West Musgrave Copper and Nickel Project

September 2021

Flora and Vegetation Management Plan

VERSION CONTROL

Revision	Version	Authorisation	Position	Signature	Date
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SUMMARY

A summary of the key Environmental Management Plan (EMP) information is presented in Table 1.

Table 1: Summary of Key EMP Information

Project Information	Description
Proposal Name	West Musgrave Copper and Nickel Project
Proponent Name	OZ Minerals
Ministerial Statement No/s and Condition/Clauses	The Proposal is currently being assessed by the Government of Western Australia's Environmental Protection Authority (EPA). The EPA has proposed that a Flora and Vegetation Management Plan (FVMP) will be a condition of approval of the proposed project. A Ministerial Statement and associated conditions are yet to be issued.
Purpose of the EMP	To provide a management framework for flora and vegetation, specifically to avoid, where possible, otherwise minimise direct and indirect impacts to priority and other significant flora resulting from the implementation of the West Musgrave Project.
Key Environmental Factor	Flora and Vegetation
Objective	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained*, where ecological integrity is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements.
Key Provisions of the EMP	See Section 2
Proposed Construction Timing	Commencing 2022, progressing to 2024
EMP Required Pre-construction?	Yes, prior to issuing of Ministerial Statement
Proposed Operations Timing	26 years from date of commissioning

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1 CONTEXT, SCOPE AND RATIONALE

This Flora and Vegetation Management Plan (FVMP) has been prepared by OZ Minerals to support the assessment, approval and implementation of the Proposal under Part IV of the *Environmental Protection Act, 1986* (WA) (EP Act). Flora and vegetation are protected under Commonwealth and State legislation, primarily governed by four Acts:

- *Environment Protection and Biodiversity Conservation Act, 1999* (Cth)
- *Environmental Protection Act, 1986* (WA)
- *Biodiversity Conservation Act, 2016* (WA)
- *Biosecurity and Agriculture Management Act, 2007* (WA).

In addition to Commonwealth and State legislation, the following policy and guidance statements were considered in the development of this FVMP:

- EPA Statement of Environmental Principles, Factors and Objectives (EPA, 2020b)
- EPA Environmental Factor Guideline – Flora and Vegetation (EPA, 2016a)
- EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016b).

This FVMP addresses the Notice Requiring Information for Assessment, received from the EPA on 14 April 2021 (the Notice). The Notice requires OZ Minerals to:

> *Provide a Flora and Vegetation Management Plan detailing application of the mitigation hierarchy including measures to avoid, where possible, otherwise minimise direct and indirect impacts to priority flora and vegetation species. The Plan should incorporate the February 2021 targeted flora and vegetation survey results for the Northern Borefield. The Plan should be prepared in accordance with the Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA, 2020a).*

1.1 Proposal

1.1.1 Project Overview

The West Musgrave Copper and Nickel Project (WMP) is located in the West Musgrave Ranges of Western Australia. The WMP is located approximately 1,300 km north-east of Perth near to the border of South Australia and the Northern Territory. The WMP is within the Ngaanyatjarra Native Title determination, and Class A Reserve No. 17614 (for the Use and Benefit of Aboriginal Inhabitants). The nearest towns include the Indigenous Communities of Jameson (Mantamaru) 26 km north, Blackstone (Papulankutja) 50 km east, and Warburton (Milyirrtjarra) 110 km west of the project (Figure 1).

The project, with a current expected life of approximately 26 years, will consist of:

- Mining of copper and nickel ore from two open cut mine pits using conventional blast, load and haul methods
- Placement of mine waste into permanent waste rock dumps (WRDs) and dedicated tailings storage facility (TSF) adjacent to mine pit voids
- Milling and processing of ore using floatation to produce two separate copper and nickel concentrates
- On-site power supply using a combination of renewable power infrastructure (photovoltaic solar panels, wind turbines and battery storage) supported by backup thermal power generation
- Development of a process/potable water supply borefield that may include a combination of overland and/or underground pipelines for use during construction and operations
- Miscellaneous infrastructure, including stormwater management infrastructure (bunds and drains), internal roads and service tracks, a dedicated site access road, accommodation village (approximately 450 beds during operations and 1,200 during construction), airstrip, wastewater treatment, landfill and other supporting infrastructure including offices, warehouses and workshops.
- Concentrate will be transported via existing roads and rail networks.

A summary of the key project characteristics is presented in Table 2.

Table 2: Key Project Characteristics

Elements	Location	Proposed Extent Authorised
Physical Element		
Mine and associated infrastructure	Figure 2	Clearing of up to 3,830 ha of native vegetation within a Development Envelope of 20,852 ha
Operational Element		
Mining voids	Figure 2	Below water table mining Nebo pit void to be backfilled above water table post-closure Babel pit void to be a permanent and episodic pit lake post-closure
Mining waste (waste rock)	Figure 2	Placement of waste rock into permanent WRDs
Ore processing waste (tailings)	Figure 2	Disposal tailings into a TSF and/or Nebo pit void
Power supply	Figure 2	Up to 60 MW (instantaneous load requirement) of fossil fuel electricity generation Up to 100 MW of photovoltaic solar electricity generation Up to 100 MW of wind electricity generation
Water supply	Figure 2	Abstraction of up to 7.5 GL/a of groundwater from the Borefield and through mine pit dewatering

Figure 1: Site Location

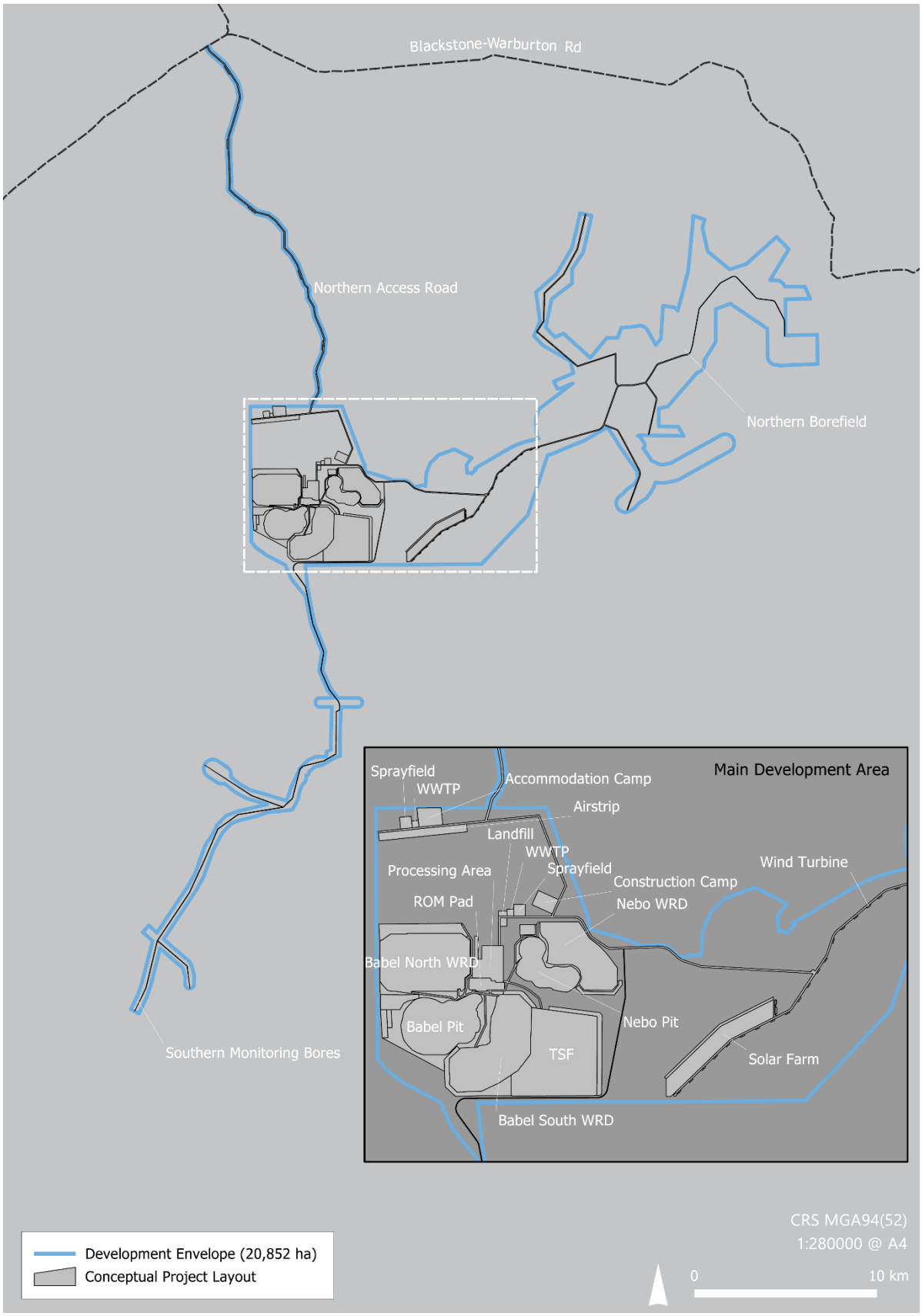


Figure 2: Location of Key Physical and Operational Elements

1.2 Key Environmental Factor

This FVMP specifically relates to the Land (Flora and Vegetation) factor guidelines. The EPA's Statement of Environmental Principles, Factors and Objectives (EPA, 2020b) lists the following as their objective for flora and vegetation:

> *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*

The EPA Section 38 Referral (OZ Minerals, 2021) concluded that "*the Proposal was assessed (by OZ Minerals) as having no significant or irreversible impact on flora and vegetation-related environmental values and the EPA Objective for flora and vegetation 'To protect flora and vegetation so that biological diversity and ecological integrity are maintained' would be met should the Proposal be implemented*". This conclusion was based on:

- Significant survey effort having been undertaken over a 16-year period both inside and outside of the Development Envelope, over an area of 46,263 ha, by technical subject matter experts with a long history working at West Musgrave and within the bioregion. This survey effort contributed to a comprehensive characterisation of the botanical environment of the project area, and of the potentially sensitive flora and vegetation related environmental values.
- Vegetation associations, including terrestrial groundwater dependent ecosystems (GDEs), are considered to be widespread and well represented in the region (OZ Minerals, 2021; Appendix B1). No individual vegetation association identified would experience greater than 20.4% vegetation disturbance of the areas mapped during project flora and vegetation surveys.
- No TECs, or PECs were identified within the Development Envelope or a 100 km radius.
- No Threatened flora as listed under the *Environment Protection and Biodiversity Conservation Act, 1999* (Cth) or *Biodiversity Conservation Act, 2016* (WA) were recorded.
- Eight Department of Biodiversity, Conservation and Attractions (DBCA) priority taxa were recorded in the Development Envelope, of which four were recorded in the Main Development Area (consisting of one P1 and seven P3 species).
- Potential loss of priority flora is considered to present a low risk to the conservation status of these species as the species are known to occur outside the Development Envelope.
- Of the four identified species of taxonomic significance only one occurs within the disturbance footprint with a total take of 17.3% of the total populations recorded in the survey area, constituting of a relatively insignificant portion of the population recorded.
- Of the 17 range extensions identified within the Development Envelope, less than 12.8% of any given species recorded in the survey area fall within the disturbance footprint, constituting a relatively insignificant portion of the population recorded during surveys.

During the assessment of the EPA Section 38 Referral, the EPA noted that there remained uncertainty relating to the taxonomy of a potential novel species; *Eragrostis* sp. (G & S Cockerton WB37426), or whether this species was the priority 3 species *Eragrostis* sp. *Erect spikelets* (P.K. Latz 2122). Should this species have represented a new or novel species the proposed impacts of the Proposal could have been considered significant. Since the EPA Section 38 Referral (OZ Minerals, 2020), additional work has been undertaken to resolve this question (see Section 1.2.2 and OZ Minerals, 2021). Based on this new understanding the scope of this FVMP is therefore focussed primarily on the management of priority species, in particular on those specific impact events that have the potential to result in EPAs Environmental Objective for Flora and Vegetation from being met.

While the management measures proposed in this FVMP would contribute to the protection of priority species, it is considered that the same measures would also contribute to the protection of other flora species at West Musgrave. Further details relating to the monitoring and management of terrestrial GDEs is provided in the groundwater monitoring and management plan (OZ Minerals, 2021; Appendix K2).

1.2.1 Proposal Activities that May Affect the Key Environmental Factor

In compliance with the Notice provided by the EPA, this management plan applies to the management of priority flora species, to the extent that the interaction of the project may negatively impact this flora such that the EPA objective may not be achieved. To this end the following credible events have been identified with the potential to result in negative impacts to priority flora species, specifically:

- Loss of priority flora species resulting in a change in their conservation status due to project-related land clearing
- Loss of, or degradation of, vegetation condition due to project-related indirect impacts from:
  - Altered fire regimes
  - Increased abundance and or diversity of weeds.

Other impact events identified in the EPA Section 38 Referral (OZ Minerals, 2021) were assessed as not having an impact on priority or other species such that EPA's environmental objective for flora and vegetation would not be met, and as such have not been considered further in this management plan.

1.2.2 Site Specific Environmental Values

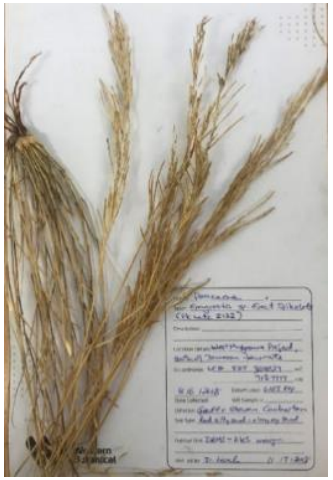
Eight DBCA priority flora species were recorded within the Development Envelope (Table 3 and Figure 3). An additional nine priority flora species were recorded within the study area, but outside of the Development Envelope. As these species have been avoided they are not discussed further in this FVMP.

In the time since submission of the EPA Section 38 Referral in December 2020 (OZ Minerals, 2020), a targeted flora survey was undertaken in March 2021 (referred to in the Notice as February 2021) to confirm whether one of the species identified as a potential species of taxonomic significance found in the Northern Borefield area (*Eragrostis* sp. (G & S Cockerton WB37426)) was actually the priority 3 species *Eragrostis* sp. *Erect spikelets* (P.K. Latz 2122). This targeted survey has subsequently confirmed that all specimens previously identified as *Eragrostis* sp. (G & S Cockerton WB37426) were actually *Eragrostis sp. Erect spikelets*. During this targeted survey further populations of *Eragrostis* sp. *Erect spikelets* (P.K. Latz 2122) were also identified. The results of the survey are reported as an Addendum to Appendix B1 Detailed Flora and Vegetation Survey of the updated EPA Section 38 Referral (OZ Minerals, 2021; Appendix B1 Addendum 2).

Table 3: Priority Flora Species Present in the Survey Area

Priority Species	Priority Status	Description and Habitat	Populations Recorded in Survey Area	Populations Recorded in Development Envelope	Representative Photograph
Aenictophyton anomalum	P1	*Aenictophyton anomalum* is a perennial herb growing to 0.2 m high with tufted stems ascending from long fine horizontal underground roots. The leaves are blue green in colour, folded and occur in two to five pairs of leaflets plus a single terminal leaflet. The leaflets are variable, from linear to obovate and are sometimes deciduous. Flowers are orange and in small terminal racemes. *Aenictophyton anomalum* is always associated with the deep sands of the Sand Dune Acacia - Grevillea Shrubland (SDAGS) Vegetation Association.	208	49	
Amaranthus centralis	P3	*Amaranthus centralis* is an erect annual herb growing to 0.6 m tall with angular, sometimes reddish, and sparsely hairy to glabrous stems (Western Australian Herbarium, 1998). It grows in red sand in ephemeral watercourses, sandy to clayey loam associated with riverbanks and edges of permanent pools in *Eucalyptus* lined channels, or *Acacia* Shrublands. *Amaranthus centralis* was recorded throughout the survey area within the Hardpan Mulga Woodlands (HPMW) Vegetation Association.	21	11	

Priority Species	Priority Status	Description and Habitat	Populations Recorded in Survey Area	Populations Recorded in Development Envelope	Representative Photograph
Aristida jerichoensis var. subspinulifera	P3	*Aristida jerichoensis* var. *subspinulifera* is an upright perennial tussock grass 0.8 to 1.2 m in height. *Aristida jerichoensis* var. *subspinulifera* is similar in habit and features to the more widespread species *Aristida inaequiglumis* and *Aristida latifolia*. Separating these three species requires careful inspection of mature florets with a microscope. *Aristida jerichoensis* var. *subspinulifera* was found within the Hardpan Mulga Woodland (HPMW) and Groved Mulga (GRMU) vegetation associations along the Northern Access Road corridor.	4	2	
Chrysocephalum apiculatum subsp. *racemosum*	P3	*Chrysocephalum apiculatum* subsp. *racemosum* is a perennial shrub to 0.5 m high and 0.8 m wide with long silky hairs covering short glandular hairs on blue-green foliage, with clusters of bright yellow flower heads. *Chrysocephalum apiculatum* subsp. *racemosum* has been seen scattered within the Sandplain and Sand Dune groups of Vegetation Associations along the Northern Access Road and Western Access Road alignments and Northern Borefield.	9	1	

Priority Species	Priority Status	Description and Habitat	Populations Recorded in Survey Area	Populations Recorded in Development Envelope	Representative Photograph
Eragrostis sp. Erect spikelets (P.K. Latz 2122)	P3	*Eragrostis* sp. Erect spikelets (P.K. Latz 2122) is a perennial tussock grass growing to 0.4 m high. *Eragrostis* sp. Erect spikelets (P.K. Latz 2122) was initially recorded along the Northern Access Road alignment, on the boundary of the *Acacia kempeana* Shrubland (AkS and HPMW) and growing in shallow sand over outcropping and sub cropping granodiorite.	1,489	384	
Eragrostis sp. Limestone (P.K. Latz 5921)	P3	*Eragrostis* sp. Limestone (P.K. Latz 5921) is a perennial tussock grass to 0.3 m high and 0.4 m wide with short basal foliage forming a ring of live vegetation. *Eragrostis* sp. Limestone (P.K. Latz 5921) is always associated with outcropping calcrete platforms and is found in small, isolated populations of up to a couple of dozen clumps with other grasses including *Triodia scariosa*, *Eragrostis eriopoda*, *Eriachne mucronata* typical form and *Aristida contorta*.	183	117	

Priority Species	Priority Status	Description and Habitat	Populations Recorded in Survey Area	Populations Recorded in Development Envelope	Representative Photograph
Goodenia asteriscus	P3	*Goodenia asteriscus* is a herbaceous perennial, facultatively stoloniferous, rosette-forming herb growing from 8 to 22 cm tall, developing a woody taproot and thickened basal stem that retain the old pedicel bases. *Goodenia asteriscus* has numerous records and is mostly been found growing on limestone plains with outcropping calcrete (Lang and Davies, 2017). During surveys it was found within the Calcrete Platform Hummock Grassland (CPHG) vegetation association, which is consistent with descriptions of vegetation and soil associations it has previously been collected within.	299	94	
Stackhousia clementii	P3	*Stackhousia clementii* (P3) is a dense broom-like perennial herb, growing to 0.45 m high. The flowers are green/yellow/brown. *Stackhousia clementii* has been recorded growing on skeletal soils and has been recorded in the region growing on shallow sands over calcrete (Western Australian Herbarium, 1998).	226	32	

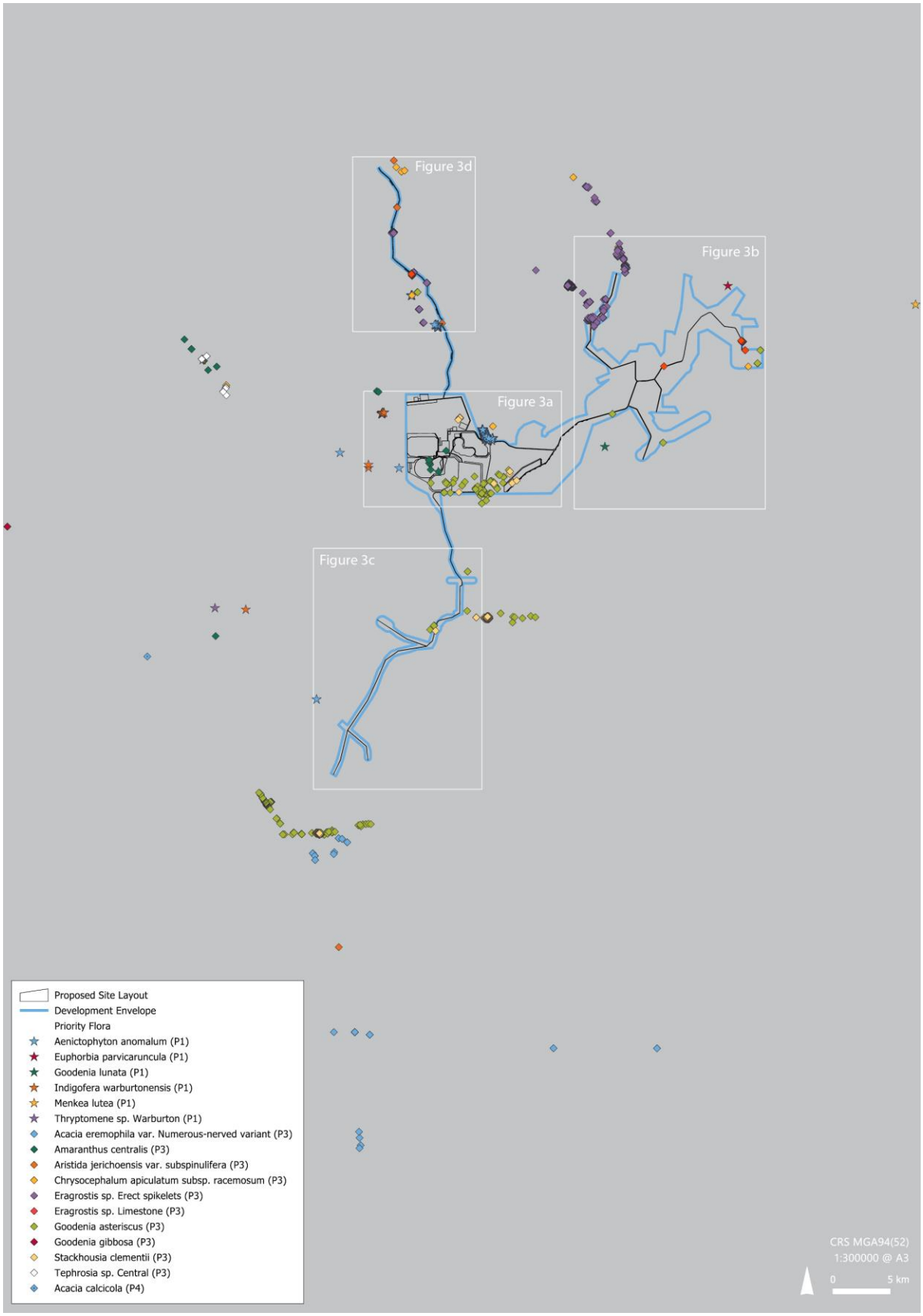


Figure 3: Priority Flora Species in the West Musgrave Project Area

Figure 3a: Priority Flora Species in the West Musgrave Project Area

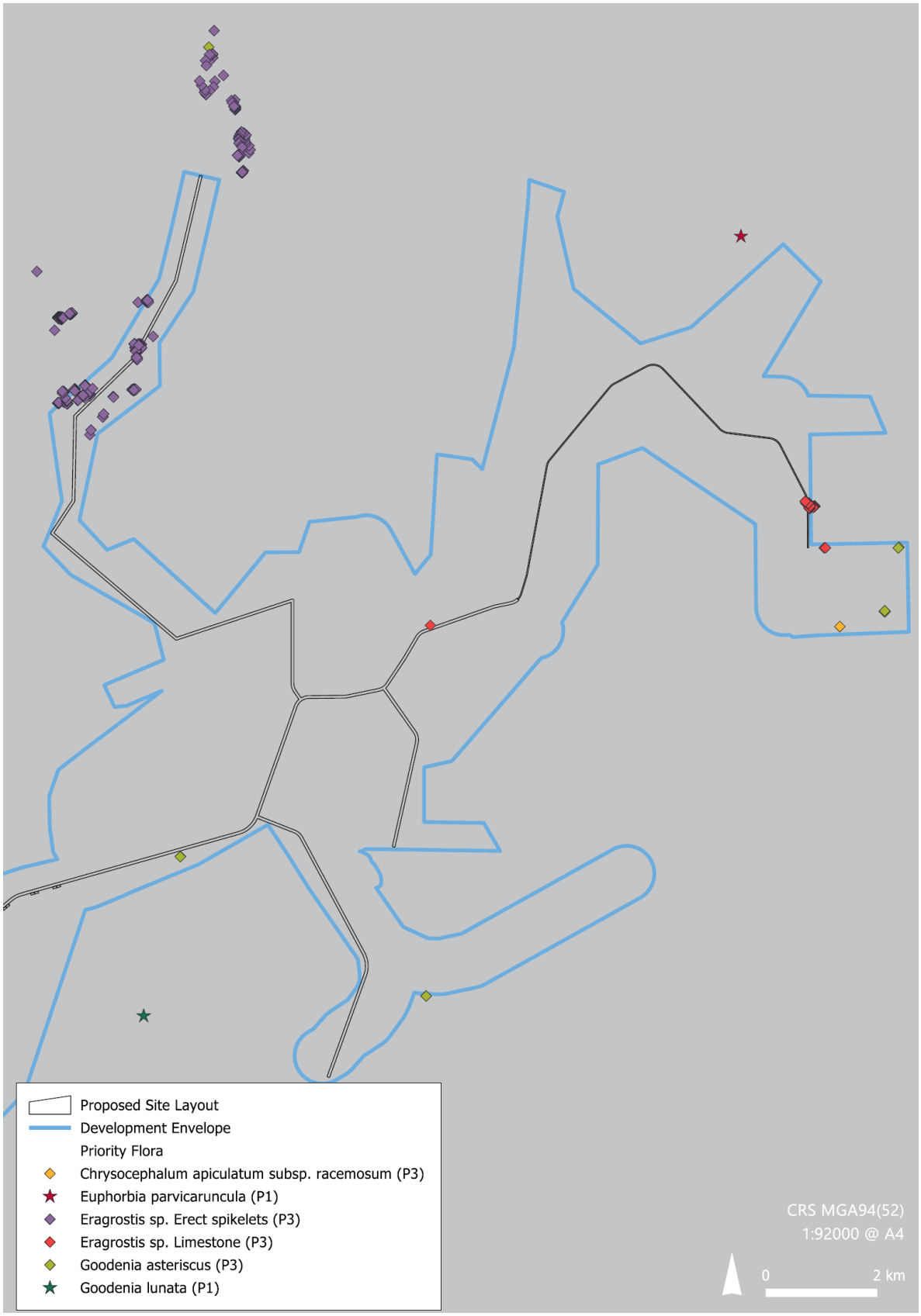


Figure 3b: Priority Flora Species in the West Musgrave Project Area

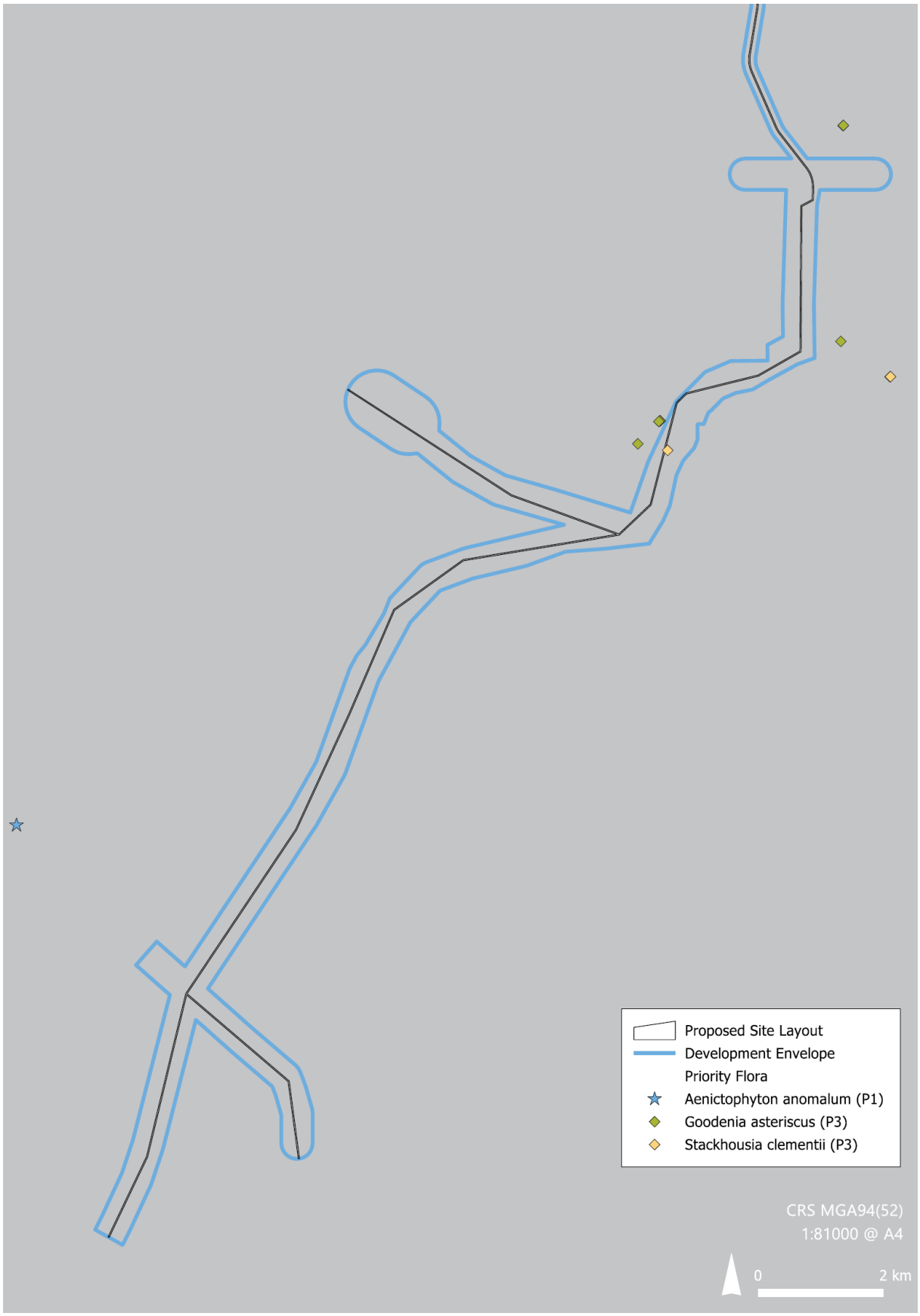


Figure 3c: Priority Flora Species in the West Musgrave Project Area

Figure 3d: Priority Flora Species in the West Musgrave Project Area

1.3 Condition Requirements

A Ministerial Statement and associated conditions are yet to be issued.

1.4 Rationale and Approach

This FVMP outlines how priority flora species will be managed, and where relevant monitored, to verify the effectiveness of the management measures and to ensure potential impacts associated with the proposed construction and operation of the project are minimised.

OZ Minerals' approach is to give significant focus during project design to avoid and minimise impacts by carefully designing the Development Envelope and siting infrastructure to avoid priority flora and vegetation species where possible.

1.4.1 Survey and Study Findings

1.4.1.1 Direct Impacts

Eight priority flora and vegetation species, as listed by DBCA, were recorded in the Development Envelope during surveys and are discussed in detail in Table 3.

The direct loss of priority flora species based on the indicative site footprint is presented in Table 4. These species are known to occur widely outside the Development Envelope, and all occur in other States or Territories, including within Aboriginal Lands where a greater level of protection is afforded (OZ Minerals, 2021). This broader occurrence demonstrates that the clearance of these populations presents negligible risk to the conservation status of these species. In addition, due to the under-studied nature of the project area, there is a high likelihood that these species occur more extensively than has been recorded to date.

Table 4: Indicative Disturbance of Priority Flora Species

Priority Species	Populations Within the Survey Area	Populations Within the Development Envelope	Other Known Populations	Proposed Populations to be Cleared	Percentage Loss of Populations (%)	Comments
Aenictophyton anomalum (P1) *	208	49	109	1	0.3	Recorded twice in WA (GVD and Murchison IBRA regions). Recorded more extensively in the south-west corner of NT and north-western SA. Also present as a disjunct population in northern NSW and southern Qld
Amaranthus centralis (P3)	21	11	103	10	8.1	Commonly occurs in southern NT, and in northern SA 10 Records of this species are from Central Ranges and Pilbara IBRA regions in WA
Aristida jerichoensis var. *subspinulifera* (P3)	4	2	641	1	0.2	Represents a significant range extension within WA. Only a slight range extension south of known distribution in the NT
Chrysocephalum apiculatum subsp. *racemosum* (P3)	9	1	92	0	0.0	Widespread in the NT and populations also known in northern SA and western Qld Species is poorly known in WA with only 5 confirmed specimens held at the WA Herbarium
Eragrostis sp. Erect spikelets (P.K. Latz 2122) (P3)	1,489	384	147	63	3.9	Well known within central and southern parts of the NT and southern SA. Known from 6 other records in WA
Eragrostis sp. Limestone (P.K. Latz 5921) (P3) *	183	117	145	17	5.2	The majority of records are from the NT Known from 7 other records in WA
Goodenia asteriscus (P3)	299	94	25	31	9.6	Known from SA and 11 records within WA
Stackhousia clementii (P3)	226	32	220	5	1.1	Well represented and widely distributed in SA, NT and WA with some records in Qld

* Range extensions which are also Priority species

1.4.1.2 Indirect Impacts

Indirect impacts may occur to priority flora species as a result of interaction with indirect sources from the project. Table 5 outlines the credible indirect impacts events that may impact priority flora species and are considered further in this management plan.

Table 5: Potential Indirect Impacts to Priority Flora Species

Potential Impact	Description of Potential Indirect Impact
Project-related altered fire regimes	Traditional Owners actively use fire as a land management tool within the local area and region. Implementation of the project would require changes in traditional use of fire to ensure protection of people and project assets. While the increased occurrence of tracks, road networks, and cleared areas associated with the project provide natural fire breaks likely to reduce the intensity and extent of fires, further management measures would be required to minimise the likelihood of fire starting from project activities.
Project-related increase in the abundance and diversity of weeds	While eight existing weed species are known to occur within the survey area, six of these species are not considered to be significant, with the two remaining species considered to be highly invasive (OZ Minerals, 2021; Appendix B1). There is potential for project-related activities to introduce new species and increase abundance of weed across project areas.

1.4.2 Key Assumptions and Uncertainties

This FVMP has been developed using all relevant and available information at the time of preparation. As the understanding of flora and vegetation management improves over time, this FVMP may require updating.

The key assumptions and uncertainties associated with this current FVMP are described in Table 6.

Table 6: Key Assumptions and Uncertainties Associated with Flora and Vegetation Management

ID	Assumption / Uncertainty	Description
A1	Survey effort	The flora surveys undertaken to date accurately report the distribution and status of flora in the project area Flora surveys were undertaken during 'good' seasons, and as such are considered likely to have captured the majority of flora species present The competency and experience of the consultants carrying out the flora surveys was sufficient to ensure qualified results.
A2	Effectiveness of management actions	The management actions required by this MP (Section 2) are appropriate and sufficient to protect priority flora species from significant project-related direct and indirect impacts, thereby not resulting in a potential adverse change in conservation status due to the project.

ID	Assumption / Uncertainty	Description
U1	Regional knowledge	Few flora studies have been undertaken outside of the project area, and as such, the following uncertainty exists. It is considered likely that the priority flora species populations found to date also occur more widely in the region, outside of those areas associated with the Development Envelope.
U2	Knowledge sharing	The project area is located close to the borders of SA and the NT. Whilst WA survey records have been interrogated thoroughly as a component of the EPA Section 38 Referral (OZ Minerals, 2021) and this FVMP, the distribution of priority flora species may occur across borders into SA and the NT.

1.4.3 Management Approach

While OZ Minerals has identified a number of avoidance, minimisation and mitigation measure that would be implemented to protect flora and vegetation in the EPA Section 38 Referral (OZ Minerals, 2021) the management approach, and management actions detailed in this FVMP are specifically designed to ensure the project meets the EPA's objective for Flora and Vegetation (Section 1.2) as it pertains to priority flora, with a focus on the mitigation hierarchy; this includes avoidance and minimisation of direct impacts (Table 7) and the mitigation of indirect impacts (Table 8).

Table 7: Minimisation Measures for Direct Impacts to Priority Flora

Mitigation
Measures to Avoid
• A considerable effort has been made to reorient and reduce the size of Development Envelope to avoid impacts to environmental values. This has included a reduction of the Development Envelope from 25,200 ha to 20,852 ha (17% reduction), and of the disturbance footprint from 3,961 ha to 3,830 ha resulting in the exclusion of some significant species • Known locations of priority and significant flora species will be included in the site's GIS database to ensure locations are avoided where possible during future activities • Project footprint will be designed to avoid priority and significant flora populations where possible • Clear demarcation would be erected around Priority 1 species where possible, including *Aenictophyton anomalum*
Measures to Minimise
• Land clearing would be kept to the minimum necessary for development of the proposed project, and avoid, where possible, Priority 1 species exclusion areas • Develop and implement a site-specific internal clearing/disturbance procedure and associated permit to prevent clearing outside approved boundaries • Where practicable, land clearing would be undertaken progressively with the amount of active disturbance minimised • Existing disturbed areas would be used wherever possible to minimise total ground disturbance • The site induction program would provide information on priority species, exclusion zones and ground disturbance authorisation procedures

Mitigation
Measures to Rehabilitate
• Progressive rehabilitation would be undertaken on disturbed areas as they become available • Topsoil and vegetation (including woody debris) would be re-spread over rehabilitated areas to act as a seed source and to protect the soil from erosion • Local provenance seed and propagated material would be used, if required, to rehabilitate disturbed areas

Table 8: Mitigation Measures for Indirect Impacts to Priority Flora

Mitigation
Altered fire regimes
• Firefighting equipment would be located on site and emergency personnel would be trained in fire response • Vehicles would not be permitted to leave access tracks or cleared areas • A Hot Work Permit system would be developed and implemented • All machinery and vehicles undertaking clearing activities would be fitted with firefighting equipment • Fire management practices would be made in consultation with the Department of Fire and Emergency Services (DFES) and the Ngaanyatjarra Council including installation and maintaining firebreaks if required, so that potential environmental damage from extreme and out of control wildfires is minimised, and infrastructure and the community are protected throughout the life of the project • The project site induction would include information on prevention and management of fires
Increased abundance and or diversity of weeds
• A vehicle hygiene procedure would be implemented for vehicles and equipment coming on to, or returning to, the site for earthmoving • Weed control would be implemented on areas to be disturbed for infrastructure • A weed control management plan would be developed to manage known weed infestations and prevent their spread

1.4.4 Rationale for Choice of Management Targets

The provisions included in this FVMP are objective-based as they relate to specific management actions.

2 EMP COMPONENTS

2.1 Management Objectives, Actions and Targets

Management objectives, actions and targets focused on achieving the EPA's objective for Flora and Vegetation (Section 1.2) as relevant to priority flora species are presented in Table 9. These focus the greatest management effort on project activities that have the highest likelihood of causing adverse impact on priority flora species. The order of management objectives and the resultant management actions and targets is from highest to lowest management effort to achieve the EPA's objective.

Table 9: Outcome and Objective-Based EMP for Flora and Vegetation

EPA Factor: Flora and Vegetation

Key Environmental Values: Priority flora species

Key Impacts and Risks:

- **Loss of priority flora species resulting in a change in their conservation status due to project-related land clearing**
- **Loss of, or degradation of, vegetation condition due to project-related indirect impacts from:**
  - **Altered fire regimes**
  - **Increased abundance and or diversity of weeds**

Management Action	Management Target(s)	Monitoring	Reporting
Management Objective: Minimise requirements for land clearing and associated loss of priority flora species **Key Impacts and Risks: Project-related clearance of priority flora species, resulting in a change in their conservation status**			
• Land disturbance kept to the minimum necessary for development of the project • Develop and implement a site-specific internal clearing/disturbance procedure and associated land disturbance permit (LDP) • Where practicable, land clearing undertaken progressively with the amount of active disturbance minimised • Existing disturbed areas used wherever possible to minimise total land disturbance	• Total project-related land disturbance is to be within the approved Development Envelope and not to exceed the approved area • Disturbance of priority flora species populations avoided wherever practicable, and otherwise minimised	• Annual review of land disturbance-related survey data, and comparison with project-related land disturbance on the respective year's aerial imagery, relative to the approved area of project-related land disturbance • Annual review of internal project-related land disturbance register relative to actual project-related land disturbance and LDPs	• Internal project-related Land Disturbance Register and LDPs • Mining Rehabilitation Fund (MRF) annual reporting • Annual WMP Compliance Assessment Report • Details (locations and species) of additional priority flora species populations to be forwarded to the DBCA within 6 months of discovery
Management Objective: Minimise project-related indirect impacts to priority flora species **Key Impacts and Risks: Loss of, or degradation of, vegetation condition due to project-related indirect impacts from altered fire regimes**			
• Develop and maintain a Fire Mitigation Plan and incorporate into the Asset Emergency Management Plan • Install and maintain fire extinguishers and firefighting equipment in the project area and on site to relevant Australian Standards • Install and maintain firefighting equipment in machinery and vehicles undertaking land disturbance activities • Project emergency response personnel trained in fire and bushfire response • Vehicles kept to access tracks or cleared areas • Develop and implement a Hot Work Permit system • Fire management practices developed in consultation with WA Department of Fire and Emergency Services (DFES) and the Ngaanyatjarra Council, including installation and maintenance of firebreaks if required • Site induction to include information on prevention, management and response to fires	• No unplanned fires attributable to project-related activities • To minimise the potential environmental damage from project-related extreme or out-of-control wildfires	• Quarterly emergency response equipment inspections relative to relevant Australian Standards • Annual fire response training exercise including wildlife response • Annual review of fire break development for evidence of adequate installation and maintenance	• Internal incident reports • Internal project-related Land Disturbance Register and LDPs • Hot Work Permit register • Induction and training records • Annual WMP Compliance Assessment Report
Management Objective: Minimise project-related indirect impacts to priority flora species **Key Impacts and Risks: Loss of, or degradation of, vegetation condition due to project-related indirect impacts from increased abundance and or diversity of weeds**			

• Vehicle hygiene procedure implemented for vehicles and equipment coming on to, or returning to, the site for earthmoving
• Weed control implemented on all project-related areas of disturbance
• Develop and implement a Weed Control Management Plan to manage known weed infestations and control spread (See Section 2.2)
	• No vehicles or equipment brought to site without being cleaned of soil and vegetative matter
	• No new declared pest species listed under Section 22 of the *Biosecurity and Agriculture Management Act, 2007* (WA), Weeds of National Significance (see https://weeds.org.au/) and weeds listed on DBCA's 'Goldfields Impact and Invasiveness Ratings List', become established within project-related disturbed areas
	• No increases to weed species' diversity or abundance due to project-related activities
		• Quarterly review of vehicle and equipment hygiene inspection records
		• Annual review of site-wide weed inspection records in disturbance areas
			• Incident reports
			• Weed register
			• Workplace inspection reports
			• Annual WMP Compliance Assessment Report which will include:
			  ○ Details of any new weeds identified
			  ○ Details on the success of control actions

2.2 Weed Monitoring

To clearly demonstrate that the management action relating to "loss of, or degradation of, vegetation condition due to project-related indirect impacts from increased abundance and or diversity of weeds" the following monitoring program has been established for implementation. This monitoring program would be further developed following the outcomes of the first monitoring activity detailed below (see No. 1).

Table 10: Weed Monitoring and Surveillance Program

No.	Phase	Location	Frequency and Timing	Survey Method
1.	Prior to Construction	Main Development Area and along infrastructure corridors (main access and Northern Borefield). Main focus of baseline will include drainage lines, areas where water accumulates, roadsides	One-off (March to June)	Targeted Weed Survey (for weeds as defined in Table 9). Monitoring will include: • Date and time of monitoring • Weed species observed at specific locations within the Development Envelope (a visual guide will be available for identification of previously recorded Declared and introduced species). GPS location of any species not previously identified and not present within the visual guide • Estimate number of plants at each location • Reproductive status of weed if possible (e.g. flowering, non-flowering, seed set, seeding, condition) Results of baseline targeted weed survey will be used to determine appropriate quadrats for ongoing monitoring activities
2.	Construction and Operation	Sites to be selected as an output of No.1, nominally, these locations (shown in Figure 2) may include: • Reference site between Jameson (Mantamaru) and Blackstone (Papulankutja) communities • Along main access road • WMP camp and spray field area • Adjacent WMP processing plant • WMP WRDs • Northern Borefield alignment	Annually (March to June, preferably within 6 to 8 weeks of rainfall)	Targeted annual surveys of high-risk areas as identified as an output of No.1. The survey will include assessment of at least six permanent 50 m x 50 m quadrats (marked with metal stakes and flagging tape) which will be established at each of the locations as identified in the Targeted Weed Survey detailed above (No. 1). The following details will be collected at each location: • Date and time of monitoring • Weed species observed at specific locations within the Development Envelope (a visual guide will be available for identification of previously recorded Declared and introduced species). GPS location of any species not previously identified and not present within the visual guide • Estimate number of plants at each location • Reproductive status of weed if possible (e.g. flowering, non-flowering, seed set, seeding, condition) • Observations relevant to the presence of the new species (i.e. proximity to roads, water sources) • Any control actions taken (i.e. manual removal, spraying etc.)
3.	Construction and Operation	Main Development Area and along infrastructure corridors (main access and Northern Borefield). Main focus of baseline will include drainage lines, areas where water accumulates, roadsides	Every five years (March to June, preferably within 6 to 8 weeks of rainfall)	Targeted Weed Surveys as detailed in No 1.

2.3 Reporting

2.3.1 Ngaanyatjarra Council and Ngaanyatjarra People

All reporting discussed in this section will be made specifically available to the Ngaanyatjarra People through the Ngaanyatjarra Council, including where necessary periodic face-to-face meetings to discuss the results and outcomes of monitoring.

Where necessary training and support of relevant members of the Ngaanyatjarra People will be supported by OZ Minerals to ensure an understanding of monitoring results and their relevance. Further, opportunities for the involvement of Ngaanyatjarra People in the monitoring activities will continue to be explored as the project is developed.

2.3.2 Compliance Reporting

OZ Minerals will prepare Annual Environmental Reports (AERs) to be submitted to regulatory authorities. The format of these reports will be consistent with requirements stipulated by individual regulatory authorities.

A Compliance Assessment Report (CAR) will be submitted to the Compliance Branch at Government of Western Australia's Department of Water and Environmental Regulation (DWER) at an agreed date. The CAR will document compliance with conditions of approval including assessment of compliance with management plan requirements where management plans form part of approval conditions.

3 ADAPTIVE MANAGEMENT

Adaptive management is a systematic approach to improving environmental results and management practices during project implementation through the application of learning from monitoring of management actions. Specifically, adaptive management in relation to this MP includes:

- Defining the issue and objectives, and developing the FVMP to address these (i.e., this document)
- Implementing the management actions described in this FVMP (Table 9)
- Monitoring and evaluating the applied management and mitigation against the outcomes and objectives, as per the monitoring program outlined in Table 9
- Adjusting the management actions and monitoring (if required) to meet the outcome or objective, based on what is learnt from:
    - evaluation of the effectiveness of applied mitigation measures
    - review of assumptions and uncertainties
    - re-evaluation of risk assessment
    - external changes during the life of the project (e.g., technical advances or innovation, changes to priority flora listings).

3.1 Management Plan Review

This FVMP will nominally be reviewed at least every three years from the date of endorsement to ensure that it reflects the current situation with regards to WMP flora management and monitoring. The MP may also be reviewed should any of the following occur:

- A change in conservation rating of any flora species known to occur in the project area (e.g., the addition of new species and/or an increase or decrease in the conservation rating of any species)
- The addition or change of infrastructure within WMP that has the potential to significantly change the predicted direct or indirect impacts on priority flora species, and that was not approved within the scope of the project
- Any change in operational practices on site that has the potential to significantly change the predicted direct or indirect impacts on priority flora species, and that was not approved within the scope of the project.

As this management plan is a requirement of a regulatory condition, OZ Minerals will seek formal approval from DWER to make any changes to this document after endorsement based on information gained through adaptive management and may involve consultation with relevant stakeholders.

4 STAKEHOLDER CONSULTATION

Consultation has been undertaken as part of the Section 38 Referral under Part IV of the EP Act, and as part of ongoing discussions relating to a Mining Agreement with the Ngaanyatjarra People. Details of these consultations are provided in Section 3, Section 6.1.3, Appendix A4 and Appendix A5 of the EPA Section 38 Referral (OZ Minerals 2021).

Through consultation with Traditional Owners the following areas were identified as areas of concern to Ngaanyatjarra People relating to flora and vegetation, these matters have been specifically considered in this FVMP or the Groundwater Monitoring and Management Plan (GMMP).

- Interest in general clearing activities, and where possible minimising the extent of vegetation that will require clearing to support the project activities
- Interest in what actions may be undertaken to control the introduction of weeds to the site
- Potential impacts to tree species resulting from water abstraction e.g. obligate water users. This is particularly apparent for a stand of desert oaks which form part of a significant dreaming trail known as the Marlu dreaming trail located immediately west and south of the Development Envelope. Further, impacts to other potential GDEs may be perceived negatively by the Traditional Owners due to broader cultural associations and custodianship of the land. This matter is addressed further within the GMMP.

Consultation specific to this FVMP includes internal peer review with subject-matter experts (MBS Environmental and Western Botanical) and meetings with the Government of Western Australia's DWER and EPA.

A review of a draft FVMP was undertaken by the Ngaanyatjarra Council's environmental consultant. The Ngaanyatjarra Council noted that this FVMP does not relate to any specific concerns raised by Ngaanyatjarra People, and that relevant flora and vegetation matters of greater interest to the Ngaanyatjarra People relate to potential GDEs which are managed within the GMMP.

5 UPDATES TO THE EMP

This section is not applicable to the first version of the Flora and Vegetation Management Plan, and will be updated in future revisions.

6 REFERENCES

EPA. 2016a. *Environmental Factor Guideline: Flora and Vegetation*. Environmental Protection Authority. December 2016. Perth.

EPA. 2016b. *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*. Environmental Protection Authority. December 2016. Perth.

EPA. 2020a. *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*. Environmental Protection Authority. September 2020. Perth.

EPA. 2020b. *Statement of Environmental Principles, Factors and Objectives*. Environmental Protection Authority. April 2020. Perth.

Lang, P.J. and Davies, R.J.P. 2017. *Goodenia asteriscus (Goodeniaceae), a new arid zone species from north-western South Australia and eastern Western Australia*. Swainsona 31: 37–43.

OZ Minerals. 2020. *West Musgrave Copper and Nickel Project: EPA Section 38 Referral Supporting Document*. December 2020. Revision 1. Adelaide.

OZ Minerals. 2021. *West Musgrave Copper and Nickel Project: EPA Section 38 Referral Supporting Document*. May 2021. Revision 2. Adelaide.

Western Australian Herbarium. 1998. *FloraBase, the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. Accessed July 2019 at florabase.dpaw.wa.gov.au.