

# Comet Vale Sand Project

2023/09460: Preliminary Documentation

*Environmental Protection Biodiversity Conservation Act 1999*

October 2024

## Revision Table

Version	Title	Task	Name	Company	Date
1	Comet Vale Sand Project Preliminary Documentation	Prepared By	Erin Lee	RPM Advisory Services Pty Ltd	13/08/2024
		Approved By	Murray Leahy	MLG Oz Limited	16/09/2024

## Executive Summary

MLG Oz Limited (MLG) is proposing to develop the Comet Vale Sand Project (Comet Vale, or the Proposed Action), located approximately 96 km north of Kalgoorlie in the Goldfields region of Western Australia (WA). Comet Vale is a greenfields small-scale shallow sand and gravel extraction project requiring excavation pits above the water table, access tracks and provision of screening plant within the disturbed areas.

The Proposed Action was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 28 March 2023 under the *Environment Protection and Biodiversity Conservation 1999* (EPBC Act) due to the presence of Matters of National Environmental Significance (MNES).

The delegate of the Minister for the Environment and Water deemed the Proposed Action was likely to have a significant impact on matters protected under Division 4 of the EPBC Act and provided a determination of Controlled Action on 1 May 2023. The delegate deemed the Proposed Action to be assessed by Preliminary Documentation.

The document has been prepared in accordance with the requirements of the 'Request for Further Information for Preliminary Documentation' provided to MLG on 25 May 2023, providing an environmental impact assessment of the Proposed Action on Malleefowl (*Leipoa ocellata*). Malleefowl are listed as Vulnerable under the EPBC Act, indicating that these species face a high risk of extinction in the wild in the medium-term.

Several fauna habitat assessments and targeted searches for the presence of Malleefowl have been completed over the study area. A LiDAR survey was completed to identify potential Malleefowl mounds within the tenement area and in the surrounding regional environment. These mounds were ground truthed, and a population density of at least one breeding pair, with a potential maximum of up to five breeding pairs, was estimated for the proposed Development Envelope.

MLG is committed to the mitigation hierarchy of avoid, minimise and offset to remove any significant residual impacts to the species from the Proposed Action. These include but are not limited to:

- Pre-clearance surveys are undertaken to ensure all mounds are avoided with a 50 m buffer applied from disturbance and no clearing will be undertaken within this area.
- Disturbance of critical habitat is limited to the construction of access tracks only with excavation areas occurring only within foraging habitat.
- Development of a Project in partnership with the Great Victoria Desert Biodiversity Trust (GVDBT) to offset residual significant impacts of the Project.

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## 1 Introduction

### 1.1 Background

MLG Oz Limited (MLG) is proposing to develop the Comet Vale Sand Project (Comet Vale, or the Proposed Action), located approximately 96 km north of Kalgoorlie in the Goldfields Region of Western Australia. The Proposed Action was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 28 March 2023 under the *Environment Protection and Biodiversity Conservation 1999* (EPBC Act).

The delegate of the Minister for the Environment and Water deemed the Proposed Action was likely to have a significant impact on matters protected under Division 4 of the EPBC Act and provided a determination of Controlled Action on 1 May 2023. The delegate deemed the Proposed Action to be assessed by Preliminary Documentation.

### 1.2 Proponent

The proponent of the Proposed Action is MLG Oz Limited (MLG, the Proponent). All compliance and regulatory requirements regarding this assessment document should be forwarded by email, post, or courier to the following address:

**Company:** MLG Oz Limited  
**Address:** PO Box 1484, Kalgoorlie WA 6433  
**Contact:** Murray Leahy, Managing Director  
**Telephone:** (08) 9022 7746  
**Email:** murray@mlgoz.com.au

### 1.3 Purpose and Scope

This Preliminary Documentation provides the information requested by DCCEEW through a letter dated 25 May 2023, under s95A (2) of the EPBC Act. Compliance with Tables A, B and C of the request is provided as Appendix 1.

This document has been developed to:

- Describe the Proposed Action that has the potential to directly and indirectly impact Matters of National Environmental Significance (MNES).
- Describe the Commonwealth and State environmental approvals required before the Proposed Action can proceed.
- Provide context of the regional and local environment.
- Provide detailed information on the MNES potentially impacted by the Proposed Action considering appropriate policy and guidance.
- Identify the potential direct and indirect impacts to MNES from the Proposed Action.
- Describe the management measures using the mitigation hierarchy to avoid, minimise and restore.
- Where a significant impact to MNES is identified, provide details of the offset plan proposed for consideration.

## 1.4 Location and Tenure

The Proposed Action is located 96 km north of Kalgoorlie, Western Australia on tenure granted under the WA *Mining Act 1972* (Mining Act) and it is accessed from the Goldfields Highway onto internal access tracks. The location of the Proposed Action is shown in Figure 1-1.

The Proposed Action is located within the Nyalpa Pirniku Native Title Claim (WAD91/2019), that was determined on 31 October 2023. The Proposed Action is also located on the Jeedamya Pastoral Lease within the Shire of Menzies. There are two reserves, located over the mining lease application area being:

- Explosives Reserve R13500 which is vested to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS).
- Common Reserve R16153 which is the responsibility of the Department of Planning, Lands and Heritage (DPLH).

The proposed mining lease application area, reserves, and Native Title Claim areas are shown on Figure 1-2.

Figure 1-1 Location Plan

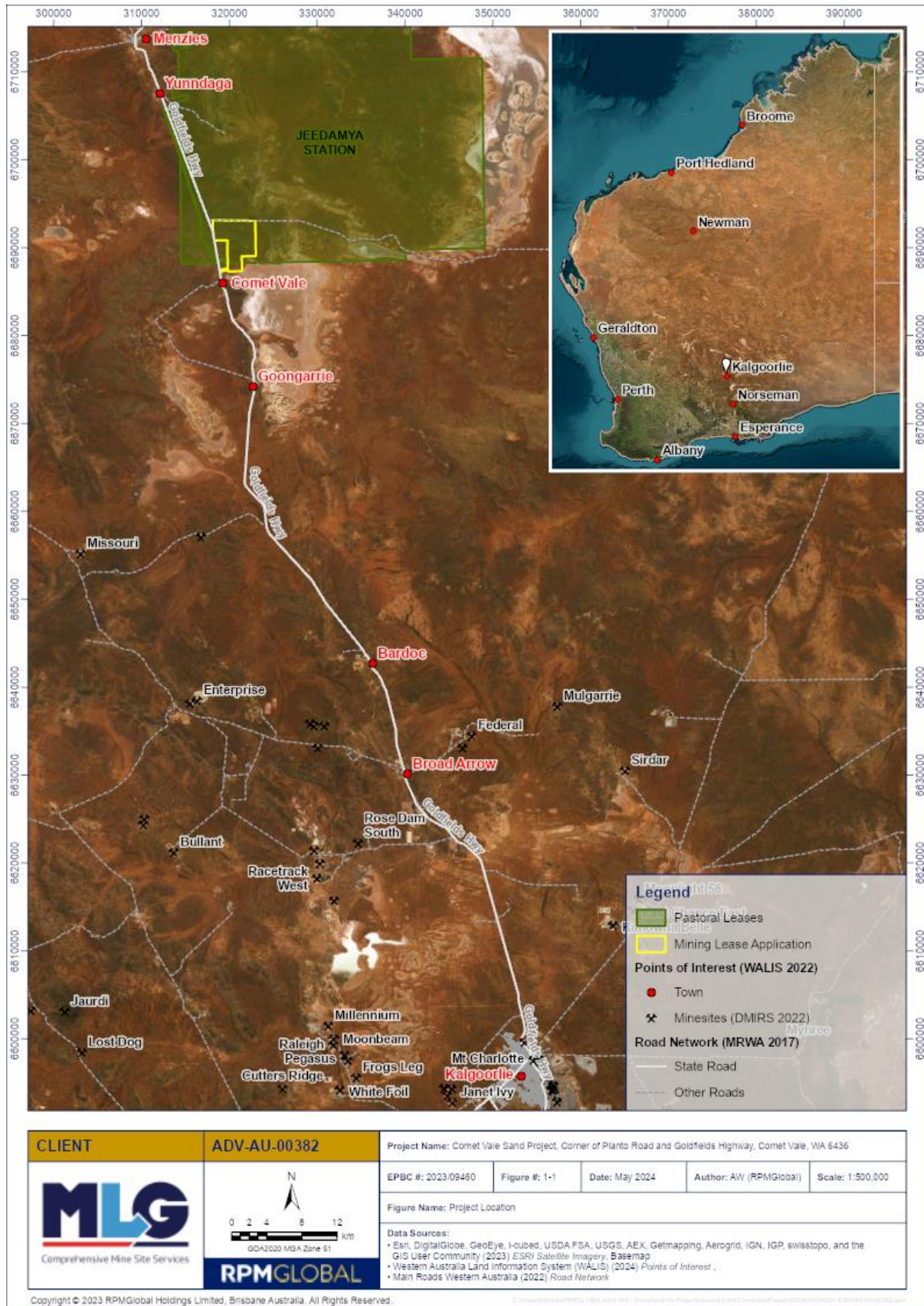
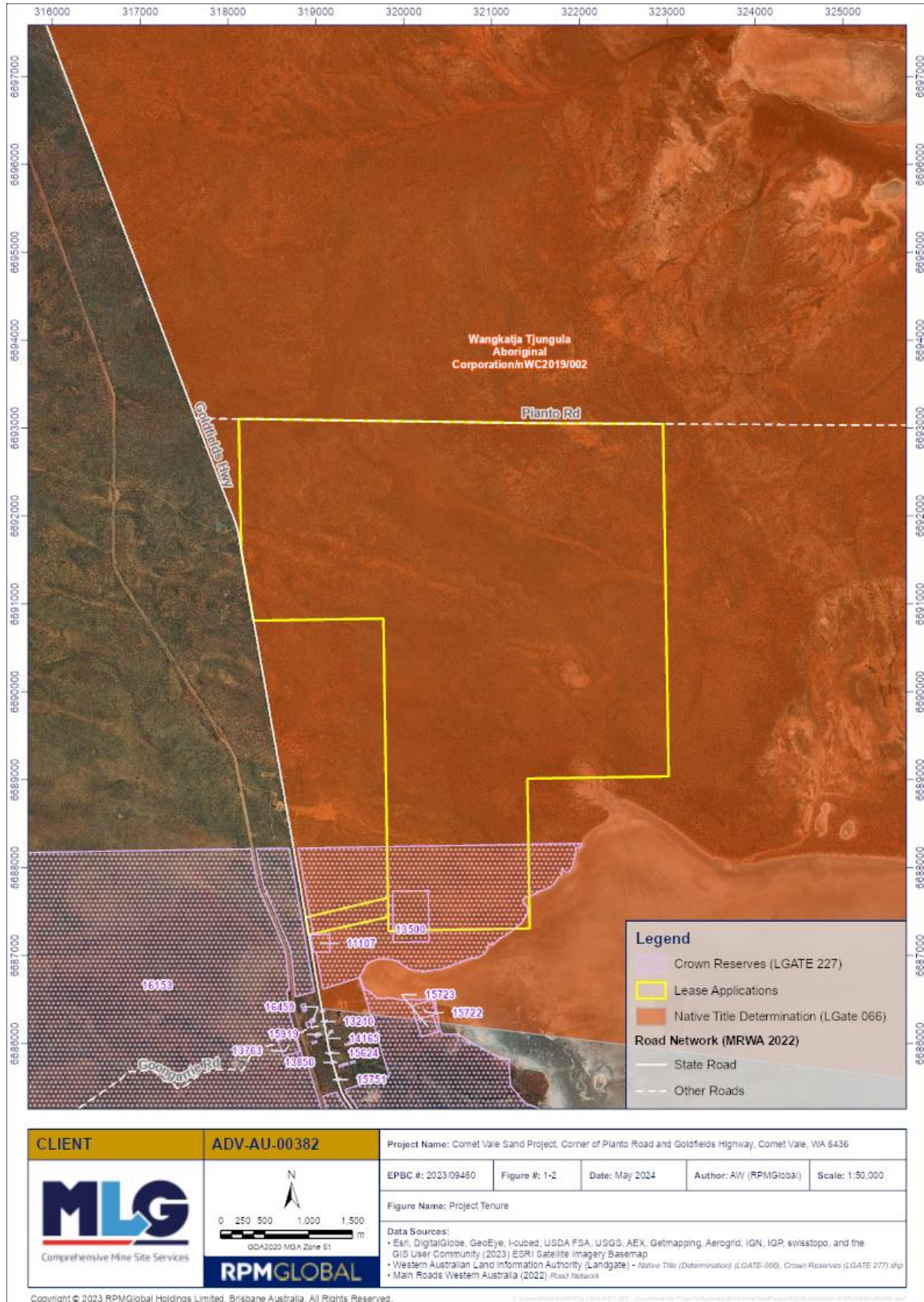


Figure 1-2 Project Tenure



## 2 Proposed Action

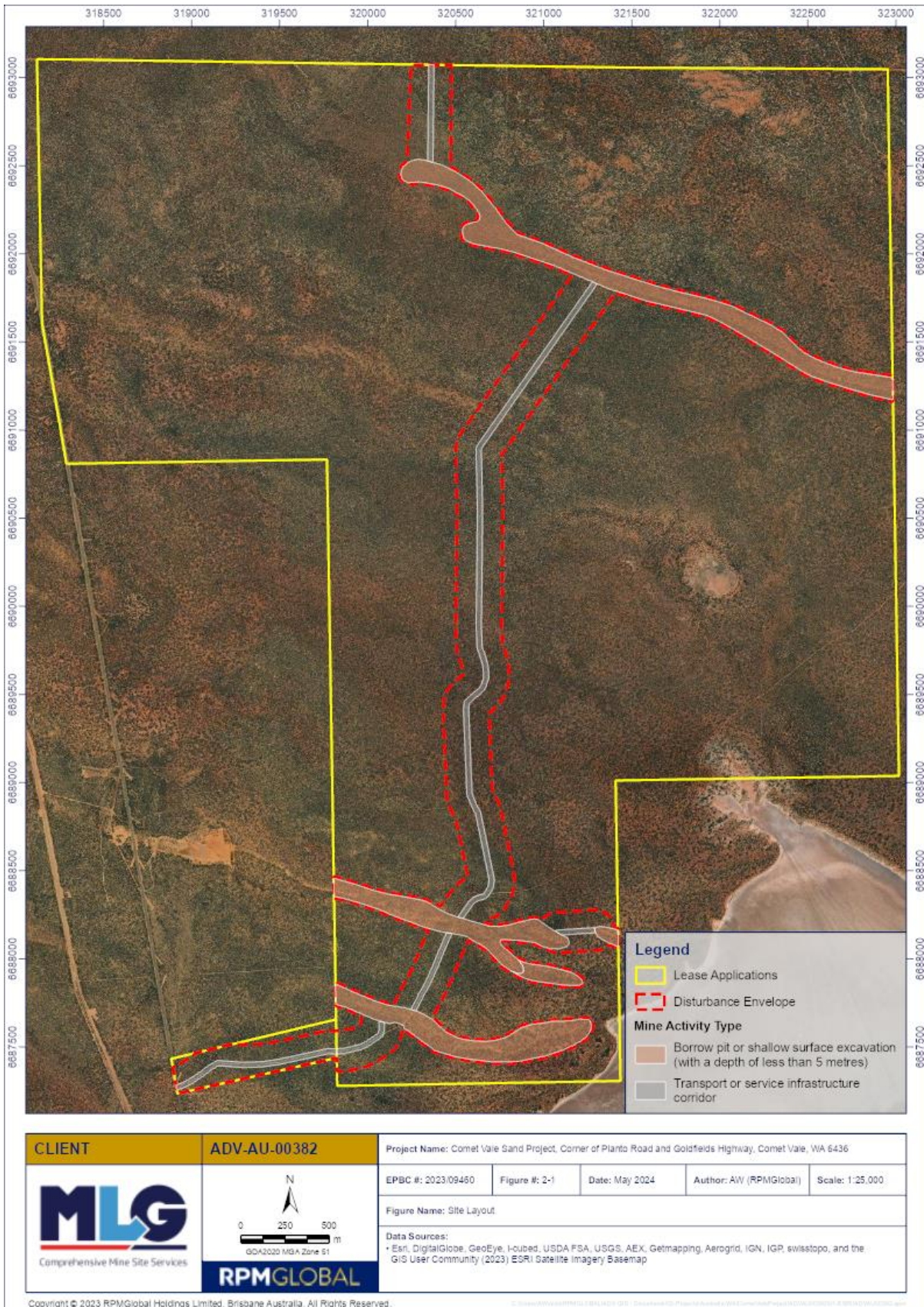
### 2.1 Proposed Disturbance

MLG proposes to develop a small-scale shallow sand and gravel extraction operation. The Proposed Action will require a disturbance footprint of up to 93 ha within a 244 ha Development Envelope. The Development Envelope adds a 10 m buffer to all mining activities and a 110 m buffer to all access tracks to allow for track diversion around identified Malleefowl mounds. A breakdown of the disturbance by mining tenure is provided in Table 2-1. The proposed site layout is shown in Figure 2-1.

*Table 2-1 Proposed Disturbance*

Tenement	Activity	Proposed Disturbance (ha)
Mining Lease Tenure (pending)	Sand and gravel extraction	73.4
	Access Road	16.7
Miscellaneous Licence (pending)	Access Road	2.9
<b>Total</b>	-	<b>93</b>

Figure 2-1 Proposed Site Layout

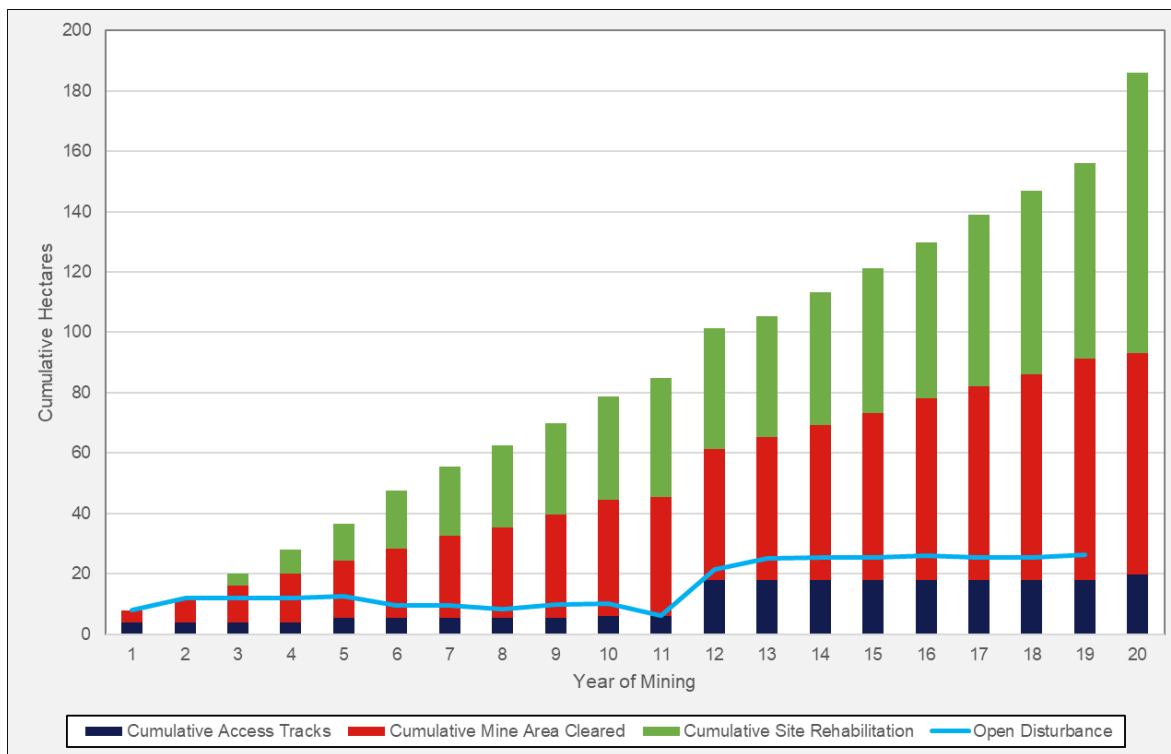


The disturbance of 93 ha will occur over the course of the 20-year Life of Mine (LOM) with a maximum of 10 ha of excavation area open for extraction activities at any one point in time. The disturbed land will be progressively rehabilitated over the LOM life to allow for continued mining. The conceptual LOM progress is described in Table 2-2 and shown graphically in Figure 2-2.

Table 2-2 Conceptual LOM Disturbance per Year

Year	Access Tracks			Mine Area			Total	
	Clearing (ha/yr)	Rehabilitation (ha/yr)	Total Open (ha)	Clearing (ha/yr)	Rehabilitation (ha/yr)	Total Open (ha)	Open Disturbance (ha)	All Disturbance (ha)
1	4.0	0.0	4.0	4.0	0.0	4.0	8.1	8.0
2	0.0	0.0	4.0	4.0	0.0	8.0	12.2	12.0
3	0.0	0.0	4.0	4.0	4.0	8.0	12.2	16.0
4	0.0	0.0	4.0	4.0	4.0	8.0	12.2	20.0
5	1.5	0.0	5.5	3.0	4.0	7.0	12.6	24.5
6	0.0	0.0	5.5	4.0	3.0	8.0	9.0	28.5
7	0.0	0.0	5.5	4.1	4.0	8.1	13.2	32.6
8	0.0	0.0	5.5	2.9	4.1	6.9	12.6	35.5
9	0.0	0.0	5.5	4.3	2.9	8.3	12.7	39.8
10	0.7	0.0	6.2	4.0	4.3	8.0	14.5	44.5
11	0.0	0.0	6.2	1.0	4.0	5.0	11.3	45.5
12	11.9	0.7	17.4	4.0	5.0	4.0	21.0	61.4
13	0.0	0.0	17.4	3.9	0.0	7.9	24.9	65.3
14	0.0	0.0	17.4	4.0	3.9	8.0	25.0	69.3
15	0.0	0.0	17.4	4.0	4.0	8.0	25.3	73.3
16	0.0	0.0	17.4	4.7	4.0	8.7	25.2	78.0
17	0.0	0.0	17.4	4.2	4.7	8.2	26.4	82.2
18	0.0	0.0	17.4	4.0	4.2	8.0	25.2	86.2
19	0.0	0.0	17.4	5.1	4.0	9.1	21.3	91.3
20	1.7	19.1	0.0	0.0	9.1	0.0	0.0	93.0
<b>Total</b>	<b>19.8</b>	<b>19.8</b>		<b>73.2</b>	<b>73.2</b>			<b>93.0</b>

Figure 2-2 Conceptual LOM Clearing and Rehabilitation per Year



## 2.2 Proposed Action Activities

### 2.2.1 Overview

The Proposed Action will be undertaken in four phases; construction, operations, progressive rehabilitation and closure. A description of each of these phases is provided in the following subsections with an overview of the mining process shown in Figure 2-3.

The sand mining operation is small in scale, with only a small number of vehicles on site at any time including:

- 1 x Komatsu 155 bulldozer (pre-strip and rehabilitation activities).
- 1 x Caterpillar 966H front end loader (extraction of material, road train loading of the material).
- 2 x Kenworth road trains (transport of the mined sand and gravel to the end customer).
- 1 x Kenworth water truck (dust suppression).
- 1 x Caterpillar 140H grader for road maintenance (when required).
- 1 x Mobile screening unit (operations only).

### 2.2.2 Workforce

The onsite workforce is minimal with drive in drive out staff from Kalgoorlie-Boulder. The workforce onsite at any one time would consists of one machine operator and one road train driver. Ad hoc workforce requirements include:

- Surveying
- external environmental support.

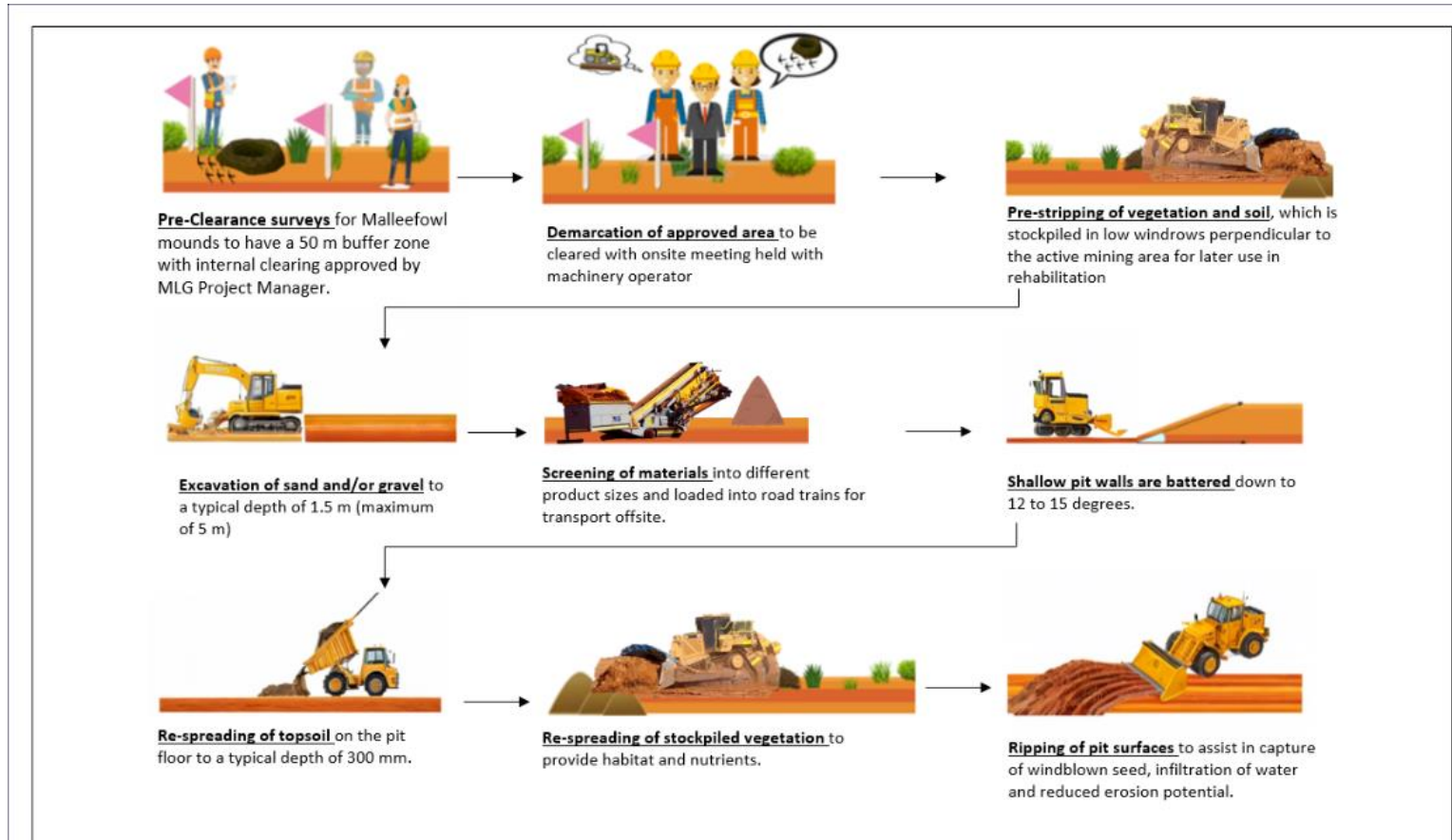




### 2.2.3 Resource Requirements

No onsite power or water facilities are required. No fuel will be stored on site, with a fuel truck making refuelling visits as required from off-site.

Figure 2-3 Proposed Action Process Flow



CLIENT	ADV-AU-00382	Project Name: Comet Vale Sand Project, Corner of Planto Road and Goldfields Highway, Comet Vale, WA 6436	EPBC #: 2023/09460
 Comprehensive Mine Site Services	Drawing not to Scale	Figure Name: Conceptual Mining Method	Figure #: 2-2
		Data Sources:	Date: August 2024
			Author: AW (RPMGlobal)
			Scale: Drawing not to scale

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#### 2.2.4 Construction Phase

The proposed action is planned to commence in FY24-25 once all necessary environmental approvals have been obtained and mining tenure is secured. Construction required for the proposed action is limited to the development of the access road and initial area to be mined within the sand dune. The following activities will be undertaken in the construction phase:

- Pre-clearance surveys for Malleefowl mounds with internal clearing approval granted by the MLG Project Manager.
- The approved area for clearing will be marked, including any buffer zones from vegetation, Malleefowl mounds, or neighbouring tenements. Onsite meetings with the machinery operators will ensure the exact clearance areas are properly articulated. The clearing area includes the access track from Goldfields Highway and up to 10 hectares of sand dunes in the first year.
- Pre-stripping of up to 300 mm of topsoil by a Komatsu 155 bulldozer, which is stockpiled in separate low windrows perpendicular to the active mining area for later use in rehabilitation (Plate 2-1)
- Pre-stripping of vegetation, which is stockpiled in separate low windrows perpendicular to the active mining area for later use in rehabilitation (Plate 2-2).
- Open extraction areas are limited to a maximum of 10 ha at any one time.
- Movement of the mobile screening plant into initial excavation area.

The construction phase is initially expected to take approximately four weeks, and then will be periodically implemented due to progressive clearing of stages for extraction until all approved areas have been cleared.

*Plate 2-1 Example of Topsoil Stockpile Along Excavation Area*



Plate 2-2 Example of Vegetation Stockpile Along Excavation Area



### 2.2.5 Operation Phase

The mining operation phase is proposed to be carried out in a basic strip-mining style over the 20-year Life of Mine (LOM). The operation phase will comprise the following activities:

- Pre-clearance surveys for Malleefowl mounds with internal clearing approval granted by the MLG Project Manager.
- Demarcation of the approved area to be cleared with onsite meeting held with machinery operator followed by regular onsite meetings with the equipment operators to ensure proper understanding and compliance.
- Pre-stripping of vegetation and soil, which is stockpiled in low windrows perpendicular to the active mining area for later use in rehabilitation.
- Open extraction area limited to a maximum of 10 ha at any one time.
- Excavation of sand and gravel to a typical depth of 1.5 m and maximum depth of 5 m.
- Screening of sand and gravel into various product sizes for use in the construction industry (Plate 2-3).
- Loading of product into road trains for transport offsite.

Plate 2-3 Example of Screening Plant within Excavation Area



### 2.2.6 Progressive Rehabilitation Phase

MLG commits to having no more than 10 ha of open excavation area at any time. Progressive rehabilitation following completion of excavation works is estimated to commence in the second year of operations. Progressive rehabilitation, demonstrated in Plate 2-4, includes:

- Stabilising the shallow pit walls by battering them to gradient of 12 to 15 degrees.
- Respreading stockpiled topsoil on the shallow pit floor to a typical depth of 300 mm.
- Respreading stockpiled vegetation to provide habitat, seedbank, stabilisation of topsoil, and protection against erosion.
- Ripping of excavated pit surfaces to reduce compaction, assist capturing windblown seed, aid water infiltration and minimise erosion and loss of topsoil.
- Seeding of ripped surface with native local species if required.

MLG operates several sand extraction sites and has demonstrated success in implementing progressive rehabilitation. MLG has also implemented an advanced rehabilitation performance monitoring program at all its sites to demonstrate that the rehabilitated land is progressing towards the agreed end land use.

Plate 2-4 Example of Progressive Rehabilitation



### 2.2.7 Closure Phase

DEMIRS must assess and approve a Mining Proposal and Mine Closure Plan (MCP) before the construction and operation of a mining project can commence. A revised MCP must be submitted every three years or whenever a significant change to approved operations occurs. Revised MCPs must demonstrate that the site is working towards closure and addressing any gaps and commitments in the previous plan. The Comet Vale Conceptual MCP has been provided as Appendix 2.

MLG has developed a MCP for the Proposed Action in accordance with the DEMIRS Statutory Guidelines for Mine Closure Plans (DMIRS, 2020a), last updated in January 2023. The MCP details how the Proposed Action will be rehabilitated to an acceptable and agreed post mining land use. In addition to the progressive rehabilitation described in Section 2.2.6 the following steps will be undertaken:

- Access to excavation pit areas restricted by rehabilitating access roads and tracks.
  - Implementation of rehabilitation performance monitoring program using qualitative and quantitative data until the agreed completion criteria have been met.

Examples of rehabilitation at other sites operated by MLG are shown in Plate 2-5 and Plate 2-6 with the conceptual mining method with final landform shown in Figure 2-4.

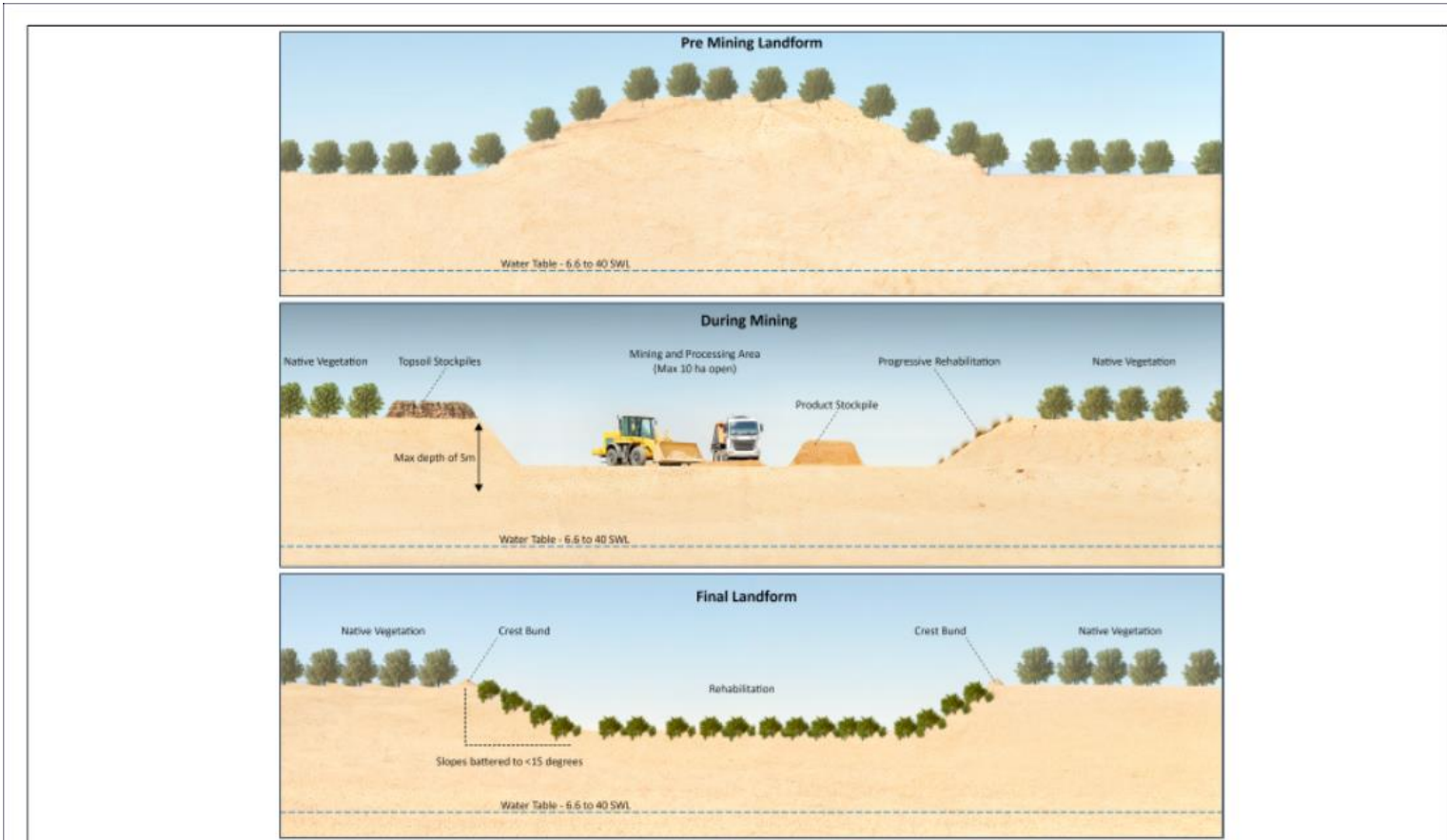
*Plate 2-5 Example of Early Rehabilitation*




*Plate 2-6 Example of Rehabilitation Providing Dense Habitat*



Figure 2-4 Conceptual Mining Method



<b>CLIENT</b>	<b>ADV-AU-00382</b>	Project Name: Comet Vale Sand Project, Corner of Pianto Road and Goldfields Highway, Comet Vale, WA 6436	EPBC #: 2023/09460
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			Author: AW (RPMGlobal)
			Scale: Drawing not to scale

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Comet Vale Sand Project - Environmental Impact Statement - Appendix 2 - Conceptual Mining Method



## 2.2.8 Anticipated Timing and Duration of Activities and Associated Impacts

The Proposed Action is estimated to have a 20-year life of mine. After year 1, it is anticipated that an average of 5 hectares of land is to be incrementally cleared each year with up to 10 ha of active sand extraction open at any time. Areas which have completed operations are to be progressively rehabilitated. The Proposed Action is planned to commence in FY24/25, once all necessary approvals have been obtained.

Potential impacts of each phase of the Proposed Action and year is presented in Table 2-3.

Table 2-3 Potential Impacts to MNES by Phase

Phase	Year	Activity	Potential Impacts
Construction	Year 1	Clearing of vegetation	<ul style="list-style-type: none"> <li>Habitat loss.</li> <li>Vehicle strike.</li> <li>Disturbance to individuals from noise and vibration.</li> <li>Introduction of feral animals.</li> </ul>
		Vehicle movement	<ul style="list-style-type: none"> <li>Vehicle strike.</li> <li>Disturbance to individuals from noise and vibration.</li> </ul>
Operations	Years 1 to 19	Clearing of vegetation	<ul style="list-style-type: none"> <li>Habitat loss.</li> <li>Vehicle strike.</li> <li>Disturbance to individuals from noise and vibration.</li> <li>Introduction of feral animals.</li> </ul>
		Vehicle Movement	<ul style="list-style-type: none"> <li>Vehicle strike.</li> <li>Disturbance to individuals from noise and vibration.</li> <li>Introduction and/or spread of weeds.</li> </ul>
Progressive Rehabilitation	Years 2 to 19	Vehicle Movement	<ul style="list-style-type: none"> <li>Vehicle strike.</li> <li>Introduction and/or spread of weeds.</li> </ul>
Closure	Year 20	Vehicle Movement	<ul style="list-style-type: none"> <li>Vehicle strike.</li> <li>Introduction and/or spread of weeds.</li> </ul>

## 3 Stakeholder Engagement

### 3.1 Stakeholder Strategy

MLG is committed to following the five principles of stakeholder engagement:

- **Communication:** Communication must be open, accessible, clearly defined, two-way and appropriate.
- **Transparency:** The process and outcomes of community and stakeholder engagement should, wherever possible, be made open and transparent, agreed upon and documented.
- **Collaboration:** A cooperative and collaborative approach to seek mutually beneficial outcomes is considered key to effective engagement.
- **Inclusiveness:** Inclusiveness involves identifying and involving communities and stakeholders early and throughout the process, in an appropriate manner.
- **Integrity:** Community and stakeholder engagement should establish and foster mutual trust and respect.

### 3.2 Key Stakeholders

The purpose of the existing stakeholder engagement strategy is to ensure that relevant stakeholders are actively kept informed and have the opportunity to provide input into aspects of the Proposed Action. It also aims to minimise the potential impact of the Proposed Action on both workers and the local community. The stakeholder engagement strategy is targeted at different stakeholder groups identified which comprise:

- **Commonwealth Government:** DCCEEW
- **State Government:** Department of Water and Environment Regulates (DWER), DEMIRS, Department of Biodiversity, Conservation and Attractions (DBCA), Department of Planning, Lands and Heritage (DPLH) and Main Roads Western Australia (MRWA).
- **Local Government:** Menzies Shire.
- **Aboriginal Parties/Representatives:** Nyalpa Pirniku (WC2019/002).
- **Local Community/Land Users:** Jeedamya Pastoral Lease (PL N050457).
- **MLG:** Shareholders, employees and their families, caretakers, Corporate/Senior management and consultants/contractors.

### 3.3 Consultation

A summary of consultation (Appendix 3) undertaken by the proponent for the Project is provided as the Stakeholder Register.

## 4 Legislative Requirements

The principal legislation in Western Australia governing the environmental assessment of the Proposal is the EP Act. The Proposed Action will be subject to various federal and state environmental laws and associated regulations. The principal Commonwealth legislation governing the environmental assessment of the Proposal is the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Under the EPBC Act, actions that have, or are likely to have, a significant impact on Matters of National Environmental Significance (MNES) require approval from the Australian Government Minister for the Environment. Approvals sought under the legislation described in Table 4-1 will stipulate additional conditions relevant to environmental management and stakeholder interests.

Table 4-1 Legislative Framework

Legislation	Relevance	Description
<b>EPBC Act (Cth)</b> Projects that have the potential to have significant impacts upon MNES require referral	Assessment of significance against MNES	The Project has been referred under the EPBC Act and is currently under assessment due to the presence of Malleefowl (EPBC Number 2023/09460). This Preliminary Documentation provides all the relevant information required for an assessment of the Proposed Action by DCCEEW.
<b>Native Title Act 1993 (Cth)</b> Records of Native Title applications and determinations to the Federal Court under the <i>Native Title Act 1993</i> are maintained by the Native Title Tribunal.	Native Title registrations	Native Title was determined on 31 October 2023 for the Nyalpa Pirniku Native Title Claim Group. The determination is managed by the Wangkatja Tjungula Aboriginal Corporation.
<b>Environmental Protection Act 1986 (EP Act) (WA)</b> Part IV – Projects with the potential to have significant impacts on the environment require referral.	Key environmental factors assessed via the Environmental Protection Authority (EPA) under Part IV: <ul style="list-style-type: none"> <li>• Benthic Communities and Habitats</li> <li>• Coastal Processes</li> <li>• Marine Environmental Quality</li> <li>• Marine Fauna</li> <li>• Flora and Vegetation</li> <li>• Landforms</li> <li>• Subterranean Fauna</li> <li>• Terrestrial Environmental Quality</li> <li>• Terrestrial Fauna</li> <li>• Inland Waters</li> <li>• Air Quality</li> <li>• Social Surroundings</li> <li>• Human Health</li> </ul>	Based on the review of environmental data for the Project it is considered unlikely that the Project poses a significant impact to the environment. The Proposed Action does not trigger referral to the EPA and can be adequately managed under the provisions of the Mining Act 1978 and Part V of the EP Act and associated regulations.
<b>EP Act (WA)</b> Part V (Section 51) – Clearing of Native Vegetation: Part V of the EP Act specifies that clearing of native vegetation in WA requires a permit. The clearing provisions of this Act are described in the <i>Environmental Protection Amendment Act 2003</i>	Assessment against the 10 clearing principles (biological diversity, significant fauna habitat, rare flora, threatened ecological community, remnant vegetation, association with watercourse or wetland, cause appreciable land degradation, impact on a conservation area, impact	A clearing permit application will be submitted for the Proposed Action and is expected to include conditions relating to the management of clearing of critical and foraging habitat for Malleefowl.

Legislation	Relevance	Description
(WA) and the <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> (WA)	surface or underground water quality, cause or exacerbate flooding)	
<b>EP Act (WA)</b> Part V (Section 52): Establishes a range of statutory instruments to permit the assessment and management of environmental outcomes arising from emissions from industry by DWER. Prescribed Premises categories are defined in Schedule 1 of the <i>Environmental Protection Regulations 1987</i> .	A Works Approval authorises work to be undertaken on Prescribed Premises which is likely to cause, increase, alter or result in a discharge of waste, emission of noise, odour or electromagnetic radiation to the environment.	An application for registration of a mobile screening unit will be prepared for the screening of sand and gravel at the Project site.
<b>Mining Act 1978 (Mining Act) (WA)</b> Projects involving mining, processing and associated activities that require approval and regulation under the Mining Act.	Compliance with tenement conditions.  Assessment of mining proposals MCPs. (MCPs are reviewed every three years).	<ul style="list-style-type: none"> <li>• MLG is committed to complying with all tenement conditions for the Project.</li> <li>• A MCP has been developed as part of this submission (Appendix 2).</li> <li>• The Mining Proposal and MCP have been prepared to conform with the DEMIRS Guidelines (DMIRS, 2023; DMIRS, 2020)</li> </ul>
<b>Aboriginal Heritage Act 1972 (AH Act) (WA)</b> The AH Act allows for the protection of Aboriginal cultural heritage in Western Australia.	Protection of Aboriginal heritage sites and matters.	Search of AHIS database returned no registered Aboriginal heritage sites on across the tenements. MLG will continue to liaise with the Traditional Owners and commission Aboriginal heritage surveys across the proposed disturbance areas prior to undertaking any works.
<b>Biodiversity Conservation Act 2016 (BC Act) (WA)</b> The BC Act and Biodiversity Conservation Act Regulations 2018 is State legislation for the protection of Threatened flora, fauna and communities and is administered by DBCA.	Threatened Flora, Fauna and Ecological Communities listed under the BC Act.	It is unlikely that the proposal will impact the conservation status of any flora or fauna species based on the assessment of flora, vegetation, terrestrial fauna and communities completed by specialist consultants.
<b>Rights in Water and Irrigation Act 1914 (RIWI Act) (WA)</b> Requirement to obtain a groundwater well license (GWL) to construct, enlarge, alter or deepen any well and for dewatering and to take underground water for purposes other than firefighting. These are issued by DWER under the provisions of the RIWI Act and are subject to conditions which may stipulate maximum annual abstraction volumes, monitoring and reporting requirements.	The RIWI Act is the primary legislation for the management and allocation of all terrestrial water resources in Western Australia and is administered by DWER.	The Project does not require a GWL as mining operations do not intersect groundwater.

## 5 Baseline Environmental Data

### 5.1 Regional Setting

The Proposed Action is located on relatively flat land with undulating dune systems within the East Murchison (MUR01) subregion of the Murchison Region as described by the Interim Biogeographic Regionalisation for Australia (IBRA) Version 7 (DCCEEW, 2020). The East Murchison sub-region is situated in the Yilgarn Craton covering an area of 7,847,996 ha (Cowan et al., 2001).

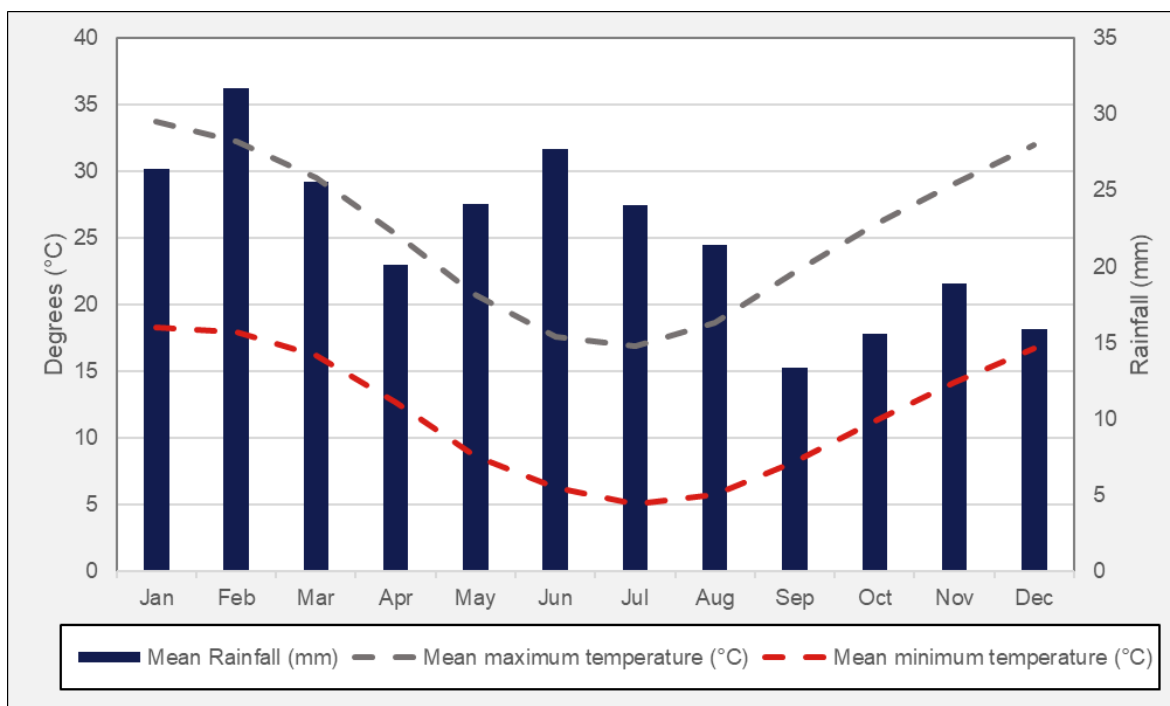
The East Murchison subregion is characterised by its internal drainage and elevated red desert sandplains with minimal dune development. The vegetation is dominated by Mulga woodlands with ephemerals, hummock grasslands, saltbush shrublands and Halosarcia shrublands (Cowan et al., 2001).

### 5.2 Climate

The nearest active Bureau of Meteorology (BOM) station for which meteorological data exists is Kalgoorlie-Boulder Airport, located approximately 105 km south of the site. Site 012038 readings commenced in 1898 with the latest available data from 3 April 2024.

Kalgoorlie-Boulder has a semi-arid climate with hot summers and mild winters. The annual average rainfall reported at the site is 264.6 mm (BOM, 2024). The highest rainfall typically occurs in February (31.7 mm) and the lowest rainfall occurs in September (13.4 mm). The annual average number of days of rain is 39.2 (Figure 5-1). Temperatures range from a mean maximum of 33.7°C in January to 16.9°C in July. Minimum mean temperatures at the Project site range from 18.4°C in January to 5.1°C in July (BOM, 2024). The Project area has experience three fires between 1975 and 1998. The most recent fire was within 6 km of the Project in 2022.

Figure 5-1 Climate Chart – Kalgoorlie Boulder Airport Meteorological Station (Site 012038)



### 5.3 Geology

The tenements are located within the Kalgoorlie Province as defined by Tille in 'Soil-landscapes of Western Australia's Rangelands and Arid Interior' (Tille, 2006). The Kalgoorlie Province is located on the central eastern portion of the Yilgarn Carton, predominantly over Archean rocks. The basement rocks consist mainly of granite, gneiss and greenstone. To the north, where the tenement area is located, even-grained porphyritic granite rocks with quartz vein and dolerite dyke intrusions are common (Tille, 2006).

Interdunal areas consist of flat undulating zones containing residual iron rich pisolithic gravels. The pisolites are up to 1.5 centimetres (cm) in diameter, consist mainly of goethite and are used for maintenance of gravel roads. There is a surficial quartz sand sheet and dune sand cover.

### 5.4 Soils

RPM Advisory Services Pty Ltd (RPM) was commissioned by MLG to conduct an assessment of the chemical and physical characteristics of the soil at the location of the Proposed Action. The key findings from this survey (RPM, 2022) comprise of:

- The materials are loose, pale red brown aeolian sands with very low plant available water capacity.
- Although the sands have a low risk of generating significant amounts of dust, they contain substantial amounts of fine to medium sand-sized particles that are easily mobilised by moderate to strong wind gusts.
- The sands are moderately acidic, with pH values ranging from 5.3 to 5.6. As the soils are comprised mainly of silica particles with very low concentrations of exchangeable aluminium, the acidity levels are unlikely to be a problem for common sand dune species (notably *Spinifex Triodia* sp.) in the arid regions of WA.
- The sands are non-saline and non-sodic.
- Nutrient contents and soil organic matter contents are extremely low. Low Phosphorous Buffer Index (PBI) and Cation Exchange Capacity (CEC) values indicate they have very little capacity to retain soluble nutrients applied as soluble fertilisers or mineralised organic materials.
- Heavy metal and metalloid concentrations are exceptionally low and comply with "clean fill" criteria in WA (DWER, 2019).

Overall, the soils property is described as stable, geochemically benign aeolian sands with limited nutritional value for plant growth. Given that local, native plant species are adapted to these conditions, revegetation of disturbed surfaces is expected to occur over time. This is reinforced by the positive performance of areas that have already been rehabilitated by MLG, as demonstrated by rehabilitation performance monitoring reports (Blueprint, 2021a, 2021b) and general site observations.

### 5.5 Hydrogeology

A review of several key studies undertaken on Goldfields's hydrogeology, including those undertaken by Commander et.al., (1992), K.H. Morgan & Associates (2000) and Parsons Brickerhoff (2004), has been used to develop a conceptual hydrogeological model of the regional hydrogeology, including:

- The Project is located within the Goldfields Groundwater Area (Rebecca Sub-Area) and partially within the Lake Goongarrie catchment, where the bulk of the water resources are saline with a

total dissolved solids content (TDS) of over 14,000 mg/L and dominated by Sodium (NA) and Chlorine (Cl) ions.

- Rainfall infiltration is the main source of aquifer recharge throughout the region with increasing salinities as Lake Goongarrie is approached.
- Groundwater depths within the area of the Proposed Action ranges from a minimum of 4 to a maximum of 27 metres.
- Drainage is uncoordinated and directed towards the paleodrainages of Lake Goongarrie, Lake Ballard and Lake Marmion.
- Discharge from the groundwater systems takes place by evaporation from salt lakes.

Groundwater occurrence can be grouped as follows:

- Tertiary sediments. The Lake Rebecca system, which includes Lake Goongarrie, is the surface expression of an extensive ancient river system. Locally these palaeochannel sediments reach a thickness of up to 60 m, generally being low permeability silts and clays but with basal layers of moderate permeability sands.
- Regolith horizon. The Tertiary sediments are incised into a weathering profile, with a thickness of up to about 60 metres. Permeability can range from low to very high and is typically greatest in saprock and oxidised bedrock near the base of the oxidised profile. It is commonly higher in ultramafic and siliceous sedimentary rocks. Water quality in these unconfined aquifers can be fresh to brackish and this resource has been used for pastoral supplies.
- Bedrock. Below the base of oxidation, permeability is generally very low and decreases further with depth. Development in the footwall basalt produces very little water. Fresh rock mining in the region generally produces only small flows from fractured rock aquifers located in the ore environment. These waters are typically hypersaline.

Given the superficial depth of the target aeolian sands and the extraction of material from raised sand dunes, groundwater will not be encountered as part of the Proposed Action.

## 5.6 Hydrology

The Proposed Action is in the Raeside-Ponton catchment within the Salt Lake Basin of the Western Plateau Division, as delineated in the DWER Hydrographic Catchments Database (DWER, 2023).

There are no RAMSAR wetlands within or near the Development Envelope or tenement boundaries which may be impacted by the Proposed Action. The EPBC Protected Matters Report confirmed there are no wetlands of international importance with 50 km of the Proposed Action (DCCEE, 2021) with the closest RAMSAR site is located approximately 430 km south at Lake Gore on the south coast of Western Australia. A draft proposed RAMSAR site at Lake Ballard is approximately 40 km north of the No impacts from the Proposed Action are anticipated within the Development Envelope due to the low-impact clearing and surface mining operations.

The nearest surface water features to the Action comprise Lake Goongarrie to the immediate south. Lake Goongarrie is an ephemeral salt-lake which covers an area of 113 km<sup>2</sup> and forms part of the Rebecca Paleochannel (oriented north to south) covering an area of approximately 8,715 km<sup>2</sup>. This drainage has a dominant flow towards the east to the Eucla Basin through Lake Yindarlgooda and Lake Marmion.

Locally, the Development Envelope is situated across five small catchments, with the Disturbance Footprint located almost entirely within two of these (Figure 5-2):

- A central, internally draining catchment with all associated drainage terminating within a small, unnamed mud pan located in the southeast of the tenement. This catchment covers approximately 13 km<sup>2</sup> and contains the northern mining area and the majority of the haul roads.
- A southern catchment that drains into the northwest extremity of Lake Goongarrie. This catchment covers approximately 29 km<sup>2</sup>, of which 13 km<sup>2</sup> is situated within the tenement. The southern mining area and associated haul roads are located within this catchment.

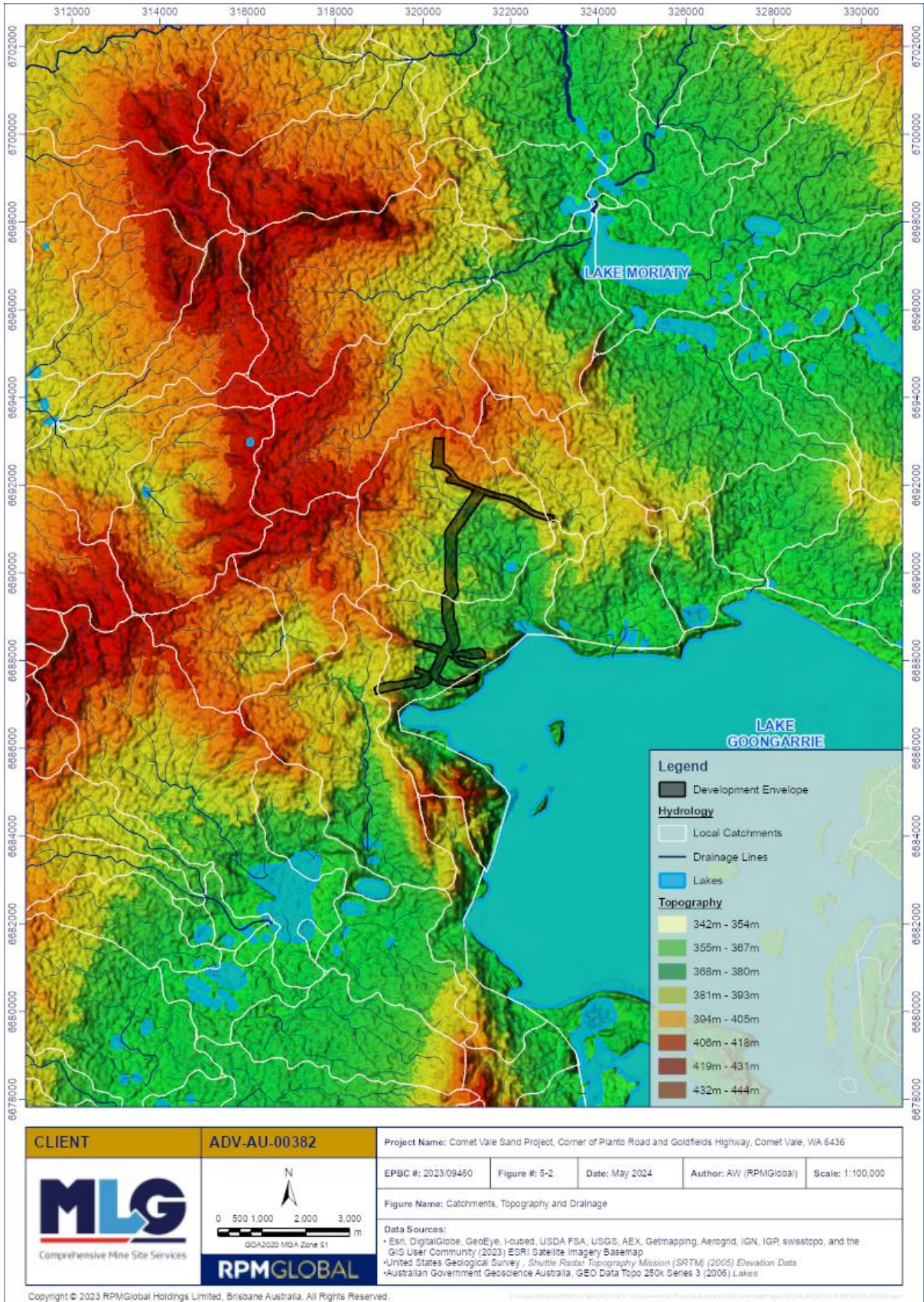
Local topography is generally subdued, comprising a series of low sand dunes, a broader topographic high area towards the northwest corner of the tenement and a topographic low area where the tenement adjoins Lake Goongarrie. Elevations in the topographic high area are in the order of 415 m RL (AHD) while Lake Goongarrie is situated at approximately 357 m RL (AHD). Gradients across the tenement are low, averaging between 1 and 2% and generally not exceeding 10%. The steepest gradients are associated with the sand dune areas, which have gradients varying between 2% and 10%.

There are several minor drainage paths within the tenement, however stormwater flow typically occurs as sheetwash in a south-easterly direction. Under regular rainfall events, stormwater flows are expected to be limited across the Development Envelope due to the highly permeable aeolian sands. More extreme storm events may produce sheetwash that will broadly follow the drainage paths shown in Figure 5-2.

Flooding associated with these two surface water features is not expected to impact the Development Envelope, with a minimum 10 m elevation differential between the closest mine infrastructure and water body (Lake Goongarrie and/or mud pan).



Figure 5-2 Catchments, Topography and Drainage



## 5.7 Flora and Vegetation

### 5.7.1 Studies

A total of four flora and vegetation surveys have been completed across the tenement and surrounding areas to characterise the vegetation and identify significant flora, these include:

- Reconnaissance Flora and Vegetation Survey of the Comet Vale Project (Goldfields Landcare Services (GLS), 2018).
- Detailed Flora and Vegetation Survey of the Comet Vale Project (GLS, 2022b) (Appendix 4).
- Targeted Priority Flora Survey of the Comet Vale Project (NVS (Native Vegetation Solutions), 2023).
- Detailed Flora and Vegetation Survey (RPS AAP Consulting Pty Ltd (RPS), 2024) (Appendix 5).

The surveys across the site were completed in accordance with the following guidelines:

- Environmental Factor Guideline – Flora and Vegetation (EPA (Environment Protection Authority), 2016).
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016).

### 5.7.2 Vegetation Communities

The 2022 and 2024 detailed surveys identified six separate vegetation types across the total survey area. All vegetation types are common and widespread throughout the Goldfields region and a summary of the vegetation types is provided in Table 5-1 and presented in Figure 5-3.

Table 5-1 Vegetation Communities

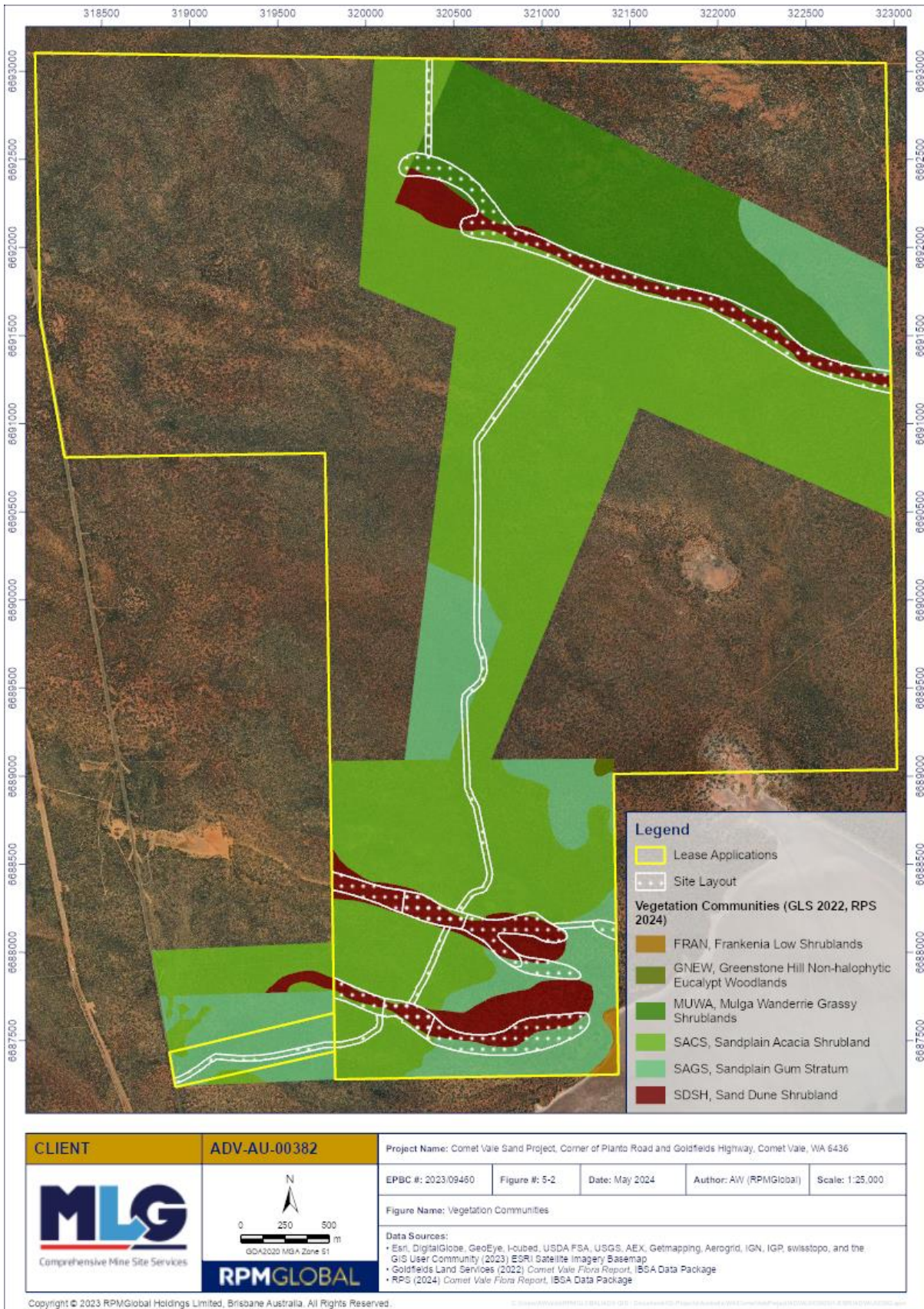
Code	Broad Floristic Formation	RPS (2023) Flora Classification	Vegetation Description	Area (ha)
SAGS (Variety A)	Sandplain – gum stratum (Variety A)	EcAePcEf, Eucalyptus Complex	Eucalyptus rigidula, E. jutsonii subsp jutsonii (P3) Low Woodland A (PFC 23%, 5-8m) with Scattered Low Trees A of Callitris collumelaris (PFC 1%, 5 m) and Scattered Tall Shrubs of Hakea francisiana (PFC 1%. 5 m) over mixed Low Scrub of Rinzia carnosa, Phebalium laevigatum, P.canaliculatum, Acacia prainii, Bertya dimerostygma, Grevillea didymobotrya subsp. didymobotrya, Westringea cephalantha, Dodonaea ambylophylla, D. rigida, Alyxia tetanifolia (P3), A. buxifolia, Bursaria spinosa and Scaevola spinescens (PFC 24%, 1-2 m) over Open Hummock Grass and Grass of Triodia sp and Rytidosperma caespitosum (PFC 13%) on red sand approximately 50 m from base of sand dune.	181.4
SDSH	Sand dune shrubland	Not recorded	Very Open Shrub Mallee of Eucalyptus oldfieldii (PFC 5%; 3m) over Open Scrub of Leptospermum erubescens, Acacia effusifolia and Grevillea juncifolia (PFC 9%, 2-2.5m) over Low Scrub of Verticordia helmsii, Homalocalyx grandiflorus (P3), with minor Calytrix watsonii, Grevillea acacioides, Newcastleia insignis (P2) and Alyxia buxifolia (PFC 18%, 1-2m) over Open Dwarf Scrub of Leucopogon sp Coolgardie	78.5

Code	Broad Floristic Formation	RPS (2023) Flora Classification	Vegetation Description	Area (ha)
			(PFC 3%), <1m) and Open Hummock Grass of <i>Triodia</i> sp (PFC 15%) on orange sand on a sand dune.	
SACS	Sandplain Acacia shrublands	AevPcEf, EcAievrPcEf, ElsAievEf	<i>Acacia effusifolia</i> Scrub (PFC 25%; 2-3m) with emergent Scattered Shrub Mallee of <i>Eucalyptus leptopoda</i> (PFC 2%;4m) and <i>Melaleuca uncinata</i> Open Scrub (PFC 4%; 3m) over Heath of <i>Phebalium canaliculatum</i> , <i>Grevillea acacioides</i> , <i>Aluta aspera</i> subsp <i>aspera</i> , <i>Rinzia carnosa</i> , <i>Leptospermum erubescens</i> and <i>Malleostemon roseus</i> (PFC 51%;1-2m) over Scattered Low Shrubs and Grasses of <i>Prostanthera campbellii</i> and <i>Rytidosperma caespitosum</i> (PFC 2%; <1m) on orange sandy silt with very minor Laterite on a sand plain.	567.8
MUWA	Mulga grassy wanderrie shrublands	Not recorded	<i>Eucalyptus rigidula</i> Open Low Woodland A (PFC 6%; 8m) over a Thicket of <i>Acacia effusifolia</i> , <i>A. caesaneura</i> and <i>A. ramulosa</i> var. <i>ramulosa</i> (PFC 44%;2.5-5m) over Low Scrub dominated by <i>Eremophila forrestii</i> subsp. <i>forrestii</i> with <i>Philotheca brucei</i> , <i>Scaevola spinescens</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dodonaea rigida</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> and <i>Aluta aspera</i> subsp. <i>aspera</i> (PFC 22%;<1m) over Scattered Low Shrubs and Grasses of <i>Philotheca brucei</i> , <i>Prostanthera grylloana</i> , <i>Solanum lasiophyllum</i> and <i>Eragrostis eriopoda</i> on orange sandy silt with Laterite pebbles on an alluvial plain.	150.2
FRAN	Frankenia low shrublands	Not recorded	Low Heath, (PFC 37%, <1m) dominated by <i>Frankenia sesillis</i> (20%) and <i>Tecticornia peltata</i> (12%) with <i>Surreya diandra</i> , <i>Frankenia georgii</i> , <i>Maireana amoena</i> , <i>Tecticornia pergranulata</i> , <i>Gunniopsis rodwayii</i> and <i>Eragrostis falcata</i> (5%) on pale orange brown saline soil on a lake edge.	2.7
GNEW	Greenstone hill (non-halophytic) eucalypt woodlands	Not recorded	<i>Eucalyptus rigidula</i> Low Woodland A (PFC 10%, 8 m) over <i>Allocasuarina helmsii</i> , <i>Eremophila scoparia</i> and <i>Exocarpus aphylla</i> Open Scrub (PFC 9%, 3m) over <i>Westringea rigida</i> Open Dwarf Scrub (PFC 10%, <1 m ) with Scattered Low Shrubs of <i>Senna artemisioides</i> subsp <i>filifolia</i> , <i>Olearia muelleri</i> , <i>Eremophila oppositifolia</i> and <i>Scaevola spinescens</i> (PFC 2%, <1m) over Very Open Hummock Grass of <i>Triodia basedowii</i> on orange sand with a mantle of Calcrete and Ironstone gravel.	1.0
<b>Total</b>				<b>981.6</b>

In addition, a desktop assessment completed in 2022 as part of the detailed survey identified the closest Threatened Ecological Community (TEC) as the 'Depot Springs Stygofauna Complex' located approximately 273 km northwest of the Project site. The nearest Priority Ecological Community (PEC) recorded is the 'Emu Land System' located approximately 23 km south of the Project with a total of 10 occurrences within 50 km. No TECs or PECs were identified during the field surveys.

Vegetation condition was mapped as Good to Excellent with some areas impacted by grazing from pastoral activities. The vegetation was also visibly impacted by the low rainfall the region had received preceding the surveys.

Figure 5-3 Vegetation Communities



### 5.7.3 Introduced Flora

No non-native species were recorded in the study area from the surveys.

### 5.7.4 Conservation Significant Flora Species

A total of 215 flora species (including sub-species and varieties) from 40 families and 106 genera were recorded. Seven conservation significant species were found within the survey area, with an additional two conservation significant plant species located just outside the survey area.

No flora species listed under the EPBC Act were recorded during the surveys.

## 5.8 Fauna and Habitat

### 5.8.1 Studies

Fauna and habitat surveys completed at the Proposed Action area include:

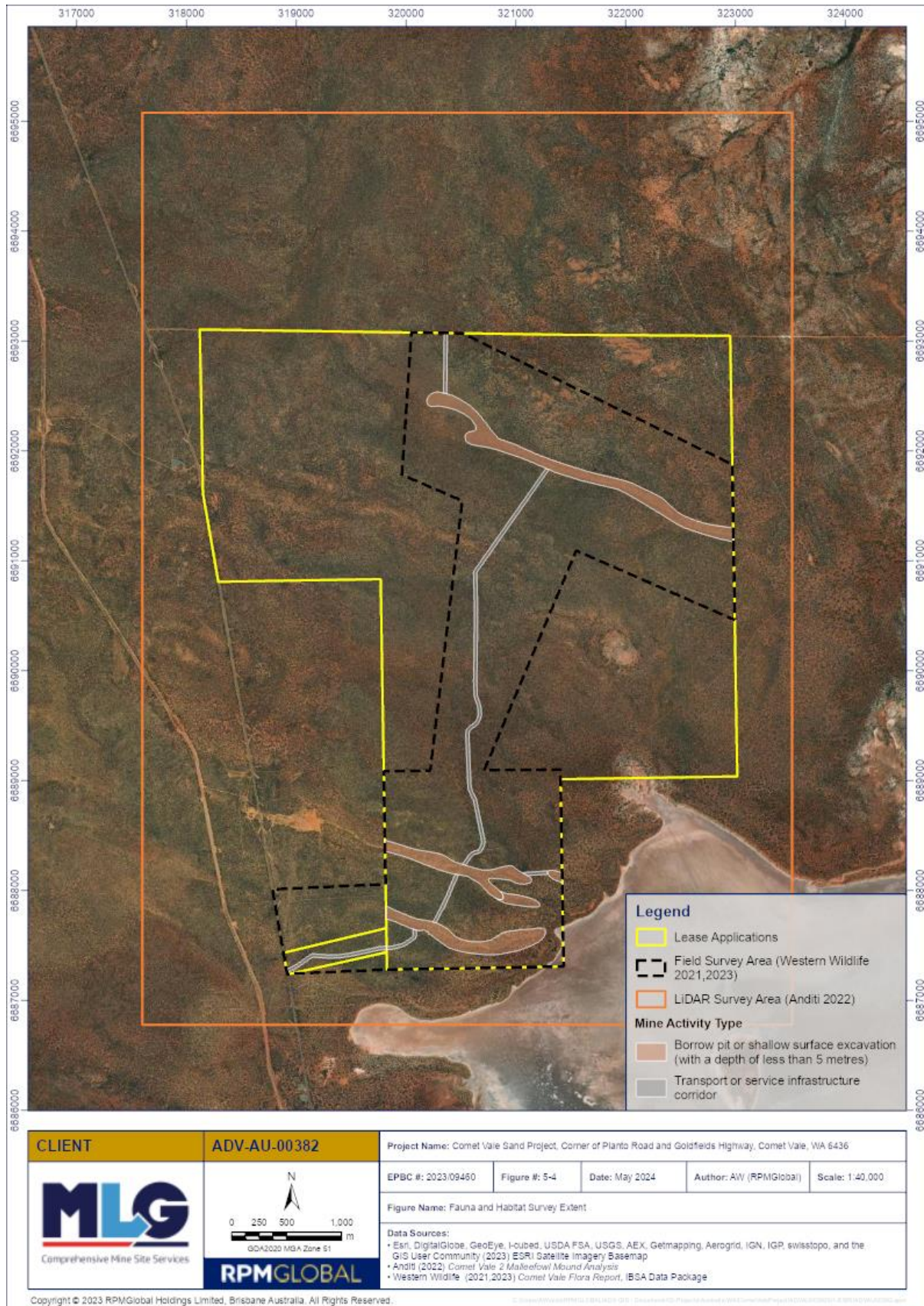
- Basic vertebrate fauna survey and targeted Malleefowl survey (Western Wildlife, 2024) (Appendix 6)
- Light Detection and Ranging (LiDAR) Survey of a tenement area (Anditi, 2022b) (Appendix 7).
- Light Detection and Ranging (LiDAR) Survey of a regional of 49km<sup>2</sup> (Anditi, 2022a) (Appendix 8).
- Targeted survey and ground truthing of LiDAR mounds (Western Wildlife, 2024) (Appendix 9).
- Desktop assessment for potential short-range endemic species (Invertebrate Solutions Pty Ltd (Invertebrate Solutions), 2022).

The surveys across the site were completed in accordance with the following guidelines:

- EPA Technical Guideline – Terrestrial Fauna Surveys (EPA, 2020).
- EPA Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna (EPA, 2016).

The extent of the fauna survey is provided in Figure 5-4.

Figure 5-4 Fauna and Habitat Survey Extent



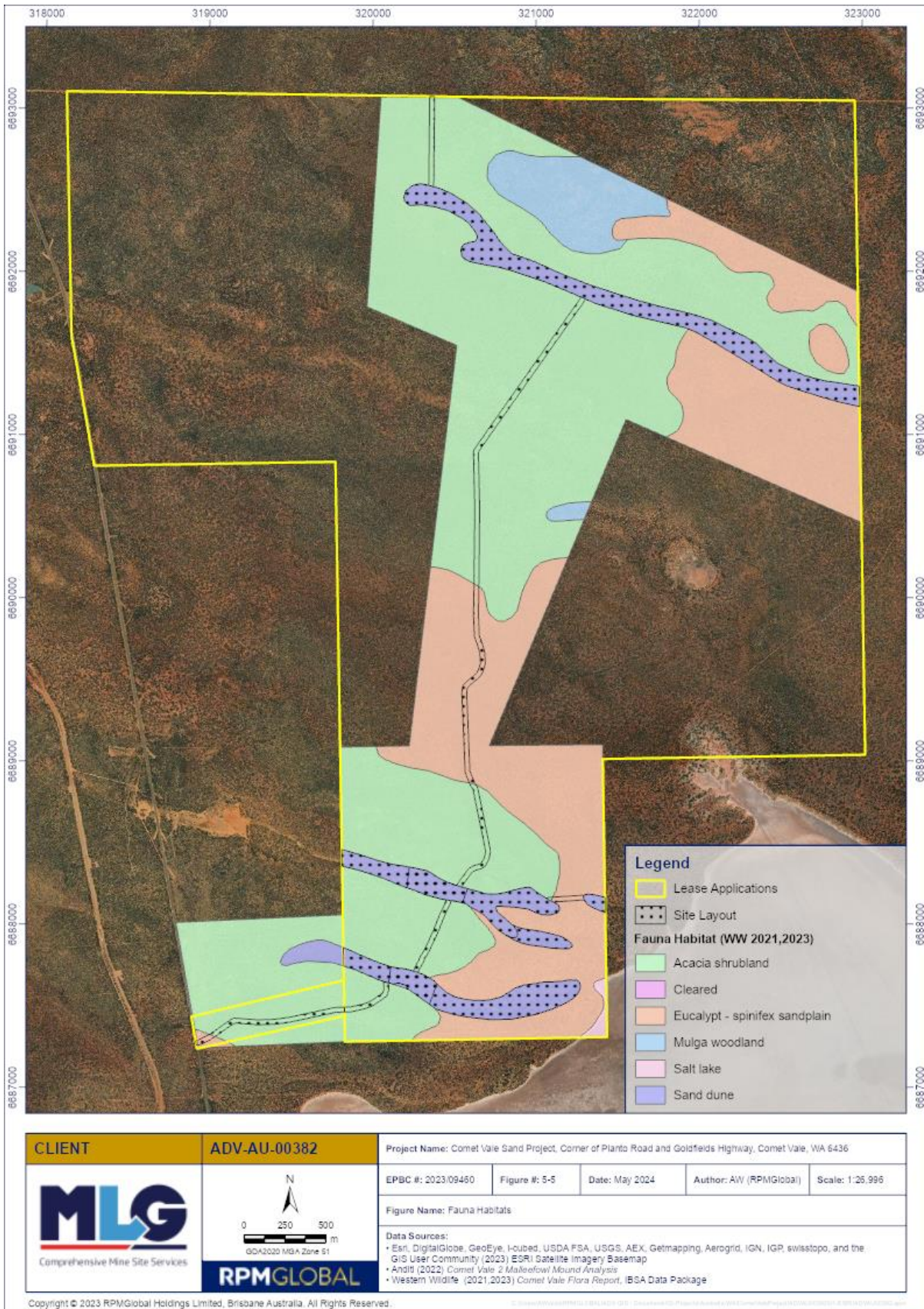
## 5.8.2 Habitat

The Western Wildlife (Western Wildlife, 2024) studies recorded five broad fauna habitats across the study as described in Table 5-2. All habitats are described as relatively common in the IBRA subregion with restricted habitat types that occur in the subregion, such as granite outcrops, salt lakes or freshwater wetlands, largely absent from the study area, except for a small area of salt lake (which occurs outside the Development Envelope). A narrow track is present, and a small portion is recently burnt but the remainder of the study area is undisturbed native vegetation. Fauna habitat types are shown in Figure 5-5.

Table 5-2 Fauna Habitats

Fauna Habitat	Key Habitat Elements	Total Area (ha)
Mulga Woodland	<ul style="list-style-type: none"> <li>Tall, dense shrubland provides habitat for nesting birds.</li> <li>Larger mulga trees provide crevices and small hollows.</li> <li>Leaf litter and gravelly sands provide breeding habitat for Malleefowl.</li> </ul>	42.4
Acacia Shrubland	<ul style="list-style-type: none"> <li>Tall, dense shrubland provides habitat for nesting birds.</li> <li>Leaf litter and gravelly sands provide breeding habitat for Malleefowl.</li> <li>Scattered mallee eucalypts provide crevices and small hollows.</li> </ul>	568.7
Sand Dune	<ul style="list-style-type: none"> <li>Loose sands provide habitat for fossorial reptiles.</li> <li>Scattered mallee eucalypts provide crevices and small hollows.</li> </ul>	77.8
Eucalypt spinifex Sandplain	<ul style="list-style-type: none"> <li>Scattered mallee eucalypts provide crevices and small hollows.</li> <li>Leaf litter and consolidated sands provide breeding habitat for Malleefowl.</li> <li>Consolidated sands provide habitat for burrowing fauna.</li> <li>Spinifex provides habitat for some reptiles.</li> </ul>	289.5
Salt Lake	<ul style="list-style-type: none"> <li>May support waterbirds when inundated.</li> </ul>	2.3
Cleared	<ul style="list-style-type: none"> <li>None.</li> </ul>	1.0
<b>Total</b>		<b>981.7</b>

Figure 5-5 Fauna Habitats





### 5.8.3 Conservation Significant Species

There are 18 vertebrate fauna of conservation significance that are known to occur within the region as described in Table 5-3.

Table 5-3 Conservation Significant Fauna

Species	EPBC Status	Habitat Preference	Likelihood of Occurrence	Notes
<i>Pezoporus occidentalis</i> Night Parrot	Endangered	Mature spinifex grasslands, chenopods and herblands.	Unlikely	The study area lacks the large mature spinifex required by this species for roosting and breeding.
<i>Calidris ferruginea</i> Curlew Sandpiper	Critically Endangered Migratory	Wetlands, salt lakes, beaches.	Potential	Potentially occurs as a non-breeding summer visitor to the salt lake but prefers coastal habitats.
<i>Calidris ferruginea</i> Curlew Sandpiper	Vulnerable Migratory	Wetlands, salt lakes, beaches.	Potential	Potentially occurs as a non-breeding summer visitor to the salt lake.
<i>Tringa nebularia</i> Common Greenshank	Endangered Migratory	Wetlands, salt lakes, beaches.	Potential	Potentially occurs as a non-breeding summer visitor to the salt lake.
<i>Leipoa ocellata</i> Malleefowl	Vulnerable	Acacia thickets, mallee woodlands and shrublands with leaf litter. Also forages in adjacent habitats.	Known to occur	Active and inactive mounds of this species were recorded during this survey, and suitable foraging and breeding habitat is present. Additional details on the species, potential impacts from the Proposed Action and management measures are provided in Section 6.
<i>Dasyurus geoffroii</i> Chuditch	Vulnerable	Forests, woodlands and shrublands, denning in hollow logs, babbler nests, burrows or rock crevices.	Possible	Although the habitats present are suitable, there are no recent records in the region with a single uncertain record from 2008 the only one reported within 70 km of the survey area.
<i>Aphelocephala leucopsis</i> Southern Whiteface	Vulnerable	Open woodlands and shrublands with a shrubby and/or grassy understory.	Potential	Some of the habitats present are potentially suitable and the study area is within the known range of the species.
<i>Actitis hypoleucos</i> Common Sandpiper	Migratory	Wetlands, salt lakes, beaches.	Potential	Potentially occurs as a non-breeding summer visitor to the salt lake.
<i>Calidris ruficollis</i> Red-necked Stint	Migratory	Wetlands, salt lakes, beaches.	Potential	Potentially occurs as a non-breeding summer visitor to the salt lake.

Species	EPBC Status	Habitat Preference	Likelihood of Occurrence	Notes
<i>Calidris melanotos</i> Pectoral Sandpiper	Migratory	Wetlands, salt lakes, beaches.	Possible	Possibly occurs as a non-breeding summer visitor to the salt lake but prefers freshwater wetlands.
<i>Tringa glareola</i> Wood Sandpiper	Migratory	Freshwater wetlands, mudflats.	Possible	Possibly occurs as a non-breeding summer visitor to the salt lake but prefers freshwater wetlands.
<i>Gelochelidon nilotica</i> Gull-billed Tern	Migratory	Coasts, inland waters.	Possible	This species occurs at inland salt lakes but there are no nearby records.
<i>Apus pacificus</i> Fork-tailed Swift	Migratory	Overfly any habitat.	Potential	This species is largely aerial in Australia, and although it may overfly the area, the study area is not likely to be important for this species.

Additional species that were represented by records on the Protected Matters Search Tool are vagrant to the region and not likely to be reliant on any habitat in the study area include:

- Glossy Ibis (*Plegadis falcinellus*) – Migratory. This species occurs in freshwater wetlands, a habitat absent from the study area, and is a vagrant to the region.
- Ruddy Turnstone (*Arenaria interpres*) – Migratory. This shorebird occurs on the coast and is a vagrant to inland sites.
- Grey Wagtail (*Motacilla cinerea*) – Migratory. This species is a vagrant to the region.
- Grey Falcon (*Falco hypoleucos*) – Vulnerable. This species is a vagrant to the region.
- Princess Parrot (*Polytelis alexandrae*) – Vulnerable. This species is a vagrant to the region.

## 6 MNES Assessment - Malleefowl (*Leipoa ocellata*)

The EPBC Act protects 9 matters of national environmental significance, as well as Commonwealth land, Commonwealth heritage places overseas, and all actions by Australian Government agencies. MNES assessment is required by DCCEEW and Commonwealth Minister of Environment for the Proposed Action due to the presence of Malleefowl, which are protected under Division 4 of the EPBC Act.

### 6.1 Species Overview

The Malleefowl is listed as vulnerable under the EPBC Act. The Malleefowl occurs in all mainland states except Queensland and is recognised as “Threatened” wherever it occurs. The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and *Acacias*. Malleefowl are ground dwelling species and mostly move about their home-range by foot, rarely flying except when disturbed or roosting in the canopy.

Adults reach up to 60 cm in length and weigh up to 2.5 kg. The Malleefowl is the only species in the genus *Leipoa*, belonging to the family Megapodidae known as the megapodes or mound builders. Malleefowl require leaf litter on sandy substrates to create mounds. The mounds are constructed intermittently by a pair of birds between autumn and spring, with chicks hatching between November and January. Chicks receive no parental care from parents and are vulnerable to predation by feral predators.

The degree of fragmentation of the remaining Malleefowl habitat is of particular concern and presents a major limiting factor to halting and reversing the decline of the species. Malleefowl have significantly declined over the past century, and several detailed studies have examined their conservation ecology in south-eastern Australia.

In central Australia, the Malleefowl is a feature in Aboriginal mythology associated with specific ‘Dreaming’ sites and trails and protection of the species is important for conservation and cultural purposes.

### 6.2 Relevant Policy and Guidelines

Relevant policy and guidelines relating to the Malleefowl, which are informing studies, planning and development of the Proposed Action, include:

- Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment (Environmental Protection Agency (EPA), 2020).
- National Malleefowl Monitoring Manual - Standards, Protocols and Monitoring Procedures (National Malleefowl Recovery Team (NMRT), 2020).
- National Recovery Plan for Malleefowl (*Leipoa ocellata*) (Commonwealth of Australia, 2024).

### 6.3 Habitat

Malleefowl are primarily found in the semi-arid to arid zone of Australia in shrublands and low woodlands dominated by mallee and associated habitats. In Western Australia, the Malleefowl is also located in shrublands dominated by *Acacia* and occasionally in woodlands dominated by eucalypts such as Wandoo (*Eucalyptus wandoo*), Marri (*Corymbia calophylla*) and Mallet (*Eucalyptus astringens*).

The habitat requirements are poorly understood, however a sandy substrate and abundance of leaf litter are necessary for construction of mounds. Habitat critical to survival of the Malleefowl is only known in broad terms. Any occupied habitat used for breeding, or breeding habitat that is temporarily

unoccupied (e.g. due to fire) that may be used in the future, may be considered habitat critical to the survival of the species.

## 6.4 Threats

Key threats as discussed in the 'Action Plan for Australian Birds' and in the 'National Recovery Plan' that are applicable to the Proposed Action include:

- Clearing and habitat destruction.
- Mortality on roads.
- Fragmentation/isolation.
- Fire (wildfire and planned burning).
- Climate change (drought).
- Predation by foxes.
- Weeds

Additional key threats that are not applicable to the Proposed Action include genetic management of small populations, spread of disease, chemical exposure and destruction of habitat from excessive grazing by herbivores.

## 6.5 Survey Effort

### 6.5.1 Overview

Several studies were conducted to determine the presence of Malleefowl in the Project footprint and wider area, provide an accurate count of Malleefowl mounds, mound status and provide a population estimate. A description of the surveys, with timing and methods is provided in Table 6-1.

*Table 6-1 Description of Completed Malleefowl Surveys*

Survey	Author	Method	Timing
Basic Vertebrate Fauna Survey and Targeted Malleefowl Survey 2021	Western Wildlife	<ul style="list-style-type: none"> <li>• Basic vertebrate fauna survey.</li> <li>• Identification of fauna habitats, habitat assessments.</li> <li>• Targeted searches for evidence of the Malleefowl (<i>Leipoa ocellata</i>), totalling 40km of walked transects.</li> </ul>	23 to 27 August 2021
Comet Vale Malleefowl Mound Analysis LiDAR survey - Tenement	Anditi	<ul style="list-style-type: none"> <li>• LiDAR survey of the proposed exploration licence.</li> <li>• Classification of the data and analysis to identify mounds.</li> <li>• Rating of mounds from 1 to 4.</li> </ul>	31 May 2022
Comet Vale Malleefowl Mound Analysis LiDAR survey - Regional	Anditi	<ul style="list-style-type: none"> <li>• LiDAR survey of the regional area totalling 49km<sup>2</sup>.</li> <li>• Classification of the data and analysis to identify mounds.</li> <li>• Rating of mounds from 1 to 4.</li> </ul>	02 August 2022
Basic Vertebrate Fauna Survey and Targeted Malleefowl Survey 2023	Western Wildlife	<ul style="list-style-type: none"> <li>• Extension of Basic vertebrate fauna survey.</li> <li>• Identification of fauna habitats, habitat assessments.</li> <li>• Targeted searches for evidence of the Malleefowl (<i>Leipoa ocellata</i>),</li> </ul>	02-07 December 2023

Survey	Author	Method	Timing
Targeted Malleefowl Survey 2024	Western Wildlife	<ul style="list-style-type: none"> <li>Ground truthing of LiDAR data from Anditi during breeding season as stipulated in the National Monitoring Manual (National Malleefowl Recovery Team, 2020).</li> <li>Score the habitat within the study area using DCCEEW habitat scoring system for Malleefowl.</li> <li>Estimate number of adults birds that will be impacted by the project.</li> <li>Identify breeding and foraging habitat in the region.</li> </ul>	02-07 December 2023

### 6.5.2 Basic Fauna Field Surveys

The fauna survey was completed under Fauna Taking (Biological Assessment) Licence 27000507 and Authorisation to Take or Disturb Threatened Species TFA 2021-0105.

All vertebrate fauna observed in the study area were recorded. The presence of fauna was observed directly or inferred from secondary signs such as burrows, diggings, feathers, tracks, scats or skulls. Particular attention was paid to searching for signs of conservation significant species, including the Malleefowl (*Leipoa ocellata*).

The desktop assessment conducted by Western Wildlife included a review of the DBCA known locations of Malleefowl records within 70 km of the Project. The database identified numerous records of Malleefowl that was supported with the identification of five Malleefowl mounds in the survey area including one recently active, one inactive and three historic mounds. An additional recently active mound was identified opportunistically by Western Wildlife outside of the study area.

### 6.5.3 LiDAR Survey

#### Overview

A Light Detecting and Ranging (LiDAR) survey was undertaken by Anditi in 2022 to understand the potential extent of Malleefowl within the initial survey area and the surrounding area of 49 km<sup>2</sup>.

The National Malleefowl Monitoring Manual LiDAR is described as an alternative method to 20 m transects for searching larger sites. Data is collected from an aircraft, processed to reveal likely Malleefowl Mounds, and those sites visited to confirm the presence of Malleefowl mounds (National Malleefowl Recovery Team (NMRT), 2020).

The LiDAR results were analysed to identify potential mounds and rated on the degree of certainty. The ratings used were:

- **Rating 1:** Very closely matches a typical Malleefowl mound shape and is highly likely to be a Malleefowl mound.
- **Rating 2:** It is similar to a Malleefowl mound shape and could be a Malleefowl mound.
- **Rating 3:** A mound shape that is approximately within the parameters of size for a Malleefowl mound. This could be an old Malleefowl mound, a mound of earth around living or dead trees/vegetation, natural hummocks around waterways, etc.

#### Ground Truthing LiDAR Results

The locations and descriptions of Malleefowl mounds detected in the 2022 LiDAR survey were provided to Western Wildlife for ground truthing. Western Wildlife visited the site between 5th and

7th December 2023. Approximately 65 km of transect was walked, including between possible LiDAR mounds and proposed access roads. The methodology included:

- Suitably Qualified and Experienced Person (SQEP) visiting each of the 29 identified potential mounds.
- At each potential mound a GPS location, photograph, description of the habitat, estimated age of the mound (if present) and any evidence of shell fragments were recorded. Excavations or diggings that were not used for nesting (i.e. the mound attempt abandoned or site deemed unsuitable by the Malleefowl) were also recorded as evidence of Malleefowl activity in the area, as were any tracks or sightings.
- Taking opportunistic records of any other Malleefowl Mounds, birds, tracks, or feathers.

#### **Justification for LiDAR Ground Truthing**

Following discussions with the specialist fauna consultant (Western Wildlife), and review of the survey guidelines within the National Malleefowl Monitoring Manual (NMMM), it was determined that ground truthing of the completed LiDAR survey results was appropriate. It was deemed suitable to provide the required contextual information given:

- LiDAR assessment is listed as a suitable alternative survey method appropriate for large areas in the NMMM.
- LiDAR is likely to provide comprehensive results at least equal to, if not greater than targeted 20m transects.
- A much greater area could be surveyed, improving the reliability of the Malleefowl population estimate, and providing greater contextual information on the species.
- The vegetation of the area is very thick with low visibility, and 20m transects would provide limited results in some areas. Reducing the width of the transects would extend the field survey timeframe and/or number of personnel required, while likely still encountering limitations due to visibility.
- A review of LiDAR accuracy in the Great Victoria Desert indicated ground-truthing of LiDAR was a useful and successful means for rapidly searching for mounds over a large project area. The rating system was shown to successfully reflect the likelihood of a structure being a Malleefowl mound, with ground-truthing confirming 99% of rating 1 mounds, 80% of rating 2 mounds and 4% of rating 3 mounds National Malleefowl Recovery Group (NMRG), 2020.)
- Reduced human error due to fatigue.
- Reduced risk to health and safety in arid environments in Malleefowl breeding season.

#### **6.5.4 Targeted Malleefowl Survey**

An assessment of the habitat within the study area classified each fauna habitat type into critical and foraging based on the following criteria:

- Critical habitat is defined as a habitat where breeding occurs. The criteria for identifying such habitat include:
  - Signs of breeding; mounds recorded.

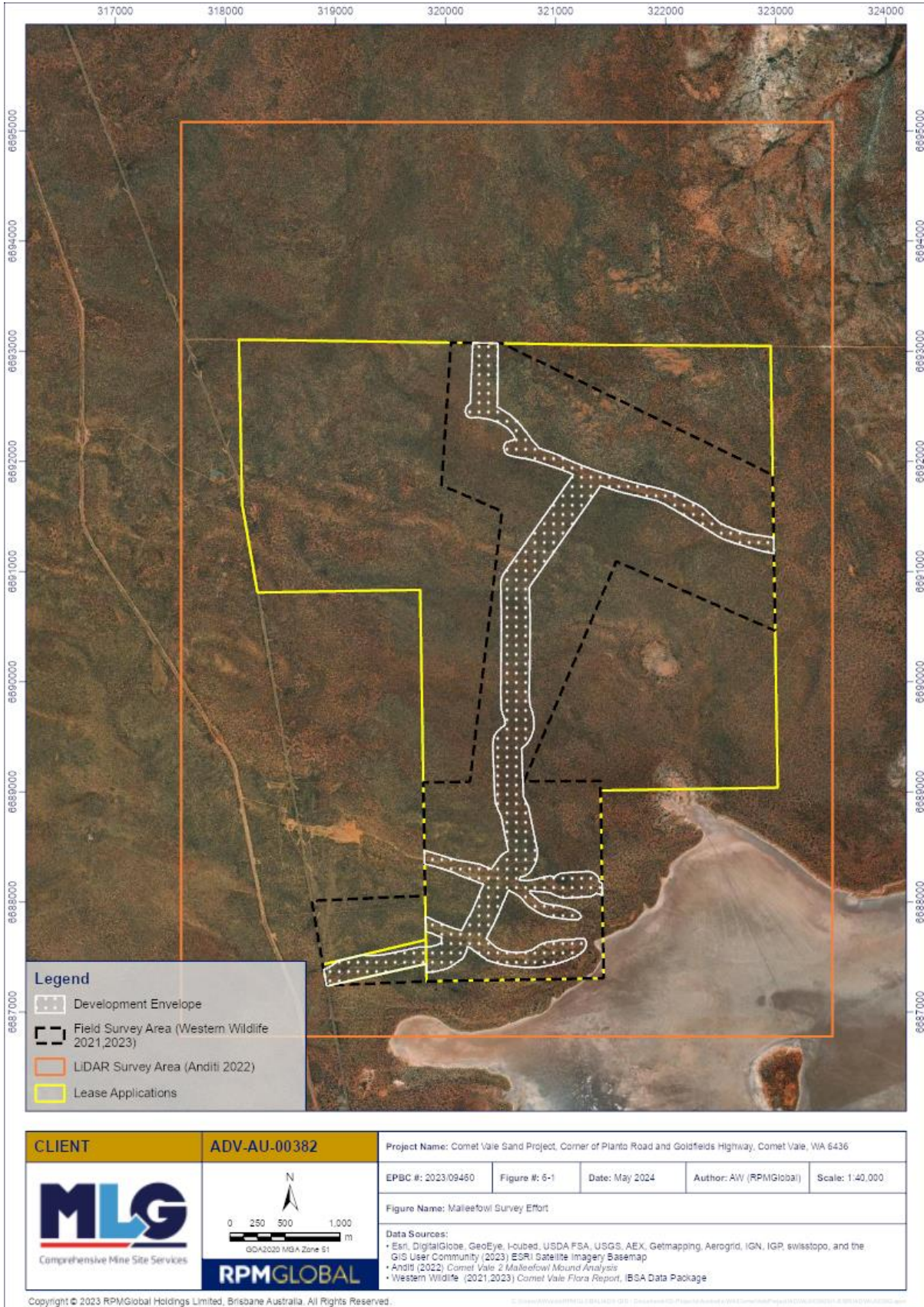
- Has the potential to support Malleefowl breeding.
  - Mulga woodland.
  - Acacia shrubland.
  - Tall dense shrubland with leaf litter and gravelly sands.
- Suitable habitat is habitat where there is no breeding, but the species may forage or disperse. Criteria for identification are:
    - Areas of vegetation, all vegetation in the study area was considered foraging habitat.
    - Foraging habitat adjacent to critical habitat.
    - No mounds recorded.

All Malleefowl mounds identified during field and LiDAR surveys were recorded with a GPS location, photograph, description of the habitat, estimated age of the mound and any evidence of shell fragments. Excavations or diggings that were not used for nesting (i.e. the mound attempt abandoned, or the site deemed unsuitable by the Malleefowl) were also recorded as evidence of Malleefowl activity in the area, as were any tracks or sightings.

Mounds were assessed using the following categories:

- Active – Recorded mound building and egg laying activity.
- Inactive –No recorded mound building or egg laying activity.
- Historic - very weathered mounds that have clearly not been used for many years.

Figure 6-1 Malleefowl Survey Effort





## 6.6 Results

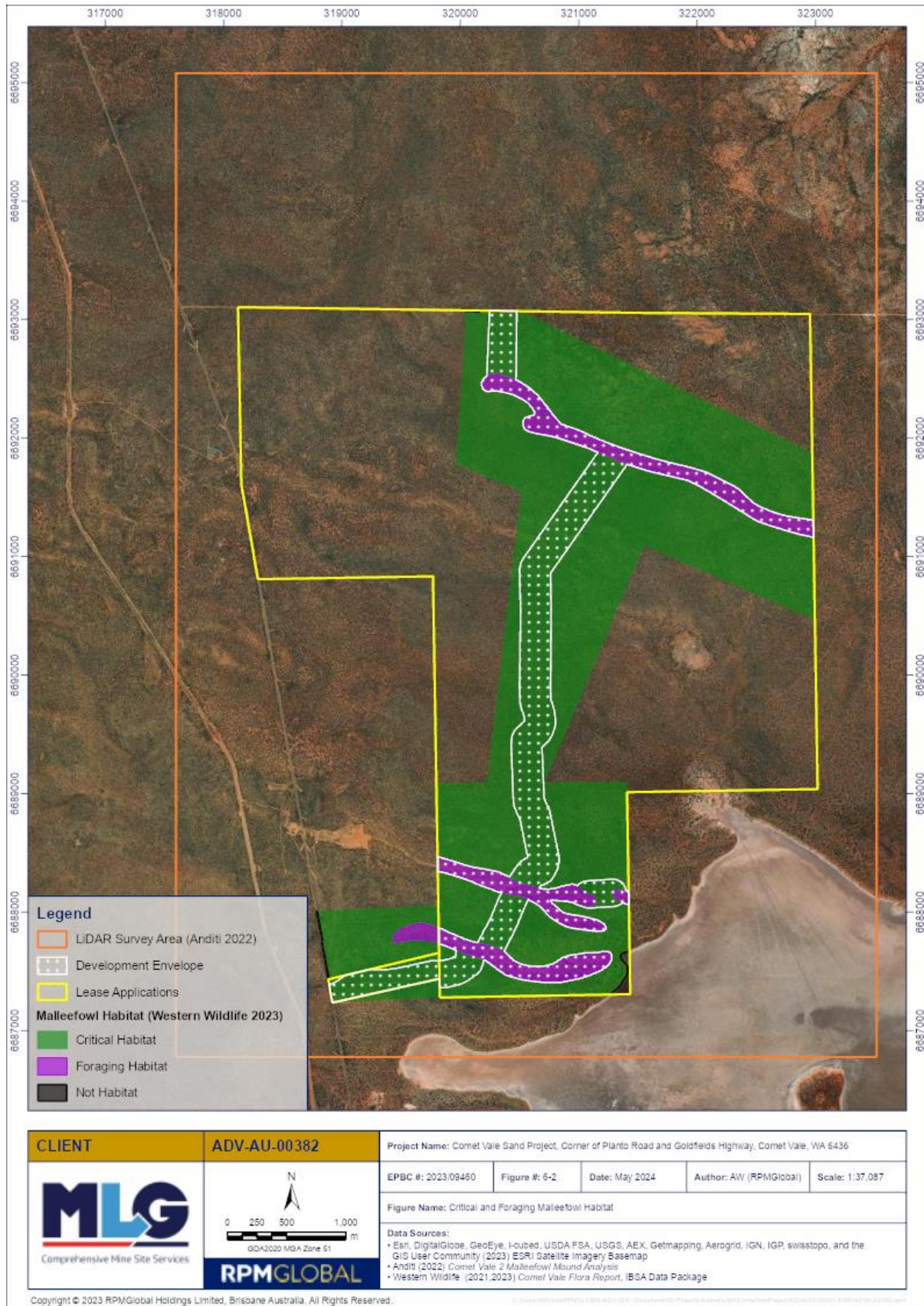
### 6.6.1 Habitat Assessment

Vegetation in the survey area is dominated by Mulga woodlands with ephemerals, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands. All of the fauna habitats, excluding the salt lake have been classified as either critical or foraging habitats for Malleefowl across the survey area. These classifications and the proposed disturbance from the Proposed Action are described in Table 6-2 and shown in Figure 6-2.

Table 6-2 Classification of Fauna Habitats

Fauna Habitat	Classification	Total Mapped Area	Area in Development Envelope (ha)	Proposed Action Activity	Area in Disturbance Footprint (ha)
Mulga Woodland	Critical	42.4	0	N/A	0
Acacia Shrubland	Critical	568.7	126.3	Access Track	14.8
Sand Dune	Foraging	77.8	73.5	Excavation	73.4
Eucalypt Spinifex Sandplain	Critical	289.5	43.9	Access Track	4.8
Salt Lake	None	2.3	0	N/A	0
Cleared	None	1.0	0.3	N/A	0
<b>Total</b>	-	<b>981.7</b>	<b>244</b>	-	<b>93</b>

Figure 6-2 Critical and Foraging Malleefowl Habitat



## 6.6.2 Malleefowl Mounds

The results of the LiDAR survey completed by Anditi identified 29 potential Malleefowl mounds, summarised in Table 6-3.

Table 6-3 LiDAR Malleefowl Mound Detection

Rating	Tenement	Regional	Total
Rating 1 – Highly Likely	4	7*	11
Rating 2 – Likely	1	6	7
Rating 3 - Possible	3	8	11

\* Initial report of Survey area classified this mound as a Rating 2. It was subsequently upgraded in the Regional survey analysis

These findings were ground-truthed during the breeding season of 2023 by Western Wildlife. This survey found one active, eight inactive and two historic with a further 15 inactive mounds found in the surrounding area shown in Figure 6-3.

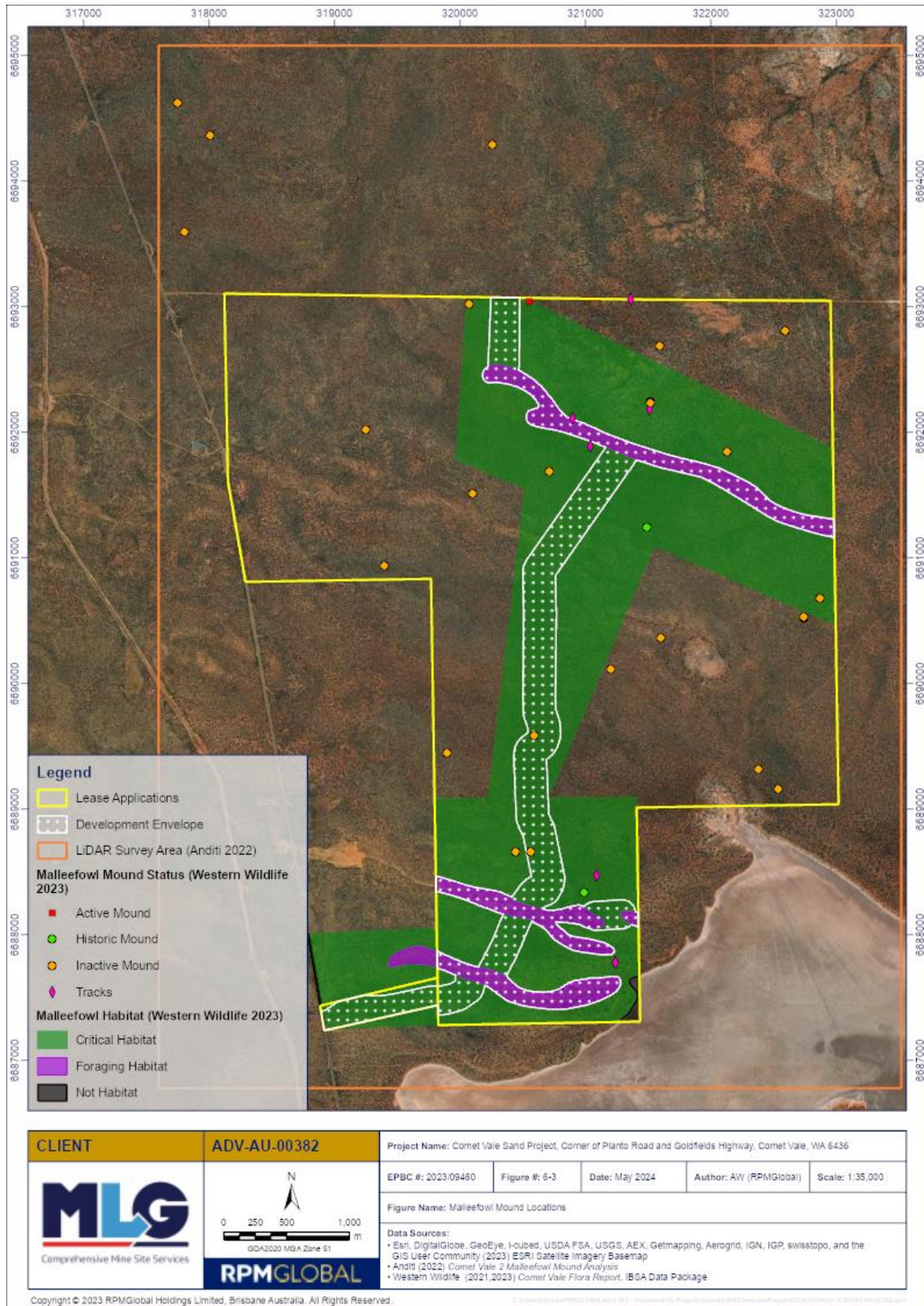
Details of each of the ground truthed mound from the 2023 Western Wildlife targeted survey are presented in Table 6-4. Photographs of all identified mounds, along with historical photos of revisited mounds within disturbance footprint and infrastructure route, with descriptions in accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team (NMRT), 2020) are presented in Appendix 1 of Appendix 9.

Table 6-4 Details of Recorded Malleefowl Mounds

Mound ID	Location	Activity	Anditi ID Number	Mound Profile	Freshly Scraped	Eggshell Presence
MM01	Regional	Inactive	5321	3	No	None
MM02	Survey Area	Inactive	N/A	1	No	None
MM03	Survey Area	Historic	N/A	6	No	None
MM04	Survey Area	Historic	N/A	6	No	None
MM05	Survey Area	Active	1567	5	Yes	Lots
MM06	Regional	Inactive	5151	1	No	Lots
MM07	Survey Area	Inactive	5412	1	No	Some
MM08	Regional	Inactive	5085	2	No	None
MM09	Survey Area	Inactive	1364	2	No	Some
MM10	Survey Area	Inactive	N/A	1	No	None
MM11	Survey Area	Inactive	N/A	3	No	None
MM12	Survey Area	Inactive	N/A	3	No	Lots
MM13	Regional	Inactive	1547/5301	2	No	Some
MM14	Survey Area	Inactive	1478	3	No	Some
MM15	Regional	Inactive	3546	1	No	Some
MM16	Regional	Inactive	3585	1	No	None
MM17	Regional	Inactive	3638	1	Yes	None

Mound ID	Location	Activity	Anditi ID Number	Mound Profile	Freshly Scraped	Eggshell Presence
MM18	Regional	Inactive	4155	3	No	Lots
MM19	Regional	Inactive	4203	1	No	None
MM20	Regional	Inactive	4382	3	No	Some
MM21	Regional	Inactive	4428	3	Yes	Lots
MM22	Regional	Inactive	5544	3	No	Some
MM23	Regional	Inactive	5738	3	No	Some
MM24	Regional	Inactive	5751	1	No	None
MM25	Regional	Inactive	5924	2	No	None
MM26	Survey Area	Inactive	1170	1	No	Some

Figure 6-3 Malleefowl Mound Locations



### 6.6.3 Population Density

Western Wildlife calculated the density of active mounds to estimate the number of breeding pairs. The single active mound within the regional LiDAR survey area equates to a density of 0.02 active mounds per km<sup>2</sup> in the buffer area which is low compared to other studies. This low density can be attributed to reduced rainfall in 2022 and 2023.

Of the eleven mounds identified in the study area, one was active (MM05), six appeared not to have been used for some time (MM02, MM03, MM04, MM07, MM10, MM26) and the remaining four, although inactive, showed previous signs of preparation (MM09, MM11, MM12, MM14).

These numbers were then used to estimate the densities and populations within the Development Envelope and Mining Lease, these estimations include:

- Malleefowl population using the Development Envelope (2.44 km<sup>2</sup>) - There are two inactive mounds within the Development Envelope MM10 and MM11. The reduction in rainfall in 2022 and 2023 has contributed to the inactivity of these mounds, however, it is unlikely that increased rainfall would activate all mounds. If both mounds were active, the density would be 0.8 mounds per km<sup>2</sup> for the Development Envelope, suggesting the area could support an average of two pairs.
- Malleefowl population using the Mining Lease (ML) (19.38 km<sup>2</sup>) – There are 22 sites within the ML, of which 20 are inactive sites one is currently active and one is a historic site. While it is unlikely that all sites within the ML would be active simultaneously, if that were the case, the density would be 1.03 mounds per km<sup>2</sup>, suggesting the area could support an average of 20 breeding pairs.

### 6.6.4 Significant Trees

MLG were requested to provide information on the number of trees impacted by the Proposed Action, including data on significant trees such as tree diameter at breast height (DBH). MLG considers the detail of individual large trees across the disturbance footprint inconsequential for this species, as they are ground-dwelling birds that create large mounds on the ground for breeding. Vegetation and fauna habitat types have been classified as critical or foraging, and these classifications will be used to assess impacts.

Details of significant trees across the survey therefore has not been collected as:

- The majority of woodland vegetation identified is Mulga woodland comprising small trunk diameter *Acacia aneura* trees, *Acacia* shrubland comprising shrubs rather than trees, and Mallee (*Eucalyptus* sp.) which have multiple stems rather than one trunk.
- Malleefowl do not require trees of a certain DBH to occupy an area. Counting the number of trees impacted and measuring DBH will not provide relevant information on the value of the vegetation to Malleefowl. DBH is not mentioned in the approved recovery plan for the Malleefowl (Commonwealth of Australia, 2024).
- Malleefowl utilise trees to escape danger and to roost, but DBH does not influence use for these purposes.
- Malleefowl are a ground-dwelling species, moving predominately by foot and rarely flying. They forage in leaf litter and nest on the ground, building large mounds filled with decomposing vegetative matter to incubate their eggs (Commonwealth of Australia, 2024)
- To build mounds, Malleefowl utilise leaf litter from all vegetation, irrespective of DBH.

- Sufficient data has been provided on habitats and their value to Malleefowl, categorised into breeding habitat, foraging habitat, or no value as habitat. These habitat categorisations will be used to calculate the impact to Malleefowl and to calculate offsets to the species.
- Counting and measuring every tree in the 93 ha area will not improve impact assessment or environmental outcomes for the persistence of the species.

## 6.7 Potential Impacts and Management

### 6.7.1 Potential Impacts

The potential impacts from the Proposed Action and the mitigation measures to be implemented by MLG are provided in Table 6-5 with additional information provided in the Environmental Management Plan provided as Appendix 10.

Table 6-5 Potential Impacts and Mitigation Measures

Threats	Potential Impacts	Avoidance and Mitigation Measures
<b>Direct Impact</b>		
<b>Clearing of critical and foraging habitat</b>	<ul style="list-style-type: none"> <li>• Upper clearing limit of 20 ha of critical habitat proposed to be cleared for road access tracks</li> <li>• Upper clearing limit of 75 ha of foraging habitat to be cleared for road access tracks and excavation areas.</li> <li>• Vehicle strikes during clearing.</li> <li>• Introduction and spread of weed species.</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-clearance surveys by a suitably qualified person to identify Malleefowl mounds.</li> <li>• Completion of internal clearing authorisation procedure prior to any clearing being undertaken.</li> <li>• Clearing of critical habitat is limited to access tracks only for vehicle movement between the excavation areas and public roads.</li> <li>• Clearing to be undertaken progressively with no more than 10 ha of excavation area open at one time to limit fragmentation of habitat across the site.</li> <li>• Avoidance of all Malleefowl mounds with a 50 m buffer applied to all mounds from clearing. No Malleefowl mounds are to be destroyed from Project activities.</li> <li>• Progressive rehabilitation completed throughout LOM to reduce habitat loss.</li> <li>• Clearing to occur towards undisturbed vegetation.</li> <li>• Speed limits across the site.</li> <li>• Weed hygiene measures in accordance with MLG's existing Weed Management Procedure implemented to prevent establishment and spread of weeds.</li> <li>• Weed control measures undertaken for new weed infestations when identified.</li> </ul>
<b>Clearing of Malleefowl mounds</b>	<ul style="list-style-type: none"> <li>• Direct mortality of eggs or young chicks.</li> <li>• Disruption to the breeding cycle of the local population.</li> </ul>	<ul style="list-style-type: none"> <li>• All Malleefowl mounds are avoided from the disturbance footprint.</li> <li>• A 50m buffer is applied to all known Malleefowl mounds.</li> <li>• Pre-clearance surveys prior to disturbance is undertaken and a 50 m buffer is applied to all new mounds discovered during the surveys.</li> </ul>

Threats	Potential Impacts	Avoidance and Mitigation Measures
		<ul style="list-style-type: none"> <li>Off-road driving by onsite personnel is prohibited.</li> </ul>
<b>Vehicle Strike</b>	<ul style="list-style-type: none"> <li>Direct mortality of individual birds.</li> <li>Breeding pair is split due to mortality of one bird.</li> </ul>	<ul style="list-style-type: none"> <li>Malleefowl signage to be erected at entrance of Project site to warn drivers.</li> <li>Maximum speed limits of 40 km/hr through Project area.</li> <li>Offroad driving by onsite personnel is prohibited.</li> <li>All vehicle strikes of Malleefowl are reported to DBCA and logged as an incident in the company's incident reporting system.</li> <li>Onsite induction for contractors and employees to include all measures for the protection of Malleefowl.</li> </ul>
<b>Change to fire regime</b>	<ul style="list-style-type: none"> <li>Loss of critical and foraging habitat.</li> <li>Direct mortality.</li> <li>Abandonment of breeding mounds.</li> </ul>	<ul style="list-style-type: none"> <li>No offroad driving.</li> <li>Hot work is prohibited onsite.</li> <li>Adherence to total fire bans during high fire danger conditions.</li> <li>Smoking by personnel is to only occur in designated smoking areas, away from vegetation. Cigarette butts are extinguished appropriately and safely disposed of.</li> <li>All vehicles and plant machinery are equipped with firefighting equipment.</li> <li>All fires are immediately reported to Department of Fire and Emergency Services.</li> <li>Fire prevention and management are included in site induction for all onsite personnel.</li> </ul>
<b>Indirect Impacts</b>		
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>Loss of foraging habitat</li> <li>Decrease in breeding attempts</li> </ul>	<ul style="list-style-type: none"> <li>Regular maintenance of vehicles according to manufacturer's specifications to reduce emissions.</li> </ul>
<b>Predation</b>	<ul style="list-style-type: none"> <li>Direct mortality of Malleefowl</li> </ul>	<ul style="list-style-type: none"> <li>No waste stored on site.</li> <li>All putrescible waste removed from site daily and deposited in suitable offsite waste facilities.</li> <li>Onsite personnel prohibited from feeding feral species.</li> <li>Waste management and feral species are included in the site induction procedure.</li> <li>Rehabilitation is designed so no excessive ponding attracting predator species.</li> </ul>
<b>Increase in introduced herbivores</b>	<ul style="list-style-type: none"> <li>Degradation of critical habitat</li> </ul>	<ul style="list-style-type: none"> <li>Onsite personnel prohibited from feeding feral species.</li> <li>Rehabilitation is designed so no excessive ponding attracts herbivore species.</li> </ul>



## 6.7.2 Regional Cumulative Impact Assessment

Regional fauna habitat mapping is unavailable at the same scale as the fauna habitat assessment undertaken by Western Wildlife. Therefore, Pre-European Vegetation mapping has been assessed for its likelihood to support critical breeding habitat. This assessment is provided as Table 6-6. Of the 28,206,348 ha within the Murchison IBRA region, 78% is considered likely to contain Malleefowl critical habitat, 16% likely to contain foraging habitat with some critical habitat present, 2% to be foraging habitat only and 4% not suitable for Malleefowl.

Table 6-6 Regional Context Methodology

Malleefowl Likelihood	Pre-European Vegetation Association	Area (ha)
Likely to contain Malleefowl breeding habitat	Mulga <i>Acacia aneura</i> and associated species.	17,243,521
	Mulga, other wattle <i>Atriplex spp</i> , <i>Maireana spp.</i> with <i>Acacia aneura</i> & other <i>Acacia spp.</i>	770,332
	Mulga, other wattle, casuarina, <i>Atriplex spp.</i> <i>Maireana spp.</i> with <i>Acacia aneura</i> , <i>A. papyrocarpa</i> , <i>Allocasuarina cristata</i>	898,879
	Wattle with York gum, casuarina, mulga <i>Acacia spp.</i> with <i>Eucalyptus loxophleba</i> , <i>Allocasuarina spp.</i> <i>Acacia aneura</i> .	587,803
	Wattle, casuarina and teatree acacia-allocauarina-melaleuca alliance.	112,157
	Wattle, teatree & other species <i>Acacia spp.</i> <i>Melaleuca spp.</i>	2,484,718
	<b>Total</b>	<b>22,097,410</b>
Likely to be Malleefowl foraging habitat, some breeding habitat may be present	Hummock grassland with scattered eucalypts over wattle scrub or mallee <i>Triodia spp.</i> <i>Acacia spp.</i> <i>Corymbia dichromophloia</i> , <i>Eucalyptus leucophloia</i> , <i>E. youngiana</i>	229,403
	Hummock grassland with scattered low trees over dwarf shrubs or mixed short grass and spinifex mixed species, <i>Triodia spp.</i>	802,609
	Hummock grassland with scattered shrubs or mallee <i>Triodia spp.</i> <i>Acacia spp.</i> , <i>Grevillea spp.</i> <i>Eucalyptus spp</i>	3,162,732
	Other acacia, banksia, peppermint, cypress pine, casuarina, York gum <i>Acacia spp.</i> , <i>Banksia spp.</i> , <i>Agonis flexuosa</i> , <i>Callitris spp.</i> , <i>Allocasuarina spp.</i> , <i>Eucalyptus loxophleba</i> .	208,722
	Woodland / Shrub (mallee) steppe*	123
	York gum, mulga, <i>melaleuca</i> or casuarina <i>Tecticornia spp.</i> , <i>Eucalyptus loxophleba</i> , <i>Acacia aneura</i> , <i>Melaleuca spp.</i> , <i>Allocasuarina spp.</i>	21,136
	<b>Total</b>	<b>4,424,725</b>
Likely to be Malleefowl foraging habitat only	<i>Atriplex spp.</i> <i>Maireana spp.</i> communities on alkaline soils	46,909
	Wheatbelt; York gum, salmon gum etc. <i>Eucalyptus loxophleba</i> , <i>E. salmonophloia</i> . Goldfields; gimlet, redwood etc. <i>E. salubris</i> , <i>E. oleosa</i> . Riverine; rivergum <i>E. camaldulensis</i> . Tropical; messmate, woollyb	167,216
	Low woodland or open low woodland / bluebush & saltbush*	172,773
	Succulent steppe bluebush and saltbush / samphire	88,186
	<b>Total</b>	<b>475,084</b>

Malleefowl Likelihood	Pre-European Vegetation Association	Area (ha)
Not Malleefowl Habitat	<i>Tecticornia spp.</i> communities in saline areas	384,332
	<i>Tecticornia spp.</i> with <i>Melaleuca spp.</i> <i>Acacia spp.</i>	84,983
	Rock	24,645
	Salt Lake, lagoon, clay pan	715,169
<b>Total</b>		<b>1,209,129</b>

An assessment of the cumulative impacts of the Proposed Action has been undertaken against a Local Impact Area and a Regional Impact Area. These are described as:

- Local Impact Area: based on a 100 km circular buffer taken from the centre point of the Development Envelope for the Proposed Action and clipped at the Murchison IBRA region. This area equates to 2,390,550 ha.
- Regional Impact Area: based on the Murchison IBRA region totalling 28,206,348 ha.

The assessment includes the review and addition of Projects referred under the EPBC Act taking a conservative approach by assuming the whole Development Envelopes is being cleared. These Projects are provided in Table 6-7 and shown in Figure 6-4.

Table 6-7 Other EPBC Referrals

Proponent	Project Name	Determination	Location	Area (ha)
Mega Lake Maitland PTY LTD	Lake Maitland Uranium Project	Controlled Action	Regional Impact Area	1,210
Toro Energy Limited	Wiluna Uranium Project	Controlled Action	Regional Impact Area	1,100
Northern Star Resources Pty LTD	Northern Star Resources Pty LTD	Controlled Action	Regional Impact Area	241
Toro Energy Limited	Extension to Wiluna Uranium Mine (Millipede & Lake Maitland), Wiluna, WA	Controlled Action	Regional Impact Area	1,615
AngloGold Ashanti Australia Limited and AFB Resources Pty Ltd	Tropicana Gold Project- Develop open cut gold mine, and associated infrastructure	Controlled Action	Regional Impact Area	3,495 (only 100 ha in Regional Impact Area)
Cameco Australia Pty Ltd	Yeelirrie Uranium Mine	Controlled Action	Regional Impact Area	10,000
Macarthur Iron Ore Pty Ltd	Ularring Hematite Project	Not Controlled Action	Regional Impact Area	529
			Local Impact Area	117
Jupiter Mines Ltd	Mt Mason Hematite DSO Project	Not Controlled Action	Local Impact Area	115



The disturbance from the above Projects combined with the Proposed Action on Malleefowl habitat within the local and regional areas is provided in Table 6-8 shown in Figure 6-4.

The Proposed Action is expected to contribute 0.004% of the total impacted area on habitat likely to be critical to the survival or provide foraging habitat for Malleefowl within a 100 km radius. This impact is lowered significantly further when compared to the percentage impact across the IBRA bioregion.

Figure 6-4 EPBC Act Referred Projects

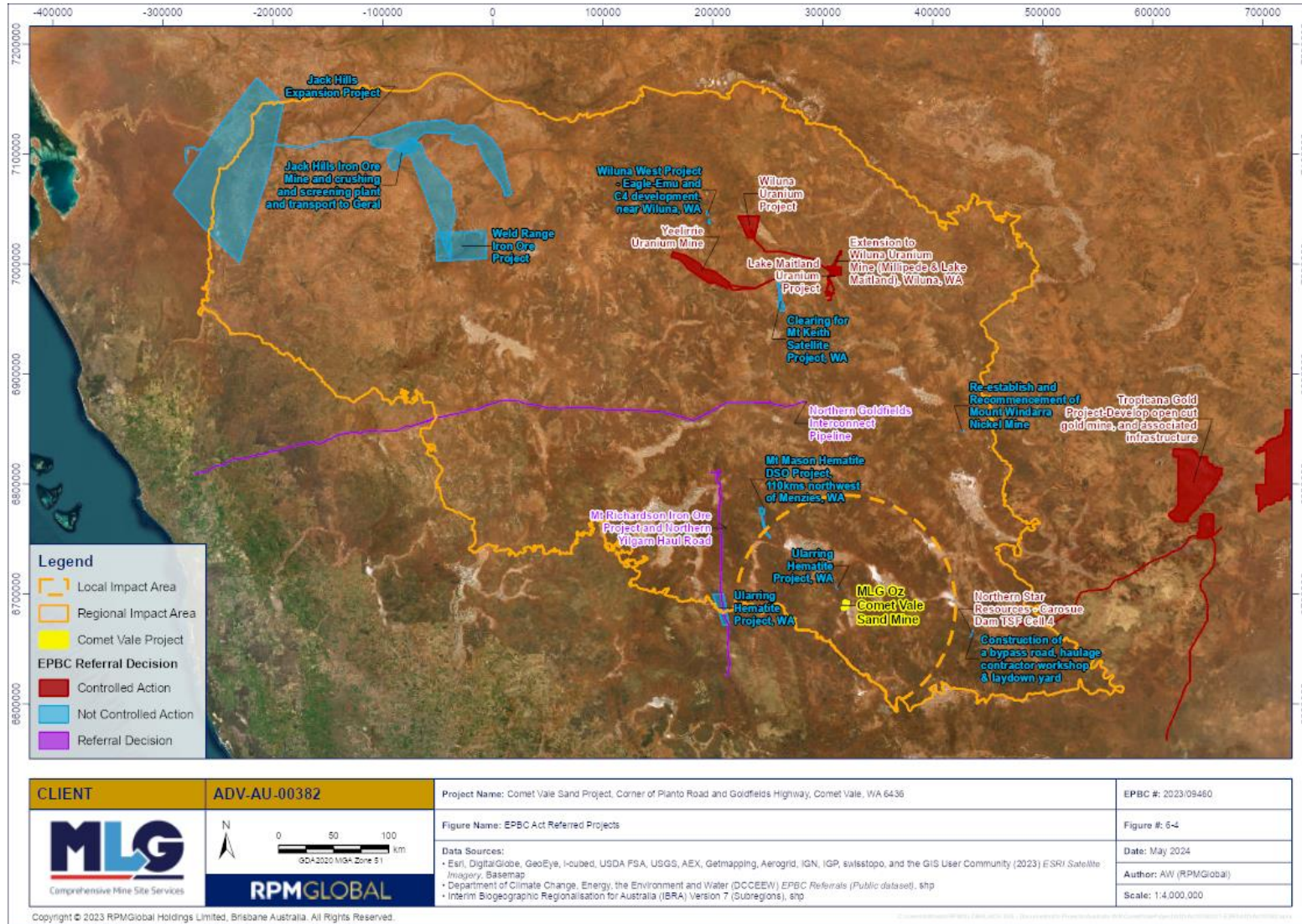
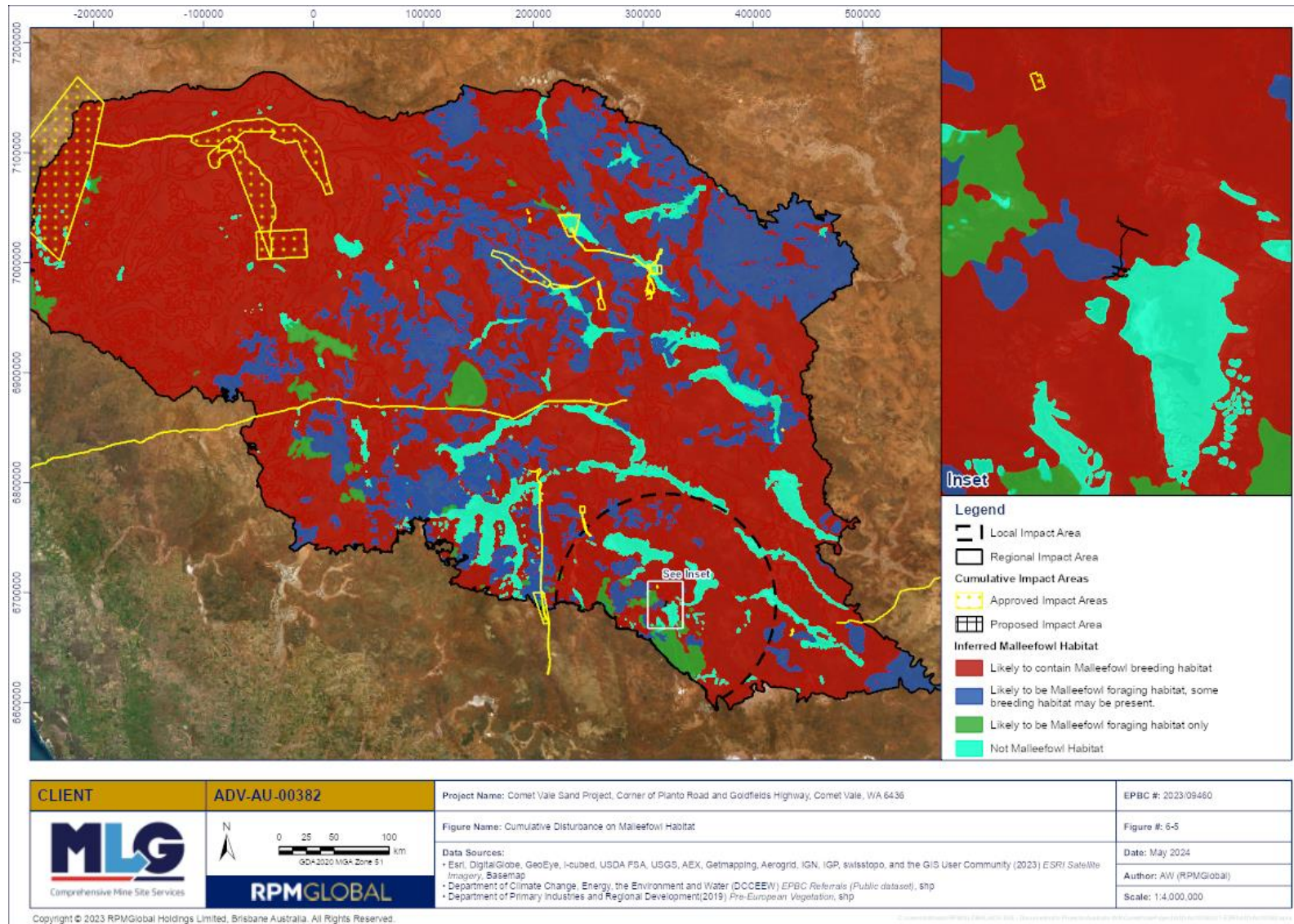


Table 6-8 Cumulative Disturbance on Malleefowl Habitat

Habitat Type	Proposed Action Disturbance (ha)	Local Impact Area (100 km Buffer)					Regional Impact Area (Murchison IBRA Region)				
		EPBC Act Referred Projects (ha)	Proposed Action Total Area (ha)	Existing Impact (%)	Proposed Action Impact (%)	Cumulative Impact (%)	EPBC Act Referred Projects (ha)	Proposed Action Total Area (ha)	Existing Impact (%)	Proposed Action Impact (%)	Cumulative Impact (%)
Likely to contain Malleefowl breeding habitat	76	1,001	76	0.042%	0.003%	0.045%	994,170	81	3.85101%	0.00031%	3.85133%
Likely to be Malleefowl foraging habitat, some breeding habitat may be present	10	46	10	0.002%	0.001%	0.002%	46,404	10	0.17975%	0.00004%	0.17979%
Likely to be Malleefowl foraging habitat only	0	0	0	0.000%	0.000%	0.000%	2,063	0	0.00799%	0.00000%	0.00799%
Not Malleefowl Habitat	7	0	7	0.000%	0.000%	0.000%	27,235	7	0.10550%	0.00003%	0.10552%
<b>Total</b>	<b>98</b>	<b>1,047</b>	<b>98</b>	<b>0.044%</b>	<b>0.004%</b>	<b>0.048%</b>	<b>1,069,872</b>	<b>98</b>	<b>4.14425%</b>	<b>0.00038%</b>	<b>4.14463%</b>

Figure 6-5 Cumulative Disturbance on Malleefowl Habitat



## 6.8 Feasible Alternatives to the Proposed Action

Sand and gravel are essential materials for construction, mining and infrastructure including local and state government roads. New resources are constantly required to service these industries within the local area.

Overall, there are no alternatives for the proposed action; as with most mining and extractive industry projects, the location of suitable materials, in this case quality sand and gravel suitable for the construction industry, determines the location of the Proposed Action's disturbance footprint. Sand dunes are not considered critical habitat for Malleefowl, and no further alternatives were considered to limit impacts to these features. Not all dunes in the exploration licence will be utilised, disturbance to critical Malleefowl habitat is limited to haulage tracks providing access from the sand dune areas offsite.

Several options were considered during the planning phase to minimise the impact to the Malleefowl:

- Main access track - the original alignment of the access track was located in an uncleared area. A review of the aerial imagery indicated an existing pastoral track between the work areas. The proposed track location was moved to utilise the area of existing disturbance. Although this track may require upgrading for the project, less clearing will be required, minimising the impact to critical Malleefowl habitat, and reducing fragmentation.
- Known Malleefowl mounds – Following completion of the on ground targeted Malleefowl survey and LiDAR survey for potential mounds, the northern access track location was altered to avoid the only active Malleefowl mound within the tenement area. MLG commit to avoid clearing within 50 m of any active Malleefowl mounds. The design has considered the local environment avoiding all known Malleefowl mounds and reducing the impact on breeding habitat.
- Limit of disturbed open area – only 10 ha of excavation will be open at any one-time during operations. Limiting the area open area minimises the total habitat loss over the life of mine, with rehabilitation occurring directly behind the extraction. Additionally, if conditions change and the product is no longer required or becomes unviable, undisturbed areas will remain intact.
- Progressive rehabilitation – Ongoing progressive rehabilitation enables vegetation to establish from an early stage, facilitating the return of areas to Malleefowl critical and foraging habitat well before the end of mine's life. This approach results in more mature habitat, including leaf litter for mound building by Malleefowl, being available by the end of mining activities.

All habitats in the 28,206,348 ha Murchison bioregion are considered either foraging or breeding habitat for Malleefowl. Therefore, there is no option for the Proposed Action to proceed without impacting Malleefowl habitat to some extent.

## 7 Contaminant Impact Assessment

### 7.1 Overview

Impacts arising from contamination as a result of the Proposed Action can only occur if there is an applicable contaminant source, exposure pathway and receptor. Each of these aspects are discussed in further detail below as well as proposed management measures that will reduce the likelihood and magnitude of any contamination risks.

### 7.2 Potential Contaminants of Concern

Mining and mineral processing is often a source of contamination to the environment, however there are very few contaminants to be used for the Proposed Action as compared to more complex mining operations. The types and sources of contamination are well understood within the industry, and the Western Australian government department responsible for its oversight, DWER, has published a list of potentially contaminating activities and associated contaminants of concern in the DWER guideline “Assessment and Management of Contaminated Sites” (Department of Water and Environmental Regulation (DWER), 2021).

Common contaminants associated with mining and mineral processing are listed in Table 7-1 along with their relevance to Comet Vale.

*Table 7-1 Potential Contaminants and Applicability to the Project*

Contaminant	Relevance to the Project
Chemical reagents used in mineral processing	Comet Vale relies on physical screening of sand and gravels. No chemical reagents are used or stored on site.
Metals/metalloids associated with mineralised ore bodies and mineral processing	The materials extracted by MLG are geochemically benign silica sands that are non-sodic and non-acid forming (RPM, 2022).
Acid rock drainage associated with mineralised and acid forming geologies	
Acid sulfate soil drainage, where acid sulfate soils are disturbed	Comet Vale is in a low probability area for acid sulfate soils, according to the CSIRO Atlas of Australian Acid Sulfate Soils. Local soils comprise geochemically benign silica sands and no acid sulfate soils will be disturbed.
Various solute plumes and/or seepage associated with mine waste facilities	No waste products are produced at the Project.
Radioactive materials, often associated with mineral sand extraction	Local soils comprise benign silica sands which differ to those associated with heavy mineral sands that contain levels of naturally occurring radioactive material (e.g. uranium and thorium associated with minerals such as monazite, zircon and ilmenites).
Turbidity / total suspended solids	Disturbed soils are a common source of sediment in stormwater runoff and can increase the turbidity of local surface water features. However, given the granular nature of the local soils which contain a very low content of fine-grained material such as clays and silts, the impacts of sedimentation and increased turbidity are expected to be minimal, particularly as local drainage occurs as sheet wash with no defined drainage lines in proximity to the Project.
Hydrocarbons and solvents	Bulk storage of hydrocarbons will not be undertaken on site. However, approximately 1000 L lubricating oil will be stored



in drums and other containers. Earthmoving equipment will use diesel fuel, lubricating and hydraulic oils. Refuelling of plant and machinery will be undertaken via a fuel truck from off site.

Table 7-1 indicates that potential contaminants of concern are limited to a range of hydrocarbons required for the use and maintenance of site equipment (as listed under Section 1.3.5), and sediment from soil disturbance and stockpiling.

### 7.3 Potential Receptors

A review of potential receptors susceptible to hydrocarbon or sediment related contamination is provided as follows:

- Water Resources:
  - Surface water: The nearest surface water feature is Lake Goongarrie, located approximately 1 kilometre southeast of the Project, at its closest point. There are no defined drainage lines in the Project area, with drainage occurring via sheet wash. Given the small volumes of hydrocarbons used at the Project, any spill or leak is expected to be limited in magnitude and unlikely to extend beyond the Project boundary to contaminate surface water.
  - Groundwater: The Project comprises removal of dune systems with very shallow excavation that will not intercept groundwater. A search of the BOM Groundwater Explorer database and the BOM National Groundwater Information System (NGIS) was undertaken to interrogate established bores in the vicinity of the Project. Bores that were identified within 15 km of the Project had groundwater depths ranging from a minimum of 4 to a maximum of 27 metres (standing water level). Groundwater in all bores was classified as brackish and is unlikely to have any beneficial use. Given the small volumes of hydrocarbons used on site, and the depth to groundwater, it is unlikely that any spills or leaks will reach the water table.
- Soil: Soils within the Project footprint may receive small volumes of hydrocarbons due to leaks or spills throughout the life of mine. However, the potential for significant contamination of local soils is considered unlikely, given the limited volume of hydrocarbons used on site and absence of bulk storage facilities.
- Native flora, fauna and MNES (Malleefowl): Impacts to native flora and fauna (including Malleefowl) are considered very unlikely, as any hydrocarbon spills or leaks are expected to be minor in volume and limited to the cleared mining area. In addition, native fauna is unlikely to frequent the active mining area.

### 7.4 Potential Exposure Pathways

Potential exposure pathways have been identified as follows:

- Hydrocarbons: A number of mechanisms could result in the release of hydrocarbons to the environment with impacts to the receptors identified in Section 7.3. These mechanisms comprise:
  - Inappropriate storage and handling of hydrocarbons: Incorrect hydrocarbon storage and handling could lead to the spillage or leaking of hydrocarbons and associated contamination to the surrounding environment including the immediate soils and groundwater, with potential exposure to native flora and fauna via ingestion or uptake.

- Refuelling: Minor fuel spills could occur during refuelling activities. Fuel spilled on the ground will cause soil contamination and may infiltrate through the soil to the groundwater table, with potential uptake by native flora and fauna.
- Unmaintained, poorly maintained, or old machinery and vehicles: Leaking oil or broken hydraulic hoses can lead to hydrocarbon contamination, primarily affecting soil with limited potential for uptake by native flora and fauna or infiltration to the groundwater table as associated volumes are minor.
- Transportation risks: Hydrocarbon spills or leaks could occur during the transport of machinery or equipment to/from site, which may lead to hydrocarbon contamination of the surrounding soil and potential contaminant uptake by flora and fauna and infiltration to the groundwater table.
- Surface water runoff: Stormwater may transport hydrocarbons from heavy machinery, sand stockpiles and disturbed soil from the mine site into the environment, with impacts to soil, surface water and native flora and fauna.

### 7.5 Avoidance and Mitigation

The Project will employ a range of management and mitigation measures to ensure that contamination related impacts on potential receptors, including MNES, are minimised. These measures are standard practice within the Western Australian mining industry and have proven effective at MLG’s other operations. Proposed management and mitigation measures are detailed in the following subsections.

Containing and mitigating potential risks from various exposure pathways during sand mining without chemical processing involves a combination of responsible practices and management measures. In order to ensure effective prevention of potential contaminants and infiltration runoff, measures that will be implemented during the life of the project are provided in Table 7-2. These comprehensive measures are aimed at minimising the risk of contamination and infiltration runoff, ensuring the protection of the environment and MNES throughout the sand mining operations.

*Table 7-2 Containment and Mitigation Measures*

Aspect	Mitigation Measures
<b>Hydrocarbons</b>	
<b>Hydrocarbon Storage</b>	<ul style="list-style-type: none"> <li>● Maximum of 1000 L of hydrocarbons to be stored on site with a mobile fuel cart used for machinery refuelling.</li> <li>● Any stored hydrocarbons are to be segregated and banded in dedicated storage areas at least 25 m from the edge of the disturbance footprint.</li> <li>● Dedicated hydrocarbon storage area to contain a complete spill containment kit at all times.</li> <li>● Any spills or leaks are to be cleaned up immediately.</li> <li>● All personnel will be trained on spill response procedures, including containment, cleanup and reporting requirements.</li> <li>● Detailed records will be maintained including hydrocarbon transactions, volumes, inspection reports, maintenance activities, and incidents.</li> </ul>

Aspect	Mitigation Measures
Refuelling	<ul style="list-style-type: none"> <li>• Refuelling to be undertaken using a fuel truck or self-bunded fuel trailer, equipped with nozzle with automatic cut off facility, clearly visible amber light flashing whilst refuelling, emergency stop button and spill kit.</li> <li>• All refuelling to be undertaken within pre-disturbed areas where topsoil has been stripped (e.g. pit) and at least 25 m from the edge of the disturbance footprint.</li> <li>• Ensure that the refuelling area is equipped with fire extinguishers, spill containment kits, and emergency shutdown controls.</li> <li>• Ensure that only trained and authorised personnel undertake refuelling activities.</li> <li>• Conduct regular inspections and maintenance of the mobile fuel cart to identify and address any leaks, damage, or malfunctioning parts. This will include a visual inspection of the pump unit and verification that the hoses, seals and fittings appear in good condition with no evidence of wear or damage.</li> <li>• All used spill equipment and waste material to be disposed of appropriately at an authorised disposal facility.</li> </ul>
Equipment, Machinery and Transportation	<ul style="list-style-type: none"> <li>• Chemical management requirements shall be addressed with personnel as part of workplace inductions and workplace meetings and training.</li> <li>• Fuel for mobile plant will be provided by fuel cart, with a maximum of 1000L of hydrocarbon stored on site.</li> <li>• All equipment is serviced and maintained away from site at MLG's Kalgoorlie Depot.</li> <li>• Transfer of diesel shall occur at designated transfer points with spill protection and containment available.</li> <li>• All mobile equipment will carry spill response kits to allow for a quick response to spills.</li> <li>• Spill response equipment appropriate to the volume and type of hydrocarbon being stored shall be easily accessible, clearly labelled and highly visible.</li> <li>• Competency based spill response training will be delivered to relevant personnel.</li> <li>• Available records of maintenance and service work done to each vehicle.</li> <li>• Vehicles comply with <i>Road Transport (vehicle registration) Regulations 1999</i> and the relevant Australian Design Rules.</li> <li>• All plant will be inspected as part of regular environmental audits to ensure that they carry the appropriate spill kit items.</li> <li>• Enforce strict spill prevention and response protocols for vehicles transporting in and out of site to prevent hydrocarbon spills on roads.</li> <li>• Inspect and maintain transportation vehicles and equipment to minimise the risk of leaks and spills.</li> </ul>



Aspect	Mitigation Measures
<b>Site Control</b>	
<b>Site assessment and planning</b>	<ul style="list-style-type: none"> <li>• Conduct a site assessment and planning phase to identify environmentally sensitive areas, water bodies, and potential contamination pathways.</li> <li>• Plan mining activities to minimise disturbance to sensitive areas and maintain appropriate buffer zones.</li> </ul>
<b>On-Site Water Management</b>	<ul style="list-style-type: none"> <li>• Manage on-site water to prevent pooling and the formation of water bodies.</li> </ul>
<b>Regular Monitoring</b>	<ul style="list-style-type: none"> <li>• Conduct periodic site inspections for spills</li> </ul>
<b>Adherence to Regulations</b>	<ul style="list-style-type: none"> <li>• Adhere to all relevant environmental regulations, permits, and reporting requirements to maintain compliance with environmental standards and guidelines</li> </ul>

## 8 Risk Assessment

The Proposed Action has been developed using a risk assessment approach, identifying key risks and potential impacts on Malleefowl. The risk assessment was completed based on the Likelihood and Consequence descriptions shown in Table 8-1 and Table 8-2 to determine the risk rating described in Table 8-3. The potential impacts to Malleefowl identified are presented in Table 8-4 of the Project's risk assessment with inherent risks, mitigation measures and residual risks.

Table 8-1 Likelihood Criteria

Likelihood	Description
Almost Certain	Common or Frequent occurrence (e.g., once per day)
Likely	Is known to occur or "it's happened" (e.g., >once per month, but <once per day)
Possible	Could occur or "I've heard of it happening" (e.g., >once per year, but <once per month)
Unlikely	Not Likely to occur (e.g., <once per year)
Rare	Rare / practically impossible (e.g., very unlikely to ever occur)

Table 8-2 Consequence Criteria

Consequence	Description
Insignificant	None or insignificant impact of MNES (Malleefowl) with no effect on ecosystem function
Minor	Moderate to minor impact to MNES (Malleefowl) resulting in a minor, recoverable impact.
Moderate	Minor and short-term impact to MNES expected, resulting in a moderate, recoverable impact.
Major	Long-term impact to MNES expected, resulting in a major, recoverable impact.
Catastrophic	Irreversible impact to MNES expected.

Table 8-3 Risk Rating Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	Medium



Table 8-4 Risk Assessment

Risk Event	Potential Impact	Inherent			Mitigation Measures	Risk		
		Likelihood	Consequence	Rating		Likelihood	Consequence	Rating
Unauthorised clearing outside of approved areas	<ul style="list-style-type: none"> <li>Reduction in habitat critical to the survival of the species</li> </ul>	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Approved clearing areas are established prior to disturbance.</li> <li>Implementation of internal clearing procedure.</li> <li>Induction for all onsite personnel.</li> </ul>	Unlikely	Moderate	Medium
Clearing of Malleefowl mounds	<ul style="list-style-type: none"> <li>Reduced breeding success of resident breeding pairs</li> </ul>	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Approved clearing areas are established prior to disturbance.</li> <li>Pre-clearance surveys undertaken to identify any mounds.</li> <li>Any mounds identified during pre-clearance surveys are avoided with a 50 m buffer applied from clearing.</li> </ul>	Unlikely	Moderate	Medium
Machinery strike on individual birds from clearing	<ul style="list-style-type: none"> <li>Loss of individuals</li> <li>Loss of breeding pairs</li> <li>Loss of young chicks unable to escape machinery</li> </ul>	Possible	Minor	Medium	<ul style="list-style-type: none"> <li>Pre-clearance surveys undertaken prior to clearing activities.</li> <li>Any mounds identified during pre-clearance surveys are avoided with a 50 m buffer applied from clearing.</li> <li>Clearing to be undertaken towards undisturbed vegetation to allow individuals to escape into vegetation cover.</li> </ul>	Unlikely	Minor	Low
Vehicle strike from light vehicles travelling through site	<ul style="list-style-type: none"> <li>Loss of individuals</li> <li>Loss of breeding pairs</li> </ul>	Possible	Minor	Medium	<ul style="list-style-type: none"> <li>Offroad driving is prohibited by all MLG employees and contractors.</li> <li>Signage to be erected upon entrance to the site warning drivers that Malleefowl are present.</li> <li>A maximum of 40 km/hr speed limit applied across the whole site.</li> <li>All vehicle strikes are immediately reported.</li> </ul>	Unlikely	Minor	Low



Risk Event	Potential Impact	Inherent			Mitigation Measures	Risk		
		Likelihood	Consequence	Rating		Likelihood	Consequence	Rating
Fragmentation of habitat from clearing	<ul style="list-style-type: none"> <li>Reduction of continuous habitat foraging.</li> </ul>	Possible	Moderate	High	<ul style="list-style-type: none"> <li>Excavation areas are limited to 10 ha open at any one time.</li> <li>Progressive rehabilitation is completed throughout the LOM.</li> <li>Existing pastoral tracks are utilised in the first instance.</li> </ul>	Unlikely	Moderate	Medium
Incorrect storage or disposal of putrescible waste	<ul style="list-style-type: none"> <li>Increase in feral predator species causing increase in mortality of young and adult birds</li> </ul>	Possible	Moderate	High	<ul style="list-style-type: none"> <li>No infrastructure onsite, with all employees and contractors driving on to site each day.</li> <li>All putrescible waste is disposed offsite in approved waste facilities.</li> <li>Waste management is included in the Site Induction.</li> </ul>	Unlikely	Moderate	Medium
Poor rehabilitation techniques	<ul style="list-style-type: none"> <li>Increase in ponding of surface water attracting feral predator and herbivore species.</li> <li>Foraging and critical habitat not returned to a self-sustaining ecosystem</li> <li>Erosion of rehabilitated areas</li> </ul>	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Rehabilitation undertaken in accordance with approved MCP.</li> <li>Rehabilitation undertaken in a way to reduce water ponding.</li> <li>Rehabilitation techniques implemented prevent erosion of slopes.</li> </ul>	Unlikely	Moderate	Medium
Unauthorised fire from Project activities	<ul style="list-style-type: none"> <li>Reduction in critical habitat</li> <li>Reduction of foraging habitat</li> <li>Loss of individual birds or breeding pairs</li> </ul>	Likely	Major	High	<ul style="list-style-type: none"> <li>All onsite personnel are trained in available firefighting equipment and techniques.</li> <li>All light and heavy vehicle equipment are fitted with firefighting equipment.</li> <li>No hot work is performed onsite.</li> <li>Offroad driving is prohibited by onsite personnel.</li> </ul>	Unlikely	Major	Medium



Risk Event	Potential Impact	Inherent			Mitigation Measures	Risk		
		Likelihood	Consequence	Rating		Likelihood	Consequence	Rating
					<ul style="list-style-type: none"> <li>Deliberate burning of vegetation onsite is prohibited.</li> <li>Smoking by onsite personnel to be undertaken in designated areas away from vegetation. Cigarette butts are extinguished appropriately and disposed of in appropriate waste facility offsite.</li> </ul>			
Excessive dust generation	<ul style="list-style-type: none"> <li>Reduction in health of vegetation critical to the survival of Malleefowl</li> </ul>	Possible	Minor	Medium	<ul style="list-style-type: none"> <li>Clearing of vegetation and stripping of topsoil is not undertaken during periods of high winds.</li> <li>Screening of product is not undertaken during periods of high winds.</li> <li>Adherence to speed limits to reduce dust generation.</li> <li>Utilisation of standard dust suppression techniques including use of water cart on access roads when required.</li> </ul>	Unlikely	Minor	Low
Introduction and/or spread of weed species	<ul style="list-style-type: none"> <li>Reduction in health of vegetation critical to the survival of Malleefowl</li> </ul>	Likely	Minor	Medium	<ul style="list-style-type: none"> <li>Adherence to Weed Management Procedure.</li> <li>All vehicles and machinery are clean of seeds, soils and plant material prior to entering site.</li> </ul>	Unlikely	Minor	Low
Excessive noise and vibration from machinery and plant	<ul style="list-style-type: none"> <li>Individual birds do not breed in areas close to the operating excavation area</li> </ul>	Likely	Minor	Medium	<ul style="list-style-type: none"> <li>All vehicles are regularly serviced to manufacturers specifications.</li> <li>Heavy vehicles only utilised when required.</li> </ul>	Unlikely	Moderate	Medium
Spills from hydrocarbon handling or onsite refuelling	<ul style="list-style-type: none"> <li>Decline of critical or foraging fauna habitat surrounding impact area.</li> </ul>	Possible	Minor	Medium	<ul style="list-style-type: none"> <li>Hydrocarbons managed in accordance with Australian Standard 1940-2004.</li> <li>Implementation and adherence to site Hydrocarbon Management Procedure.</li> <li>No fuel stored on site.</li> </ul>	Rare	Minor	Low





Risk Event	Potential Impact	Inherent			Mitigation Measures	Risk		
		Likelihood	Consequence	Rating		Likelihood	Consequence	Rating
	<ul style="list-style-type: none"> <li>Decline in surface water quality.</li> <li>Contamination of soils.</li> </ul>				<ul style="list-style-type: none"> <li>Preventative maintenance program of all light and heavy vehicles.</li> <li>Refuelling to occur in disturbed areas only where topsoil and vegetation have been stripped for excavation.</li> <li>Refuelling cart to be equipped with spill kit that is regularly maintained and stocked.</li> <li>Spills are to be cleaned up immediately and reported.</li> </ul>			
Surface water runoff from contaminants from Proposed Action run	<ul style="list-style-type: none"> <li>Decline in health of foraging and critical habitat from contaminants after rainfall.</li> <li>Contamination or sedimentation of surface water systems.</li> </ul>	Possible	Minor	Medium	<ul style="list-style-type: none"> <li>Implementation of erosion control measures to prevent sediment run off from excavation area.</li> <li>Implementation of Hydrocarbon Management Procedure to prevent spills and runoff.</li> <li>Adhere to all relevant environmental regulation, permits and reporting requirements related to surface water management.</li> </ul>	Unlikely	Minor	Low
Leachate from stockpiles entering groundwater system	<ul style="list-style-type: none"> <li>Contamination of groundwater</li> </ul>	Rare	Minor	Low	<ul style="list-style-type: none"> <li>Soil sampling indicates the materials are largely benign with heavy metal and metalloid concentrations extremely low.</li> <li>Product is stockpiled in disturbed areas where extraction has occurred of the material above groundwater level.</li> <li>Topsoil stockpiles are maximum height of 2 m.</li> </ul>	Rare	Insignificant	Low

## 9 Offset Proposal

### 9.1 Purpose

MLG proposes to offset the significant residual impact of the Proposed Action through a Project developed in partnership with the Great Victoria Desert Biodiversity Trust (GVDBT). The offset project will be developed in accordance with the principles of the EPBC Act Environmental Offsets Policy (the Policy) (DCCEEW, 2012) and Nature Positive Plan (DCCEEW, 2022). The Policy provides eight principles that are applied in determining the suitability of offsets, as described in Table 9-1.

*Table 9-1 Environmental Offsets Policy Offset Principles*

Principle Number	Principle
1	Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action
2	Be built around direct offsets but may include other compensatory measures
3	Be in proportion to the level of statutory protection that applies to the protected matter
4	Be of a size and scale proportionate to the residual impacts on the protected matter
5	Effectively account for and manage the risks of the offset not succeeding
6	Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets under the EPBC Act for the same action)
7	Be efficient, effective, timely, transparent, scientifically robust and reasonable
8	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

This section provides a brief overview of the offset partnership with GVDBT with further detail explained in the Proposed Offset Strategy (POS) provided in Appendix 11.

### 9.2 Residual Impacts

MLG has provided all avoidance and mitigation strategies to protect MNES from activities associated with the Proposed Action. The residual significant impact on Malleefowl is limited to:

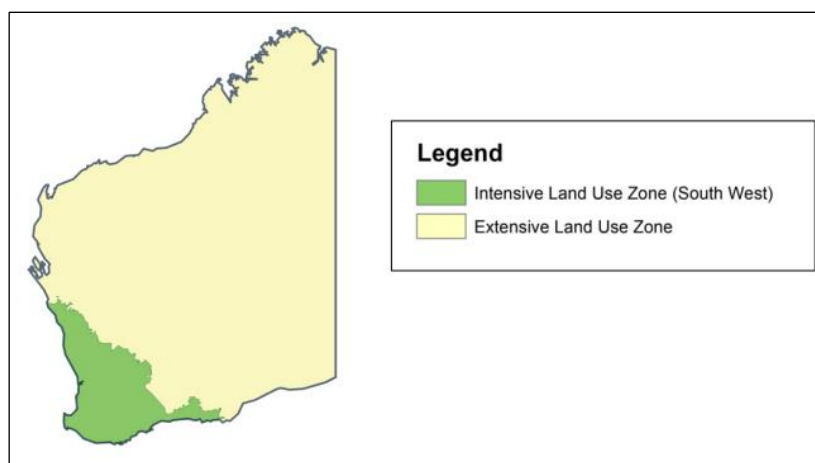
- Upper clearing limit of 25 ha of critical breeding habitat
- Upper clearing limit of 75 ha of foraging habitat.

### 9.3 Offset Proposal Summary

The Proposed Action is located within the 'rangelands', or 'Extensive Land Use Zone' (ELZ) of WA (Figure 9-1). Projects in the southwest of WA or 'Intensive Land Use Zone' (ILZ) typically utilise traditional offsets such as land acquisition and management as adequate freehold land is available with appropriate environmental values. Projects located in the ELZ generally are unable to utilise this method as land is almost exclusively Crown owned land overlain by pastoral and mining leases. MLG have therefore identified an alternative approach by identifying a partnership to deliver an

environmental offset with similar environmental values without the need to acquire unavailable freehold land.

Figure 9-1 Land Use Zones of WA



MLG is proposing to partner with the GVDBT for their offset strategy for Malleefowl impacts. The Nature Positive Plan for offsets outlines that a contribution of offsets to net positive outcome for MNES is applicable with conservation payments (DCCEEW, 2022).

The GVDBT represents a unique model for an environmental offset in the ELZ of WA. The main purpose of the GVDBT is to deliver conservation benefits to nationally listed threatened species (specifically the Malleefowl and Sandhill Dunnart), land management and enhance biodiversity in the region. The GVDBT conserves and increases knowledge of biodiversity in the Great Victoria Desert, the neighbouring bioregion to the Proposed Action.

The GVDBT was established to deliver state and federal environmental offset projects for the Tropicana Gold Mine (Tropicana) biodiversity offset strategy. AngloGold Ashanti established the GDVBT in 2013 to establish a strategic approach for on-ground research and conservation projects identified during the biodiversity offset strategy development. The projects are limited to MNES impacted by Tropicana being Malleefowl and Sandhill Dunnart.

## 9.4 EPBC Act Environmental Offsets Policy

Details regarding how the proposed offset aligns with the principles of the EPBC Act Environmental Policy is described within the Proposed Offset Strategy (Appendix 11).

### 9.4.1 Direct Offset

Direct offsets must account for at least 90% of the total offset. Offsets under the EPBC Act can occur through securing restoring and protecting land, threat abatement programs or captive breeding and release programs (DCCEEW, 2023) . Each of these options are addressed with regards to the Proposed Action.

- In order to quantify impacts in the ELZ, there is a need to consider a proxy value for what would normally be direct land purchase (DWER, 2014).

The value of the offset for the residual significant impact resulting from the Proposed Action should take into account:

- The Murchison region location.
- Presence of only one MNES being Malleefowl.

- The disturbance is limited to access tracks through the critical habitat only of which Malleefowl can easily traverse (no fragmentation of an important population).
- The area has no specialised environmental values such as riparian habitat, wetland habitat or TECs.
- The fauna habitats present are widespread, extensive and well represented regionally.
- There are limited cumulative impacts in the region.

#### 9.4.2 Indirect Offsets

Indirect offsets include other compensatory measures such as research and education and can only be used for a maximum of 10% of the total offset contribution.

Given the direct offsets in this region are financial, and will contribute directly to improved outcomes for Malleefowl, these were prioritised over indirect offsets.

#### 9.5 Significant Residual Habitat

The quantum of impact is based on the area and quality of habitat which will be impacted by the Proposal for each MNES with a significant residual impact.

The DCCEEW Offset Assessment Guide (DCCEEW, 2012) was used to assess the quantum of residual impact associated with the Proposal and quantify offset requirements. The Offsets Policy (DCCEEW, 2012) considers impacts to habitat in terms of spatial extent (ha) and relative quality of that habitat in terms of 'Quantum of Impact', a numerical value calculated from the Area of Impact (ha) x Habitat Quality Score.

Habitat Quality is on a scale out of 10 (Department of Sustainability Environment water population and communities, 2012) defined by:

- Condition (ability to meet ecological requirements).
- Context (regional importance); and
- Stocking rate (utilisation).

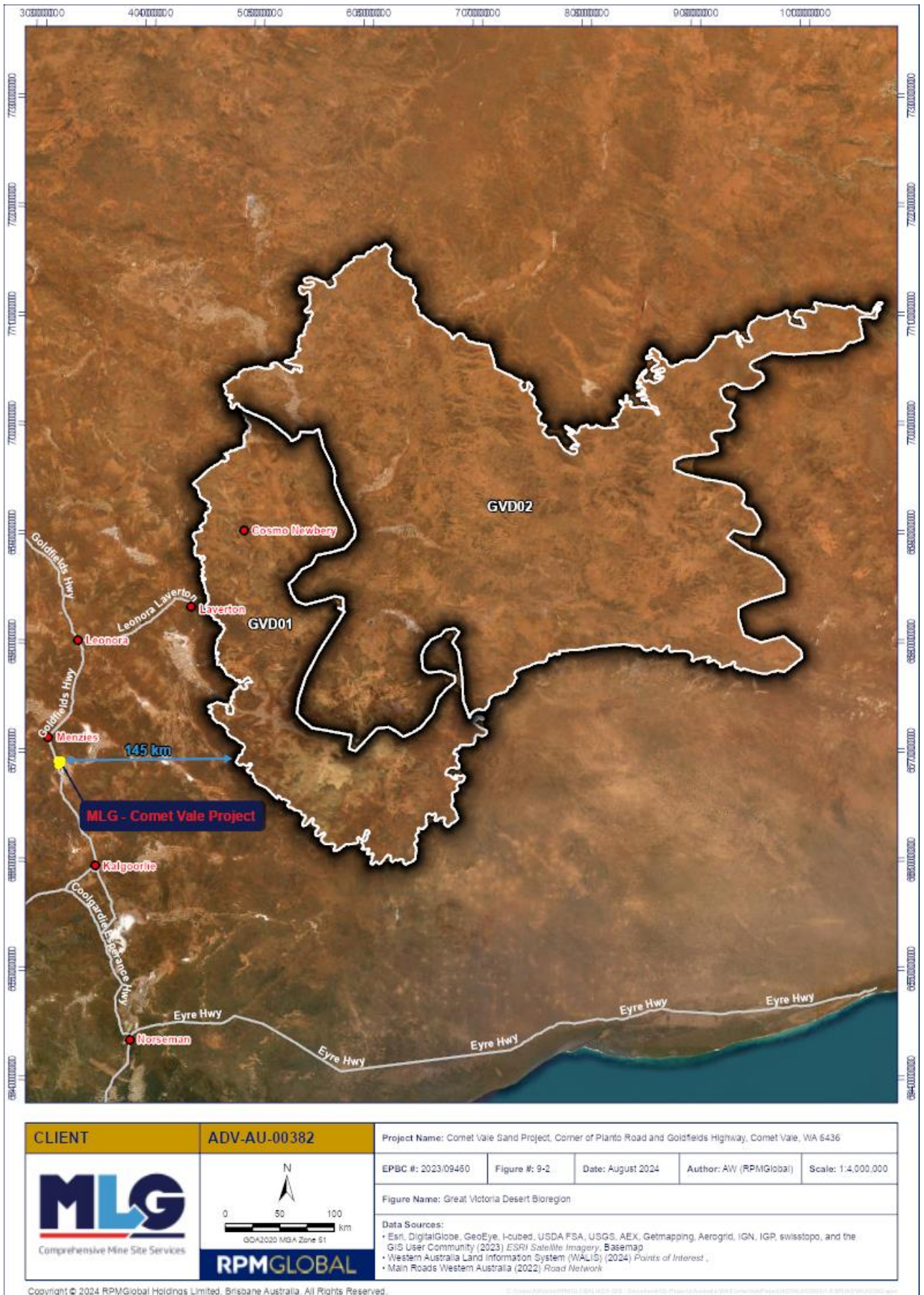
Higher habitat quality scores represent more ideal, critical, and utilised habitat than areas with a lower score.

#### 9.6 Location and Environmental Value

The Great Victoria Desert is located across Western Australia and South Australia, covering 422,465 km<sup>2</sup>. The bioregion comprises six separate subregions, with two located entirely within Western Australia and is the focus of the GVDDBT. These two include the Shield (GVD01) and Central (GVD02) and cover an area of 173,327 km<sup>2</sup>. The boundary of the bioregion is approximately 145 km east of the Proposed Action as shown in Figure 9-2.

The southern part of the Shield sub-region borders the Eastern Goldfields region, which is botanically an interzone between the South West and Eremanean Botanical Provinces. This zone exhibits both mesic and arid systems. Malleefowl have been recorded in both bioregions and it is expected that habitat continues between the two.

Figure 9-2 Great Victoria Desert Bioregion



### 9.7 Implementation of the Offsets Assessment Guide

Unless otherwise directed, the EPBC Act Offsets Assessment Guide (also known as the Offset Calculator), will not be used to assess the suitability of the proposed offset. Consultation with DCCEEW and the GVDBT on a suitable project site and description will be conducted throughout the life of mine for the Proposed Action to ensure adequacy and acceptability of the offset by DCCEEW.

Instead, MLG propose a rate, that includes CPI, is to be imposed on the residual significant impact of the Proposed Action to be provided to the GVDBT for an offset Project.

### 9.8 Management and Monitoring Strategies

MLG is committed to working with GVDBT to enhance the availability of critical breeding habitat for Malleefowl as a result of the offset for the Proposed Action. This may include efforts to establish feral-free conservation area and engaging Traditional Owners in conservation activities such as fire management. These programs aim to benefit the Malleefowl species by creating suitable environments for their survival and reproduction.

As part of the offset projects, MLG plans to incorporate successful initiatives currently led by the GVDBT in a new area managed under the Trust Deed by GVDBT. These initiatives include a Predator Control Program and participation in the Great Victoria Desert Indigenous Fire Project, known as Right Way Fire (GVDBT, 2024). These are discussed further in the Proposed Offset Strategy (Appendix 11).

### 9.9 Reporting

The effectiveness of management measures and results from monitoring programs will be reported to DCCEEW in the Annual Compliance Report.

## 10 Economic and Sustainable Development

### 10.1 Ecologically Sustainable Development

The proposed action has considered and meets the principles of Ecologically Sustainable Development (ESD), as defined in section 3A of the EPBC Act. Mineral sands mining is a temporary land use that maximizes the utilization of natural resources. By adhering to sustainable development principles, the mining area will be restored to a landform that aligns with the surrounding environment and its previous land use.

The principles and methods they have been addressed are outlined in Table 10-1.

Table 10-1 Ecologically Sustainable Development Principles

ESD Principle	Address
Decision making processes should effectively integrate both long term and short term economic, environmental, social, and equitable considerations.	<ul style="list-style-type: none"> <li>Environmental considerations have been adequately addressed in this Proposal.</li> <li>Stakeholders will continue to be consulted, including traditional owners, and no significant issues have been raised that would be at variance with this proposal.</li> </ul>
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	<ul style="list-style-type: none"> <li>There is no threat of serious or irreversible damage from the proposal; all clearing will be rehabilitated, and all residual impacts offset.</li> </ul>
The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	<ul style="list-style-type: none"> <li>The health, diversity and productivity of the environment will be maintained, with all clearing rehabilitated, and all residual impacts offset.</li> </ul>
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	<ul style="list-style-type: none"> <li>Significant mitigation measures are in place to conserve biological diversity and ecological integrity.</li> <li>All clearing will be rehabilitated, and all residual impacts offset.</li> </ul>
Improved valuation, pricing and incentive mechanisms should be promoted.	<ul style="list-style-type: none"> <li>The costs of offsetting will be passed on in the price of the sand and gravel produced to reflect the true environmental cost of the product.</li> </ul>

### 10.2 Economic and Social Impacts

MLG is an Australian listed company that has been operating for over 21 years with operations in Western Australia and the Northern Territory. The proponent partners with many of Australia's largest resource and mining companies in Western Australia and the Northern Territory by supplying bulk materials for their mining and construction operations.

- Existing customers currently rely on sand that is mined from distant locations and transported over considerable distances. By sourcing sand locally, MLG can significantly reduce transportation costs and contribute to the local economy. Additionally, this approach has the potential to enhance productivity and contribute to real wage growth. In addition, the sustainable

development approach to the Project enables economic, environmental, and social benefits for the Project Area and the communities of Western Australia and the Northern Territory in the following ways:

- Providing direct and indirect local and regional employment and training opportunities during construction, operation and closure.
- Supply chain impacts, supporting local businesses:
  - Construction supplies.
  - Accommodation and food.
  - Providers for waste removal and disposal.
  - Fuel suppliers.
- Producing sand that is planned to be used in a variety of projects.
- Regional and national economic growth by contributing funds into the economy.
- The Project will enhance the social system of Western Australia, in the following ways:
  - Tax contributions.
  - Employment, particularly in regional areas.



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# Appendices

## Appendix 1 Information Requested by DCCEEW

Table A

Requirement	Additional Information Requested by DCCEEW	Section
<b>1. Description of the Action</b>		
1.1	1.1.1 A description of the action should include the location of all works to be undertaken (including plans and maps) and elements of the action that may have impacts on EBPC Act listed threatened species. It must also include details on how the works are to be undertaken (including stages of development and their timing) and design parameters for any structural elements of the action that may have impacts on EBPC Act listed threatened species.	Section 2 (page 5)
	1.1.2 The following information is required in relation to the details of the action: a) A flow diagram of sand/gravel extraction through to stockpiling, and the associated concentrations of materials/chemicals at each stage.	Section 2.2 (page 8) Figure 2-3 (page 10)
	b) The activities associated with each phase of the proposed action.	Section 2.2 (page 8)
	c) The location, boundaries and size (in hectares) of the proposed action area, any discrete disturbance areas, and any adjoining areas which may be directly or indirectly impacted by the proposed action. This information should be supported by mapping which meets the Guide for providing maps and boundary data for EPBC Act projects, referenced at item 9d.	Section 2.1 (page 5) Figure 2-1 (page 6)
	d) The anticipated timing and duration (including start and completion dates) of each component of the proposed action, and associated impacts.	Section 2.2.8 (page 17)
e) Any feasible alternatives to the action to the extent reasonably practicable, including, the alternative of taking no action, a comparative description of the impacts of each alternative on Matters of National Environmental Significance and sufficient detail to make clear why any alternative is preferred to another. Short, medium and long-term advantages and disadvantages of the options should be discussed.	Section 6.8 (page 55)	
<b>2. Impacts</b>		
2.1	<b>Assessment of contaminants impact</b> 2.1.1 The following information is required in relation to the potential impacts of contaminants to the environment (i.e. water and soil quality) and MNES as a result of the proposed action: a) Identify the potential impacts from contaminants on water and soil quality and MNES at each stage.	Section 7.2 (page 56)
	b) Identify possible exposure pathways or ecological receptors for contaminants.	Section 7.3 (page 57) Section 7.4 (page 57)
	c) Identify the potential environmental receptors that can be impacted by chemicals at each stage.	Section 7.3 (page 57)
	d) Quantify the potential risks of these chemicals to the receptors.	Section 7.4 (page 57) Section 8 (page 61)
<b>3. Avoidance and Mitigation</b>		
3.1	Mitigation Hierarchy	Section 7.5 (page 58)

Requirement	Additional Information Requested by DCCEEW	Section
	3.1.1 The following information is required in relation to appropriate avoidance and mitigation measures which needs to be undertaken to reduce the potential impacts of contaminants to the environment and MNES: a) Propose containment techniques, to ensure potential contaminant infiltration and runoff is effectively prevented, thereby avoiding impacts on water and soil quality and MNES.	
	b) Propose management strategies for managing stockpiled material during typical and extreme weather events and emergencies.	Section 8 (page 61)
	c) Propose the management strategy to prevent chemical contamination. Note that off-site process may have the potential for leaks, spills, and other losses of containment, causing contamination.	Section 7.5 (page 58)
	d) Develop appropriate management measures to mitigate the potential risks arising from each exposure pathway.	Section 8 (page 61) Table 8-4 (page 62)
<b>4. Baseline Data and Regional Context</b>		
<b>4.1 Malleefowl (leipoa ocellata) - vulnerable</b>	<b>Baseline data</b> The Department notes that the proposed action proposes to clear up to 93 ha of foraging and potential breeding habitat for Malleefowl (Leipoa ocellata) – Vulnerable. The following information is required for the Department to further assess these impacts. <u>Foraging and breeding</u> 4.1.1 The Department will require the following information to be provided regarding foraging and breeding habitat: a) Include the results of an updated targeted Malleefowl survey and impact assessment for the Development Envelope, including the areas which have not been surveyed (infrastructure routes) along with the areas surveyed in 2021 and surrounding areas. The survey and assessment must: I. Be conducted within the Malleefowl breeding season, as defined in the National Malleefowl Monitoring Manual referenced at item 9a (October to December).	Section 7 (Page 36)
	II. Be conducted in accordance with the procedures outlined in the National Malleefowl Monitoring Manual referenced at item 9a, including but not limited to transect spacing of no more than 20 metres depending on the density of the landscape being searched	Section 7 (Page 36) Justification for ground truthing LiDAR results is provided within Section 6.5.3 (page 37)
	III. Include a photo of all identified mounds, and historical photos of revisited mounds within the disturbance footprint as well as infrastructure routes.	Appendix 9
	IV. Detail any evidence of use by Malleefowl, including mound condition and status in accordance with the descriptors outlined in National Malleefowl Monitoring Manual referenced at item 9a.	Section 6.6.2 (page 43)
	V. Provide an estimate of the size of the Malleefowl population likely to use the site and surrounds within the disturbance footprint as well as infrastructure routes.	Section 6.6.3 (page 46)
	b) Include evidence and mapping that demonstrates the location of the 93ha of 'suitable	Section 6.6.1 (page 41) Figure 6-2 (page 42)

Requirement	Additional Information Requested by DCCEEW	Section
	habitat' that is located within the Development Envelope. This should differentiate between suitable habitat (such as that used for forage or cover) and critical habitat (such as that used for breeding).	
	c) Provide information on the number of trees which will be impacted by the proposed action, significant tree data including trees' diameter at breast height (DBH).	Section 6.6.4 (page 46)
	Given inconsistency across the referral documents (Attachment 5, Table 5 and Attachment 6, Table 3), provide clarification on the total area of each vegetation (ha) within the survey area including Sand Dune system which will be cleared as a result of the action.	Section 6.6.1 (page 41)
	<b>Regional context</b> 4.1.2 The following additional information is required in relation to the regional context: a) Include evidence and mapping to show how the extent and location of habitat that is available outside of the Development Envelope. The purpose of this is to show where displaced birds may reside and quantify potential contraction in individual bird ranges.	Figure 6-5 (page 54)
	b) Details of the methodology used to determine and assess the suitability of habitat present in and around the site.	Section 6.7.2 (page 4949)
<b>5. Impacts</b>		
<b>5.1 Malleefowl (Leipoa ocellata) - vulnerable</b>	<b>Disturbance Footprint</b> 5.1.1 The following information is required in relation to impacts to Malleefowl (Leipoa ocellata) – Vulnerable: a) Provide a description of all potential impacts (direct, indirect, consequential and cumulative) on Malleefowl in the Development Envelope as a result of the proposal including but not limited to the following: I. Fragmentation of habitat and impacts on habitat use due to this fragmentation. The description must include details of the distances between the proposal site and alternative suitable breeding habitat including access to these external habitat areas.	Section 6.7.2 (page 4949)
	II. The total area (in hectares) of habitat that will be impacted, including the number of Malleefowl breeding mounds that are proposed to be removed, and the number that will be impacted.	Section 6.7.1 (page 47)
	III. Increased risk of vehicle strike.	Section 6.7.1 (page 47)
	IV. An estimate of the number of individual adult birds that will be impacted by the proposed activity, and discussion of the likely outcomes for these birds following displacement from the proposed impact site.	Section 6.6.3 (page 46) Section 6.7.1 (page 47) Table 6-5 (page 47)
	V. Include a risk assessment of the potential impacts of the proposed action, including whether the nature and/or scale of the potential impacts are unknown, unpredictable or irreversible, and what confidence is placed on the predictions of relevant impacts.	Section 8 (page 61) Table 8-4 (page 62)
	VI. Include details of any relevant policy guidelines, studies, surveys or consultations with subject-matter experts which were not included in the original referral.	Section 6.2 (page 35) Section 7 (page 36)



Requirement	Additional Information Requested by DCCEEW	Section
<b>6. Avoidance an Mitigation</b>		
<b>6.1 Malleefowl (leipoa ocellata) – vulnerable</b>	<p>Mitigation Hierarchy</p> <p>6.1.1 The following information is required in relation to Malleefowl (<i>Leipoa ocellata</i>) – Vulnerable:</p> <p>a) Provide a Construction Environmental Management Plan (CEMP) specific to the proposed action area that details how potential environmental impacts associated with construction activities will be managed. The CEMP provided should be developed consistent with the Department’s Environmental Management Plan Guidelines referenced at item 9b. The CEMP should include, but not be limited to:</p> <p>I. Procedures to protect fauna during construction, through ensuring that a qualified fauna spotter catcher is present during all clearing and is given sufficient authority to guide clearance activity whilst mitigation measures are undertaken. This should ensure that Malleefowl have safely moved out of the Development Envelope identified for clearing, of their own volition, before the habitat is cleared.</p>	Appendix 10
	<p>II. Management actions to avoid and reduce risks to Malleefowl that could be present on site at the time of clearing, such as clearing outside of breeding season.</p>	Appendix 10
	<p>III. Measures to reduce risk of Malleefowl collision with construction machinery or other vehicles. Suitable measures may include the imposition of suitable vehicle speed limits for all vehicles travelling within any part of the Development Envelope.</p>	Appendix 10
	<p>IV. Details of how clearing activities will be conducted to allow Malleefowl to move into adjacent native vegetation ahead of clearing activity.</p>	Appendix 10
	<p>b) Provide information (including engineering, technical and operational considerations) that demonstrates why the proposed action (mining) must be conducted in the proposed location, and not in an alternative location which does not impact MNES. This information should include discussion of any alternative designs that were considered but ruled out prior to acceptance of the current proposed design.</p>	Appendix 10 Section 6.8 (page 55)
<b>7. Offsets</b>		
<b>7.1</b>	<p>Offsets</p> <p>7.1.1 An offset is required to compensate for all predicted or potential residual significant impacts to EPBC Act listed threatened species and communities. This residual significant impact includes the total area of habitat lost and/or degraded for each EPBC species. Offsets must be built around direct offsets, which should form a minimum of 90% of the total offset requirement. Other compensatory measures may satisfy up to 10% of the offset requirement. Offsets must meet the principles of the EPBC Act Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (2012) (see Table C item 2.4i).</p> <p>a) Provide an offset proposal that compensates for the residual significant impacts of proposed action. Note that where more than one offset is proposed, each offset requires an individual Offset Management Plan. Offset Management Plans should be consistent with the Environmental Management Plan Guidelines (2014) (see</p>	Section 9 (page 66)

Requirement	Additional Information Requested by DCCEEW	Section
	Table C item 2.4h) and the Department's Draft Offset Management Plan Template (Attachment C).	
	<p>b) Suitable offsets for Malleefowl foraging and breeding habitats must take into account considerations such as the following:</p> <p>I. A description of the proposed offset site(s) including location, size, current condition and relevant ecological/species habitat features, landscape context and cadastre boundaries of the offset site(s), supported by mapping which meets the guide for providing maps and boundary data for EPBC Act projects, referenced at item 9d.</p>	Appendix 11
	<p>II. Baseline survey information to determine the extent, type and quality of Malleefowl habitat at the offset site(s) that was conducted in accordance with relevant guidelines.</p>	Appendix 11
	<p>III. An outline of the management and monitoring strategies and actions proposed to ensure the offset site attains and/or maintains the same or better habitat quality as the quality of the impact site.</p>	Appendix 11
	<p>IV. Current and likely future tenure of the proposed offset site and details of how the offset site will be legally secured for the full duration of the impact.</p>	Appendix 11
	<p>V. An assessment of risk that the offset proposal will not succeed, including risks associated with climate change. The risk assessment must specify the mitigation, rectification and management measures needed to ensure that the offset will succeed, as well as the party responsible for implementing such measures.</p>	Appendix 11
	<p>VI. Justification of how the offset proposal meets the requirements of the EPBC Act Offsets Assessment Policy, referenced at item 9c.</p>	Appendix 11
	<p>c) Details and justification demonstrating how the proposed direct offset will maintain or improve the viability of the protected matter(s) consistent with the EPBC Environmental Offsets Policy referenced at item 9c This includes:</p> <p>I. A conservative estimate of the offset completion criteria (i.e. environmental outcomes) to be achieved, and reasoning for these in reference to the National Recovery Plan for Malleefowl at item 9e and relevant threat abatement plans (items 9 f-i).</p>	Appendix 11
	<p>II. Milestones to demonstrate adequate progress towards achieving the offset completion criteria.</p>	Appendix 11
	<p>d) In justifying your proposal, you must have due regard to the Department's offset guidance and the Government's Nature Positive Plan.</p>	Appendix 11

**Table B**

Requirement	Information from the referral and associated documents	Section
<b>1. Description of the action</b>		
1.1	A description of all components of the action, as described in the referral documentation.	Section 2 (page 5)
<b>2. Description of the environment</b>		

Requirement	Information from the referral and associated documents	Section
2.1	A description of all environments, as it relates to the proposed action, as described in the referral documentation.	Section 5 (page 21)
<b>3. Relevant matters of National environmental significance</b>		
3.1	Details of the relevant MNES, as described in the referral and including: a) Malleefowl ( <i>Leipoa ocellata</i> )	Section 6 (page 35)
<b>4. Baseline information</b>		
4.1	Description of the baseline data contained in the referral documentation and including: a) Historic land use b) Species occurrence c) Site and regional context maps d) Hydrology and proximity to Ramsar wetlands e) Methodology, results and discussion of detailed flora and vegetation assessment f) Methodology, results and discussion of basic fauna and targeted Malleefowl assessment	Section 5 (page 21)
		Section 6 (page 35)
<b>5. Impacts</b>		
5.1	Description of the impacts contained in the referral documentation, including: a) Habitat loss b) Loss of foraging and breeding habitat for Malleefowl	Section 6.7 (page 47)
		Section 8 (page 61)

**Table C**

Requirement	Information requested	Section
<b>1. Considerations for decision making</b>		
1.1 Ecologically Sustainable Development	1.1.1 A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act. The following principles are principles of ecologically sustainable development: <ul style="list-style-type: none"> <li>Decision making processes should effectively integrate both long term and short term economic, environmental, social, and equitable considerations.</li> <li>If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</li> <li>The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.</li> <li>The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.</li> <li>Improved valuation, pricing and incentive mechanisms should be promoted.</li> </ul>	Section 10.1 (page 71)
1.2 Economic and social matters	1.2.1 An analysis of the economic and social impacts of the action, both positive and negative.	Section 10.2 (page 71)
	1.2.2 Details of any public consultation activities undertaken and their outcomes.	Section 3 (page 18) Appendix 3
	1.2.3 Details of any consultation with Indigenous stakeholders. Indigenous engagement	Section 3 (page 18) Appendix 3

Requirement	Information requested	Section
	1.2.4 Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts.	Section 4 (page 19)
	1.2.5 Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes.	Section 3 (page 18) Appendix 3
	1.2.6 Best practice consultation, in accordance with the Interim Engaging with First Nations People and Communities on Assessments and Approvals under Environment Protection and Biodiversity Conservation Act 1999 (interim guidance) (2023) includes: <ul style="list-style-type: none"> <li>• Identifying and acknowledging all relevant affected Indigenous peoples and communities.</li> <li>• Committing to early engagement.</li> <li>• Building trust through early and ongoing communication for the duration of the project, including approvals, implementation, and future management.</li> <li>• Setting appropriate timeframes for consultation; and - Demonstrating cultural awareness.</li> </ul>	
	1.2.7 Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action with regards to Indigenous peoples and communities.	Section 4 (page 19)
	1.2.8 Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies.	Section 10.2 (page 71)
	1.2.9 Employment opportunities expected to be generated by the project (including construction and operational phases).	Section 10.2 (page 71)
1.3 Environmental record of the person proposing to take the action	1.3.1 Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: <ol style="list-style-type: none"> <li>a) The person proposing to take the action.</li> <li>b) For an action for which a person has applied for a permit, the person making the application.</li> <li>c) If the person is a body corporate—the history of its executive officers in relation to environmental matters.</li> <li>d) If the person is a body corporate that is a subsidiary of another body or company (the parent body)—the history in relation to environmental matters of the parent body and its executive officers.</li> </ol>	
1.4 International obligations	1.4.1 Justify, with supporting evidence, how the proposed action will not be inconsistent with Australia’s obligations under: <ol style="list-style-type: none"> <li>a) The Bonn Convention.</li> <li>b) China-Australia Migratory Bird Agreement.</li> <li>c) Japan-Australia Migratory Bird Agreement.</li> <li>d) International Agreement – Republic of Korea-Australia Migratory Bird Agreement; and</li> <li>e) Any international agreement approved under subsection 209(4) of the EPBC Act.</li> </ol>	Section 4 (page 19)
1.5 Other approvals and conditions	1.5.1 The preliminary documentation must include information on any other requirements for approval or conditions that apply, or that you reasonably believe are likely to apply, to the proposed action. This must include:	Section 4 (page 19)

Requirement	Information requested	Section
	a) A description of any approval obtained or required to be obtained from a State or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply (or are reasonably expected to apply) to the action.	
	b) A description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.	
<b>2. Content, style and formatting requirements</b>		
2.1 Style	2.1.1 Be written so that any conclusions reached can be independently assessed. Include all key claims, findings, proposals, and undertakings in the main document.	N/A
2.2 Format	2.2.1 Be in a suitable format to be published in hardcopy (A4 or A3 size, with maps and diagrams in A4 or A3 size and in colour) and published in electronic format (e.g., MSWord or PDF) on the internet.	N/A
2.3 Content	2.3.1 Include a cross-reference table indicating where the information fulfilling the requirements in Table 1, 2 and 3 is included in the preliminary documentation.	N/A
2.4 Relevant standards, policies and other guidance material	2.4.1 Refer to all relevant standards, policies and other guidance material published by the Department. Any instances where published guidance is not followed must be justified. Where no Commonwealth standards exist, state government and industrystandards may be useful. Relevant standards, policies and other guidance material include, but are not limited to: a. National Malleefowl Monitoring Manual: 2020_1 Edition (Revised June 2020). Available from: <a href="https://www.nationalmalleefowl.com.au/wpcontent/uploads/2020/08/Monitoring-Manual-v2020_1.pdf">https://www.nationalmalleefowl.com.au/wpcontent/uploads/2020/08/Monitoring-Manual-v2020_1.pdf</a> . Department of the Environment (2014). Environmental Management Plan Guidelines. Canberra, ACT: Commonwealth of Australia. Available from: <a href="https://www.environment.gov.au/system/files/resources/21b0925f-ea74-4b9e-942e-a097391a77fd/files/environmental-management-planguidelines.pdf">https://www.environment.gov.au/system/files/resources/21b0925f-ea74-4b9e-942e-a097391a77fd/files/environmental-management-planguidelines.pdf</a> . Department of Sustainability, Environment, Water, Population and Communities (2012). Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. Canberra, ACT: Commonwealth of Australia. Available from: <a href="https://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offsets-policy_2.pdf">https://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offsets-policy_2.pdf</a> . Department of Agriculture, Water and the Environment (2021). Guide for providing maps and boundary data for EPBC Act projects. Canberra, ACT: Commonwealth of Australia. Available from: <a href="https://www.environment.gov.au/system/files/resources/5bb0509e-c4b5-4f7a-910b-5b04d82db491/files/epbca-maps-data-guidelines.pdf">https://www.environment.gov.au/system/files/resources/5bb0509e-c4b5-4f7a-910b-5b04d82db491/files/epbca-maps-data-guidelines.pdf</a> e. The National Recovery Plan for Malleefowl <i>Leipoa ocellata</i> (2007). Department of Environment and Heritage, South Australia. <a href="https://www.awe.gov.au/environment/biodiversity/threatened/recoveryplans/malleefowl-leipoa-ocellata-2007">https://www.awe.gov.au/environment/biodiversity/threatened/recoveryplans/malleefowl-leipoa-ocellata-2007</a> . Department of the Environment (2015). Threat abatement plan for predation by feral cats. Canberra, ACT: Commonwealth of Australia. Available from: <a href="http://www.environment.gov.au/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats">http://www.environment.gov.au/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats</a> . Department of the Environment and Energy (2016). Threat abatement plan for competition and land degradation by rabbits. Canberra, ACT: Commonwealth of Australia. Available from: <a href="http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016">http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbits-2016</a> h. Department of the Environment, Water, Heritage and the Arts (2008). Threat abatement plan for predation by the European red fox. Canberra, ACT: Commonwealth of Australia. Available from: <a href="http://www.environment.gov.au/biodiversity/threatened/publications/tap/predation-european-red-foxi">http://www.environment.gov.au/biodiversity/threatened/publications/tap/predation-european-red-foxi</a> . Department of the Environment, Water, Heritage and the Arts (2008). Threat abatement plan for competition and land degradation by unmanaged goats. Canberra, ACT: Commonwealth of Australia.	N/A

Requirement	Information requested	Section
	<p>Available from: <a href="http://www.environment.gov.au/biodiversity/threatened/publications/tap/c-competition-and-land-degradation-unmanaged-goatsj">http://www.environment.gov.au/biodiversity/threatened/publications/tap/c-competition-and-land-degradation-unmanaged-goatsj</a>. Report to National Environmental Science Programme, Department of the Environment and Energy (2017). Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act. Available from: <a href="https://www.nespthreatenedspecies.edu.au/media/zpyajjq1/5-1-guidance-for-deriving-risk-of-loss-report_2017_low-res.pdf">https://www.nespthreatenedspecies.edu.au/media/zpyajjq1/5-1-guidance-for-deriving-risk-of-loss-report_2017_low-res.pdf</a>. Department of Climate Change, Energy, the Environment and Water (2022). Nature Positive Plan. Available from: <a href="https://www.dcceew.gov.au/sites/default/files/documents/nature-positiveplan.pdf">https://www.dcceew.gov.au/sites/default/files/documents/nature-positiveplan.pdf</a></p>	
2.5 Maps, diagrams and images	<p>a. Maps, plans, diagrams, technical information (e.g. specifications, schematics) and images provided must be clearly annotated, in colour and of high resolution.</p> <p>b. All maps submitted as part of the response must be consistent with the Department's Guide for providing maps and boundary data for EPBC Act projects (2021) (see Table C item 2.4d).</p>	N/A
2.6 Referencing standards	2.6.1 Reference all sources using the Harvard standard of referencing. Ensure that other supporting documents (e.g. academic studies, regulatory standards) are publicly accessible, with electronic links provided where possible.	N/A
2.7 Evidence based conclusions	<p>2.7.1 The information provided must be supported by:</p> <p>a. Evidence-based conclusions based on the best available peer-reviewed scientific literature with supporting references cited or expert opinion provided and/or the views of suitably qualified experts.</p> <p>b. Scientifically robust methodologies that are appropriate for purpose, and sufficient description of the methodology used and justification of why the methodology was selected.</p> <p>c. Include detailed technical information, studies or investigations necessary to support the information in the stand-alone document as appendices.</p>	N/A
2.8 Inclusion of sensitive information	2.8.1 The response will form part of the preliminary documentation that must be published for public comment. Therefore, the contact details of Departmental officers must not be included in the response. The response should not contain commercial in confidence markings. If the response contains sensitive information, please discuss with the Department.	N/A
2.9 Ecological data	2.9.1 The preliminary documentation must include an appendix of occurrence records (both sightings and evidence of presence) for all listed threatened and migratory species identified during field surveys for the proposed action. This data may be used by the Department to update the relevant species distribution models that underpin the publicly available Protected Matters Search Tool (PMST).	N/A
	37. The species occurrence records must be provided in accordance with the Department's Guidelines for biological survey and mapped data (2018) using the species observation data template provided with this request for additional information. Sensitive ecological data must be identified and treated in accordance with the Department's Sensitive Ecological Data – Access and Management Policy V1.0 (2016) or subsequent revision.	N/A

# Appendix 2 Conceptual Mine Closure Plan

(Provided Separately)

## Appendix 3 Stakeholder Engagement Register



# Appendix 4 Flora and Vegetation Survey of the Comet Vale Project (GLS, 2022a)

(Provided Separately)

# Appendix 5 Detailed Flora and Vegetation Survey. Comet Vale Sand Project (RPS, 2024)

(Provided Separately)

# Appendix 6 Basic Vertebrate Fauna Survey and Targeted Malleefowl Survey 2021 & 2023 (Western Wildlife, 2024)

(Provided Separately)

# Appendix 7 Comet Vale Malleefowl Mound Analysis (Anditi, 2022b)

(Provided Separately)

# Appendix 8 Comet Vale 2 Malleefowl Mound Analysis (Anditi, 2022a)

(Provided Separately)

# Appendix 9 Targeted Malleefowl Survey 2023 (Western Wildlife, 2024)

(Provided Separately)

# Appendix 10 Environmental Management Plan

(Provided Separately)

# Appendix 11 Proposed Offset Strategy

(Provided Separately)