



MANAGEMENT PLAN

FLORA AND VEGETATION MANAGEMENT PLAN

LAMB CREEK IRON ORE MINE

25/09/2024 VERSION 0



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Acknowledgement of Country

MinRes is committed to reconciliation and recognises and respects the significance of Aboriginal and Torres Strait Islander peoples' communities, cultures, and histories. MinRes acknowledges and respects Aboriginal and Torres Strait Islander peoples as the traditional custodians of the land.

EXECUTIVE SUMMARY

Table ES 1 summarises the purpose of the Flora and Vegetation Management Plan (FVMP), including monitoring program within the context of the Western Australia Environmental Protection Authority (EPA) objectives for the key environmental factor of Flora and Vegetation (EPA, 2016). The FVMP and Monitoring Program also aligns with the EPA (2021c) and Commonwealth of Australia (2014) Environmental Management Plan Instructions and Guidelines. The FVMP and Monitoring Program has been prepared for the Mineral Resources Limited (MinRes) Lamb Creek Iron Ore Project and considers all proposed land disturbance for implementation of the Project (i.e. Indicative Footprint (IF)) as referred to in Mining Proposal and EPBC submissions (646.9 ha). Noting that this IF is different to the IF for the EP Act Part IV Section 38 referral (636.3 ha), as the Part IV referral area does not include the area of the proposed Great Northern Highway (GNH) intersection. Ground disturbance and vegetation clearing for the GNH intersection is covered under a separate Native Vegetation Clearing Permit (NVCP) as these works are wholly within Main Roads WA road reserve. This Environmental Management Plan specifically addresses the Flora and Vegetation environmental factor associated with the Project related ground disturbances (under all approvals).

Summary **Table ES 1** below presents the environmental outcomes and objectives for the environmental factor to be met through implementation of this FVMP, as well as the environmental criteria and management targets to measure achievement of the associated environmental outcomes and objectives.

Table ES-1: Flora and Vegetation Management Plan Summary

Project Title	Lamb Creek Iron Ore Project	
Short Description	<p>Open pit iron ore mine located approximately 130 km northwest of Newman to produce up to 10 million tonnes per annum (Mtpa) of crushed and screened iron ore over a period of three to five years. This will comprise a multi-stage crushing and screening process plant and associated mine infrastructure including, but not limited to, site offices, maintenance and equipment service area, water pipelines, fuel storage, power generation, telecommunications and an accommodation village for site personnel. The total disturbance footprint of the Project is 646.9 ha (Indicative Footprint), within a Development Envelope of 874 ha, as referenced in the Mining Proposal and EPBC referral (Figure 1).</p> <p>Iron ore product will be loaded onto road trains and transported 16 km on a dedicated private haul road to its intersection with Great Northern Highway, where it will be transported 320 km to ship load-out facilities at the Utah Point berth in Port Hedland.</p>	
Proponent Name	Process Minerals International (PMI) a wholly owned subsidiary of MinRes (ACN 118 549 910)	
Ministerial Statement No.	TBA	
Scope And Purpose Of FVMP	To present a robust and implementable environmental management framework to protect the environmental values of the Project and to demonstrate that the EPA's objective for this factor is met during the construction and operation of the Project.	
Key Environmental Factor And Objective	Flora and Vegetation:	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
Condition Clauses	TBA	
Key Components In The Flora And Vegetation MP	Key provisions are detailed in Section 3	

Outcome-based Management Provisions	Ensure development and operation of the Project meets the objective of protecting flora and vegetation to maintain biological diversity and ecological integrity.
Objective-based Management Provisions	<ul style="list-style-type: none"> • No clearing of native vegetation shall occur outside of approved area(s) during construction or operation. • No weed species to be introduced into the Development Envelope as a result of construction and operation of the Project. • No significant expansion of known weed populations within the Development Envelope as a result of construction and operation of the Project. • Effective operation of the Project to avoid Project related fire. • Minimise decline of flora and vegetation due to dust, weeds, and hydrocarbon or chemical leaks and altered hydrological regimes as a result of construction and operation of the Project.
Proposed Construction And Operation Dates	<p>The forecast key milestones for construction and commissioning are:</p> <ul style="list-style-type: none"> • construction Q3 to Q4 2025. • commence commissioning Q1 2026. • commence operation from Q1 2026 to Q2 2026.
Flora And Vegetation Management Required Pre-construction	Yes - this FVMP will be required to be implemented during installation of access tracks and roads into the site, following granting of licensed tenements

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed



Full name (please print)

Celine Mangan

Organisation (please print)

Mineral Resources Ltd

Date

25/09/2024

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ABBREVIATIONS

Abbreviation	Definition
AER	Annual Environmental Report
BC Act	<i>Biodiversity Conservation Act 2016</i>
CAR	Compliance Assessment Report
DE	Development Envelope
DCCEEW	Department of Climate Change, Energy the, Environment and Water
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DSO	Direct Shipping Ore
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Western Australian Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESD	Environmental Supporting Document
GWOS	Groundwater Operating Strategy
FVMP	Flora and Vegetation Management Plan
ha	Hectare
IF	Indicative Footprint
MCP	Mine Closure Plan
MRWA	Main Roads Western Australia
NVCP	Native Vegetation Clearing Permit
P	Priority
PEC	Priority Ecological Community
PEOF	Pilbara Environmental Offset Fund
PMI	Process Minerals International
RSD	Referral Supporting Document
SWMP	Surface Water Management Plan
T	Threatened
WA	Western Australia

1. CONTEXT, SCOPE AND RATIONALE

1.1 PROJECT BACKGROUND

Process Minerals International (PMI; the Proponent), a wholly owned subsidiary of Mineral Resources Limited (MinRes), proposes to develop the Lamb Creek Iron Ore Project (the Project), located approximately 130 kilometres (km) northwest of Newman, in the East Pilbara Local Government Authority (LGA) in Western Australia (WA).

Open pit iron ore mine to produce up to 10 million tonnes per annum (Mtpa) of crushed and screened iron ore over a period of three to five years. This will comprise a multi-stage crushing and screening (process plant and associated mine infrastructure including, but not limited to, site offices, maintenance and equipment service area, water pipelines, fuel storage, power generation, telecommunications and an accommodation village for site personnel. The total disturbance footprint of the Project is 646.9 ha (Indicative Footprint), within a Development Envelope of 874 ha (Figure 1), as referenced in the Mining Proposal and EPBC referral. Iron ore product will be loaded onto road trains and transported 16 km on a dedicated private haul road to its intersection with Great Northern Highway, where it will be transported 320 km to ship load-out facilities at the Utah Point berth in Port Hedland.

The Project is being referred under s. 38 of the *Environmental Protection Act 1986* (EP Act) as it has the potential to significantly affect key environmental factors, defined by the WA Environmental Protection Authority (EPA) in its *Statement of environmental principles, factors, objectives and aims of EIA* (Environmental Protection Authority, 2021b). The Project is also being referred under the *Environment Protection and Biodiversity and Conservation Act 1999* (EPBC Act) as it is likely to have a significant impact on Matters of National Significance (MNES). A Native Vegetation Clearing Permit (NVCP) under Part V of the EP Act will also be sought for the area of the Project that intersects the Great Northern Highway Road Reserve.

As a result of the various approvals being sought for the Project, there are subtle differences in the Development Envelopes (DE) and Indicative Footprints, however the overall clearing associated with the Project is the same. The maximum DE or Proposed Action Area for the EPBC referral is 897.5 ha, as the EPBC referral was based on an earlier, now revised, DE footprint. The EPBC referral DE is also slightly larger than that for the s. 38 Referral, due to the splitting of the DE between the approvals under Part IV and Part V of the EP Act. This Flora & Vegetation Management Plan (FVMP) has been prepared to support the submission of the EPBC referral, s. 38 Referral Supporting Document (RSD) and the NVCP application and details the management actions proposed to reduce adverse environmental impacts to the key environmental factor of Flora and Vegetation from all proposed land disturbance.

Key nomenclature used throughout this document is summarised below:

- **The Project:** This refers to the boundary within which the elements of the proposed Lamb Creek Project activities are situated.
- **Project Area (897.5 ha):** Refers to the maximum proposed Development Envelope (as for EPBC) within R47/19 (to be converted to M47/1592) and L47/1008, which overlie the Juna Downs pastoral lease (LPL N050471). A small portion of the access road and Great Northern Highway intersection area is within railway corridor L021124 (Hamersley Iron Pty Ltd- Yandicoogina Rail) that is excised from Juna Downs. This Project Area also includes the area of the intersection with the Great Northern Highway which is entirely within Main Roads WA road reserve.
- **Development Envelope (874 ha):** delineates the area within which the Project components are located (**Figure 1**) and is a combination of the development envelopes included in the Part IV and Part V applications.

- **Indicative Footprint (646.9 ha):** refers to the area that is proposed to be directly disturbed by the Project (e.g. clearing of native vegetation) (**Figure 1**) and occurs entirely within the Development Envelope. The layout of the Indicative Footprint may be subject to change; however, total disturbance will not exceed the maximum disturbance for the Development Envelope.
- **Flora and Vegetation Survey Area (3,785 ha):** refers to the Umwelt (2022a) field survey boundary (**Figure 2**).
- This FVMP has been prepared in accordance with the *How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans: Instructions* (Environmental Protection Authority, 2021a).

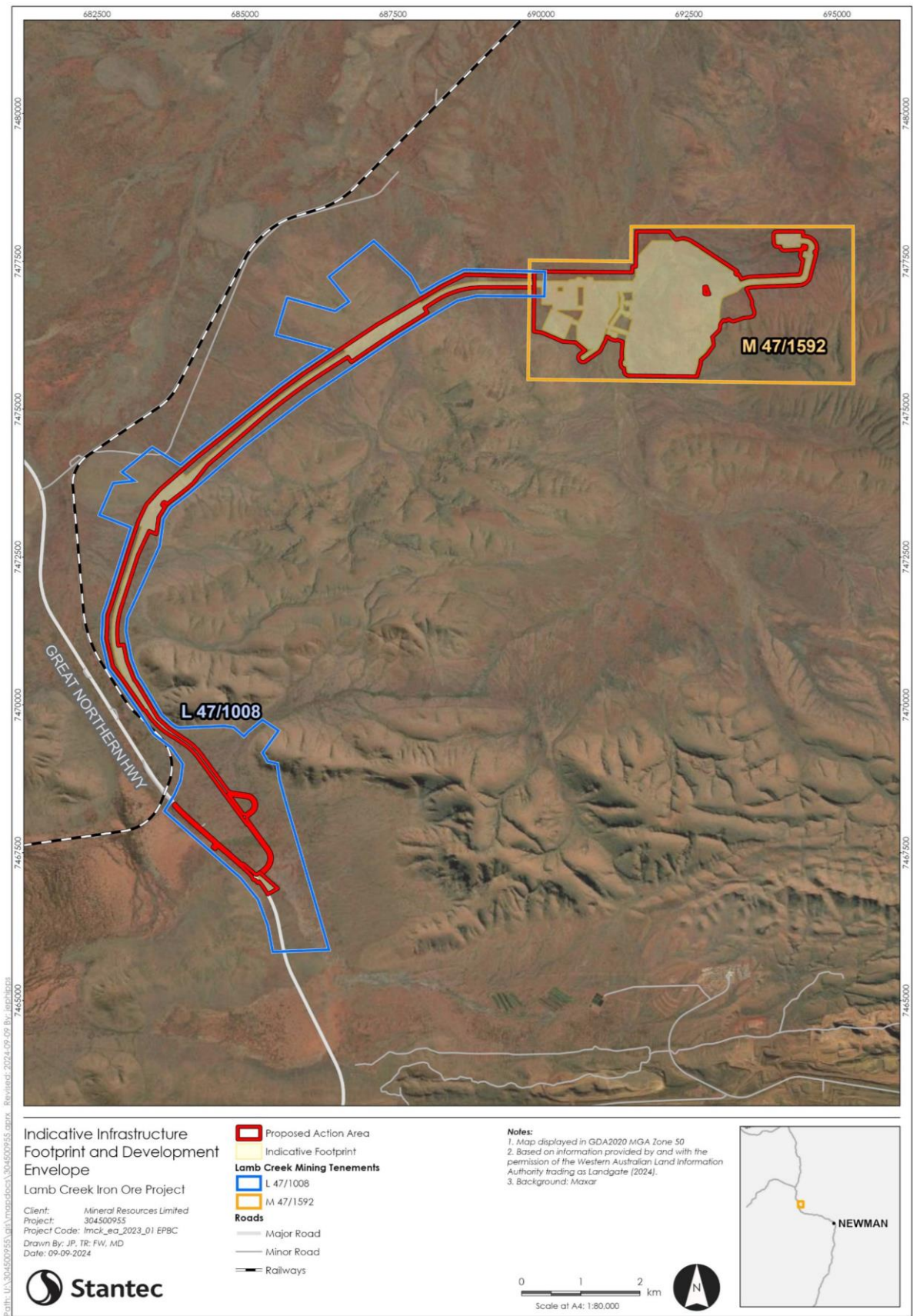


Figure 1: Development Envelope and Indicitive Footprint

1.2 KEY ENVIRONMENTAL FACTOR – FLORA AND VEGETATION

This FVMP demonstrates that the potential impacts to flora and vegetation can be managed to meet the EPA's objective, aided by the conceptual design, planned construction and operational procedures that will be implemented to avoid, mitigate and maintain values. In addition, 646.9 ha of native vegetation in "Good" to "Excellent" condition will be offset through the Pilbara Environmental Offsets Fund (PEOF). Any additional requirements in relation to threatened flora will be managed by the EPBC referral process.

The EPA's objective for the environmental factor of Flora and Vegetation is "*To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*" (Environmental Protection Authority, 2016). In the context of this objective, ecological integrity is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements. Flora and Vegetation is considered a key environmental factor for the Project due to the potential for direct and indirect impacts during construction and operation activities.

1.2.1 Site Specific Environmental Values

The flora and vegetation values identified as having the potential to be affected by the Project include:

- native vegetation within the Pilbara bioregion comprising 13 identified vegetation types, with clearing of up to 646.9 ha to occur; and
- Conservation significant flora present in the Indicative Footprint; *Aristida lazardis* (P2), *Rhagodia* sp. Hamersley (M. Trudgen 17794) ("*Rhagodia* sp. Hamersley") (P3) and *Seringia exastia* (T – Commonwealth) recorded within the Indicative Footprint.

1.2.2 Potential Impacts to Flora and Vegetation

The Project may directly and indirectly impact on flora and vegetation, with the potential direct impacts identified as:

- loss of native vegetation due to clearing; and
- loss of significant flora taxa due to clearing.
- The potential indirect impacts have been identified as:
 - potential for fragmentation of vegetation as a result of construction of linear corridors.
 - introduction and / or spread of introduced flora species.
 - degradation or alteration of vegetation as a result of altered fire regimes.
 - degradation or alteration of vegetation as a result of altered hydrological regimes.
 - degradation of vegetation through dust deposition.
- An assessment of the potential impacts and risks to the flora and vegetation resulting from the Project has been undertaken and is included as **Appendix B**. Results of the risk assessment have been used to develop management measures that form part of this FVMP.

1.3 PURPOSE AND OBJECTIVE

The purpose of this FVMP is to document the Proponent's approach and management measures for avoiding and minimising potential impacts on vegetation and significant flora species from the Project during construction and operation. Successful implementation of these measures will help maintain the biodiversity and ecological integrity of significant flora and vegetation in the Project Area, for aspects within the proponents control. The objective of this FVMP is to meet the EPA's objective for the

environmental factor of Flora and Vegetation using the EPA's mitigation hierarchy of avoid, mitigate, rehabilitate and offset (Government of Western Australia, 2014).

1.4 RATIONALE AND APPROACH

The Proponent is committed to avoiding and minimising potential impacts caused by the operations of the Project to flora and vegetation species of significance to ensure that the biodiversity, ecological integrity and function of vegetation is maintained. The Project has been designed to avoid impacts to key environmental factors located within the Project Area.

The FVMP focuses on outcome-based management provisions including monitoring and evaluating success of management actions with respect to significant flora and vegetation within the Project Area, driven by triggers and thresholds. Assessment of the pathways over which impacts may occur provides the rationale for choice of provisions and choice of appropriate indicators to measure against the environmental outcome and/or objective.

This FVMP is subject to approval by the EPA and Department of Climate Change, Energy, the Environment and Water (DCCEEW) and will subsequently be implemented.

1.5 LEGISLATION, POLICY AND GUIDANCE

This FVMP has been written in accordance with Western Australian (WA) and Commonwealth policies and guidance, including:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016; (EPA, 2021a)
- Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans; (EPA, 2021c)
- Environmental Impact Assessment (Divisions 1 and 2) Procedures Manual (EPA, 2021b);
- Environmental Management Plan Guidelines (Commonwealth of Australia, 2014);
- Outcomes-based conditions policy (DoE, 2016b);
- Outcomes-based conditions guidance (DoE, 2016a);
- Environmental Factor Guideline – Terrestrial Flora (EPA, Environmental Protection Authority, 2016);
- Biosecurity and Agriculture Management Act 2007 (WA);
- Biodiversity Conservation Act 2016 (WA); and
- Rights in Water and Irrigation Act 1914 (WA) and
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).

The following management plans and strategies are also relevant to the FVMP, specific to the Project and include:

- Significant Fauna Management Plan (SFMP)

State and Commonwealth plans and management prescriptions that are relevant to flora and vegetation include:

- Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia, 2013).

2. VEGETATION

2.1 SURVEY AND STUDY FINDINGS

The rationale for the proposed management approach in this FVMP is supported by desktop, detailed and targeted flora and vegetation surveys that have been completed over the Lamb Creek Project area since 2012 (Rapallo, 2012, 2017, 2020, 2021a, 2021c, 2021d, 2022; Umwelt, 2022a). The findings of these surveys are summarised in the following sections and have been used to inform the impact assessment within the RSD and EPBC referral, and to develop mitigation measures detailed in this FVMP (Table 1). Surveys and studies undertaken include:

- Lamb Creek Flora and Vegetation Impact Assessment Report (Umwelt, 2022b)
- Detailed and Targeted Flora and Vegetation Survey (Umwelt, 2022a)
- Targeted conservation significant flora survey of the Lamb Creek project area (Rapallo, 2022)
- Detailed flora and vegetation survey of the Great Northern Highway intersection – Lamb Creek Project (Rapallo, 2021a)
- Lamb Creek Flora mapping update and data review (Rapallo, 2017), and
- Level 2 Flora and Vegetation Survey of the Lamb Creek Project Area (Rapallo, 2012);

Table 1: Summary of Flora and Vegetation Surveys Conducted for the Project

Survey (Reference)	Study Type/ Dates	Proximity to Project Area	Survey / Study Effort	Flora and Vegetation recorded	Key Findings
Lamb Creek Detailed and Targeted Flora and Vegetation Survey (Umwelt, 2022a)	<p>Scope</p> <ul style="list-style-type: none"> Detailed and Targeted Flora and Vegetation survey. <p>Timing</p> <ul style="list-style-type: none"> 14 – 23 March, 4 – 14 April and 29 June – 1 July 2022 (field surveys). <p>Size</p> <ul style="list-style-type: none"> 3785.7 ha. 	Over Project area	<p>Desktop assessment</p> <ul style="list-style-type: none"> Database searches (max 40 km buffer). Review of relevant reports. <p>Field survey</p> <ul style="list-style-type: none"> 116 quadrats. 5 relevés. Targeted searching for all significant flora previously recorded in the Study Area or considered potentially to occur. 	<p>328 discreet vascular flora taxa including:</p> <ul style="list-style-type: none"> 45 families. 137 genera including 7 introduced taxa. <p>10 Vegetation Types were defined.</p> <p>The majority of the vegetation within the Study Area (90.5 %) was rated as Excellent, with no obvious signs of damage caused by human activities. The remainder of the vegetation was rated as Very Good and Good.</p>	<p>One Threatened taxon under the EPBC Act (<i>Seringia exastia</i>) was recorded however it is likely to be delisted in the near future.</p> <p>Seven significant flora taxa were recorded within the Study Area including five Department of Biodiversity, Conservation and Attractions (DBCA) listed Priority (P) taxa, and two potentially undescribed taxa, as listed below:</p> <ul style="list-style-type: none"> <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> (P3). <i>Aristida lazaridis</i> (P2). <i>Corchorus</i> sp. (Potentially undescribed). <i>Eremophila naaykensii</i> (P3). <i>Euphorbia ferdinandi</i> s. lat. (Potentially undescribed). <i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708) (P2). <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3).
Detailed flora and vegetation survey of the Great Northern Highway intersection – Lamb Creek Project (Rapallo, 2021b)	<p>Scope</p> <ul style="list-style-type: none"> Single phase detailed flora and vegetation survey of the Great Northern Highway intersection. <p>Timing</p> <ul style="list-style-type: none"> 12-17 May 2021 (field surveys). <p>Size</p>	Over the Great Northern Highway intersection.	<p>Desktop assessment</p> <ul style="list-style-type: none"> Database searches (max 60 km buffer). Review of relevant reports. <p>Field survey</p> <ul style="list-style-type: none"> 19 flora quadrats (50 m by 50 m). 1 relevé were sampled during the field survey. Additional flora taxa were recorded opportunistically while traversing between quadrats. Survey also included: 	<ul style="list-style-type: none"> 187 flora taxa including: 35 families 178 genera including 9 introduced taxa Six vegetation types were mapped and described. Vegetation condition across the survey area varied from Very Good to 	<p>Five conservation significant flora taxa were recorded from the survey area, as listed below:</p> <ul style="list-style-type: none"> <i>Aristida lazaridis</i>: (P2). <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794): (P3). <i>Goodenia nuda</i>: (P4). <i>Seringia exastia</i>: Critically Endangered. <i>Euphorbia</i> aff. <i>ferdinandi</i>: Potentially undescribed.

Survey (Reference)	Study Type/ Dates	Proximity to Project Area	Survey / Study Effort	Flora and Vegetation recorded	Key Findings
	<ul style="list-style-type: none"> 254 ha. 		<ul style="list-style-type: none"> opportunistic records and field notes. specimen collection and identification. vegetation health classification. 	Degraded, with most of the quadrats ranked as Good.	
Targeted conservation significant flora survey of the Lamb Creek project area (Rapallo, 2022)	<p>Scope</p> <ul style="list-style-type: none"> A targeted significant flora survey was conducted over two phases. <p>Timing</p> <ul style="list-style-type: none"> Phase one: 15-29 April 2020. Phase two: 12-17 May 2021. <p>Size</p> <ul style="list-style-type: none"> 872 ha. 	The project area at the time of the survey only included R47/19 and L47/736. This footprint has now been superseded, the current footprint extends outside of the survey area by 236 hectares (36%).	<p>Desktop assessment</p> <ul style="list-style-type: none"> Review and refine desktop information on conservation significant flora within 30km of the Project Area. <p>Field survey</p> <ul style="list-style-type: none"> a flora desktop assessment. systematic parallel traverses spaced approximately 50 m apart. additional searches on foot and via helicopter, outside the survey area. 		<p>One Threatened taxon under the EPBC Act (<i>Seringia exastia</i>) was recorded however it is likely to be delisted in the near future. Six species of priority flora listed by the DBCA were recorded:</p> <ul style="list-style-type: none"> Aristida Lazaridis (P2). Aristida jerichoensis var. subspinulifera (P3). Eremophila sp. Hamersley Range (P3). Rostellularia adscendens var. latifolia (P3). Rhagodia sp. Hamersley (M. Trudgen 17794) (P3) Euphorbia aff. ferdinandi: Potentially undescribed.
Lamb Creek and Wedge Deposits – Flora and Vegetation Desktop Assessment (Woodman, 2020)	<p>Scope</p> <ul style="list-style-type: none"> Desktop Assessment of Lamb Creek Deposit, Wedge Deposit and access road from Great Northern Highway. <p>Size</p>	Over Project Area.	<p>Desktop assessment</p> <ul style="list-style-type: none"> Database searches (40km buffer). Review of relevant reports. 	9 significant vegetation communities. 38 introduced taxa.	<ul style="list-style-type: none"> 62 significant flora taxa or habitat for significant taxa. 61 DBCA classified priority flora. 1 Threatened taxon.

Survey (Reference)	Study Type/ Dates	Proximity to Project Area	Survey / Study Effort	Flora and Vegetation recorded	Key Findings
	<ul style="list-style-type: none"> 3,110 ha. 				
Lamb Creek flora mapping update and data review (Rapallo, 2017)	<p>Scope</p> <ul style="list-style-type: none"> Level 2 Flora and Vegetation single-phase field survey. <p>Timing</p> <ul style="list-style-type: none"> 27 March to 1 April 2012 (6 days). <p>Size</p> <ul style="list-style-type: none"> 233 ha. 	An extension to the 2012 vegetation mapping to account for a change in alignment of one of the proposed haul road options. (215 ha of L47/736 outside of the previous area mapped in 2012).	<p>Desktop assessment</p> <ul style="list-style-type: none"> extrapolation of vegetation mapping into the new haul road corridor. No field work was conducted within the portion of the new haul road located outside the area surveyed in 2012. 2012 observations and drawings were utilised. 	5 vegetation communities assessed as occurring in the additional study area based on extrapolation.	
Level 2 Flora and Vegetation Survey of Lamb Creek project area for Process Minerals International (Rapallo, 2012)	<p>Scope</p> <ul style="list-style-type: none"> Level 2 Flora and Vegetation single-phase field survey. <p>Timing</p> <ul style="list-style-type: none"> 27 March to 1 April 2012 (6 days). <p>Size</p> <ul style="list-style-type: none"> 2,068 ha. 	The survey encompassed the proposed mine site, two alternate haul road routes (nominal 120 m buffer either side), three alternate accommodation camp locations.	<p>Desktop assessment</p> <ul style="list-style-type: none"> Review and refine desktop information on conservation significant flora (max 40km) of the Project Area. <p>Field survey</p> <ul style="list-style-type: none"> A total of 46 flora quadrats of 50 x 50 m were established within the area within each of the five land systems within the Flora and Vegetation Survey Area as well as opportunistic collections of species. 	<p>230 species</p> <p>110 genera</p> <p>42 families</p> <p>5 introduced taxa</p> <p>6 vegetation communities.</p> <p>Average vegetation condition was excellent to very good.</p>	<p>3 species of priority flora listed by the DBCA were recorded</p> <ul style="list-style-type: none"> Aristida Lazaridis (P2) Brachyscome sp. Wanna Munna Flats (P3) Aristida calycina var. calycina (P2)

2.2 PRE-EUROPEAN VEGETATION

Pre-European vegetation mapping was originally undertaken by Beard (1975) at various scales across WA and has since been updated to be consistent with the National Vegetation Information System (NVIS) descriptions at a scale of 1:250,000 (Beard et al., 2013). Two vegetation associations have been mapped within the Flora and Vegetation Survey Area; Hammersley 18 and Hammersley 82 (Table 2) described as follows:

- Hammersley 18: Low woodland; continuous Mulga woodland communities over spinifex *Triodia basedowii* and *Triodia epactia* hummock grasslands on stony undulating plains; and
- Hammersley 82: Low scattered tree steppe; Snappy Gum *Eucalyptus leucophloia* over spinifex *Triodia wiseana* hummock grassland on stony undulating plains.

Vegetation associations retaining less than 30% of their pre-European extent generally experience accelerated species loss at an ecosystem level and are regarded as being 'vulnerable', while vegetation types retaining less than 10% of their original extent are regarded as being 'endangered' (Environmental Protection Authority, 2020). The two vegetation associations found to intersect the Flora and Vegetation Survey Area have close to 100% of their original extent remaining and are considered 'least concern'. In addition, at a scale of 1:1,000,000, the vegetation units described by Beard (1975) within the Flora and Vegetation Survey Area are well represented throughout the Pilbara bioregion.

Table 2: European Vegetation associations within the Flora and Vegetation Survey Area (DBCA, 2019)

Vegetation Association	Scale	Pre-European Extent (Ha)	Current Extent Remaining (Ha)	Pre-European Extent Remaining	Conservation Status	Extent In Survey Area (Ha)
Hammersley 18.11	State Wide	19,892,306	19,843,148	99.75%	Least Concern	1,094.65
	Pilbara Bioregion	676,556	671,843	99.30%	Least Concern	
Hammersley 82.3	State Wide	2,565,901	2,157,841	99.51%	Least Concern	707.24
	Pilbara Bioregion	2,563,583	2,550,888	99.50%	Least Concern	

2.2.1 Vegetation Types

The most recent detailed flora and vegetation survey undertaken by Umwelt (2022a) found a total of 10 vegetation types within the study area with nine of these being within the DE (Table 3; Figure 2). The vegetation types mapped belonged to three broad groups based on soil and topography:

- Group 1 is characterised by Woodlands over sparse shrublands and hummock grasslands on gentle lower to upper slopes on redbrown clay loams.
- Group 2 is characterised by Open Woodlands over sparse shrublands and tussock and hummock grasslands on steep slopes, crests, gullies and gorges with exposed ironstone and skeletal soils.
- Group 3 is characterised by Mulga Woodlands over tussock grasslands and open woodlands over sparse shrublands over hummock grasslands on red-brown clay-loam on plains; and open woodlands over shrublands over hummock grasslands on major and minor drainage lines.

None of these communities were considered representative of any listed threatened ecological communities (TECs) or priority ecological communities (PECs), nor are they considered regionally significant vegetation for any other reason and are likely to be represented elsewhere.

Table 3: Vegetation Types Mapped Within the Flora and Vegetation

Vegetation Type	Description	Extent in Survey Area (ha)	Extent in Development Envelope (ha)
Group 1: Woodlands over sparse shrublands and hummock grasslands on gentle lower to upperslopes on redbrown clay loams			
1	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and/or <i>E. gamophylla</i> with isolated <i>Corymbia deserticola</i> subsp. <i>deserticola</i> over low to mid sparse to open shrubland dominated by species including <i>Acacia atkinsiana</i> and <i>A. ancistrocarpa</i> over low open hummock grassland of <i>Triodia pungens</i> , <i>T. vanleeuwenii</i> and <i>T. wiseana</i> and low open tussock grassland of <i>Themeda</i> sp. Mt Barricade and <i>Paraneurachne muelleri</i> on red-brown sandy clay loam to clay loam on gently inclined mid to lower slopes and associated drainage lines	1429.2 (37.8%)	445.8 (51.0%)
2	Low open woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> with occasional <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>C. hamersleyana</i> over low sparse shrubland of <i>Acacia hilliana</i> and <i>Hakea chordophylla</i> over open hummock grassland of <i>Triodia vanleeuwenii</i> and <i>T. wiseana</i> on red-brown clay loam with ironstone pebbles on gently inclined lower to upper slopes	382.3 (10.1 %)	66.4 (7.6 %)
3	Isolated trees of <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>E. gamophylla</i> over low sparse shrubland of mixed <i>Acacia</i> species over low hummock grassland of <i>Triodia pungens</i> and <i>T. wiseana</i> on red-brown sandy clay loam on mid to lowerslopes with ironstone pebbles	48.2 (1.3 %)	7.2 (0.8%)
Group 2: Open Woodlands over sparse shrublands and tussock and hummock grasslands on steep slopes, crests, gullies and gorges with exposed ironstone and skeletal soils.			
4	Low open woodland of <i>Corymbia ferritcola</i> or <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> with <i>Ficus brachypoda</i> occurring on gorge and gully areas, over low sparse shrubland of mixed species dominated by <i>Corchorus laniflorus</i> , <i>Dodonaea viscosa</i> subsp. <i>mucronata</i> and <i>Gossypium robinsonii</i> over sparse hummock grassland dominated by <i>Triodia pungens</i> with <i>T. wiseana</i> and tussock grasses including <i>Cymbopogon ambiguus</i> and <i>Aristida burbridgeae</i> on red brown clay loam on steep upperslopes, gullies, breakaways and gorges with significant ironstone outcropping	95.3 (2.5 %)	1.6 (0.2%)
5	Occasional <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over mixed isolated shrubs including <i>Acacia inaequilatera</i> and <i>Senna artemisioides</i> subsp. <i>glutinosa</i> over low hummock grassland of <i>Triodia wiseana</i> on steep upperslopes and associated drainage lines on red-brown clay loam with exposed ironstone and dolerite	100.9 (2.7 %)	0
6	Low woodland to open woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and occasional <i>E. kingsmillii</i> over mid isolated shrubs of <i>Acacia hamersleyensis</i> and <i>Grevillea wickhamii</i> ?subsp. <i>hispidula</i> over low hummock grassland of <i>Triodia wiseana</i> on red brown sandy clay loam on steep mid to upperslopes with exposed ironstone	316.6 (8.4 %)	4.0 (0.5%)

Vegetation Type	Description	Extent in Survey Area (ha)	Extent in Development Envelope (ha)
Group 3: Mulga Woodlands over tussock grasslands and open woodlands over sparse shrublands over hummock grasslands on red-brown clay-loam on plains; and open woodlands over shrublands over hummock grasslands on major and minor drainage lines			
7	Isolated trees of <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Eucalyptus xerothermica</i> over low open to sparse shrubland dominated by <i>Acacia aptaneura</i> , <i>A. aneura</i> and <i>A. pruinocarpa</i> over low tussock grassland to sparse tussock grassland dominated by <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471), <i>Enneapogon polyphyllus</i> , <i>Chrysopogon fallax</i> and <i>Aristida</i> spp. with occasional <i>Triodia pungens</i> on red brown clay loam with some ironstone pebbles on plains	523.4 (13.8 %)	171.9 (19.7 %)
8	Isolated trees of <i>Eucalyptus xerothermica</i> over tall open to sparse shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Acacia aptaneura</i> over low open tussock grassland of <i>Aristida contorta</i> , <i>A. inaequiglumis</i> and <i>Themeda triandra</i> on red-brown sandy clay to clay on plains	68.9 (1.8 %)	3.9 (0.5%)
9	Low open woodland of <i>Corymbia hamersleyana</i> , <i>C. deserticola</i> subsp. <i>deserticola</i> , <i>Eucalyptus gamophylla</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over tall sparse shrubland of <i>Acacia atkinsoniana</i> and occasional <i>A. ancistrocarpa</i> and <i>A. aptaneura</i> over low hummock grassland dominated by <i>Triodia pungens</i> and occasional <i>T. wiseana</i> with <i>Paraneurachne muelleri</i> also dominant on red-brown clay loam with ironstone pebbles on plains	600.8 (15.9 %)	103.3 (11.8 %)
10	Low open woodland of <i>Corymbia hamersleyana</i> with occasional <i>Eucalyptus gamophylla</i> , <i>E. leucophloia</i> subsp. <i>leucophloia</i> and <i>E. xerothermica</i> over tall open shrubland dominated by taxa including <i>Acacia cowleana</i> , <i>A. tumida</i> var. <i>pilbarensis</i> , <i>Gossypium robinsonii</i> and <i>A. pyrifolia</i> over low open hummock grassland of <i>Triodia pungens</i> and tussock grassland dominated by <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471) and <i>Aristida</i> spp. on red-brown clay loams on major and minor drainage lines	523.4 (13.8 %)	67.1 (7.7 %)
Cleared, rehabilitated, existing roads and tracks (not a vegetation type).		4.6 (0.1%)	2.9 (0.3%)
Total		3785.7	874

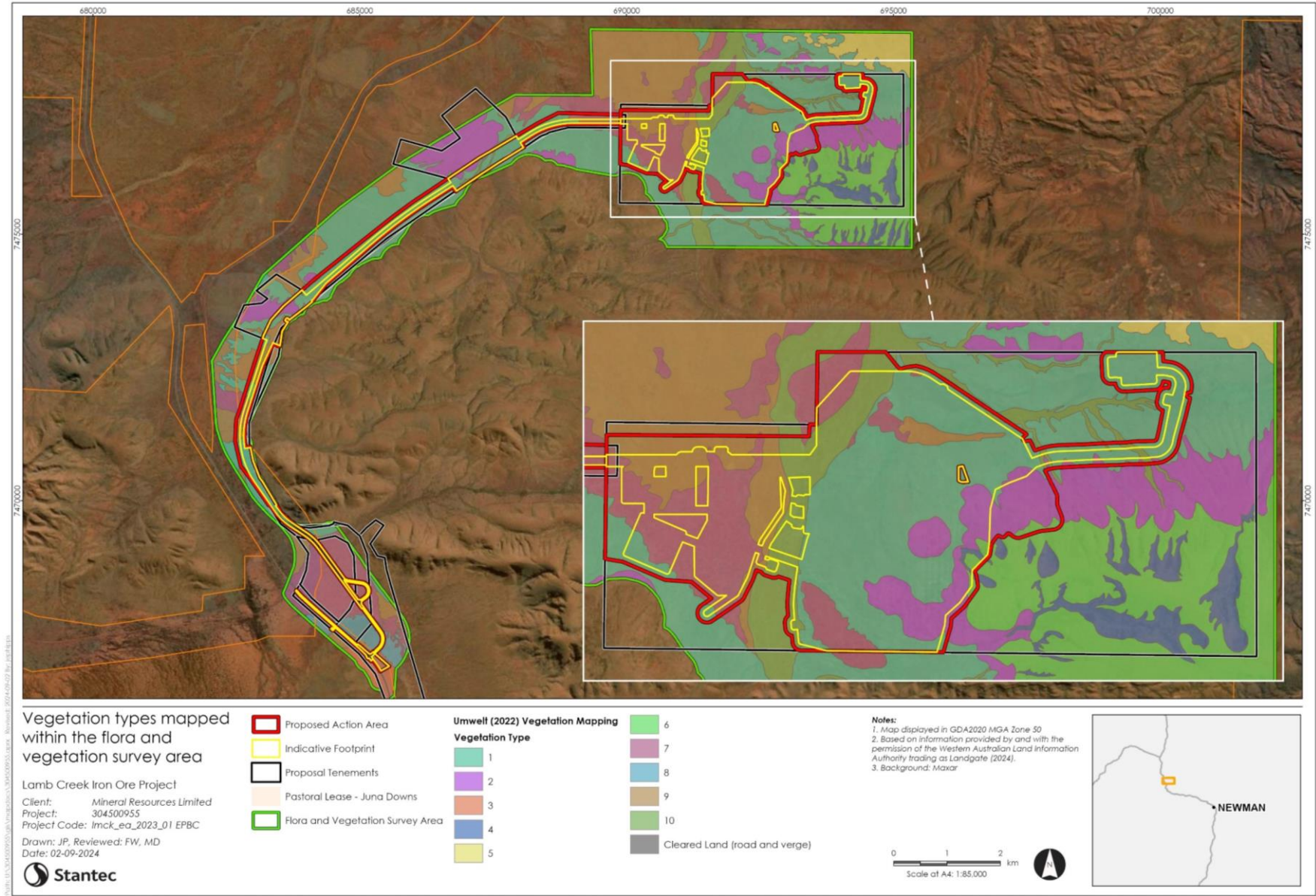


Figure 2: Vegetation Types Mapped Within The Flora And Vegetation Survey Area

2.2.1.1 Vegetation Condition

The condition of the vegetation in the Study Area was rated Good to Excellent (Umwelt, 2022a). The majority of the vegetation (90.5 %) rated as Excellent, with no obvious signs of damage caused by human activities. The remainder of the vegetation was rated as Very Good and Good (8.2 % and 1.2 % respectively), with some historical mechanical disturbance but mostly low levels of introduced flora within the Study Area. Less than 1 % of the Study Area (4.6 ha) was mapped as cleared with no native vegetation remaining.

The vegetation of the Study Area has for the most part been subject to fire in the past 10 years however none of the Study Area has been burnt more recently than four and a half years prior to survey (Umwelt, 2022a). This has resulted in a mosaic of vegetation of different fire ages. Floristic data and site photos collected in 2020 and 2021 indicate that these fires have changed both vegetation structure and floristic composition since 2012 (Rapallo, 2021e).

2.2.1.2 Vegetation of Significance

None of the vegetation types recorded from the Flora and Vegetation Survey Area are consistent with TECs or PECs listed under the *Biodiversity Conservation Act 2016* (BC Act) or EPBC Act for the Pilbara bioregion (Department of Biodiversity Conservation and Attractions, 2021). The nearest PEC to the Flora and Vegetation Survey Area is a subtype of the "Coolibah-lignum flats: *Eucalyptus victrix* over lignum community in the Pilbara". The edge of the PEC's buffer zone is located approximately 5 km south of the Flora and Vegetation Survey Area (Rapallo, 2022). As neither *Eucalyptus victrix* nor *Muehlenbeckia* spp. (lignum) have been recorded within the Flora and Vegetation Survey Area, the Coolibah-lignum flats PEC is considered unlikely to occur.

2.2.1.3 Other Vegetation of Significance

Vegetation may be of significance for reasons other than being listed as a TEC or PEC. This may include, although is not limited to, scarcity, combination of species, role as a refuge, restricted distribution and vegetation extent being below a threshold level (Environmental Protection Authority, 2004). Local significance can be determined where a vegetation type is confined to a specialised habitat and/or landform that is not common in the local area or the vegetation types are supporting significant species or groundwater dependent species. The following vegetation communities are considered to be potentially locally and/or regionally significant; however, they are not listed under the BC Act or EPBC Act.

The closest significant vegetation record to the Study Area is an occurrence of the 'Coolibah-lignum flats: *Eucalyptus victrix* over lignum community in the Pilbara - sub type 2: Coolibah woodlands over lignum (*Duma florulenta*) over swamp wanderrie (Lake Robinson)' PEC (P1); the edge of this PEC's buffer polygon is approximately 3 km south of the Study Area. The vegetation types mapped by Umwelt (2022a) are not considered to represent any listed PEC or TEC nor are they considered to be significant. None of the vegetation types are considered to be providing important functions required to maintain ecological integrity of a significant ecosystem.

2.2.1.4 Groundwater-dependent Vegetation

No groundwater dependent vegetation was recorded within the Flora and Vegetation Survey Area (Rapallo, 2022), consistent with the characterisation of part of the area as a floodplain, as well as an apparent lack of permanent or semi-permanent surface water and a lack of broad incised channels.

2.2.2 Flora

2.2.2.1 Floristic Composition

The Umwelt (2022a) survey recorded 328 vascular flora taxa from 45 families and 137 genera, including 7 introduced taxa. The most well-represented families were Fabaceae (64 discrete taxa, three known hybrids), Poaceae (56 taxa), Malvaceae (45 taxa) and Amaranthaceae (16 taxa).

2.2.2.2 Significant Flora

Nine significant flora species were recorded within, and adjacent to, the DE (**Table 4, Figure 3**). This includes five DBCA-listed Priority flora taxa, one Commonwealth listed taxa and two taxa considered significant under the 'new species or species with anomalous features that indicate a potential new species' which are referred to as "potentially undescribed (Umwelt, 2022a):

- *Aristida jerichoensis* var. *subspinulifera* (P3)
- *Aristida lazaridis* (P2)
- *Corchorus* sp. (Potentially undescribed)
- *Eremophila naaykensis* (P3)
- *Euphorbia ferdinandi* s. lat. (Potentially undescribed)
- *Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708) (P2)
- *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3)
- *Rostellularia adscendens* var. *latiflora* (P3)
- *Seringia exastia* (T – Commonwealth)

Three significant taxa were recorded in the Indicative Footprint. These were:

- *Rhagodia* sp. Hamersley (M. Trudgen 17794) was not recorded by Umwelt (2022a) but 3 plants were previously recorded by Rapallo (2022).
- *Aristida lazaridis* (P2) - Umwelt (2022a) recorded three records with a total of four individuals while Rapallo 2022c recorded 58 plants from 44 records; and
- *Seringia exastia* (T) - Umwelt (2022a) recorded 13 records with a total of 221 individuals while Rapallo 2022c recorded none).

A single plant of *Aristida jerichoensis* var. *subspinulifera* has been recorded in the Development Envelope in the indirect impact assessment zone by Umwelt (2022a) but outside of the Indicative Footprint. The Umwelt (2022a) survey recorded locations of *Seringia exastia*, a taxon currently still listed as Threatened under the EPBC Act however it has been delisted under the BC Act. Locations of significant flora taxa recorded in the Study Area by the Umwelt 2022 survey are presented in **Table 4**. The Umwelt (2022a) survey recorded *Goodenia nuda* during the survey however this species has now been delisted from a priority 4 and has therefore been excluded from **Table 4**. All significant flora taxa recorded within the Flora and Vegetation Survey Area also occur within the broader Hamersley subregion. Figure 3: Priority Flora Recorded Within The Flora And Vegetation Survey Area shows the locations of the significant flora in relation to the DE.

Table 4: Significant Flora Recorded in the Flora and Vegetation Survey Area

Species	Conservation Status	Habitat	Vegetation Types	No. of Individuals		IF	Other previous records of species
				Survey Area	DE (excluding IF)		
<i>Seringia exastia</i>	T/Cr	Variety of Mulga woodlands, sometimes with <i>Eucalyptus</i> spp., over <i>Acacia</i> spp. shrublands over <i>Triodia pungens</i> hummock grassland. Gullies and washouts. Red sand/laterite over sandstone.	1~, 2, 3, 6, 9, 10	783 in 37 locations	11	211	The species is currently listed as Critically Endangered under the EPBC Act, but this is due to a taxonomic revision where a threatened and a common species were merged, and the name of the former was adopted as the new name, with the conservation status still attached. The current distribution map published on FloraBase (Western Australian Herbarium 1998) incorporates this revision, showing <i>Seringia exastia</i> as widespread across northern Western Australia, ranging from the Coolgardie and Murchison IBRA regions in the south to the Dampierland IBRA region in the north. <i>Seringia exastia</i> is no longer listed as Threatened under State legislation and is expected to be de-listed under the EPBC Act in the future. The Rapallo (2022) survey found 2 additional records in their targeted flora survey area of the Lamb Creek site.
<i>Aristida lazaridis</i>	P2	Plain, clay/loam, drainage, slope; often Mulga low open woodland with or without <i>Eucalyptus</i> spp., over variety of shrubs and herbs, often over tussock grassland but sometimes with <i>Triodia</i> spp. hummock grassland.	7~, 8~, 3, 9	7217 in 3094 locations	12	77	Rapallo (2022) recorded an estimated population of 12773 plants from 6757 point locations over the 2020 and 2021 surveys undertaken. Searches outside the survey area on foot and from helicopter recorded the species extending outside the project area. A significant population of <i>Aristida lazaridis</i> (2405 individuals) has been recorded in deep loam soil along an un-incised drainage line north and west of the BHP Packsaddle Village, approximately 7 km south-east of the Proposal. The species has also been recorded from Lake Robinson on the eastern fringe of the Coondewanna Flats. The Western Australian Herbarium (WAH) has 20 specimen records within their database, with collections from locations across approximately 130 km extending from the Rangers Station at Karijini National Park to near Newman (DBCA 2021c). There are 43 records from the Rio Tinto Priority Flora database (Rio Tinto 2018) extending over 60 km. Additionally, this species occurs over a 2,500 km range across the Northern Territory and Queensland (Atlas of Living Australia 2021).

Species	Conservation Status	Habitat	Vegetation Types	No. of Individuals		IF	Other previous records of species
				Survey Area	DE (excluding IF)		
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P3	Plain or flat, clay/loam. Often Mulga woodlands or <i>Acacia</i> spp. shrublands over spinifex and/or tussock grassland.	8~	97 in 8 locations	1	0	Locally, there is a WAH record of <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> from 800 m northwest of the Proposal, from a level plain of orange light clay (DBCA 2021a). There are 39 specimen records within the WAH database, with collections from locations spread across 290 km extending between Nammuldi to Newman, with outliers in the Little Sandy Desert and Murchison, as well as collections from the Northern Territory and Queensland (DBCA 2021c; Atlas of Living Australia 2021).
<i>Eremophila naaykensis</i> previously <i>Eremophila</i> sp. Hamersley Range	P3	Rocky gullies and gorges. Steep rocky hill slopes and summits, high in the landscape.	4~	73 from 37 locations	0	0	This species has been recorded approximately 8 km south of the Proposal (DBCA 2021a) and from Baby Hope Downs approximately 35 km southeast of Proposal from five locations in rocky gullies and gorges (Biota 2014). There are 15 specimen records within Western Australia, with WAH records from locations spread across 220 km from Paraburdoo to Newman (Western Australia Herbarium, 1998) and 345 records, within the Rio Tinto database; recorded from Eastern Range, Channar, Turee Syncline, Karijini National Park, West Angelas, Angelo Central and Hope Downs 1 (Rio Tinto 2016).
<i>Corchorus</i> sp. Potentially undescribed	Potentially undescribed	The habitat of the recorded population was restricted to drainage lines of sandy loam soils, with no or very few stones, and an open lower stratum of tussock grasses and low shrubs	9~	35 from 23 locations	0	0	This species does not match reference specimens of any published species and has potential taxonomic significance. This entity is distinct in having elongated fruit. Fruiting specimens were collected in April and June 2022, indicating approximately a March-May flowering period. Flowering specimens were also collected in late June, though this could be considered a response to the unseasonably late rains of May 2022 rather than an indicator of usual flowering time. There are no other known populations of this entity, which may indicate that it is geographically restricted. A precautionary approach would see it regarded as a taxon of potential conservation significance, though this is not yet able to be formally assessed (Umwelt, 2022a).

Species	Conservation Status	Habitat	Vegetation Types	No. of Individuals		IF	Other previous records of species
				Survey Area	DE (excluding IF)		
<i>Rhagodia</i> sp. P3 Hamersley (M. Trudgen 17794)		Mulga over mixed grassland. Emergent eucalypts and <i>Triodia</i> spp. grassland. Very open Mulga woodland over patchy mixed grasses. Floodplains, hardpan plains.	7~, 8, 9	53 from 49 locations	0	3	This species is widespread on Mulga plains. Fifty plants were recorded near the Great Northern Highway by Rapallo (2022). The Rapallo (2022) survey found 49 additional records in their targeted flora survey area of the Lamb Creek site. Locally, 13 populations of <i>Rhagodia</i> sp. Hamersley have been recorded within 3 km of the Proposal Area. There are 63 specimen records in the WAH database, with collection locations spread approximately 290 km extending between Tom Price and Newman (DBCA, 2021). Fifty plants were recorded near the Great Northern Highway by Rapallo (2022). The Rapallo (2022) survey found 49 additional records in their targeted flora survey area of the Lamb Creek site with 3 plants been previously recorded in the Development Envelope. Umwelt (2022a) however did not record any plants in their survey.
<i>Hibiscus</i> sp. P2 Gurrinbiddy Range (M.E. Trudgen MET 15708)		Rocky gullies, drainage lines and gorges with loamy skeletal soil	4~	17 from 2 locations	0	0	This taxon is known from 24 WA Herbarium records across 10 broad regional locations, two of which occur within DBCA-managed tenure within Karijini National Park, no records are within 10km of the Study Area. This record of <i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudge MET 15708) is a slight range extension of the known range of this taxon to the north.
<i>Euphorbia</i> aff. <i>ferdinandi</i> Potentially undescribed		Often found in open woodland, <i>Acacia aneura</i> woodland, low shrublands, flats, in clay loam soil	8~, 7	60 individuals from 19 locations	0	0	This taxon was recorded from four locations near the Great Northern Highway. It was only recognised as a potentially undescribed species, and different from any known species, when the specimen was compared in detail with other <i>Euphorbia</i> specimens at the WAH. Further advice was sought from Steve Dillon at the WAH, who advised that the specimen differed from <i>Euphorbia ferdinandi</i> by having broader seeds and a stigma different from what has been described for this species (S. Dillon pers. comm., September 2021). All locations of this taxon were within the Flora and Vegetation Survey Area, but outside of the Development Envelope. The Rapallo (2022) survey found 4 additional records in their targeted flora survey area of the Lamb Creek site.

Species	Conservation Status	Habitat	Vegetation Types	No. of Individuals		IF	Other previous records of species
				Survey Area	DE (excluding IF)		
Rostellularia adscendens var. latiflora	P3	Acacia shrubland, sometimes with Eucalypts and Corymbias, over shrublands and herblands, over tussock grassland, or <i>Triodia pungens</i> hummock grassland.	1	1	0	0	Local population has been assessed to be of low regional significance. The taxon has a distribution of approximately 450 km from west of Tom Price to north east of Meenthen Station. The species is known from 42 WA Herbarium records across more than 280km from near Mt Farquhar (89km north-west of Tom Price) to the Oakover River with at least six locations occur in the Karijini National Park. This taxon has been recorded approximately 20km south-east of the Lamb Creek retention license on the MAC development Envelope (Umwelt, 2022b). A single plant was recorded by Rapallo (2022c) within a minor flowline within the area of the proposed haul road. While the study area is within the known range of the taxon, Umwelt (2022a) however did not record any plants in their survey.

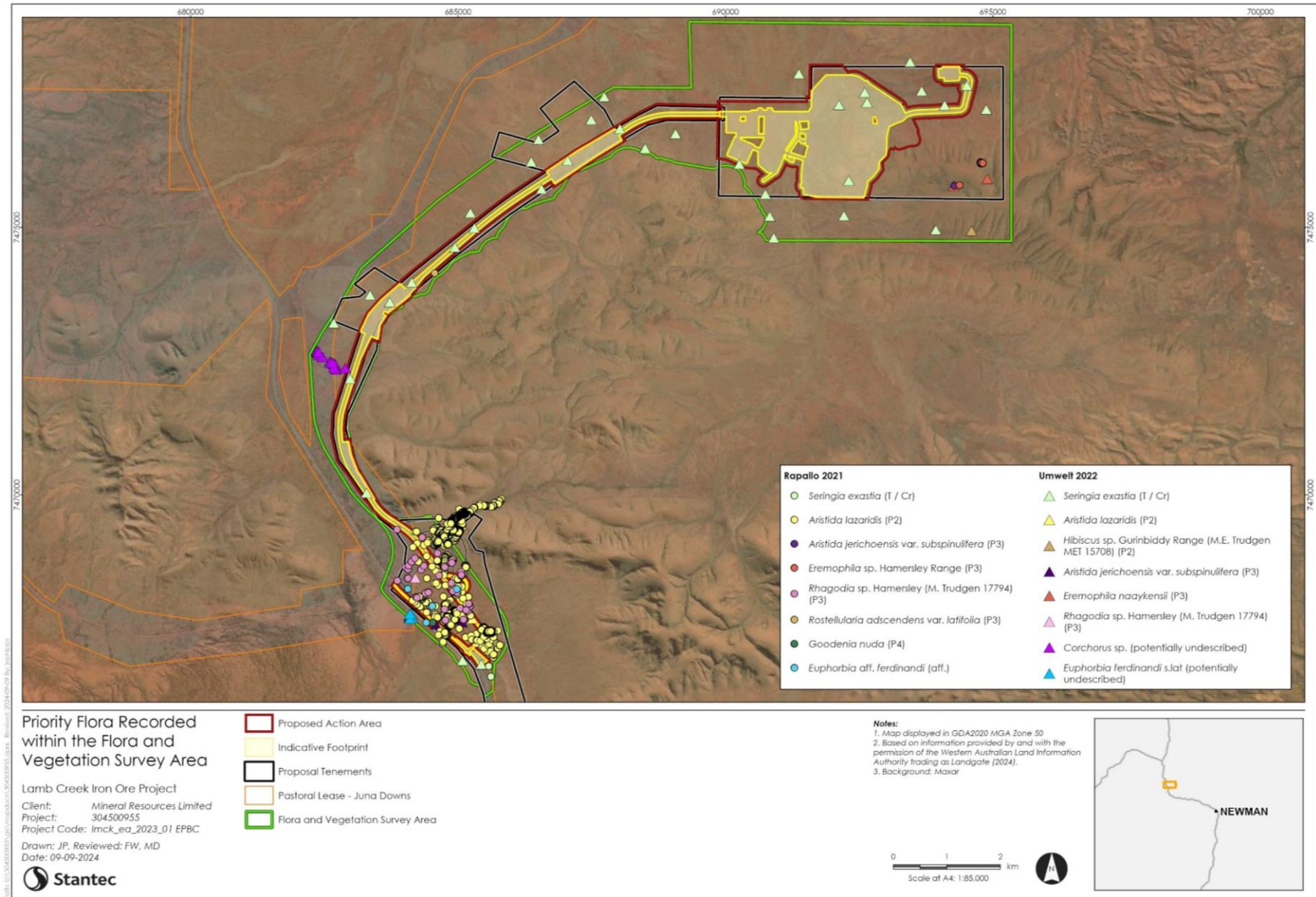


Figure 3: Priority Flora Recorded Within The Flora And Vegetation Survey Area

2.2.2.3 Introduced Flora

In total, seven introduced flora species (weeds) have been recorded within the Flora and Vegetation Study area (Table 5; Figure 3). None of these taxa were listed as Declared Pests (DPIRD, 2020) or Weeds of National Significance (Commonwealth of Australia, 2022). *Bidens bipinnata*, *Cenchrus ciliaris* and *C. setigera* were the most common introduced taxa in terms of numbers of locations and individuals recorded. Introduced flora were most commonly recorded in drainage areas (Figure 3; Figure 4:). Whilst some of the introduced flora have a High/Rapid ecological impact and invasiveness ratings, no introduced taxa were widespread in the Study Area, and the vegetation was considered to be in mostly Excellent condition (Umwelt, 2022a).

Table 5: Introduced Flora Species Recorded In The Flora And Vegetation Survey Area

Species	Common Name	Number of Locations	Number of individuals	Naturalised Status (Western Australian Herbarium, 2022)	Ecological Impact*	Invasiveness*
<i>Bidens bipinnata</i>	Bipinnate Begger's Tick	31	824	Alien to WA	Unknown	Rapid
<i>Cenchrus ciliaris</i>	Buffel Grass	13	149	Alien to WA	High	Rapid
<i>Cenchrus setiger</i>	Birdwood Grass	17	2,654	Alien to WA	High	Rapid
<i>Malvastrum americanum</i>	Spiked Malvastrum	11	70	Alien to WA	High	Rapid
<i>Portulaca pilosa</i>	Pink Purslane	1	1	Alien to WA	Not rated	Not rated
<i>Setaria verticillata</i>	Whorled Pigeon Grass	6	20	Alien to WA	High	Rapid
<i>Tribulus terrestris</i>	Caltrop	3	5	Alien to WA	Unknown	Moderate

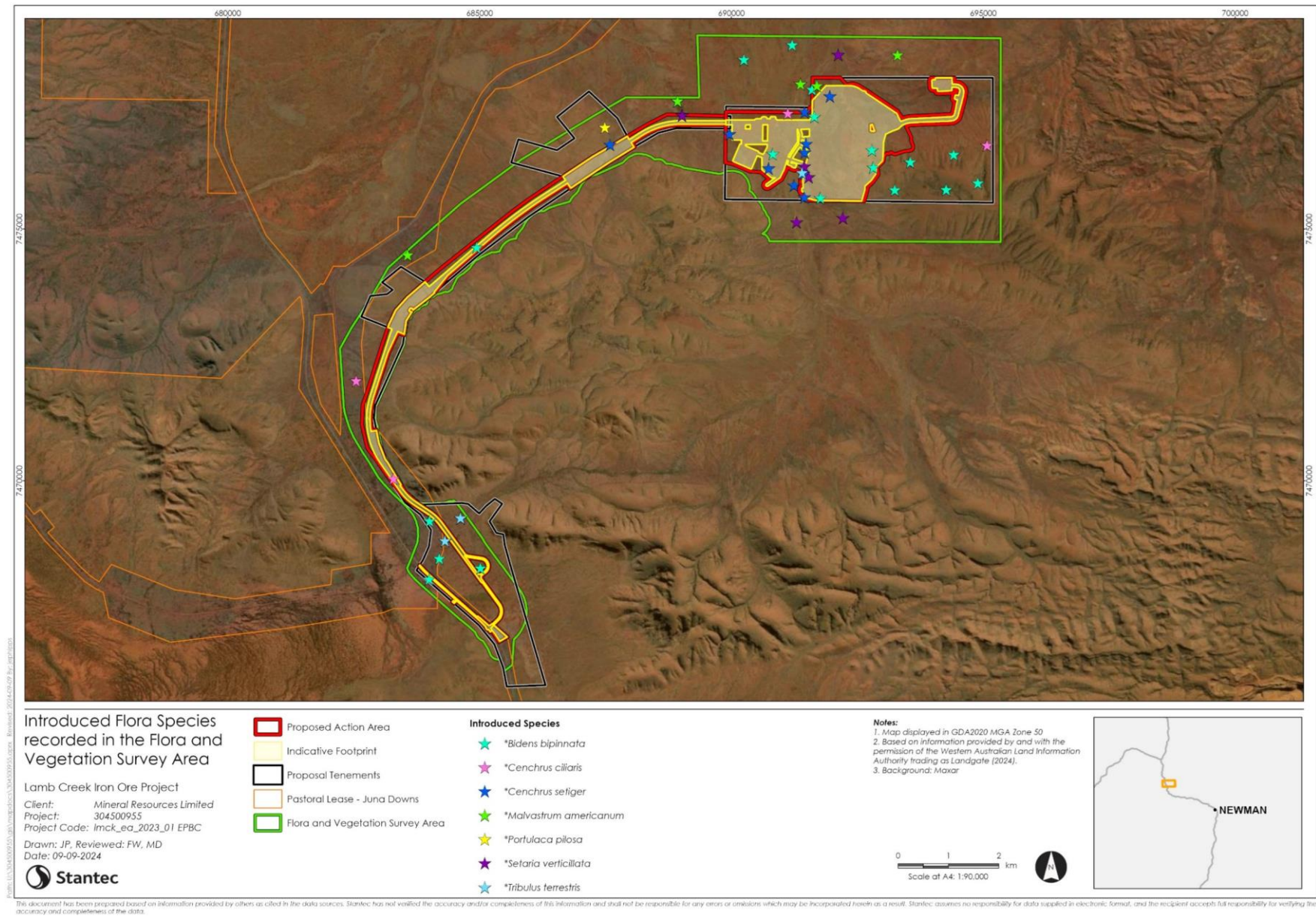


Figure 4: Introduced flora Species recorded in the Flora and Vegetation Survey Are

2.3 KEY ASSUMPTIONS AND UNCERTAINTIES

The limitations and constraints that can affect the adequacy of flora and vegetation management actions are summarised as follows:

- It is assumed that by utilising areas of existing disturbance, minimising clearing, and implementing progressive rehabilitation throughout the life of the Project, the impacts to significant flora and vegetation will be minimised.
- It is assumed that targeted surveys for significant flora have adequately characterised the populations potentially impacted and are of suitable standard to implement proposed management targets.
- Potential survey limitations of the latest Umwelt (2022a) include:
 - Survey timing and weather/season/cycle- partial limitation: All significant flora taxa known to occur or potentially occurring in the Study Area based on the desktop assessment results were considered to be identifiable during the 2022 survey with the exception of two taxa. *Arthropodium vanleeuwenii* (P2) is considered visible only when flowering in September, as it grows up through *Triodia*. This taxon could occur within the Study Area and Targeted Survey Area based on the habitats present. *Rhodanthe ascendens* (P1) was also potentially unidentifiable at the time of survey based the known flowering time. However, this taxon is unlikely to occur in the Study Area based on a combination of the habitat present, extent of targeted searching undertaken, and that the Study Area is outside of the known range. One significant flora taxon (*Euphorbia clementii*) (P2) is a known fire responder; otherwise, the fire response of other significant flora is unknown or presumed not to be fire responders (from desktop review). The majority of the targeted flora survey area was either long unburnt (>10 years), or otherwise subject to burn approximately 4.5 years ago. Unlikely that *Euphorbia clementii* (P2) is present in Study Area due to being outside of the known range of the taxon.
- Key uncertainties:
 - The extent to which climatic factors outside of the Proponents control will impact on successful rehabilitation.
 - The extent to which climatic factors outside of the Proponents control will impact on the health and extent of populations of significant flora.
 - Variation in soil condition over the Disturbance Envelope and within the revegetation zones.

2.4 POTENTIAL PROJECT IMPACTS

The Project may directly and indirectly impact on flora and vegetation, with the potential direct impacts identified as:

- loss of native vegetation due to clearing.
- loss of significant flora taxa due to clearing.
- unauthorised clearing outside the approved Indicative Footprint.

The potential indirect impacts have been identified as:

potential for fragmentation of vegetation as a result of construction of linear corridors.

- introduction and / or spread of introduced flora species.
- degradation or alteration of vegetation as a result of altered fire regimes.
- degradation or alteration of vegetation as a result of altered hydrological regimes.
- degradation of vegetation through dust deposition.

2.5 APPLICATION OF THE MITIGATION HIERARCHY

Mitigation measures have focused on significant flora, where relevant, aligning with the management provisions.

The Project will **avoid** impacts to significant flora via the following:

- Proposed clearing has been minimised as far as practicable to reduce the extent of disturbance required; the Proponent has revised the Development Envelope from 1,399 ha to 874 ha.
- The area to be cleared shall be clearly demarcated and machinery operators made aware of the operational boundary, following confirmation with the relevant manager. Some heavy equipment used may have in-cab GPS mapping and alarm functions however in the absence of this functionality, other control measures such as the use of spotters and/or restricting clearing to the daylight hours will be undertaken.
- A Land Activity Permit and Land Clearing Procedure will be implemented to ensure all clearing works are compliant with regulatory requirements and are within approved boundary.
- Significant flora populations and the area to be cleared shall be clearly demarcated and machinery operators made aware of the operational boundary, following confirmation with the relevant manager.
- Off-road driving shall be prohibited unless authorised via a LAP.
- Avoid hot work in fire sensitive areas and during fire risk day.
- Intersection of the haul road with GNH and an additional 100 m past the intersection, will be sealed to reduce the generation of dust.
- Road Train iron ore loads will be covered.
- Ground clearing (including topsoil stripping) shall not be undertaken during periods of high wind (unless soil moisture levels are also elevated enough to inhibit dust formation).

The Project will **minimise** impacts to significant flora via the following:

- Spatially restricted Indicative Footprint and short life of mine.
- Implementation of the FVMP.
- Clearing awareness training undertaken by all personnel involved in clearing activities.
- Vegetation clearing shall be kept to the minimum amount required and as approved.
- Where significant flora taxa populations cannot be avoided, as may be the case with *Seringia exastia* (EN under the EPBC Act), *Aristida lazardis* (P2) and *Rhagodia* sp. Hamersley (P3), infrastructure will be placed to avoid the highest densities and designed to minimise obstruction of surface water flows.
- Preparing and Implementing a Weed Management Plan (indicative plan attached, **Appendix A**) prior to construction and operation, to control access and movement of vehicles and construction personnel to prevent the introduction and spread of weeds into the Development Envelope, weed free areas, and between work areas.
- Vehicles with ground engaging equipment to be cleaned, inspected and issued with a Weed Hygiene Certificate prior to entry to site or moving between areas of known weed infestation within the site (as per MinRes Weed Management Plan, **Appendix A**).
- Off-road driving shall be prohibited unless authorised under a LAP.
- Weed awareness and weed hygiene shall be delivered to all personnel as part of the induction process.
- Regular inspection and maintenance of vehicles and equipment shall be undertaken (fire and spill prevention).
- Fire management awareness shall be delivered to all personnel as part of the induction process.

- Firebreaks will be incorporated into mine layout planning in accordance with the local government firebreak notice under s. 33 of the *Bush Fires Act 1954*.
- Smoking will only be permitted in designated areas, which shall be appropriately signed and contain self-arresting cigarette butt disposal containers.
- An Emergency Response Plan shall be prepared and implemented.
- An Emergency Response Team shall be formed, in accordance with requirements regulated by DEMIRS
- The Emergency Response Team will ensure that sufficient fire suppression equipment is located as per the Emergency Response Plan.
- Hot Work shall be completed under a Hot Work Permit and in accordance with MRL-SAF-PRO-0081 Hot Work Procedure.
- Traffic Management Plan shall be prepared and implemented.
- All vehicles and machinery will be fitted with fire extinguishers and/or in-plant fixed water suppression.
- Fire extinguishers will be located at infrastructure/building facilities across the project.
- Implement surface and groundwater management strategies in accordance with the Surface water Management Plan (SWMP) and Groundwater Operating Strategy (GWOS).
- Dust suppression shall be implemented to manage dust emission on cleared areas and iron ore handling areas.
- Speed limits shall be established and apply on unsealed and sealed roads within the Project Area.

The Project will **rehabilitate** impacts to flora via the following:

- Implement an appropriate rehabilitation plan (surface treatments; seed selection, collection, storage and management) in accordance with the approved MCP.
- Progressive rehabilitation of disturbed areas will be undertaken throughout the life of mine, in accordance with the approved Mine Closure Plan.
- Seasonal weed control programs shall be implemented, including herbicide spraying or physical removal, as required.
- Weeds which are physically removed will be disposed of at the waste rock landform and buried.
- Salvage and stockpile particular vegetation types, soil, or habitat features (e.g. vegetation, stumps, logs, and boulders) for use in rehabilitation programs.

The Project will **offset** impacts to significant flora via the following:

- The Proponent proposes offsets, whereby financial contributions will be made to the Pilbara Environmental Offset Fund (PEOF) to offset the significant impact to native vegetation from clearing in accordance with *Cumulative environmental impacts of development in the Pilbara region – Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the Environmental Protection Act 1986* (Department of Water and Environmental Regulation, 2019).

3. MANAGEMENT PROVISIONS

3.1 OVERVIEW

The FVMP outlines the requirements to avoid, minimise, manage, monitor, and rehabilitate direct and indirect impacts to significant flora and vegetation from the Project, aligning with the EPA's mitigation hierarchy. The subsequent sections identify the management provisions that will be implemented by the Proponent for the Project to ensure that the environmental objectives, criteria, targets, and outcomes are met for flora and vegetation. Where unacceptable environmental outcomes remain post the implementation of control measures, offset strategies will be proposed. The FVMP will be reviewed and updated as required, following an adaptive management approach (**Section 7**). A detailed Mine Closure Plan (MCP) will be provided and will address the potential impacts of the Project post closure.

3.2 OUTCOME-BASED PROVISIONS

This FVMP focuses on outcome-based provisions, which are performance-based and can be applied through a variety of means. The objectives developed are measurable, and the success of management actions can be monitored and reported. Outcome-based provisions specify triggers and thresholds (environmental criteria) for direct impacts that are quantifiable and specifically relate to flora and vegetation (Table 6). Two objectives have been developed, with associated triggers and thresholds. Where required, suitable response and corrective actions are also recommended for the environmental criteria. The following outcomes-based provisions have been established:

- Ensure development and operation of the Project meets the objective of protecting flora and vegetation to maintain biological diversity and ecological integrity.

3.3 OBJECTIVE-BASED PROVISIONS

Objective-based provisions relate to environmental management actions that are not specifically measurable. They specify management actions according to management targets, particularly for indirect impacts that are not necessarily quantifiable. Five objective-based management provisions have been outlined in Table 7 to prevent project-related adverse impacts to flora and vegetation (including significant species) within proximity to the Project with appropriate management actions and monitoring actions. The following objectives-based provisions have been established:

- No clearing of native vegetation shall occur outside of the approved, demarcated clearing area(s) during construction or operation.
- No new weed species to be introduced into the Development Envelope as a result of construction and operation of the Project.
- No significant expansion of known weed species in the Development Envelope as a result of construction and operation of the Project.
- Effective operation of the Project to avoid Project related fire.
- Minimise decline of flora and vegetation health, population, due to dust, weeds, and hydrocarbon or chemical leaks and altered hydrological regimes as a result of construction and operation of the Project.

It is also noted that as ongoing monitoring is undertaken and additional population data is gathered, the management targets may be reviewed, and quantifiable outcome-based provision(s) may be established accordingly.

3.4 ENVIRONMENTAL CRITERIA, TARGETS AND JUSTIFICATION

The development of environmental objectives and criteria for outcome-based provisions within the FVMP are based on available data and information and align with the purpose of the FVMP. Outcome-based provisions utilise monitoring and reporting to assess against the measurable environmental criteria. In addition to these, objective-based provisions have been applied with management targets.

During monitoring, where threshold criteria (outcome-based) or management targets (objective-based) are exceeded, and are project-related, response and corrective actions are provided, and will be implemented, where deemed appropriate. Monitoring will inform adaptive management, with the revision of environmental criteria, and response or corrective actions, as required.

Table 7 outlines the objective-based management provisions required to avoid and minimise any direct and indirect impacts on the following flora and vegetation environmental values within the Project Area, in alignment with the EPA's mitigation hierarchy (avoid, minimise, rehabilitate):

- Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types within the IF, with clearing of up to 646.9 ha to occur.
- 77 individuals of *Aristida lazardis* (P2), three individuals of *Rhagodia* sp. Hamersley (M. Trudgen 17794) and 211 individuals of *Seringia exastia* (EPBC listed only) recorded within the Indicative Footprint.

Where there is the potential for significant environmental impacts remaining, post implementation of control measures, environmental offset strategies are proposed to meet Environmental Protection Authority (2016) guidance for flora and vegetation. For the Project, clearing of up to 646.9 ha of native vegetation within a Development Envelope of 874 ha will occur. The Proponent proposes offsets, whereby financial contributions will be made to the PEOF to offset the significant impact to native vegetation from clearing.

Justification for the management provisions outlined in the FVMP are based on the following:

- Weeds can have a detrimental effect on ecological communities, with certain weeds such as *Cenchrus* spp. leading to an increased risk of fire which is a key threat to a number of significant fauna. Although no weeds identified by the survey were listed as Declared Pests (DPIRD, 2020) or Weeds of National Significance (Commonwealth of Australia, 2022), some species are rated as having 'High' ecological impact or 'Rapid' invasiveness in native vegetation. MinRes is committed to managing the introduction and spread of weeds as a result of the Project, however it is acknowledged that MinRes are unlikely to be able to prevent weeds from spreading from source populations into the Project Area. As a result, the Indicative Weed Management Plan (WMP) (**Appendix A**) focuses on weeds rated as having a high or very high management priority (by DBCA) within the Project Area, through managing the cover/abundance of these weeds throughout the remainder of the Project Area. Appropriate triggers and thresholds have been developed with corrective actions built into the WMP.
- Clearing of vegetation can result in the loss of significant flora and lead to degradation of vegetation types through edge effects. Clearing within the Project Area has been minimised through design and planning and will be kept to within the clearing allowance approved.
- Secondary impacts to vegetation health can occur through altered fire regimes, altered hydrological regimes, dust deposition or hydrocarbon or chemical spills. Management actions have been developed to minimize any potential project related decline in vegetation health as a result of these secondary impacts.

Table 6: Flora and Vegetation Outcome-Based Management Provisions

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained						
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant species.						
Outcome-Based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold Criteria	Trigger Level Actions	Threshold Level Actions and Contingency Actions.			
FV1	Protect flora and vegetation values to maintain biological and ecological diversity in the Project area integrity.	Total clearing reaches 90% of approved clearing value (Ha). Or unplanned clearing occurs within the Development Envelope.	Unauthorised clearing occurs, including exceedance of approved clearing allowance, any clearing outside of the Development Envelope, or any unauthorised clearing within the Development Envelope.	<ul style="list-style-type: none"> Report internally as an incident in accordance with internal procedures. Reconcile clearing to date against approved clearing allowances and review management strategies to ensure authorised limits are not exceeded. The management strategy reviews may include the following: <ul style="list-style-type: none"> Increased frequency of clearing tracking and reconciliation against approved clearing allowance. Audit and review of training and staff inductions (increase staff training and awareness to include information on buffers, legislative requirements, and appropriate clearing procedures). Review of the potential impact(s) of 	<ul style="list-style-type: none"> Undertake investigation to determine source of disturbance. If source is project-related, undertake a review to determine if impact can be minimised, develop actions to prevent recurrence and communicate findings to relevant personnel. Undertake rehabilitation of unauthorised clearing as required, in accordance with rehabilitation procedures. Report as a non-compliance to appropriate regulator within 10 days of identification. Investigation report to be submitted to appropriate regulator with remediation 	<ul style="list-style-type: none"> Monitoring of clearing register for compliance to approvals. Internal audit and inspection of areas of clearing. Analysis of clearing undertaken via annual aerial imagery survey to assess whether any unauthorised clearing has occurred. Monitor significant species populations, as appropriate. 	<ul style="list-style-type: none"> Post clearing Post clearing Annual As triggered / if required As triggered / if required 	<ul style="list-style-type: none"> Annual Environmental Reporting. Clearing Register. Internal clearing permits. Survey data. Monitoring Program reporting as appropriate. Incident reports.

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained						
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant species.						
Outcome-Based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold Criteria	Trigger Level Actions	Threshold Level Actions and Contingency Actions.			
				unauthorised clearing and report any non-compliance to appropriate regulator within 10 days of confirmation of unauthorised clearing. <ul style="list-style-type: none"> Installation of signage where appropriate. 	actions proposed within 28 days of original notification.	<ul style="list-style-type: none"> Monitoring of any rehabilitation undertaken in accordance to rehabilitation procedures. 		
FV2	Avoid facilitating the introduction of new weed species or the spread of existing weed species in the Project Area as a result of the Project.	*Addressed separately in the objective-based management provisions below and indicative WMP (Appendix A).						

Table 7: Flora and Vegetation Objectives-Based Management Provisions

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazardis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
No clearing of vegetation shall occur outside of the approved, demarcated clearing area(s) during construction or operation.	High	<ul style="list-style-type: none"> Avoid any unapproved clearing which results in take of Priority flora including <i>Aristida lazardis</i> (P2), <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> (P3), <i>Rhagodia</i> sp. Hamersley (P3), and <i>Seringia exastia</i> (T) (EPBC listed only). Significant flora populations and the area to be cleared shall be clearly demarcated and machinery operators made aware of the operational boundary, following confirmation with the relevant manager. The Land Activity Permit (LAP) and Clearing Procedure will be followed, to ensure clearing works are within approved boundary and compliant with regulatory requirements. 	<ol style="list-style-type: none"> Visual inspections for evidence of: <ul style="list-style-type: none"> adherence to boundary demarcation compliance. unauthorised access or clearing (e.g., observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation). Monitoring of clearing register for compliance to approvals: <ul style="list-style-type: none"> Clearing activities will be audited regularly to ensure compliance with LAP conditions, including prior to LAP close out. This includes confirmation that all clearing has been completed within the LAP boundary. 	<ul style="list-style-type: none"> During construction (pre-clearing clearing and post-clearing activities). Imagery analysis annually, or as required, to monitor clearing extent. As triggered. 	<ul style="list-style-type: none"> Project Manager Construction. Operations. Environment Team. 	<ul style="list-style-type: none"> Regular reporting: Monitoring reports- clearing register and Internal clearing permits. Submit an annual compliance assessment report as part of the Annual Environment Report to the DWER. Internal incident reporting and investigation process. Report any non-compliances with the LAP

¹ As per **Table 8**

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazardis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		<ul style="list-style-type: none"> Clearing awareness training is to be undertaken by all personnel involved in the LAP process and clearing activities, including specific information on significant flora within the Development Envelope, the requirements for clearing. Proposed clearing has been minimised as far as practicable to reduce the extent of disturbance required; the Proponent has revised the Development Envelope from 1,399 ha to 874 ha (and concurrent Indicative Footprint reductions). Delineate clearing boundary areas by qualified surveyors in the field and confirmed cleared areas after clearing. Coordinates for clearing extents will be provided to the Construction Contractor. Some heavy equipment will have in-cab GPS mapping and alarm functions, however in the absence of this 	<ul style="list-style-type: none"> Land disturbance will be reconciled annually, as a minimum, for compliance and reporting purposes. 3. Internal incident reporting and investigation process. 			<ul style="list-style-type: none"> and Clearing Procedure. Exceedance Reporting: Management action has not been implemented (report in accordance with Section 5, Reporting Provisions) Management target has not been achieved (report in accordance with Section 5)

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazareidis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		functionality, pegging of clearing boundaries, supplemented with other control measures such as the use of spotters and/or restricting clearing to the daylight hours will be used to prevent unauthorised clearing. <ul style="list-style-type: none"> Vehicles and equipment shall be restricted to designated roads, tracks and cleared areas, unless approved and controlled via a LAP. 				
No new weed species introduced into the Development Envelope as a result of construction and operation of the Project. No significant expansion of known weed populations within the Development Envelope as a result of	High	Addressed separately in the indicative WMP (Appendix B).				

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazareidis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
construction and operation of the Project.						
No fires occur within the Development Envelope as a result of construction of operation of the Project.	High	<ul style="list-style-type: none"> Off-road driving shall be prohibited unless authorised under a LAP. Avoid hot work in fire sensitive areas and during fire risk days. Fire awareness shall be delivered to all personnel as part of the induction process. Firebreaks will be incorporated into mine layout planning in accordance with the local government firebreak notice under s. 33 of the <i>Bush Fires Act 1954</i>. Smoking will only be permitted in designated areas, which shall be appropriately signed and contain self-arresting cigarette butt disposal containers. An Emergency Response Plan shall be prepared and implemented. An Emergency Response Team shall be formed, in 	<ul style="list-style-type: none"> Inspection and maintenance of fire breaks in accordance with the local government firebreak notice under s. 33 of the <i>Bush Fires Act 1954</i>. Regular inspection of vehicles and fire response equipment shall be undertaken. 	<ul style="list-style-type: none"> As required in accordance with the local government firebreak notice under s. 33 of the <i>Bush Fires Act 1954</i>. Quarterly 	<ul style="list-style-type: none"> Project Manager Construction personnel. Operations personnel Environment Manager Environment Team. 	Regular reporting: <ul style="list-style-type: none"> Internal incident reporting, emergency response and investigation process in the event of a fire, in accordance with internal incident reporting procedure. Submit an annual compliance assessment report as part of the Annual Environment Report to the DWER by (date to be determined) each year.

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazareidis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		<p>accordance with requirements regulated by DEMIRS.</p> <ul style="list-style-type: none"> The Emergency Response Team will ensure that sufficient operational fire suppression equipment is located as per the Emergency Response Plan. A Traffic Management Plan shall be prepared and implemented. Implement a Hot Work Permit system for high ignition risk work activities. Regular inspection and maintenance of vehicles and equipment shall be undertaken. All vehicles and machinery will be fitted with fire extinguishers and/or in-plant fixed water suppression, and water carts will be fitted with firefighting equipment. Fire extinguishers will be located at 				<p>Exceedance reporting:</p> <ul style="list-style-type: none"> Management action has not been implemented (report in accordance with Section 5) Management target has not been achieved (report in accordance with Section 5)

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazareidis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		infrastructure/building facilities across the project. <ul style="list-style-type: none"> All fuel stored on site is to be contained within a secure bund or other facility. Implement an appropriate rehabilitation plan (surface treatments; seed selection, collection, storage and management) in accordance with the approved MCP, following fire. 				
Ensure natural surface water flow is maintained as far as practicable.	High	Hydrological Regimes: <ul style="list-style-type: none"> Haul road and Development Envelope design shall consider surface water flow to minimise obstruction to seasonal overland water flow to the loamy drainage flats proximal to the Great Northern Highway. Implement surface and groundwater management strategies in accordance with the SWMP and Groundwater Operating Strategy (GWOS). Drainage management structures identified as 	<ul style="list-style-type: none"> Implement surface and groundwater monitoring as required in accordance with the Surface Water Management Plan (SWMP) and GWOS. 	<ul style="list-style-type: none"> in accordance with schedule in the SWMP and GWOS. 	<ul style="list-style-type: none"> Project Manager Construction personnel. Operations personnel Environment Manager Environment Team. 	Regular reporting: <ul style="list-style-type: none"> Submit an annual compliance assessment report as part of the Annual Environment Report to the DWER by (date to be determined) each year. SWMP monitoring reports.

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazardis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		remaining post closure shall meet recognised Australian drainage design specifications. <ul style="list-style-type: none"> The open pit will be backfilled to a minimum of 5 m above the baseline groundwater level. Progressive rehabilitation of disturbed areas will be undertaken throughout the life of mine, as far as practicable. 				Exceedance reporting: <ul style="list-style-type: none"> Management action has not been implemented (report in accordance with Section 5) Management target has not been achieved (report in accordance with Section 5)
No significant impacts to flora and vegetation from dust deposition.	Low	<ul style="list-style-type: none"> Intersection of the haul road with Great Northern Highway, and an additional 100 m past the intersection, will be sealed to reduce the generation of dust. Road haulage iron ore loads will be covered. Ground clearing (including topsoil stripping) shall not be undertaken during periods of high wind (unless soil moisture levels are also elevated) 	<ul style="list-style-type: none"> Monitoring of daily wind conditions will be taken into consideration when planning clearing or blasting activities. Visual assessment of dust suppression application and performance 	<ul style="list-style-type: none"> Daily Daily 	<ul style="list-style-type: none"> Construction. Construction Operations. 	Regular Reporting: <ul style="list-style-type: none"> Internal incident reporting, and investigation process in accordance with internal incident reporting procedure for example: <ul style="list-style-type: none"> Excessive dust

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazardis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		<p>enough to inhibit dust formation).</p> <ul style="list-style-type: none"> A Land Activity Permit and the Land Clearing Procedure will be implemented to ensure all clearing works are compliant with regulatory requirements and are within approved boundary. Spatially restricted Indicative Footprint and short life of mine. Vehicles and equipment shall be restricted to designated roads, tracks and cleared areas. Dust suppression shall be implemented to manage dust emission on cleared areas and iron ore handling areas. This will be visually assessed on an ongoing basis. Reduced speed limits shall apply on unsealed roads (site-specific but typically 40 kph). Blasting plans will consider meteorological conditions to minimise dust lift off. 				<ul style="list-style-type: none"> Vehicles reported outside authorised areas/ tracks. Submit an annual compliance assessment report as part of the Annual Environment Report to the DWER. <p>Exceedance Reporting:</p> <ul style="list-style-type: none"> Management action has not been implemented (refer to Section 5) Management target has not been achieved (refer to Section 5)

EPA Factor and Objective		Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
<ul style="list-style-type: none"> Environmental Values 		<ul style="list-style-type: none"> Native vegetation within the Pilbara bioregion comprising 9 identified vegetation types, with clearing of up to 646.9 ha to occur. Populations of <i>Aristida lazardis</i> (P2), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) and <i>Seringia exastia</i> (T) (EPBC listed only) recorded within the Indicative Footprint. 				
FVMP Purpose		To avoid adverse project-related impacts to flora and vegetation including significant flora and vegetation associations.				
Key Impacts and Risks		Potential risk to long term viability of local and regional populations of conservation significant flora and vegetation, due to direct impacts from clearing of native vegetation or direct and indirect impacts from construction or operational mining activities (Appendix B)				
Management Targets	Management Priority	Management Actions	Monitoring	Timing	Responsible ¹	Reporting
		<ul style="list-style-type: none"> Dust awareness and dust management training shall be delivered to all personnel as part of the induction process. Implement an appropriate rehabilitation plan (surface treatments; seed selection, collection, storage and management) in accordance with the approved MCP. Progressive rehabilitation of disturbed areas will be undertaken throughout the life of mine, as far as practicable. 				

4. MONITORING AND EVALUATION

4.1 ENVIRONMENTAL INSPECTIONS

The Proponent will undertake flora and vegetation environmental inspections within the Development Envelope to monitor the implementation of the Management Actions required to meet the purpose and objectives of this FVMP (**Section 1.3**). Inspection frequency will be based on the inherent risks for different activities and/or work areas, nominally a minimum of monthly in areas with active clearing activities. Inspection frequency will be reviewed based on results of previous inspections, audits or in response to incidents. A monitoring schedule is outlined in Table 6 and Table 7.

4.2 ENVIRONMENTAL AUDITS

In accordance with the Proponent's Environmental Management System (EMS), an audit of the implementation of this FVMP will be completed annually. The key requirements of this FVMP audit include:

- Assessment of compliance of all FVMP components.
- Evaluation of performance against FVMP provisions.
- Assessment of adequacy of management actions, response actions and monitoring.
- Review of management actions, response actions and monitoring as required in order to meet the purpose and objectives of this FVMP.
- Additional audit(s) in response to significant incidents of non-conformance.

A person trained and competent in the use of the audit tool, with expertise in the area being audited shall undertake an audit of the FVMP. Results of all audits will be communicated and discussed at project management review meetings.

5. REPORTING PROVISIONS

5.1 ANNUAL REPORTING

Annual compliance reporting will be undertaken for the Project in line with regulatory requirements and relevant guidance documentation, including the preparation of an Annual Environmental Report (AER) and Compliance Assessment Report (CAR), as/if appropriate. The annual reports will document compliance with Project approval conditions, as well as requirements stipulated in this FVMP.

5.2 EXCEEDANCE REPORTING

The following exceedance reporting will be undertaken if a trigger (**Section 5.3**) or Threshold (**Section 5.4**) exceedance occurs or a management action has not been implemented (**Section 5.5**) or management target has not been achieved (**Section 5.6**) in accordance with the FVMP.

5.3 TRIGGER EXCEEDANCE

- Trigger exceedance will be reported promptly in accordance with internal procedures (prior to the end of shift the following day) and reported to appropriate management staff.
- Investigate to determine the cause of the trigger exceedance.
- Internal reporting and communication of corrective actions to be implemented that eliminate or reduce the likelihood of recurrence.

5.4 THRESHOLD EXCEEDANCE

- Notify the CEO of the DWER (or other regulatory agency if appropriate) in writing within 10 days of identifying and confirming the threshold exceedance, with a report provided via email including any corrective actions identified and investigation initiated.
- Investigate to determine the cause of the threshold exceedance.
- Investigate to determine the potential environmental harm or alteration of the environment that occurred as a result of the threshold exceedance. After finalisation of the investigation, provide a report to appropriate regulator.
- A follow up report detailing the adequacy of the response actions will also be submitted to the DWER within 12 months of the initial notification or within the Compliance Assessment Report (CAR).

5.5 MANAGEMENT ACTION HAS NOT BEEN IMPLEMENTED

- Notify the CEO of the DWER in writing within 10 days of identifying and confirming the failure to implement a management action, with a report provided via email including any corrective actions identified.
- Investigate to determine the cause of the management action not being implemented.
- Investigate to determine the potential environmental harm or alteration of the environment that occurred due to the failure to implement the management action(s).
- Provide a report to the CEO including any corrective actions identified, within 21 days of completing the investigation into the failure to implement a management action.

5.6 MANAGEMENT TARGET HAS NOT BEEN ACHIEVED

- Notify the CEO of DWER in writing within 21 days of identifying and confirming the non-achievement of the target.

- Investigate to determine the cause of the management target not being achieved.
- Provide a report to the CEO within 90 days of the non-achievement of the target being reported.
- Investigate to determine the potential environmental harm or alteration of the environment that occurred due to the failure to meet management target.
- The report shall include:
 - the cause(s) of the management targets not being achieved.
 - assessment of any impacts to the environment resulting from the failure to meet management target.
 - details of revised and/or additional management actions to be implemented to prevent reoccurrence of management target(s) not being met.
 - appropriate changes to Project activities/ corrective actions required.

5.7 INCIDENT REPORTING

Environmental incidents will be promptly reported in accordance with internal procedures and reported to appropriate management staff. Corrective actions, when appropriate, will also be developed and implemented that eliminate or reduce the likelihood of recurrence.

The minimum standards required in respect to non-conformance and corrective actions are to:

- Define and document what classifications of incidents and non-conformances are reportable to:
 - internal management.
 - contractors, suppliers and vendors.
 - regulatory authorities.
 - other external stakeholders.
- Report environmental incidents and non-conformances in line with established procedures and applicable legal and other obligations.
- Investigate incidents and non-conformance such that the root cause can be determined.
- Implement corrective actions that address the root cause(s) of the incidents and non-conformances that aim to eliminate or improve response capabilities to prevent reoccurrence.
- Retain documentation as evidence.

6. ROLES AND RESPONSIBILITIES

MinRes will ensure that all personnel and contractors are responsible for ensuring they comply with the company's environmental management requirements and that any action or inaction on their part does not result in harm to the environment. Delegation of responsibilities may occur to ensure that environmental management activities are coordinated at an appropriate level; however, accountability remains with the person designated those responsibilities. MinRes also expects this general principle of line management accountability to apply to all its contractors. Roles and responsibilities have been designated to ensure that environmental management requirements within this FVMP are met. The key personnel involved in implementation of the FVMP and their roles and responsibilities are listed in **Table 8**.

Table 8: Roles and Responsibilities

Role	Responsibility
MinRes	<ul style="list-style-type: none"> • Overall responsibility for implementing this FVMP. • Audit and compliance checks. • Engagement with Traditional Owners.
Manager Environment (may delegate all or part responsibility to an appropriately qualified person)	<ul style="list-style-type: none"> • Obtain relevant approvals from regulatory agencies for disturbance as required. • Monitor and report incidents. • Maintain clearing register to ensure compliance with approvals. • Undertake internal audits and inspections of clearing areas and compliance with FVMP. • Implement and maintain the FVMP, review its effectiveness and review the implementation as required. • Liaise with stakeholders and technical experts for advice and resolution of management aspects/objectives as required. • Ensuring the required resources are allocated to fulfil the requirements of this Management Plan. • Engagement with Traditional Owners. • Providing advice to others about weed hygiene procedures and about the identification of plants that may be weeds. • Undertaking or commission weed control activities. • Undertaking site inspections for weeds. • Keeping records of weed management - weed hygiene certificates, GIS data recording the location and extent of weed populations, control methods used etc. • Presenting ongoing weed management and control awareness training and inductions of personnel in accordance with the FVMP. • Report as required to regulating authorities.
Project Manager (may delegate all or part responsibility to an appropriately qualified person)	<ul style="list-style-type: none"> • Ensure construction and operational activities are implemented by employees (inclusive of contractors) in accordance with the FVMP
Supervisor	<ul style="list-style-type: none"> • Ensuring any vehicles or earthmoving equipment leaving a mine is cleaned down so that it is free of vegetation or dirt, and, following an inspection, a Weed Hygiene Certificate (WHC) is issued. • Ensuring that personnel involved in vehicle or equipment transfers are aware of this procedure and can competently meet their responsibilities.

Role	Responsibility
Employees (inclusive of contractors)	<ul style="list-style-type: none">• Complete induction prior to commencement of work on site.• Toolbox.• Training.• Comply with requirements in FVMP.• Report potential weed occurrences and poorly cleaned machinery.• Stop works if impact to the environment is suspected or known.• Report any environmental concerns, opportunities for improvement, near misses or incidents to their supervisor ASAP.

7. ADAPTIVE MANAGEMENT AND REVIEW

Adaptive management practices will be implemented where change to management practices and monitoring may lead to more effective environmental outcomes. The adaptive management approach may include the following components:

- Evaluation of the management actions and targets:
 - if monitoring results or audits indicate that management objectives are not being achieved.
 - if new information is discovered during construction, operations or closure.
 - where any significant changes to Project design or operation have occurred.
- Evaluation of assumptions and uncertainties following further flora and vegetation monitoring.
- Review of data and information gathered over the review period that has increased understanding of the environment in the context of the regional ecosystem.
- Review of Management Actions as the Project progresses, and as new management measures and technologies become available that may be more effective for significant flora and vegetation management.
- Assessment of changes which are outside the control of the Proponent (e.g. a new project within the area or region, regional change affecting significant flora and vegetation management) and the revised management measures identified.
- Amendment to the monitoring program.

7.1 REVIEW OF THIS FVMP

This FVMP will be reviewed periodically during the Project phases (construction through operations and into closure), nominally once every 2 years. Other occasions when this FVMP will be reviewed include:

- upon significant changes to the Project activities or upon significant changes to key environmental values identified in this FVMP.
- following non-compliances or environmental incidents related to flora and vegetation management.
- if one or more management targets or performance indicators are not being met and adaptive management is required.
- upon regulatory approval of the Project by the DWER and the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS).

The review process this will ensure this FVMP remains current and adheres to regulatory requirements and the provisions of this FVMP. Any significant changes to this FVMP will be referred to the DWER for approval prior to implementation of such changes.

8. STAKEHOLDER CONSULTATION

The Proponent is committed to ongoing stakeholder engagement and communication through all stages of the Project.

8.1 ENGAGEMENT

Stakeholder engagement commenced in 2012 and specific stakeholder engagement activities undertaken have included:

- briefings and presentations with key regulatory authorities and potentially affected parties (e.g. Banjima People) to provide information on the Project, planned studies and request feedback.
- face to face meetings, telephone calls and written correspondence with potentially affected stakeholders to provide updates on the Project and obtain additional feedback.

Specifically, consultation between MinRes and the Banjima People, through the body corporate Banjima Native Title Aboriginal Corporation (BNTAC) and their consultants, regarding the preparation of various environmental regulatory approvals (State and Commonwealth) has been conducted, including reviews of this FVMP. Feedback from these engagements has been incorporated into the approval submission documents and this FVMP. On-country Social Surrounds engagement with the Banjima People has also been conducted and feedback from these consultations incorporated into management controls for the various environmental and social factors.

Through the variety of engagement forums, the Proponent has been able to identify the required studies and investigations and, importantly, key environmental and social impacts, and associated mitigation strategies required to support the Project, to ensure the Project aligns with expectations.

8.2 KEY STAKEHOLDERS

The Proponent has identified key Project stakeholders, and these are listed in **Table 9**.

Table 9: Key Stakeholders for the Project

Stakeholder Sector	Organisation
Australian Government Agencies	Department of Climate Change, Energy, the Environment and Water
State Government Agencies & Members of Parliament	Department of Biodiversity, Conservation and Attractions
	Department of Jobs, Tourism, Science and Innovation
	Department of Energy, Mines, Industry Regulation and Safety
	Department of Planning, Lands and Heritage
	Department of the Premier and Cabinet (Ministers for Water and Environment)
	Department of Primary Industries and Regional Development
	Department of Transport
	Department of Water and Environmental Regulation - Environmental Protection Authority
	Department of Water and Environmental Regulation
	Development WA
	Main Roads WA
	Pilbara Port Authority
	Alinta Energy

Stakeholder Sector	Organisation
Local Government	Shire of East Pilbara
Traditional Owners	Banjima Native Title Aboriginal Corporation
	Martidja Banyjima (MIB) – Karijini Development Pty Ltd
Corporate and Community	Rio Tinto/Juna Downs Pastoral Lease
	BHP
	Bird Life Western Australia
	Wildflower Society of Western Australia
	Conservation Council of Western Australia
	Wilderness Society

8.3 STAKEHOLDER CONSULTATION

The Proponent is committed to continued engagement with stakeholders through all development phases of the Project, as documented in the Stakeholder Engagement Plan. The key stakeholder consultation and engagement activities undertaken to date by the Proponent are summarised in referral documentation under the EPBC Act and EP Act. Outcomes of these activities are recorded in a Stakeholder Consultation Register, which is a live document that interconnects with the Stakeholder Engagement Plan.

8.4 ONGOING ENGAGEMENT

Consultation will continue to be undertaken with the respective stakeholders identified in Table 9 to ensure the Project aligns with expectations, as well as in accordance with any approval or licensing conditions.

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APPENDIX A

INDICATIVE WEED MANAGEMENT PLAN

Appendix A Indicative Weed Management Plan

A.1 Background

Introduced flora (weeds) have a detrimental effect on ecological values of communities in which they invade. Weeds outcompete native flora, alter the structure of vegetation, have an impact on fire regimes and change habitat characteristics for fauna; often leading to a decline in the quality of fauna habitat.

MinRes is committed to managing the introduction and spread of weeds as a result of Proposal through the development and implementation of a Weed Management Plan (WMP) and in accordance with the MinRes Draft Weed Hygiene and Control Procedure (MRL-EN-PRO-0007). Due to the spread of weeds through vectors such as wind and animal dispersal, it is unlikely that MinRes would be able to stop the introduction and/or spread of weeds entirely in the Proposal Area. As a result, this Plan will focus on the management of weeds rated as having a high or very high management priority (by DBCA) and managing the cover/abundance of these weeds throughout the Proposal Area.

A.2 Purpose

This indicative WMP has been developed to outline the control measures required to manage the potential weed impacts across the Proposal Area. This Plan applies to all exploration, design, construction, operation and decommissioning stages of the Proposal.

The purpose of the Plan is to:

- Ensure that the Proposal is carried out in a manner that minimises the direct and indirect impacts as a result of weeds.

This will be addressed by ensuring potential project-related impacts to flora and vegetation from weeds are avoided to the maximum extent practicable by:

- Identifying the risks and potential impacts from the Proposal in relation to weeds.
- Outlining management provisions for weeds, to avoid and minimise potential impacts to significant flora and vegetation.
- Preparing and implementing monitoring programs for weeds within the Proposal Area.
- Proposing corrective actions and response actions if triggers and thresholds are exceeded to avoid adverse impacts to vegetation resulting from weeds.

A.3 Rationale and Approach

MinRes is committed to avoiding and minimising potential impacts caused by the operations of the Proposal to flora and vegetation and their associated habitats to ensure the biodiversity and ecological integrity and function of flora and vegetation are maintained. The Proposal has been designed to avoid impacts to key environmental factors located within the footprint.

This Plan focuses on outcome-based and objective-based management provisions, including monitoring and evaluating success of management actions with respect to flora and vegetation within the Development Envelope, driven by triggers and thresholds.

A.4 Legislative Requirements

The following legislation is relevant to weed management for the Proposal:

- *Environmental Protection Act 1986.*
- *Agriculture and Related Resources Protection Act 1976.*
- *Biosecurity and Agricultural Management Act 2007.*
- *Biodiversity Conservation Act 2016.*
-

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- *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act)*

The Department of Primary Industries and Regional Development (DPIRD) regulates weeds under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Plants that are prevented entry into the State or have control or keeping requirements within the State are declared pests (**Table A 1**). Declared pests can be assigned to a C1, C2 or C3 category under the BAM Act Regulations 2013 (**Table A 2**).

TABLE A 1: PROHIBITED ORGANISMS CAN BE ASSIGNED TO A C1 OR C2 CONTROL CATEGORIES

Category	Description
Permitted organisms under section 11	Organisms that are allowed entry into Western Australia
Prohibited organisms under section 12	Organisms that are prohibited from entry into Western Australia
Unlisted organisms under section 14	If an organism cannot be categorised as either permitted or prohibited the organism will be unlisted
Declared pest under section 22	Pests that may be in the State but are under official containment, control or eradication

TABLE A 2: CATEGORIES OF DECLARED PESTS UNDER THE BAM ACT REGULATIONS

Category	Description
C1 Exclusion	Plants which should be excluded from part or all of Western Australia.
C2 Eradication	Plants which should be eradicated from part or all of Western Australia.
C3 Management	Plants that should have some form of management applied that will alleviate the harmful impact of the plant, reduce the numbers or distribution of the plant or prevent or contain the spread of the plant.

A.5 Weed Classification

Weeds are classified by different government departments based on their invasiveness and the risk they pose to the environment, people or agriculture (**Table A 3**).

TABLE A 3: DEFINITIONS AND CLASSIFICATION OF WEEDS

Term	Definition
Weed	A weed is defined in the Australian Weeds Strategy (NRMMC, 2007) as 'a plant that requires some form of action to reduce its harmful effects on the economy, the environment, human health and amenity'.
Declared Weeds	In order to protect agricultural interests, the Department of Primary Industries and Regional Development maintains a list of "Declared Plants" (weeds): https://www.agric.wa.gov.au/pests-weeds-diseases/weeds/declared-plants 'Declared Weeds', under the Agriculture and Related Resources Protection Act 1976, are those that landowners are required by law to control. They are required to be controlled as they are considered a significant risk to the Western Australian economy. Many weed species, however, are not declared under this Act as they may have an agricultural role. They may, however, be serious environmental weeds with the potential to affect native ecosystems.
Environmental Weeds	The Weed Prioritisation Process for the Department of Biodiversity, Conservation and Attractions (DBCA) prioritise weeds in each Parks and Wildlife region, termed 'environmental weeds'. 'Environmental weeds' is a secondary category of weeds, used to describe "plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of communities they invade" (DEC, 1999); page iii).



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Term	Definition
Weeds of National Significance	The Australian and state and territory governments have agreed a list of thirty two Weeds of National Significance (WONS), based on the weed species' invasiveness, The full list of WONS can be accessed at www.weeds.gov.au/weeds/lists/wons/html
Weed hygiene	Prevention of the introduction or spread of weeds through movement of earthmoving machinery, vehicles or soil containing weed seed.

A.6 Weeds Recorded in the Proposal Area

Seven introduced flora species (weeds) have been recorded within the Proposal Area (**Section A.6**). While none of these taxa were listed as Declared Pests (DPIRD, 2020) or Weeds of National Significance (Commonwealth of Australia, 2022), some species are rated as having 'High' ecological impact or 'Rapid' invasiveness in native vegetation. The ecological impact and invasiveness classifications (DPaW, 2013, 2015) for these weed species are provided in **Table A 4**. *Bidens bipinnata*, *Cenchrus ciliaris* and *C. setigera* were the most common introduced taxa in terms of numbers of locations and individuals recorded (**Table A 4**). Despite the High/Rapid ecological impact and invasiveness ratings of introduced taxa, none were widespread in the Study Area, and the vegetation was considered to be in mostly Excellent condition (Umwelt, 2022a).



TABLE A 4: INTRODUCED FLORA SPECIES RECORDED IN THE FLORA AND VEGETATION SURVEY AREA



Species (common name)	Description	Number of Locations (Number of individuals)	DBCA Classification ¹		Control Techniques ²				Photo ((WAH, 2023)
			Ecological Impact*	Invasiveness*	Chemical Control	Manual Control	Indicative seed set	Optimal timing for weed control	
<i>Bidens bipinnata</i> Bipinnate Begger's Tick	An erect annual, herb, between 0.1-1.5 m high. The species flowers between March and September with yellow flowers. It is found in alluvium, clay, loam over sandstone, limestone and along rivers and creeks as well as coastal areas and rocky hillsides (WAH, 2023)	31 (824)	Unknown	Rapid	Spot spraying with glyphosate generally well before flowering	Hand removal is only useful before seed set and all flowering material must be taken from site	All year	Chemical control year- round when plants not undergoing excessive stress, prior to seed set whenever possible	 <i>Bidens bipinnata</i> Photos: G. Byrne
<i>Cenchrus ciliaris</i> Buffel Grass	A tufted, or sometimes stoloniferous, perennial herb or grass-like species between 0.2- 1.5 m high. The species flowers between February to October with purple flowers. It is found in white/red/ brown sand, stony red loam or black cracking clay (WAH, 2023).	13 (149)	High	Rapid	Spot spray with 1-2% glyphosate and follow-up with seedling control	Hand remove small populations and seedlings; entire plants with dormant buds must be removed	All year. May begin producing seeds from approximately 3 months of age	Wet season (four to six weeks after a rain event) when plants actively growing and not stressed, prior to seed set	 <i>Cenchrus ciliaris</i> Photos: G.F. Craig, R. & M. Long & L. Wallis


¹ Data from Department of Biodiversity, C. a. A. D. (2014). *Ecological Impact and Invasiveness Ratings from the Department of Parks and Wildlife Pilbara Region Species Prioritisation Process 2014* <https://www.dbca.wa.gov.au/parks-and-wildlife-service/threat-management/plant-diseases/weeds>

² Information from Weeds-Australia. (2014). *Weeds Australia - An Australian Weeds Committee National Initiative*. <http://www.weeds.org.au/>

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Species (common name)	Description	Number of Locations (Number of individuals)	DBCA Classification ¹		Control Techniques ²				Photo ((WAH, 2023)
			Ecological Impact*	Invasiveness*	Chemical Control	Manual Control	Indicative seed set	Optimal timing for weed control	
<i>Cenchrus setiger</i> Birdwood Grass	An erect, tussocky, stoloniferous perennial herb or grass-like species up to 0.5 m high. The species flowers between April to May with cream-purple flowers. It is often found in brown sands, red loam, pindan spoils in sand dunes, plains, rangelands, stony hillsides or floodplains (WAH, 2023).	17 (2,654)	High	Rapid	Spot spray with 1-2% glyphosate and follow-up with seedling control	Hand remove small populations and seedlings; entire plants with dormant buds must be removed	All year	Wet season (four to six weeks after a rain event) when plants actively growing and not stressed, prior to seed set	 <i>Cenchrus setiger</i> Photos: G. Byrne
<i>Malvastrum americanum</i> Spiked Malvastrum	This species is an erect perennial herb or shrub that grows from 0.5 to 1.3 m high. It flowers between April to July and has orange or yellow flowers. It grows in orange, red and yellow sands, gritty alluvial sand, black/brown clay, alluvial cracking clays, limestone or calcrete. It favours stony ridges and hillsides, floodplains and drainage lines (WAH, 2023).	11 (70)	High	Rapid	Spot spray 0.5% glyphosate	Hand remove seedlings and small populations, removing whole plants	April to September	Wet season, when plants actively growing and not stressed, prior to seed set	 <i>Malvastrum americanum</i> Photo: J.F. Smith & E. Wajon

Species (common name)	Description	Number of Locations (Number of individuals)	DBCA Classification ¹		Control Techniques ²				Photo ((WAH, 2023)
			Ecological Impact*	Invasiveness*	Chemical Control	Manual Control	Indicative seed set	Optimal timing for weed control	
<i>Portulaca pilosa</i> Pink Purslane	This species is a succulent, erect or prostrate annual herb that can grow to 0.2 m high. It flowers from January to July or November and has yellow or pink flowers. It favours sandy, loamy and clayey soils (WAH, 2023).	1 (1)	Not rated	Not rated	Spot spray with 0.5% glyphosate	Hand remove before flowering	Mostly Autumn	Chemical control year-round when plants not undergoing excessive stress, prior to seed set whenever possible	 <i>Portulaca pilosa</i> Photos: G. Byrne & C.P. Campbell
<i>Setaria verticillata</i> Whorled Pigeon Grass	This species is a loosely tufted annual which is grass-like. It grows from 0.1 to 1.3 m high. It flowers from December or January to June and has green flowers. It grows on sand, clay or loam soils (WAH, 2023).	6 (20)	High	Rapid	Spot spray with 1-2% glyphosate and follow-up with seedling control	Hand remove seedlings and small populations, removing whole plants	All year	Wet season (four to six weeks after a rain event) when plants actively growing and not stressed, prior to seed set	 Photo from Weeds Australia

Species (common name)	Description	Number of Locations (Number of individuals)	DBCA Classification ¹		Control Techniques ²				Photo ((WAH, 2023)
			Ecological Impact*	Invasiveness*	Chemical Control	Manual Control	Indicative seed set	Optimal timing for weed control	
<i>Tribulus terrestris</i> Caltrop	A prostrate annual villous herb with 4-7 paired leaflets distinct divergent cocci and median spines 3-8 mm long. The species flowers between January to December with yellow flowers. It is often found on sandy soils throughout waste places (WAH, 2023).	3 (5)	Unknown	Moderate	Basal bark spray (for stems up to 10 cm in diameter) up to 30 cm above ground level application using 2% Picloram + 2,4-D amine (Enforcer) or cut stump using undiluted chemical	Cut plants at 10 to 20 cm below ground, remove reproductive parts. Remove whole plant if possible	All year	Chemical control year-round when plants not undergoing excessive stress, prior to seed set whenever possible	 <i>Tribulus terrestris</i> Photos: S.M. Armstrong, J. Dodd & R. Knox

A.7 Weed Management

Commitments relating to weeds that have been included in **Table 7** in the FVMP have been incorporated into MinRes's weed management strategy as detailed within this section.

A.7.1 Potential impacts

The Proposal has the potential to spread existing weeds and to introduce new weed species into previously weed free areas. Weeds can impact the ecology and biodiversity of natural systems by out-competing native species for habitat, nutrients and water. Once established, weeds can also alter the composition and structure of vegetation communities.

Weeds may potentially impact natural systems and values through the following examples:

- Competition with native species for natural resources such as sunlight, water, nutrients and space.
- Reduction in natural biodiversity levels from smothering and out-competition (Smyth et al., 2009).
- Reduced resiliency of native species to disturbances, including the ability for regrowth following clearance and fire.
- Limited availability of native plants which provide important habitat and food sources for animals, and
- Alteration of fire regimes, with increased temperatures and intensity (DEC, 2011).

A.7.2 Application of the Mitigation Hierarchy

The Proposal will **avoid** impacts to significant flora and vegetation from project related weeds via the following:

- A Site Disturbance Permit and Land Clearing Procedure will be implemented to ensure all clearing works are compliant with regulatory requirements and are within approved boundary.

The Proposal will **minimise** impacts to significant flora and vegetation from project related weeds via the following:

- Vehicles with ground engaging equipment to be cleaned, inspected and issued with a Weed Hygiene Certificate prior to entry to site or moving between areas on-site.
- Vehicles and equipment shall be restricted to designated roads and tracks.
- Weed awareness and weed hygiene training shall be delivered to all personnel as part of the induction process.
- Regular inspection and maintenance of vehicles and equipment shall be undertaken.
- Incident reporting of new weed species and new locations.
- Seasonal weed control programs shall be implemented, including herbicide spraying or physical removal, as required.
- Progressive rehabilitation of disturbed areas will be undertaken throughout the life of mine, as far as practicable.

A.7.3 Management Provisions

This WMP focuses on outcome-based provisions, which are performance-based and can be applied. The objectives developed are measurable, and the success of management actions can be monitored and reported. Outcome-based provisions specify triggers and thresholds for direct impacts that are quantifiable and specifically relate to weeds (**Table A 5**). Suitable trigger and threshold actions have been established, with potential corrective actions also recommended.

A.7.4 Outcome-Based Provisions

The following outcome-based management provision to avoid or minimise project related impacts from weeds has been established:

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- Avoid facilitating the introduction of new weed species or the proliferation of existing weed species in the Proposal Area as a result of the Proposal.

A.7.5 Objective-Based Provisions

Objective-based provisions relate to environmental management actions that are not specifically measurable. They specify management actions according to management targets, particularly for indirect impacts that are not quantifiable. For project related weeds, as ongoing monitoring is undertaken and additional population data is gathered, these management targets may be reviewed, and quantifiable outcome-based provision(s) may be established accordingly. Two objective-based management provisions have been outlined in **Table A 6** to prevent project-related adverse impacts to flora and vegetation (including significant flora species) from weeds within proximity to the Proposal. These are supported by appropriate management targets, management actions, a monitoring approach, reporting requirements and contingency actions.

The following objectives-based provisions for weeds have been established:

- No new weed species introduced into the Proposal Area.
- No project-related adverse impacts to vegetation due to disturbance or a decline in health from the proliferation of existing weed species recorded in the Proposal Area.

A.7.5.1 Environmental Criteria

The development of triggers and thresholds for outcome-based provisions within the WMP are based on available data and information, with justification for these criteria provided in **Table A 5** and **Table A 6**. These criteria can be used to monitor and evaluate performance against the environmental objectives of this WMP. Due to the lack of available data in some instances, the triggers and thresholds are considered preliminary, until sufficient baseline data becomes available from further weed monitoring. During monitoring, where thresholds (outcome-based) or targets (objective-based) are exceeded, appropriate management or corrective actions have also been developed. Monitoring will inform adaptive management, with the revision of triggers and thresholds, or corrective actions where required.

A.7.6 Weed Awareness and Weed Hygiene Training Procedure

Induction and awareness training for weeds will be undertaken through the following procedure:

- All employees and contractors are required to participate in the site induction, which will provide an awareness of weeds, including risk species, and an overview of the weed hygiene process.
- Employees and contractors who are involved in movement or operation of earthworks equipment, off road vehicles, and land clearing will be specifically trained in weed hygiene procedures and documentation. This includes but is not limited to, exploration personnel, surveyors, environmental survey consultants, workshop and logistics personnel.
- Training or technical assistance may be required for site personnel to be able to recognise locally-occurring weed species.
- Specialist training (chemical handling, personal protection etc.) may be required if site personnel are involved in chemical methods of weed control.
- Tool box talks will be presented from time to time to refresh employees and contractors on weed hygiene procedures.

The movement of earthmoving equipment and vehicles may require use of a Weed Hygiene Certificate (WHC). This procedure cannot cover every situation but a WHC would generally be required when there is a medium to high risk. Medium to high-risk situations include:

- Movement of equipment that has been operating in borrow pits or in topsoil stockpiling or recovery operations.
- Light vehicles and drill rigs operating in an area with known weed occurrences.
- Any off-road earthmoving or heavy equipment moving from one mine site to another.

WHCs are generally not required for low-risk situations. Low risk situations include:

- Light vehicles and support vehicles remaining on established roads.
- Excavators and dump trucks operating within multiple pits at one mine site.
- Drill rigs operating on overburden or ore within multiple pits after topsoil has been removed.
- Graders operating at one mine site (although regular clean down is recommended).

Where a WHC is required, the following procedure will be adhered to:

- The earthmoving equipment or vehicle must be cleaned to remove any seeds, plant material or mud that could contain seeds.
- Cleaning can be undertaken using wet or dry methods.
- Ensure any material cleaned from equipment and containing weed seed does not itself become a source of weeds. Disposal to landfill or other suitable alternative is required.
- Once the cleaning process has been completed and the Supervisor is satisfied the equipment or vehicle is clean, a WHC can be completed.
- The WHC remains with the equipment until its arrival at its destination.
- At this point, a further inspection is conducted by the ED or delegate to verify the Certificate is accurate, 'sign off' on the Certificate and free the equipment for use at the new location.
- Movement of vehicles or earthmoving equipment that does not comply with this procedure must be reported as an incident.

A.7.7 Weed Control

Weeds found in the Proposal area and their suggested control is outlined in **Table A 4**. The Draft Weed Hygiene and Control Procedure (MRL-EN-PRO-0007) outlines the process for controlling weeds on MinRes sites:

- If populations of declared or pest plants occur on site, control should be undertaken in consultation with DPIRD.
- If populations of environmental weeds occur on site, control should be undertaken where it is practical to do so. Some environmental weeds are so well established that control is not warranted.
- This procedure does not require control of other introduced species but control methods may be used in particular circumstances.
- Control methods may include spraying with herbicide or physical removal.
- Herbicide use will only be undertaken in accordance with the manufacturer's instructions. Users must consider their personal safety, the safety of others (e.g. people potentially exposed to herbicide through wind drift) and sensitive non-target plant species that occur nearby. If the target area is on a pastoral property, liaison with the pastoralist is required.
- Weeds that are physically removed should be disposed of to a landfill or waste rock landform and buried.
- Soil or material movement from areas that have or may have weeds should be done in consultation with the Environmental Advisors or delegates. Areas of risk include topsoil recovery or re-use and recovery of material from borrow pits.

TABLE A 5:OUTCOME-BASED MANAGEMENT PROVISIONS FOR WEEDS

EPA Factor and Objective	Flora and vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained						
FVMP Purpose	To avoid adverse project-related impacts to flora and vegetation including significant species.						
Outcome-Based Management Objectives	Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
	Trigger Criteria	Threshold Criteria	Trigger Level Actions	Threshold Level Actions and Contingency Actions.			
Avoid facilitating the introduction of new weed species or the proliferation of existing weed species in the Proposal Area as a result of the Proposal.	<ul style="list-style-type: none">Detection of new weed species rated high or very high management priority (by DBCA) at a potential impact site where it was not detected during baseline weed mapping of the Proposal Area and a significant increase in cover or abundance over successive monitoring events.	<ul style="list-style-type: none">Detection of a Declared Pest Plant or Weed of National Significance which was not detected during baseline weed surveys for the Proposal Area.A significant increase in cover or abundance of an existing* Declared Pest Plant or Weed of National Significance over successive monitoring events.New weed species rated high or very high management priority (by DBCA) (not detected during baseline weed surveys for the Proposal Area) becomes established** <p>* No Declared Pest Plants or WONS are known to occur within the Proposal Area, however the baseline flora and vegetation surveys were not exhaustive and these species may potentially occur.</p> <p>** Where 'established' means 'A weed species which has grown to maturity and reproduced. Weeds are producing a viable second generation of individual plants signifying persistence at a given location in spite of treatment.</p>	<ul style="list-style-type: none">Report as incident internally.Investigate cause of occurrence and review management strategies and implement changes to prevent future weed occurrences, where possible.If exceedance is attributed to project-related activities, undertake a review of procedures to determine if impact can be minimised, develop corrective actions with consideration of the following:Consider revising monitoring frequency for weeds; and educate staff on weed identification and weed hygiene practices.Implement weed control as required.Undertake weed control in accordance with the identified weed control techniques (Table A 4).	<ul style="list-style-type: none">Report any non-compliance to DWER within 7 days of identification.Undertake investigation to determine source of the exceedance.If project-related, undertake review to determine if impact can be minimised, develop actions to prevent recurrence and communicate findings to relevant personnel.If continued increase in exceedance is recorded over three consecutive events, additional targeted weed control will be considered.Revise weed monitoring schedule accordingly and monitor the success of corrective actions.Undertake weed control in accordance with the identified weed control techniques (Table A 4).	<ul style="list-style-type: none">Biannual monitoring of the presence and abundance of weeds compared to baseline presence and abundance to determine the effectiveness of control programs.	<ul style="list-style-type: none">Bi-annually	<ul style="list-style-type: none">Monitoring reports.Annual Compliance Assessment Report (ACAR).

TABLE A 6: OBJECTIVE-BASED MANAGEMENT PROVISIONS FOR WEEDS

Objective-based Management Targets	Management Actions	Monitoring	Timing	Responsible	Reporting
<div>1. No new weed species introduced into the Development Envelope as a result of construction and operation of the Proposal.</div> <div>2. No new occurrences of existing weeds within the Development Envelope as a result of construction and operation of the Proposal.</div>	<p>Avoid:</p> <ul style="list-style-type: none">A Land Access Permit and Land Clearing Procedure will be implemented to ensure all clearing works are compliant with regulatory requirements and are within approved boundary. <p>Minimise:</p> <ul style="list-style-type: none">A Weed Management Plan shall be prepared and implemented as part of the FVMP, prior to construction and operation, to control access and movement of vehicles and construction personnel to prevent the introduction and spread of weeds into the Development Envelop, weed free areas, and between work areas.Vehicles and equipment to be cleaned, inspected and issued with a Weed Hygiene Certificate prior to entry to site or moving between areas on-site.Vehicles and equipment shall be restricted to designated roads and tracks.Weed awareness and weed hygiene training shall be delivered to all personnel as part of the induction process, in accordance with the training procedure (Section A.7.6), including the environmental implications of the introduction and spread of weeds, identification of weed species, and the process for reporting observations.Regular inspection and maintenance of vehicles and equipment shall be undertaken.Restrict movement of topsoil at known weed locations.Ensure timely response for the management of any declared weed occurrences or other weed infestations occurs. <p>Rehabilitate:</p> <ul style="list-style-type: none">Seasonal weed control programs shall be implemented, as required.Progressive rehabilitation of disturbed areas will be undertaken throughout the life of mine, as far as practicable. <p>Contingency Actions (if Management Targets not met):</p> <ul style="list-style-type: none">Investigate cause or source of infestation.Inspect surrounding area to assess extent of infestation.Review weed hygiene measures for efficacy.Review training and implementation of weed hygiene measures.Implement control measures (e.g. spraying, removal) at seasonally appropriate time.Monitor success of control actions.Review frequency and suitability of weed monitoring and control measures.Revise areas of restrict access in accordance with occurrence of new weed species and/or new occurrences of existing weed species.	<ul style="list-style-type: none">Biannual monitoring of the presence and abundance of weeds (in accordance with the FVMP) compared to baseline presence and abundance to determine the effectiveness of control programs.Inspection of cleared and rehabilitated areas to detect presence of new weed species and/or new occurrences of existing weed species to determine success of management actions.Inspection of vehicles and equipment used for construction activities at entry and exit points.Post-construction inspection of cleared areas to detect presence of new weed species and/or new occurrences of existing weed species.	<ul style="list-style-type: none">Bi-annually \Annually (as a minimum)	<ul style="list-style-type: none">ConstructionOperationsEnvironment Team	<ul style="list-style-type: none">Compliance against these Management Targets will be included within a CAR, submitted as part of the AER for the Proposal.Complete an incident report if new weed species and/or new occurrences of existing weed species are recorded.

A.8 Roles Responsibilities

The key personnel involved in the implementation of the indicative WMP and their roles and responsibilities are listed below.

TABLE A 7: ROLES AND RESPONSIBILITIES FOR WEED MANAGEMENT MEASURES

Role Responsible	Weed Management Measure
Project Manager (may delegate all or part responsibility to an appropriately qualified person)	<ul style="list-style-type: none"> Ensuring full compliance with the requirements of this Management Plan. Ensuring training in weed hygiene requirements is provided to personnel responsible for the transfer of earthmoving equipment and vehicles between sites. Ensuring the required resources are allocated to fulfil the requirements of this procedure.
Supervisor	<ul style="list-style-type: none"> Ensuring any vehicles or earthmoving equipment leaving a mine is cleaned down so that it is free of vegetation or dirt, and, following an inspection, a Weed Hygiene Certificate (WHC) is issued. Ensuring that personnel involved in vehicle or equipment transfers are aware of this procedure and can competently meet their responsibilities.
Manager Environment (may delegate all or part responsibility to an appropriately qualified person)	<ul style="list-style-type: none"> Providing advice to others about weed hygiene procedures and about the identification of plants that may be weeds. Undertaking or commission weed control activities. Undertaking site inspections for weeds. Keeping records of weed management - weed hygiene certificates, GIS data recording the location and extent of weed populations, control methods used etc. Presenting ongoing weed management and control awareness training.
Employees (inclusive of contractors)	<ul style="list-style-type: none"> Understand and meet the obligations of this procedure. Report potential weed occurrences and poorly cleaned machinery.

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APPENDIX B

RISK ASSESSMENT

Appendix B Risk Assessment

A qualitative risk assessment was conducted in accordance with the Environmental Management Plan Guidelines (Commonwealth of Australia, 2014) to assess the risks of the proposal and is shown in **Table B 2**. Each environmental risk identified has been provided a likelihood and consequence rating using the criteria in **Table B 1** below to generate a risk rating of low, medium, high or severe.

TABLE B 1: RISK ASSESSMENT CRITERIA

	Consequence				
Likelihood	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High
Likelihood					
The following criteria has been used to determine the likelihood of the risk occurring					
Highly likely	The risk event is expected to occur in most circumstances				
Likely	The risk event will probably occur during the life of the project				
Possible	The risk event might occur during the life of the project				
Unlikely	The risk event could occur but considered unlikely or doubtful				
Rare	The risk event may only occur in exceptional circumstances				
Consequence					
The following criteria has been used to determine the consequences of a risk occurring					
Minor	Minor incident of environmental damage that can be reversed				
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts				
High	Substantial instances of environmental damage that could be reversed with intensive efforts				
Major	Major loss of environmental amenity and real danger of continuing				
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage				

TABLE B 2: FLORA AND VEGETATION ENVIRONMENTAL RISK ASSESSMENT

Value	Potential Impacts	Inherent Risk			Management Measures	Residual Risk		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Flora and vegetation	Loss of native flora and vegetation due to unauthorised clearing	Unlikely	High	Medium	<p>Management measures are outlined in Table B 2.</p> <p>Any potential loss of native flora and vegetation due to clearing is expected to be managed through suitable design and mitigation measures, with negligible impacts. Loss of native vegetation is considered a LOW risk, however due to its value for several significant fauna species it is proposed to be offset.</p>	Rare	High	Low
Flora and vegetation	Take of significant flora taxa due to unauthorised clearing	Highly Likely	Moderate	High	<p>Management measures are outlined in Table B 2.</p> <p>Any take of significant flora due to clearing is expected to be managed through suitable design and mitigation measures, with negligible impacts. Due to the limited nature of impacts and short life of mine, this risk event is considered LOW.</p>	Possible	Minor	Low
Flora and vegetation	Potential for fragmentation of vegetation as a result of construction of linear corridors.	Likely	Moderate	Medium	<p>Management measures are outlined in Table B 2.</p> <p>It is considered unlikely that fragmentation of habitat as a result of the Proposal will cause any significant impact to flora and vegetation, this risk event is considered LOW</p>	Unlikely	Minor	Low
Dust	Dust generated as part of construction and operation activities has the potential to impact on local flora and reduced health and viability of a flora and vegetation.	Likely	Moderate	Medium	<p>Management measures are outlined in Table B 2 of the Risk Assessment.</p> <p>Any potential decline or change in the health/composition of flora and vegetation arising from dust are expected to be managed through suitable design and mitigation measures, with negligible impacts. Due to the limited nature of impacts and short life of mine, this risk event is considered LOW.</p>	Possible	Slight	Low
Weeds	Introduction and/or spread of weed species leading to reduced flora species and system diversity.	Likely	Moderate	Medium	<p>Management measures are outlined in Table B 2 of the Risk Assessment.</p> <p>Any potential decline or change in the health/composition of flora and vegetation arising from the introduction and/or spread of weeds are expected to be managed through suitable design and mitigation measures, with negligible impacts. Due to the limited nature of impacts and short life of mine, this risk event is considered LOW.</p>	Possible	Minor	Low
Fire	Construction activities have the potential to cause accidental bushfires which may lead to damage or death to surrounding flora and vegetation communities	Likely	High	High	<p>Management measures are outlined in Table B 2 of the Risk Assessment.</p> <p>Any potential decline or change in the health/composition of fauna habitat arising from fire are expected to be managed through suitable design and mitigation measures, with negligible impacts. Due to the limited nature of impacts and short life of mine, this risk event is considered MEDIUM.</p>	Unlikely	High	Medium
Hydrological change	Potential degradation or alteration of health/composition of vegetation arising from hydrological regime changes.	Likely	Moderate	Medium	<p>Management measures are outlined in Table B 2.</p> <p>Any potential decline or change in the health/composition of fauna habitat arising from hydrological changes are expected to be managed through suitable design and mitigation measures, with negligible impacts. Due to the limited nature of impacts and short life of mine, this risk event is considered LOW.</p>	Possible	Minor	Low

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