line with access gate, view across Lot 63.

| Coordinates: | MGA94 Zone 50 | 397595mE | 6408614mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>Glimpses of perimeter bunds through the trees. |  |
| 14th October 2020<br>Mining Activities Visible:<br>• Occasional traffic using access road |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Occasional traffic using access road |  |
| | |

| Visual Assessment 7 | | | |
|---|---|---|---|
| Location Description: North west access gate to Lot 63 off Hopelands Road.<br>Photo Orientation: South west in line with access gate, view across Lot 63. | | | |
| Coordinates: | MGA94 Zone 50 | 397595mE | 6408614mN |
| **Date and Description** | | **Photo** | |
| 25th October 2022<br>Mining Activities Visible:<br>Occasional traffic using access road | |  | |
| | | | |
| | | | |

## Visual Assessment 8

Location Description: Along Elliott Road, 1km west of the railway line.

Photo Orientation: South west, view across Lot 1.

| Coordinates: | MGA94 Zone 50 | 402791mE | 6410278mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible: None |  |
| 5th October 2017<br>Mining Activities Visible:<br>• MFU Noise Bund<br>• Early stage rehabilitation works |  |
| 4th October 2018<br>Mining Activities Visible:<br>• MFU noise bund<br>• Rehabilitation works (pasture)<br>• Perimeter bunds<br>• Mobile plant |  |

## Visual Assessment 8

Location Description: Along Elliott Road, 1km west of the railway line.

Photo Orientation: South west, view across Lot 1.

| Coordinates: | MGA94 Zone 50 | 402791mE | 6410278mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Rehabilitation works (pasture)<br>• Perimeter bunds |  |
| 14th October 2020<br>Mining Activities Visible:<br>• Rehabilitation works (pasture)<br>• Perimeter bunds |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Rehabilitation works (pasture)<br>• Perimeter bunds |  |

| Visual Assessment 8 | | | |
|---|---|---|---|
| Location Description: Along Elliott Road, 1km west of the railway line.<br>Photo Orientation: South west, view across Lot 1. | | | |
| Coordinates: | MGA94<br>Zone 50 | 402791mE | 6410278mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>• Rehabilitation works (pasture)<br>• Perimeter bunds | |  | |
| | | | |
| | | | |

## Visual Assessment 9

Location Description: Southern end of Wescott Road.

Photo Orientation: South west in line with access gate, view across Lot 6.

| Coordinates: | MGA94 Zone 50 | 401635mE | 6407852mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• Topsoil windrows<br>• Early stage rehabilitation works |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Topsoil windrows<br>• Rehabilitation works |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Newly rehabilitated pasture<br>• Topsoil windrows<br>• Mobile plant (rehabilitation equipment)<br>• Rehabilitation works |  |

## Visual Assessment 9

Location Description: Southern end of Wescott Road.

Photo Orientation: South west in line with access gate, view across Lot 6.

| Coordinates: | MGA94 Zone 50 | 401635mE | 6407852mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Newly rehabilitated pasture<br>• Topsoil windrows<br>• Mobile plant (rehabilitation equipment) |  |
| 14th October 2020<br>Mining Activities Visible:<br>• Newly rehabilitated pasture |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Newly rehabilitated pasture |  |

| Visual Assessment 9 | | | |
|---|---|---|---|
| Location Description: Southern end of Wescott Road.<br>Photo Orientation: South west in line with access gate, view across Lot 6. | | | |
| Coordinates: | MGA94 Zone 50 | 401635mE | 6407852mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>• Rehabilitated pasture<br>• Profiling works as per landowners request.<br>• Native Revegetation Shelter Belts | |  | |
| | | | |
| | | | |

## Visual Assessment 10

Location Description: Southern end of Wescott Road.

Photo Orientation: South east in line with access gate, view across Lot 113.

| Coordinates: | MGA94 Zone 50 | 401635mE | 6407850mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible: None |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Perimeter bund |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Perimeter bund |  |

## Visual Assessment 10

Location Description: Southern end of Wescott Road.

Photo Orientation: South east in line with access gate, view across Lot 113.

| Coordinates: | MGA94 Zone 50 | 401635mE | 6407850mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Newly rehabilitated pasture<br>• Topsoil windrows<br>• Mobile plant (rehabilitation equipment)<br>• Rehabilitation works |  |
| 14th October 2020<br>Mining Activities Visible:<br>• Newly rehabilitated pasture |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Newly rehabilitated pasture |  |

| Visual Assessment 10 | | | |
|---|---|---|---|
| Location Description: Southern end of Wescott Road.<br>Photo Orientation: South east in line with access gate, view across Lot 113. | | | |
| Coordinates: | MGA94 Zone 50 | 401635mE | 6407850mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>• Rehabilitated pasture | |  | |
| | | | |
| | | | |

## Visual Assessment 11

Location Description: 800m south along Wescott Road (from the intersection with Elliott Road), on the western side of the road.

Photo Orientation: South west, view across Lot 57.

| Coordinates: | MGA94 Zone 50 | 401617mE | 6409410mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible:<br>• MFU<br>• Wet Concentrator Plant<br>• Mobile plant (PC1250) |  |
| 5th October 2017<br>Mining Activities Visible:<br>• Wet Concentrator Plant |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Wet Concentrator Plant |  |

## Visual Assessment 11

Location Description: 800m south along Wescott Road (from the intersection with Elliott Road), on the western side of the road.

Photo Orientation: South west, view across Lot 57.

| Coordinates: | MGA94 Zone 50 | 401617mE | 6409410mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• MFU noise bund<br>• Rehabilitation works (pasture)<br>• Perimeter bunds<br>• Mobile plant |  |
| 14th October 2020<br>Mining Activities Visible:<br>• Rehabilitation works<br>• Perimeter bunds<br>• Mobile plant |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Rehabilitation works<br>• Perimeter bunds |  |

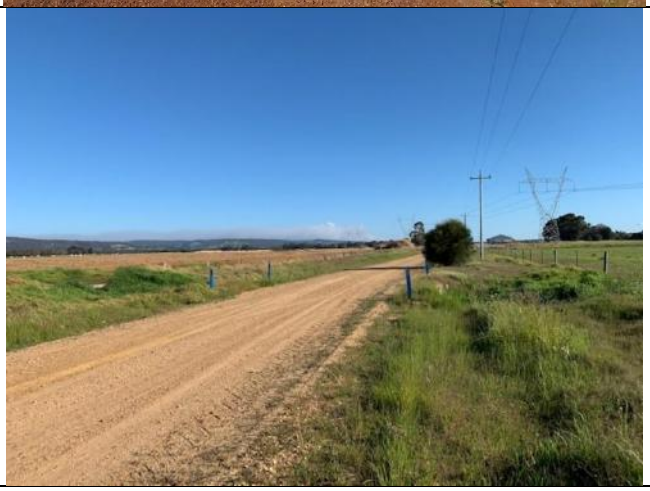
| Visual Assessment 11 | | | |
|---|---|---|---|
| Location Description: 800m south along Wescott Road (from the intersection with Elliott Road), on the western side of the road.<br>Photo Orientation: South west, view across Lot 57. | | | |
| Coordinates: | MGA94 Zone 50 | 401617mE | 6409410mN |
| **Date and Description** | | **Photo** | |
| 10th October 2022<br>Mining Activities Visible:<br>• Rehabilitation works<br>• Perimeter bunds | |  | |
| | | | |
| | | | |

## Visual Assessment 11A

Location Description: 800m south along Wescott Road (from the intersection with Elliott Road), on the western side of the road.

Photo Orientation: South east down Wescott Road, view across Lot 52.

| Coordinates: | MGA94 Zone 50 | 401617mE | 6409410mN |
|---|---|---|---|

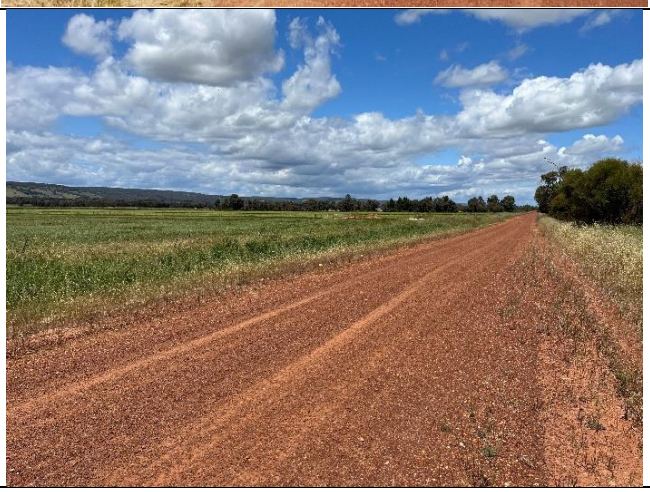
| Date and Description | Photo |
|---|---|
| 5th October 2017<br>Mining Activities Visible:<br>• Early stage rehabilitation works |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Rehabilitation works (pasture) |  |
| 2nd October 2019<br>Mining Activities Visible:<br>• Rehabilitation works (pasture) |  |

## Visual Assessment 11A

Location Description: 800m south along Wescott Road (from the intersection with Elliott Road), on the western side of the road.

Photo Orientation: South east down Wescott Road, view across Lot 52.

| Coordinates: | MGA94 Zone 50 | 401617mE | 6409410mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 14th October 2020<br>Mining Activities Visible:<br>• Rehabilitation works (pasture) |  |
| 12th October 2021<br>Mining Activities Visible:<br>• Rehabilitation works (pasture) |  |
| 10th October 2022<br>Mining Activities Visible:<br>• Rehabilitation works (pasture) |  |

## Visual Assessment 12

Location Description: Along Elliott Road 800m west of the Wescott Road intersection under the high voltage power lines.

Photo Orientation: South in line with SEC gate, view across Lot 57.

| Coordinates: | MGA94 Zone 50 | 400793mE | 6410255mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 28th September 2016<br>Mining Activities Visible (in the distance):<br>• Wet Concentrator Plant<br>• Pre-mining area |  |
| 5th October 2017<br>Mining Activities Visible (in the distance):<br>• Wet Concentrator Plant<br>• Pre-mining area |  |
| 4th October 2018<br>Mining Activities Visible:<br>• Wet Concentrator Plant<br>• Pre-mining area |  |

## Visual Assessment 12

Location Description: Along Elliott Road 800m west of the Wescott Road intersection under the high voltage power lines.

Photo Orientation: South in line with SEC gate, view across Lot 57.

| Coordinates: | MGA94 Zone 50 | 400793mE | 6410255mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 2nd October 2019<br>Mining Activities Visible:<br>• Wet Concentrator Plant<br>• Pre-mining area |  |
| 14th October 2020<br>Mining Activities Visible:<br>• MFU noise bund<br>• Rehabilitation works (pasture)<br>• Perimeter bunds<br>• Mobile plant |  |
| 12th October 2021<br>Mining Activities Visible:<br>• MFU noise bund<br>• Rehabilitation works (pasture)<br>• Perimeter bunds<br>• Mobile plant |  |

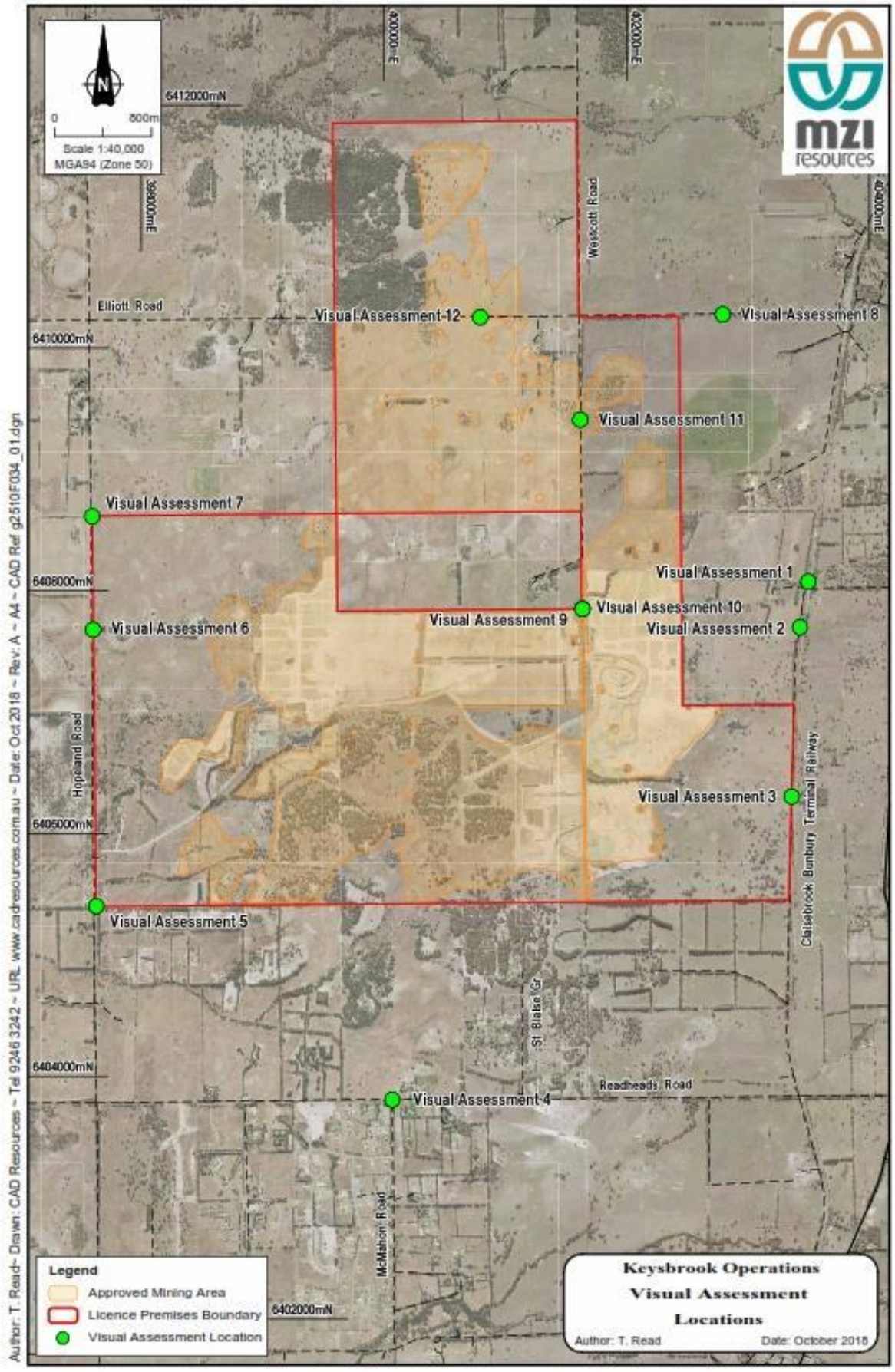
## Visual Assessment 12

Location Description: Along Elliott Road 800m west of the Wescott Road intersection under the high voltage power lines.

Photo Orientation: South in line with SEC gate, view across Lot 57.

| Coordinates: | MGA94 Zone 50 | 400793mE | 6410255mN |
|---|---|---|---|

| Date and Description | Photo |
|---|---|
| 10th October 2022<br>Mining Activities Visible:<br>• Perimeter Bund<br>• Noise Bund |  |
| | |


N
0
500m
Scale 1:40,000
MGA94 (Zone 50)
6412000mN
396000mE
400000mE
402000mE
mzi resources
Elliott Road
Wellcott Road
Visual Assessment 12
Visual Assessment 8
6410000mN
Visual Assessment 11
Visual Assessment 7
6408000mN
Visual Assessment 1
Visual Assessment 10
Visual Assessment 9
Visual Assessment 6
Visual Assessment 2
Hopeland Road
Visual Assessment 3
Collie-Bunbury Railway
6406000mN
Visual Assessment 5
St Blaise Gr
6404000mN
Readheads Road
Visual Assessment 4
McMahon Road
6402000mN
Legend
Approved Mining Area
Licence Premises Boundary
Visual Assessment Location
Keysbrook Operations
Visual Assessment
Locations
Author: T. Read
Date: October 2018
Author: T. Read- Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date: Oct 2018 ~ Rev: A ~ A4 ~ CAD Ref g2510F034_01.dgn

# APPENDIX 7: WEED AND DIEBACK MANAGEMENT PLAN

KEYSBROOK MINERAL SANDS PROJECT

# DIEBACK AND WEEDS ENVIRONMENTAL MANAGEMENT PLAN, KEYSBROOK MINERAL SANDS PROJECT, MS810

DOCUMENT REFERENCE

DIEBACK AND WEEDS ENVIRONMENTAL MANAGEMENT PLAN

27-APR-23

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# DOCUMENT DETAILS

| DOCUMENT ID | REPORT TITLE | DATE | PREPARED FOR |
|---|---|---|---|
| DIEBACK AND WEEDS ENVIRONMENTAL MANAGEMENT PLAN | DIEBACK AND WEEDS ENVIRONMENTAL MANAGEMENT PLAN, KEYSBROOK MINERAL SANDS PROJECT, MS810 | 27-Apr-23 | EPA |

# AMENDMENT REGISTER

| Date | Rev | Description of Revision | Approved |
|---|---|---|---|
| Nov 2010 | 1 | Initial Document | MM |
| Jan 2011 | 2 | Updated EMP | MM |
| Apr 2018 | 3 | Updated EMP to support S45C | PG |
| Aug 2022 | 4 | Updated EMP to support S45C (Lot 56) | CB |
| Apr 2023 | 4 | Updated EMP to support S45C (Lot 63) | CB |

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# TABLES

# GLOSSARY

| TERM | DEFINITION |
|---|---|
| BAM ACT | *Biosecurity and Agriculture Management Act 2007* |
| CAR | Compliance Assessment Report |
| 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 |
| KLPL | Keysbrook Leucoxene Pty Ltd |
| MS | Ministerial Statement |
| PER | Public Environmental Review |
| WDMP | Weed and Dieback Management Plan |

# SUMMARY

This Weed and Dieback Management Plan (WDMP) has been prepared to meet Condition 9 of Ministerial Statement No. 810 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: WDMP SUMMARY

| | |
|---|---|
| **Proposal Name** | Keysbrook Mineral Sands Mine |
| **Proponent Name** | Keysbrook Leucoxene Proprietary Limited |
| **Ministerial Statement Number** | MS810 |
| **Purpose of the EMP** | Fulfil the requirements of Implementation Condition 9. |
| **EPA Key Environmental Factor/s, outcome/s and objective/s** | **Flora and vegetation:**<br>• Prevent the introduction of new weed species within the Project area;<br>• Minimise the spread of existing weeds and dieback within the Project area;<br>• Provide control measures to progressively reduce the distribution/abundance of existing priority weed species within the Project area. |
| **Implementation Condition Clauses** | Condition 9<br>Condition 6.2<br>Condition 7.2<br>Condition 8.3 |
| **Key Provisions of the Plan** | 1. Annual weed survey to identify and record locations of declared and priority weeds within the Project area;<br>2. Management measures to prevent introduction and spread of weeds and dieback within Project area.<br>3. Provision of control measures to progressively reduce the distribution/abundance of existing priority weed species on and around the Project area. |

# 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 1,532ha, within a 3,015ha 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 Westcott 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 vegetation. 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 Weed and Dieback Management Plan (WDMP) to incorporate the amendment area and demonstrate the amendment can be managed in accordance with Condition 9 of MS810.

## 1.2. KEY ENVIRONMENTAL FACTOR

The key environmental factor relevant to this WDMP is Flora and Vegetation. While the majority of the approved mining area is cleared pasture, competition from weeds can impact the quality of remnant native vegetation and constitutes a threatening process in the establishment of successful rehabilitation (pasture or native vegetation). Similarly, the presence of *Phytophthora* dieback infestations in the Project area has the potential to spread the pathogen into areas of native vegetation currently unaffected by dieback.

Potential weed and dieback related risks arising from the Project are summarised in Table 2.

TABLE 2: POTENTIAL WEED AND DIEBACK PROJECT RISKS

| SOURCE | ACTIVITY | POTENTIAL IMPACT | INHERENT RISK |
|---|---|---|---|
| Mining and Exploration | Clearing and grubbing. | Spread of weed species to uninfested areas. | Low |

| SOURCE | ACTIVITY | POTENTIAL IMPACT | INHERENT RISK |
|---|---|---|---|
| | Topsoil removal and movement. | Spread of weed species to uninfested areas.<br>Spread of dieback to uninfested areas. | Low |
| | Heavy and light vehicle movements. | Introduction of new weed species. | High |
| | | Spread of weed species to uninfested areas | Low |
| | | Spread of dieback to offsite uninfested areas. | Low |
| | Ore extraction and material replacement in pit. | Spread of dieback to new areas | Low |
| | Material imports to site<br>(e.g., limestone) | Introduction of new weed species | Medium |
| | Revegetation using seed and tube stock.<br>Pasture re-establishment using purchased seed. | Introduction of new weed species through planting tube stock in rehabilitation areas<br>Introduction of new weed species in purchased seed spread in rehabilitation areas | High |
| Natural events | Localised flooding. | Introduction of new weed species<br>Spread of dieback | Medium |

## 1.3. CONDITION REQUIREMENTS

The Project was assessed and approved under Part IV of the *Environmental Protection Act 1986* on 19 October 2019, 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 May 2023.

This WDMP has been prepared to address the following Conditions in MS810.

TABLE 3: CONDITION REQUIREMENTS

| CONDITION NO. | CONDITION | RELEVANT SECTION OF WDMP |
|---|---|---|
| 9 | Weed and Dieback Management | |
| 9.1 | *Prior to the commencement of operations, the proponent shall prepare and submit a Dieback and Weed Management Plan to the requirements of the CEO.* | Completed: January, 2011. |
| 6 | Protection of native vegetation | |

| CONDITION NO. | CONDITION | RELEVANT SECTION OF WDMP |
|---|---|---|
| 6.1 | *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.* | N/A |
| 6.2 | *The instrument or instruments referred to in 6.1 shall include the following:*<br>b. *measures which have the objective of maintaining a functioning and self-sustaining vegetation community* | Section 2 Management Targets 1-4 (Table 4) |
| **7** | **Protection of watercourses and wetlands** | |
| 7.1 | *The proponent shall not clear vegetation or undertake mining activities:*<br>a. *within 20 metres of the banks of watercourses shown in Figure 9 of the PER document*; | N/A |
| | b. *within 100 metres of the boundary of a conservation category wetland.* | N/A |
| 7.2 | *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.* | Section 2 Management Targets 1-4 (Table 4) |
| **8** | **Rehabilitation management plan** | |
| 8.3 | *The rehabilitation management plan shall:*<br>c. *identify measures to eradicate weeds in the revegetation areas;* | Section 2 Management Targets 1-4 (Table 4) |
| | d. *identify measures to use dieback un-infested topsoil and dieback resistant species in the revegetation areas* | Section 2 Management Targets 4 (Table 4) |

# 1.4. RATIONALE AND APPROACH

## 1.4.1. SURVEY AND STUDY FINDINGS

### WEEDS

Baseline surveys of the proposal area recorded 34 weed species, excluding pasture species (Bennett Consulting, 2004) (Appendix 1). 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 (Appendix 1). 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.

Weed surveys undertaken across the Project area and along roads bordering the project during October/November 2017 have identified three of the high priority declared plants in the vicinity of the project area (Figure 2):

- *Gomphocarpus fruticosus* (Narrow Leaf Cotton Bush);
- *Zantedeschia aethiopica* (Arum Lily);
- *Echium plantagineum* (Paterson's Curse).

An additional Flora and Vegetation survey of the proposed amendment area (Lot 63) and surrounds was conducted by (Ecoedge, 2023) to support the request for amendment under S45C. Results of this survey did not identify any Declared or priority weed species within the proposed amendment area (Ecoedge, 2023).

### *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 & 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 assessment was completed by BARK Environmental (2023) of the amendment area, as well as Lots 62 and 200. Due to historical disturbance activities, there is an overall absence of suitable native indicator plants necessary to enable assessment, which resulted in the entire subject area to being mapped as excluded. A *Phytophthora* Dieback Occurrence map is provided in Figure 3. The Department of

Biodiversity, Conservation and Attractions (DBCA) methodology for Dieback Assessment notes that in areas where Keighery disturbance ratings of 5 or greater occurs, such as Degraded or Completely Degraded areas (Lot 63), that assessment is not possible (DPaw, 2015). The assessment concluded that the amendment poses no significant risk to flora and vegetation as there is no significant vegetation remaining to be at risk. The assessment (BARK Environmental, 2023) recommends that:

- The Dieback Management Plan / EMP tactics for the disturbance activities within Lot 63 should be kept simple because there is no susceptible intact vegetation remaining at the site;
- The key tactic to adopt at Excluded sites is to 'arrive clean and leave clean' to avoid introduction and/or spread of diseases and weeds within and beyond the subject area;
- Should any areas be retained for revegetation that includes plants susceptible to *Phytophthora* disease, it is recommended that standard Dieback hygiene protocols are included during inductions, at entry/exit points, clean-down of footwear/vehicles/equipment and the sourcing of seedlings is preferrable from a NIASA accredited nursery to minimise risk of disease introduction;
- Plants within any revegetation areas displaying disease symptoms could be sampled as soon as practicable for early detection, diagnosis and treatment using Phosphite application.

### 1.4.2. KEY ASSUMPTIONS AND UNCERTAINTIES

The key assumptions and uncertainties with this WDMP include:

- The Flora and Vegetation surveys conducted for the Project have accurately recorded the presence of all high priority declared plants;
- Results of annual weed surveys undertaken for the Project area since commencement of mining have been relied upon;
- The cleared, grazing areas that formed the majority of the 2013 and 2016 dieback survey areas were determined to be unmappable (uninterpretable) given the absence of indicator species. A 2017 Dieback risk assessment determined that these areas must be assumed to be infested and managed accordingly (Terratree, 2017);
- The (BARK Environmental, 2023) Dieback assessment for the proposed amendment area was also determined to be excluded, given it comprises cleared pasture with no indicator species.

### 1.4.3. MANAGEMENT APPROACH

As the Project area is predominantly pasture used for agriculture (dairy and beef cattle), weed control is focused on Declared and Priority Plants as listed under the BAM Act given that these agricultural weeds pose the greatest risk to agricultural production.

Environmental weeds will be targeted for control within native vegetation enhancement and rehabilitation areas where monitoring identifies action is warranted.

A clean vehicle and equipment policy is implemented to minimise the potential of weed and *Phytophthora* dieback material being introduced or spread by plant and equipment.

### 1.4.4. RATIONALE FOR CHOICE OF PROVISIONS

An Objectives based EMP has been selected to meet MS810 Condition 9, (prepare and submit a Dieback and Weed Management Plan) to minimise introduction and spread of weeds and dieback, as far as practicable, to protect flora and vegetation values within the Project area.

# 2. ENVIRONMENTAL MANAGEMENT PLAN PROVISIONS

Table 4 provides a summary of the objective based EMP to meet legal requirements of Condition 9 of MS810.

TABLE 4: OBJECTIVE BASED EMP PROVISIONS

| MANAGEMENT TARGETS | MANAGEMENT ACTIONS | MONITORING / PERFORMANCE INDICATOR | TIMING/ FREQUENCY OF ACTIONS | REPORTING |
|---|---|---|---|---|
| **Management Target 1**<br>Identify location of Declared or priority weed species at the Site. | **Management Actions 1**<br>Annual survey of known Declared or priority weed locations to ensure appropriate control measures are planned and implemented.<br>Information on Declared or priority weed species identified at Site to be included in site inductions to allow for identification and reporting by staff.<br>Location data of all Declared or priority weed populations to be captured digitally.<br>Ensure seed collected for use in rehabilitation is weed free. | Annual survey of known Declared or priority weed locations.<br>WDMP updated as required.<br>Location data to be updated digitally.<br>Use accredited seed collectors and suppliers. | Annually (July–August)<br>Ongoing<br>Annually<br>Ongoing | KLPL Weed Management Register<br>KLPL Weed Management Register<br>KLPL Weed Management Register<br>Internal seed records |
| **Management Target 2**<br>Control Declared or priority weed species identified at the Site. | **Management Targets 2**<br>Implement DPIRD recommended control measures for known Declared or priority weed populations.<br>Inspection of areas post control to ensure control technique has been effective. | Infestations are treated annually to prevent seeding.<br>Annual survey of known Declared or priority weed locations. | Ongoing as required.<br>Ongoing – as required following control implementation | KLPL Weed Management Register<br>KLPL Weed Management Register |
| **Management Target 3**<br>Prevent the introduction and | **Management Actions 3**<br>Ensure all plant and equipment are clean, | Site induction includes clean on | Ongoing – as required | |

| MANAGEMENT TARGETS | MANAGEMENT ACTIONS | MONITORING / PERFORMANCE INDICATOR | TIMING/ FREQUENCY OF ACTIONS | REPORTING |
|---|---|---|---|---|
| spread of weeds by plant and equipment | inspected and certified prior to entry into KLPL area of operations.<br><br>Clean on entry requirement is implemented by all personnel working within KLPL area of operations. | entry requirement and references KLPL Weed & Seed Vehicle Checklist.<br><br>Entry into area of operations is controlled (clean on entry). | | KLPL Weed & Seed Vehicle Checklists |
| **Management Target 4**<br><br>Prevent the introduction and spread of *Phytophthora* dieback | **Management Actions 4**<br><br>All personnel entering KLPL operations are informed of *Phytophthora* Dieback risk, potential impacts and key management requirements.<br><br>Ensure all heavy plant and equipment are clean, inspected and certified prior to entry/exit.<br><br>Clean on entry/exit requirement is implemented by all personnel working within KLPL area of operations.<br><br>Signage to be installed at dieback identified locations to inform all personnel entering site that *Phytophthora* Dieback is present.<br><br>Hard stand areas and internal roads to be constructed of limestone where practicable (as its high pH suppresses *Phytophthora* Dieback). | Site induction includes pertinent information relating to *Phytophthora* Dieback its impact and management<br><br>Inspections upon entry/exit to Site.<br><br>Inspections upon entry/exit to Site.<br><br>Ensure signage is installed.<br><br>Ensure hard stand areas are constructed with limestone. | (Ongoing – as required) | Induction content<br><br>Weed & Seed Vehicle Checklists<br><br>Induction content |

| MANAGEMENT TARGETS | MANAGEMENT ACTIONS | MONITORING / PERFORMANCE INDICATOR | TIMING/ FREQUENCY OF ACTIONS | REPORTING |
|---|---|---|---|---|
| | Road haul trucks collecting product and delivering sand tailings are managed so not required to be certified clean on entry and exit.<br><br>Identify and plan for use of plant species resistant to *Phytophthora* Dieback in rehabilitation areas. | Entry into area of operations is controlled.<br><br>Loading operations isolated from site extraction and processing operations.<br><br>Rehabilitation plans identify *Phytophthora* Dieback resistant species for revegetation projects. | | Rehabilitation Management Plan |

# 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 weeds and dieback are included in Table 5 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 5: MONITORING TRIGGERS, THRESHOLDS AND CONTINGENCY ACTIONS

| MONITORING PARAMETER | TRIGGER | CONTINGENCY ACTION |
|---|---|---|
| Introduction and/or spread of weeds | Weeds: An increase as a community component by 10%. | Investigate cause.<br>Conduct additional weed spraying.<br>Further restrict access to at risk weed areas.<br>Review weed inspection protocols (i.e. clean on entry/exit)<br>Monitor outcomes. |
| Introduction and/or spread of *Phytophthora* dieback | Presence of *Phytophthora* impact detected within areas previously absent of dieback. | Investigate cause.<br>Qualified Dieback Interpreter to recheck specific area for Phytophthora Dieback per DBCA (2015) methodology.<br>Further restrict access to at risk vegetation areas (dieback).<br>Review dieback controls and management in consultation with Dieback specialist.<br>Consider application of Phosphite with relevant environmental approvals by a Dept of Health W.A. Licensed Technician qualified to implement Dieback Treatment.<br>Monitor outcomes. |

## 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 4 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

Commencing prior to initial approval, the Keysbrook operations has continued a program of consultation with local residents and other key stakeholders, including the Shire of Murray and the Shire of Serpentine-Jarrahdale since 2005.

The Keysbrook Community Consultation Group (CCG) was formed in 2012 as a formal means of regular information exchange with stakeholders. The CCG comprises two Shire of Murray and Shire of Serpentine Jarrahdale Councillors, two community representatives from both Shires, an independent Chairperson and two KLPL (Doral) personnel. The CCG met monthly until 2017 and continues as a quarterly schedule.

Environmental management and performance is communicated through the CCG and regulatory reporting. The regulatory reports, CCG minutes and approved environmental management plans are available on the Doral website.

Stakeholder engagement is set through a Stakeholder Interaction and Policy Procedure which provides for the program of engagement and investigation, response and closure of any community complaints.

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 engagement is outlined in the following table.

TABLE 6: STAKEHOLDER ENGAGEMENT

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| Shire of Serpentine-Jarrahdale<br>CEO and Planning Manager | 23/02/2023 | In person meeting.<br>Receives copies of landholder updates and newsletters | 45c proposal and Shire Development Application and timings | Development Application to be considered once EPA decision advised.<br>Crossing of Elliott Road, subject to Traffic Management Plan.<br>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. |

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| Shire of Murray<br>CEO and Director Planning | 26/04/2023 | In person meeting.<br>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 for Darling Range | 07/11/2022 | In person meeting.<br>Receives copies of Community Update letters and newsletters | Extension proposals | Supportive of expansion plans, noted any community feedback received would be provided |
| Robyn Clarke MLA, Member for Murray Wellington | 07/11/2022 | In person meeting.<br>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.<br>Annual monitoring of artificial Black Cockatoo hollows. | Active involvement in the Keysbrook revegetation and fauna habitat creation |
| Peel Development Commission | 23/03/2023<br>Ongoing since 2012 | In person meeting.<br>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<br>Lot 63 mine plan and broader western extension provided at 3 | 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. |

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| | | May 2023 meeting<br>Copy of Lot 63 and western extension proposal letter dated 4 April 2023 sent | | |
| 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. |
| 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<br>14/04/2023 | Letter plus in person meeting | Water and dust. | Sits outside of 2km, interested landholder, concerns around water ad 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 |

| STAKEHOLDER | DATE | TYPE OF CONSULTATION | RELEVANT DISCUSSION POINTS/KEY ISSUES | COMMENTS RECEIVED / OUTCOMES |
|---|---|---|---|---|
| | | | | 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<br>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. |
| 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<br><br>**42 neighbours in total** | 04/04/2023<br>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.<br>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<br>**85 neighbours in total** | 14/04/2023<br>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<br>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

A summary of changes to the EMP are summarised in the below table.

TABLE 7: 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 | | 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 | Section 1.1 | 1 | Updated to include proposed S45C details for Amendment Area (Lot 63) | Update EMP to include proposed Amendment Area to support submission of S45C |
| 2 | Section 1.3 | 2-3 | Heading changes, section reworded to include proposed S45C details | Heading changes to be consistent with EPA EMP guidance, reworded to include proposed S45C. Table 3 updated to reflect changes in EMP section/layout |
| 3 | Section 1.4 | 3-5 | Headings updated, inclusion of additional weed and dieback surveys for proposed S45C | Section updated to be consistent with EPA EMP guidance.<br>New information included relevant to proposed Amendment Area (S45C). |
| 4 | Section 2 | 6-8 | Table updated to conform with EPA AMP guidance | Previous table not consistent with EPA EMP guidance<br>Rationalised management targets/actions to conform with EMP guidance |
| 5 | Section 3 | 9-10 | Table updated to conform with EPA AMP guidance | Previous table not consistent with EPA EMP guidance |

| COMPLEXITY OF CHANGES | | MINOR REVISIONS ✓ | MODERATE REVISIONS | MAJOR REVISIONS |
|---|---|---|---|---|
| NUMBER OF KEY ENVIRONMENTAL FACTORS | | One ✓ | 2-3 | >3 |
| DATE REVISION SUBMITTED TO EPA | | 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 |
| 6 | Section 4 | 11 | Updated Stakeholder Consultation | Updated Stakeholder Consultation required for S45C request |
| 7 | Section 5 | 12-13 | Table of Changes to EMP | As required by EMP guidance |

# 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.

BARK Environmental (2023). *Phytophthora Dieback Occurrence Report for Lot 63 – Keysbrook.* Unpublished report prepared for Doral Mineral Sands Pty Ltd. August 2021.

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KLPL Stakeholder Interaction and Policy Procedure. Radix Document Number: 9983

KLPL Stakeholder Interaction Report Form. Radix Document Number: 81487

KLPL Weed Management Register. Radix Document Number: 150241

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Terratree (2016). *Phytophthora Dieback Assessment*. Unpublished report prepared by Terratree for MZI Resources Keysbrook Operations. Radix Document Number: 154245

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

N

0 250 500 750 1,000 1,250
Meters

**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

DIRK BROOK
HALL RD
DIRK RD
MYARA BROOK
BADEN RD
WESCOTT RD
WALTON ST
LONGRIDGE RD
ELLIOTT RD
HOPELAND RD
ATKINS RD
SOUTH WESTERN HWY
PAGE RD
BOYD RD
ST BLAZE GR
WESTCOTT RD
READHEADS RD
MCMAHON RD
BEAU SOVEREIGN CT
REIDES RD
HINES RD
JENNIE PL
MITI RD
CORIO RD

Lot 66, Lot 54, Lot 1, Lot 7, Lot 8, Lot 56, Lot 507, Lot 508, Lot 201, Lot 5, Lot 9, Lot 11, Lot 12, Lot 4965, Lot 20, Lot 12, Lot 57, Lot 64, Lot 701, Lot 700, Lot 52, Lot 50, Lot 105, Lot 101, Lot 111, Lot 103, Lot 104, Lot 112, Lot 63, Lot 70, Lot 6, Lot 113, Lot 62, Lot 59, Lot 300, Lot 301, Lot 71, Lot 1, Lot 20, Lot 101, Lot 506, Lot 505, Lot 100, Lot 5, Lot 12, Lot 102, Lot 110

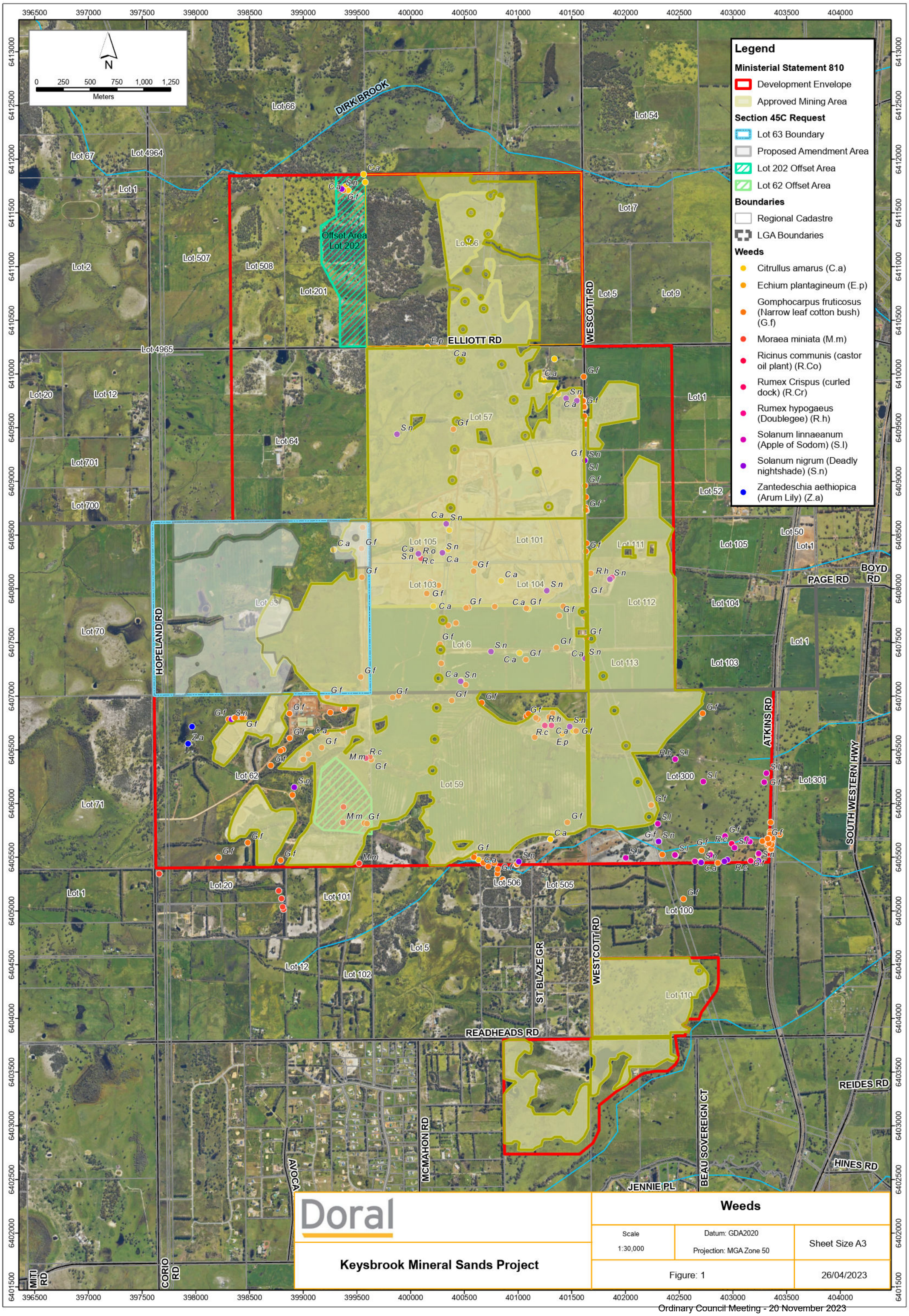
Doral

**Keysbrook Mineral Sands Project**

**Keysbrook Location Map**

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

# FIGURE 2: WEED LOCATIONS


N
0 250 500 750 1,000 1,250
Meters
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
Weeds
Citrullus amarus (C.a)
Echium plantagineum (E.p)
Gomphocarpus fruticosus (Narrow leaf cotton bush) (G.f)
Moraea miniata (M.m)
Ricinus communis (castor oil plant) (R.Co)
Rumex Crispus (curled dock) (R.Cr)
Rumex hypogaeus (Doublegee) (R.h)
Solanum linnaeanum (Apple of Sodom) (S.l)
Solanum nigrum (Deadly nightshade) (S.n)
Zantedeschia aethiopica (Arum Lily) (Z.a)
DIRK BROOK
Offset Area Lot 202
ELLIOTT RD
WESCOTT RD
HOPELAND RD
ATKINS RD
SOUTH WESTERN HWY
PAGE RD
BOYD RD
ST BLAZE GR
READHEADS RD
MCMAHON RD
AVOCA
BEAU SOVEREIGN CT
JENNIE PL
REIDES RD
HINES RD
MITI RD
CORIO RD
Lot 66
Lot 54
Lot 67
Lot 4964
Lot 1
Lot 7
Lot 2
Lot 507
Lot 508
Lot 201
Lot 56
Lot 5
Lot 9
Lot 4965
Lot 20
Lot 12
Lot 57
Lot 64
Lot 701
Lot 700
Lot 52
Lot 105
Lot 101
Lot 111
Lot 50
Lot 1
Lot 103
Lot 104
Lot 112
Lot 70
Lot 6
Lot 113
Lot 62
Lot 59
Lot 300
Lot 301
Lot 71
Lot 506
Lot 505
Lot 100
Lot 110
Lot 102
Lot 63
Doral
Keysbrook Mineral Sands Project
Weeds
Scale 1:30,000
Datum: GDA2020
Projection: MGA Zone 50
Sheet Size A3
Figure: 1
26/04/2023

# FIGURE 3: DIEBACK MAPPING

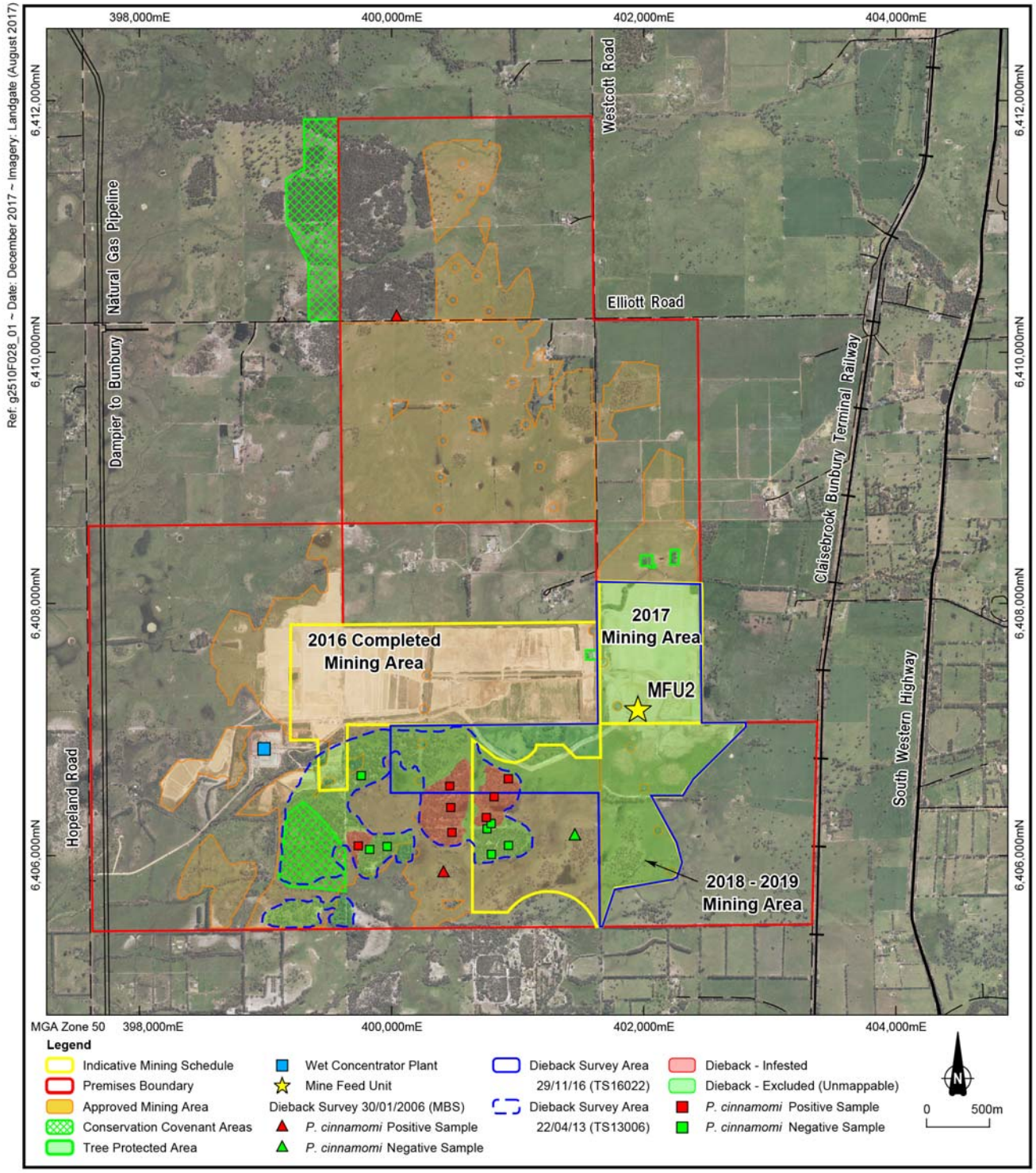



**Figure 3: Phytophthora Dieback Surveys 2006 - 2016**


## Legend

- Assessment Boundary
- Sample Results: Positive
- Sample Results: Negative
- Infested
- Uninfested
- Uninterpretable
- Excluded
- Armillaria luteobubalina
- 1. Area Numbers

**Phytophthora Occurrence Map Validity:**

Pathogens can spread over time, therefore this map:
- Is only valid for 12 months to guide site disturbance activities (Expiry 02.08.2022).
- Can be revalidated for a maximum of 3 years after initial assessment (Expiry 02.08.2024).
- After 3 years, a new assessment is required by a DBCA Registered Interpreter.

Interpreter: B. Rikli
Date of Interpretation: 02.08.2021
Date of Expiry: 02.08.2022
Interpretation Method: Comprehensive

**Area Statement**

| Occurrence Category | Area (ha) |
|---|---|
| Infested | 0.15 |
| Uninfested | 30.04 |
| Uninterpretable | 0 |
| Excluded | 93.76 |
| **Total Study Area** | 123.95 |

N

Datum: GDA 94
Projection: MGA Zone 50

Scale at A3

0 200 400 600 800 1,000 m

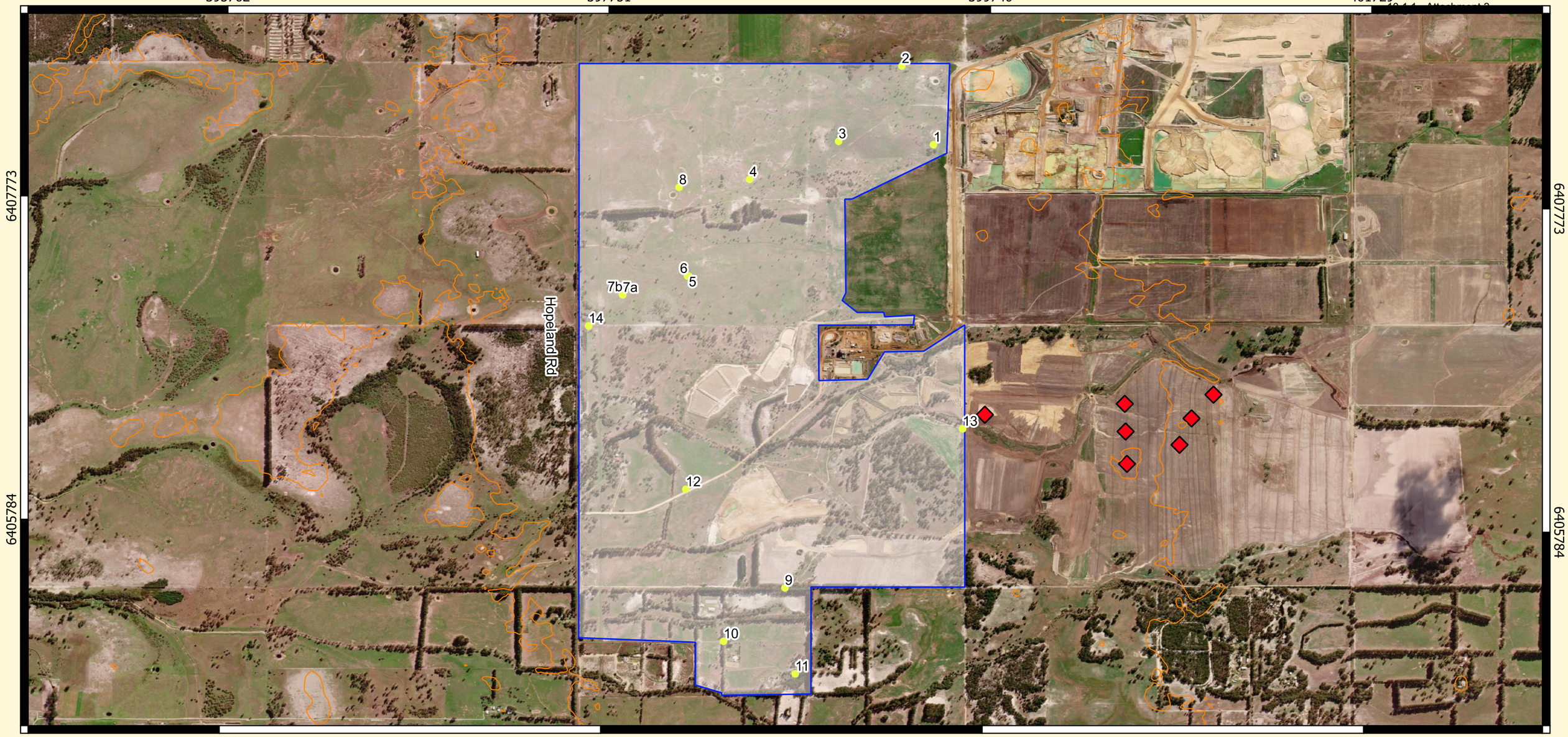
**Figure 1.**

**Phytophthora Occurrence Map Keysbrook, Lots 507, 508, 201 and 56**

Bark Job: BARK_52

Revision 1

BARK Environmental




## Legend

- Assessment Area
- Excluded Area
- 10m Countours
- Photos

### Samples

- DIDMS (2021)

Interpreter: B. Rikli
Assessment completion: 25/02/2023
Interpretation Method: Comprehensive

**Map Validity:**

Map revalidation due on 25/02/2024. This map should not be used for operational purposes for more than 1 year after assessment completion. Map may be revalidated after a re-check assessment for up to 3 years following initial assessment.

**Map limitations:**

Information shown on this map is positioned relative to mapped features and was captured by hand-held GPS so it may not be entirely accurate. Therefore, field demarcation should be followed.

### Area Statement

| Occurrence categories | Area (ha) |
|---|---|
| Infested | 0.00 |
| Uninfested | 0.00 |
| Uninterpretable | 0.00 |
| Excluded | 631.32 |
| **Total** | **631.32** |

N

Datum: GDA 94
Projection: MGA Zone 50

0 200 400 600 800 1,000 m

Scale @ A3 1:15,000

**Figure 1.**

**Phytophthora Occurrence Map: Doral - KeysBrook**

Bark Job: BARK_8_2023

Version 1

BARK Environmental

# APPENDIX 1: WEED LOCATIONS

## KLPL Priority Weed List

| Taxonomic Name | Common Name | Declared Weed | Weed of National Significance | Treatment Priority | Baseline Survey | Observed around project area | Not recorded to date but known to occur in the Shire | Weed Strategy Rating (1999) |
|---|---|---|---|---|---|---|---|---|
| *Asparagus asparagoides* | Bridal creeper | Yes - C3 | Yes | High | | | √ | High |
| *Rubus* spp. | Blackberry | Yes - C3 | Yes | High | | | √ | Moderate |
| *Echium plantagineum* | Paterson's curse | Yes - C3 | | Very High (Treat as 1st priority) | | √ | | |
| *Emex australis* | Doublegee | Yes - C3 | | High | | | √ | Low |
| *Gomphocarpus fruticosus* | Narrow leaf cotton bush | Yes - C3 | | Very High (Treat as 1st priority) | | √ | | Moderate |
| *Moraea flaccida* | Narrow leaf cape tulip | Yes - C3 | | High | | | √ | |
| *Moraea miniata* | 2 leaf cape tulip | Yes - C3 | | High | | | √ | |
| *Silybum marianum* | Variegated thistle | Yes - C3 | | High | | | √ | Low |
| *Solanum linnaeanum* | Apple of Sodom | Yes - C3 | | High | | √ | √ | Moderate |
| *Zantedeschia aethiopica* | Arum lily | Yes - C3 | | Very High (Treat as 1st priority) | | √ | | High |
| *Eragrostis curvula* | African lovegrass | | | High | | √ | | High |
| *Leptospermum laevigatum* | Victorian teatree | | | High | √ | | | High |
| *Bromus diandrus* | Great brome | | | Medium | √ | | | High |
| *Citrullus lanatus* | Pie Melon | | | Medium - treat opportunistically in rehabilitation areas | | √ | | Low |
| *Ehrharta calycina* | Perennial veldt grass | | | Medium | √ | | | High |
| *Oenothera drummondii* | Evening beach primrose | | | Medium | | √ | | Moderate |
| *Phytolacca octandra* | Red inkweed | | | Medium – treat opportunistically | | √ | | Mild |
| *Ricinus communis* | Castor oil plant | | | Medium – treat opportunistically | | √ | | Low |
| *Solanum nigrum* | Black berry nightshade | | | Medium | √ | | | Moderate |
| *Rumex crisps* | Curled dock | | | Medium | √ | | | Mild |
| *Watsonia sp.* | Watsonia | | | Medium - treat opportunistically in rehabilitation areas | | √ | | Moderate |
| *Aira caryophyllea* | Silvery hairgrass | | | Low | √ | | | Moderate |

| Taxonomic Name | Common Name | Declared Weed | Weed of National Significance | Treatment Priority | Baseline Survey | Observed around project area | Not recorded to date but known to occur in the Shire | Weed Strategy Rating (1999) |
|---|---|---|---|---|---|---|---|---|
| *Aira cupaniana* | Hairgrass | | | Low | √ | | | Moderate |
| *Arctotheca calendula* | Cape weed | | | Low | √ | | | Moderate |
| *Avena barbata* | Bearded oat | | | Low | √ | | | Moderate |
| *Briza maxima* | Blowfly grass | | | Low | √ | | | Moderate |
| *Briza minor* | Shivery grass | | | Low | √ | | | Moderate |
| *Callitriche stagnalis* | Common starwort | | | Low | √ | | | Moderate |
| *Carduus pycnocephalus* | Slender thistle | | | Low | √ | | | Moderate |
| *Cucumis myriocarpus* | Paddy melon | | | Low | √ | √ | | |
| *Cynodon dactylon* | | | | Low | √ | | | Moderate |
| *Cyperus tenellus* | Tiny flat sedge | | | Low | √ | | | Moderate |
| *Disa bracteata* | South African orchid | | | Low | √ | | | Moderate |
| *Ehrharta longiflora* | Annual veldt grass | | | Low | √ | | | Moderate |
| *Hordeum leporinum* | Barley grass | | | Low | √ | | | Moderate |
| *Hypochaeris glabra* | Flat weed | | | Low | √ | | | Moderate |
| *Juncus bufonius* | Toad rush | | | Low | √ | | | Moderate |
| *Juncus capitatus* | | | | Low | √ | | | Moderate |
| *Lolium rigidum* | Annual ryegrass | | | Low | √ | | | Moderate |
| *Orobanche minor* | Lesser broom rape | | | Low | √ | | | Moderate |
| *Parentucellia latifolia* | Red Bartsia | | | Low | √ | | | Moderate |
| *Romulea rosea* | Guildford grass | | | Low | √ | | | High |
| *Trifolium campestre* | Hop clover | | | Low | √ | | | Moderate |
| *Ursinia anthemoides* | Ursinia | | | Low | √ | | | Moderate |
| *Vulpia bromoides* | Squirrels tail fescue | | | Low | √ | | | Moderate |
| *Vulpia myuros* | Silver grass | | | Low | √ | | | Moderate |
| *Aira praecox* | Early hairgrass | | | Low | √ | | | Low |

| Taxonomic Name | Common Name | Declared Weed | Weed of National Significance | Treatment Priority | Baseline Survey | Observed around project area | Not recorded to date but known to occur in the Shire | Weed Strategy Rating (1999) |
|---|---|---|---|---|---|---|---|---|
| *Bromus hordeaceus* | Soft brome | | | Low | √ | | | Low |
| *Lotus suaveolens* | Hairy birdsfoot trefoil | | | Low | √ | | | Low |
| *Ornithopus pinnatus* | Slender serradella | | | Low | √ | | | Low |
| *Polygonum aviculare* | wireweed | | | Low | | □ | | Low |
| *Trifolium hirtum* | Rose clover | | | Low | √ | | | Low |

Weed Strategy Ratings (CALM, 1999) indicate the following:

**High** indicates this weed is prioritised for control and/or research

**Moderate** indicates control or research effort should be directed to it where possible, and it should be monitored

**Low** indicates that this species would require a low level of monitoring

C3 Weeds are defined as plant species declared under Section 22(2) of the BAM Act and are otherwise known as widespread or established weeds. They are categorised as C3 (management) control category under the BAM Act.

Prepared by:

ABEC ENVIRONMENTAL CONSULTING PTY LTD

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For and on behalf of:

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ACN 096 342 451
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E: admin@doral.com.au
W: www.doral.com.au

# APPENDIX 8: REHABILITATION MANAGEMENT PLAN