



VEGETATION SURVEY REPORT

**WIRRALIE GOLD MINE
SOLOMONS GOLD PTY LTD**

JANUARY 2022



**WULGURU TECHNICAL
SERVICES**

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Definitions

Term	Definition
ECM	Eloise Copper Mine
EO Act	<i>Environmental Offsets Act 2014</i> (Queensland)
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)
EP Regulation	<i>Environmental Protection Regulation 2019</i> (Queensland)
EPBC Act	<i>Environmental Protection Biodiversity Conservation Act 1999</i> (Australia)
ESA	Environmentally Sensitive Area
NC Act	<i>Nature Conservation Act 1992</i>
NEAC	Northern Environmental Assessment and Compliance
ML	Mining Lease
MERFP Act	<i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i> (Queensland)
PMAV	Property Map of Assessable Vegetation
PMST	Protected Matters Search Tool
PRCP	Progressing Rehabilitation Closure Plan
RE	Regional Ecosystem
SPRAT	Species Profile and Threats Database (Dept. of Agriculture, Water and the Environment)
TEC	Threatened Ecological Community (EPBC listed)
TSF	Tailings Storage Facility
VM Act	<i>Vegetation Management Act 1999</i> (Queensland)
WTS	Wulguru Technical Services

1. Introduction

Wirralie Gold Mine (WGM) (the Project) is owned and operated by Solomons Gold Pty Ltd (Solomons). The Project is operating under an active Environmental Authority EMPL00772413 (the EA). Solomons acquired the Project in December 2013 and continued to manage the site in care and maintenance, until recommencement of operations in 2014.

The Project recently received notice from the Department of Environment and Science for the provision of a Progressive Rehabilitation Closure Plan (PRCP) to meet the requirements of new legislation to improve financial assurance outcomes within the resources sector. Under the transitional provisions of the *Mineral and Energy Resources (Financial Provisioning) Act 2018* holders of existing EAs are required to submit a PRCP by a specified date. A gap analysis undertaken by Wulguru Technical services (WTS) identified the requirement for vegetation assessment across the site to inform rehabilitation planning. WTS were engaged to undertake a vegetation survey to verify the regional ecosystems present and provide recommendations with respect to suitable species, species composition and rehabilitation methodology for progressive rehabilitation of the site.

This report provides a detailed summary of general site information and environmental values identified during a desktop assessment and the results of the field-based ground-truthing survey to inform the development of the PRCP.

1.1. Objectives

The objective of this assessment was to identify potential environmental values with respect to the vegetation communities mapped within the project area and to confirm the presence or absence of these via a field-based survey. This was achieved via the following:

- A desktop assessment of environmental values including:
 - o Matters of National Environmental Significance (MNES);
 - o Matters of State Environmental Significance (MSES);
 - o Online database searches;
 - o Literature review of available sources;
- A desktop assessment of conservation significant fauna and likelihood of occurrence analysis
- A field-based survey to ground-truth:
 - o MNES/MSES where required including:
 - Threatened Ecological Communities (TECs); and
 - Habitat for threatened fauna and incidental fauna species list;
 - o Regional Ecosystems;

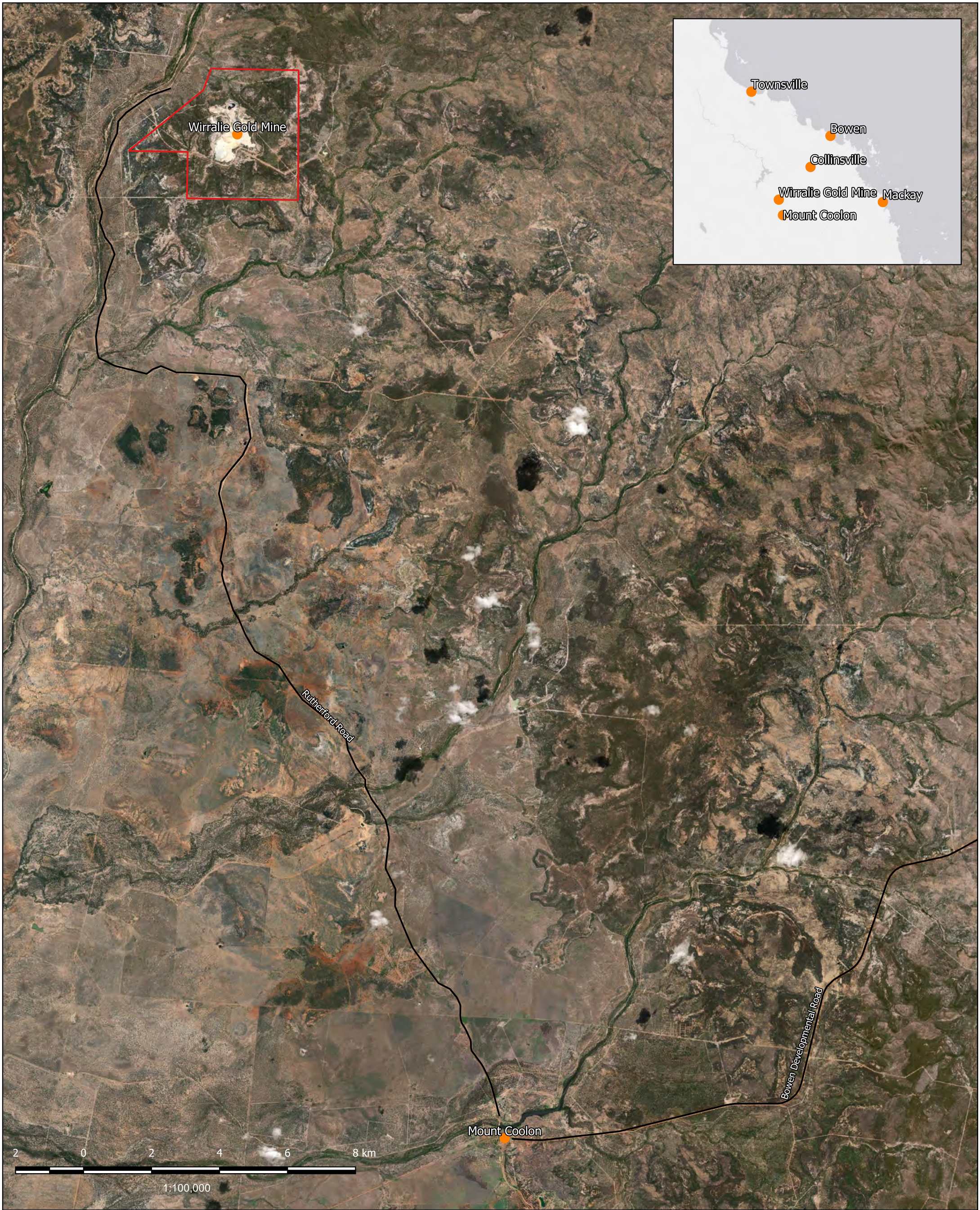
- Establishment of rehabilitation and analogue sites;
- Undertake baseline BioCondition assessments to inform rehab acceptance criteria; and
- Ground-truthing of flora species present to inform suitable species list for rehabilitation

1.2. Project Description

The WGM project is located in the Drummond Basin, approximately 200 km west of Mackay and 30 km North of Mount Coolon, Queensland (Figure 1). The Project is located on a single mining lease, ML1079, which covers an area of approximately 1,300 ha on Wirralie Station on freehold land, Lot 3272 on Plan SP237696. The property is zoned as a primary Rural zone under the Whitsunday Regional Council land zoning.

The Project is a metalliferous open cut gold mine, consisting of pits, one of which is currently active, and processing operations. Mining began in 1987 and continued until 1993, when the processing plant was relocated to the Yandan mine site, 30km west. An upgraded 1.5 million tonne per annum treatment plant was reinstated at Wirralie in 1999. The plant treated low-grade oxide and deep lead mineralisation until early 2002, when the site was placed in care and maintenance.

Solomons acquired the Project in December 2013, recommencing mining and processing operations in 2014. Planned activities include the mining and processing of 400 kt of ore annually. Under current conditions, surface waste rock dumps are not required. Instead, a pit dumping strategy is utilised where necessary. Existing waste dumps have been rehabilitated by previous mine operators with varying degrees of success.



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Figure 1. Project Location

- Key Features
 - Major Roads
 - Mine Lease
- ESRI Satellite

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Digital data for this report is available on the Queensland Government Spatial Portal at <http://www.information.qld.gov.au>.



2. Legislation

2.1. Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) provides for the protection of Queensland's environment through the regulation of prescribed environmentally relevant activities that may harm the environment. It does so by establishing standards and guidelines with respect to management of impacts to ecological processes and the regulation and administration of compliance to ensure environmental outcomes are achieved.

Under Section 125 of the EP Act:

- (1) An application for an environmental authority must—
 - (n) if the application is a site-specific application for a mining activity relating to a mining lease—be accompanied by a proposed PRCP plan;

And, under Section 126C:

- (c) include—
 - (i) a proposed PRCP schedule that complies with section 126D.

Environmental values requiring consideration in an EA application include:

- Category A and category B environmentally sensitive areas (ESAs) as defined under Schedule 19 of the *Environmental Protection Regulation 2019* (EP Regulation);
- Category C ESAs, where defined in a relevant model conditions document or ERA standard; and
- Matters of State environmental significance MSES as defined in Schedule 2 of the *Environmental Offsets Regulation 2014* (EO Regulation).

Regional ecosystems with a biodiversity status of Endangered are listed as a Category B ESA under the EP Act. The Code of Environmental Compliance for Mining Lease Projects indicates that environmental approvals are typically conditioned on the relevant environmental activity not being carried out within a Category A or Category B ESAs. Where activities are carried out within 1 km of a Category B ESA, a site-specific level of assessment may be triggered. Where impacts to regional ecosystems with a biodiversity status of endangered are unavoidable, an offset in accordance with the *Environmental Offsets Act 2014* may be required. In cases where the regional ecosystem is not listed as endangered or of concern under the *Vegetation Management Act 1999*, the requirement for an offset may not be triggered.

2.2. Mineral and Energy Resources (Financial Provisioning) Act 2018.

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* was introduced in November 2018 in response to the findings of a Review of Queensland's Financial Assurance Framework conducted by the Queensland Treasury Corporation. Recommendations from the review identified significant financial risks associated with the failure to deliver rehabilitation outcomes at mine closure and the increasing gap between disturbed and rehabilitated land associated with mining activities.

The object of the MERFP Act is to provide financial surety and reduce financial risk to the State with respect to end of life of mine rehabilitation, the delivery of environmental outcomes and to provide a source of income to the state to address the rehabilitation of existing abandoned mines and impacts, and to further research in the area of mine site rehabilitation.

The MERFP Act:

1. Replaces the financial assurance arrangements for resource activities under the Environmental Protection Act 1994 (EP Act) with a new financial provisioning scheme;
2. Changes how the estimated rehabilitation cost for an environmental authority (EA) is calculated; and
3. Amends the EP Act to introduce new requirements for the progressive rehabilitation and closure of mined land.(Department of Environment and Science 2021).

In addition:

“The MERFP Act includes transitional provisions for the application of the PRC plan requirement concerning existing mines. Holders of an existing EA, for a mining activity relating to a mining lease approved through a site-specific application, will be issued with a notice from the administering authority, within the first three years following the PRCP start date. Where an applicant applied for an EA before 1 November 2019 and the EA is issued on or after the PRCP start date, the holder will be issued a notice from the administering authority within 6 months after the EA is issued.”

2.3. Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) works in conjunction with the *Vegetation Management Regulation 2012* the *Planning Act 2016* and the *Planning Regulation 2017* to form the Vegetation Management Framework (VMF).

- (1) The purpose of this Act is to regulate the clearing of vegetation in a way that—
- (a) conserves remnant vegetation that is—
 - (i) an endangered regional ecosystem; or (ii) an of concern regional ecosystem; or
 - (iii) a least concern regional ecosystem; and
 - (b) conserves vegetation in declared areas; and
 - (c) ensures the clearing does not cause land degradation; and
 - (d) prevents the loss of biodiversity; and
 - (e) maintains ecological processes; and
 - (f) manages the environmental effects of the clearing to achieve the matters mentioned in paragraphs (a) to (e); and (g) reduces greenhouse gas emissions; and
 - (h) allows for sustainable land use.

A regional ecosystem is given a vegetation management class (VM class) of ‘endangered’ under the VM Act if:

- remnant vegetation is less than 10% of its pre-clearing extent across the bioregion; or
- 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares.

A regional ecosystem is given a VM class of ‘of concern’ under the VM Act if:

- Remnant vegetation is 10-30% of its pre-clearing extent across the bioregion; or
- More than 30% of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares.

In addition to VM class, each regional ecosystem is given a biodiversity status (BD status) which considers the relevant condition of the remnant extent with respect to degradation and/ or biodiversity loss. BD status may therefore differ to the VM class, though will always provide added (rather than less) protection. With respect to the EP Act and related legislation, ‘endangered’ and ‘of concern’ regional ecosystems are those with that specific BD status.

Existing remnant vegetation, high value regrowth, high value regrowth (watercourse), vegetation watercourse and drainage features and essential habitat are regulated vegetation under the VM Act and can only be cleared if clearing: is considered exempt clearing in accordance with the VMF; meets

the criteria under an accepted development clearing codes, or under a development or environmental approval.

2.4. Environmental Offsets Act 2014

The main purpose of the *Environmental Offsets Act 2014* (EO Act) is to counterbalance the significant residual impacts of particular activities on prescribed environmental matters through the use of environmental offsets.

This purpose is achieved primarily by:

- (a) establishing a framework for environmental offsets; and
- (b) recognising the level of protection given to prescribed environmental matters under other legislation; and
- (c) providing for national, State and local matters of environmental significance to be prescribed environmental matters for the purpose of this Act; and
- (d) coordinating the implementation of the framework in conjunction with other legislation.

2.5. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) and the *Nature Conservation (Animals) Regulation 2020* and *Nature Conservation (Plants) Regulation 2020* provide a legislative framework for the protection and conservation of Queensland's native plants and animals. Under the framework species of conservation significance are assessed and categorised with respect to population, distribution and potential threats and impacts. The objectives of the NC Act are achieved through an integrated and comprehensive conservation strategy that protects and conserves threatened and special interest species and their habitat and protected areas.

2.6. Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the protection of the environment at a national level and focuses interest on the protecting Matters of National Environmental Significance (MNES) MNES include:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (often called 'ramsar' wetlands after the international treaty under which such wetlands are listed);
- Nationally threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;

- The great barrier reef marine park;
- Nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas development and large coal mining development.

3. Methodology

3.1. Desktop analysis

A desktop analysis of the site was undertaken to identify matters of conservation significance and to inform survey effort. The following searches were undertaken, and resources used for the purposes of the analysis (Table 1).

Table 1 Desktop assessment resources and search criteria

Search/Resource	Source	Search Criteria
MNES database (Matters of National Environmental Significance)	Protected Matters Search Tool https://www.environment.gov.au/epbc/protected-matters-search-tool	10 km radius
MSES database (Matters of State Environmental Significant)	https://www.qld.gov.au/environment/pollution/management/environmental-reports-online	10 km radius
ESAs database (Environmentally Sensitive Areas)	Environmentally sensitive areas report https://environment.des.qld.gov.au/management/maps-of-environmentally-sensitive-areas	ML1079
QLD Species List	https://apps.des.qld.gov.au/report-request/species-list/	40km buffer
QLD regional ecosystem search	https://www.qld.gov.au/environment/pollution/management/environmental-reports-online	Sub-basin
Regional Ecosystem as mapped by Vegetation Regional Ecosystem version 12.00	Mapping available via QSpatial https://qldspatial.information.qld.gov.au/catalogue/custom/index.page	ML1079 and immediate areas

3.1.1. Likelihood of Occurrence Analysis

A 'likelihood of occurrence' (LOO) analysis was undertaken for all listed species of conservation significance to inform the survey design and effort and consideration given to:

- Modelled habitat and species distribution;
- Habitat preferences and habitat suitability; and
- Location of known records and species distribution;

Each species assessed will be categorised according to the potential for presence within the study area as per the following criteria:

Table 2: Likelihood of occurrence criteria

Status	Definition
Known	Species known to occur from recent records within the study area.
Likely	Species recorded within 1km of the study area and/or preferred habitat known to be present, and species recorded within 5 km.
Possible	Species recorded within 50 km of the study area and suitable habitat mapped as present.
Unlikely	Species not recorded within 50 km of the study area and suitable habitat not mapped as present.

3.2. Field Assessment

Field surveys were conducted to ground-truth the regional ecosystems identified in the desktop analysis, conduct BioCondition assessments of previous rehabilitation sites, and conduct BioCondition surveys of reference (analogue) sites to inform acceptance criteria for rehabilitation.

The objectives of this assessment included:

- Verification of RE boundaries and identification of other relevant Protected Environmental Matters (PEM);
- Establishment of BioCondition assessment sites for rehabilitation; and
- Assess the rehabilitation site against acceptance criteria;
- Identification of key flora species for rehabilitation.

3.2.1. Timing and expertise

Field surveys occurred from the 23 to 26 July 2021 and were led by Grant Paterson (GAP Tree Change) with Keely Glass (Wulguru Tech Services) assisting. Grant Paterson has over 30 years' botanical experience, working both in government and in industry. Keely Glass is a qualified ecologist and environmental advisor with 2 years field experience.

3.2.2. Regional Ecosystem ground-truthing

Regional ecosystem ground-truthing assessments were undertaken over as much of the site that was safely accessible by vehicle. Twenty quaternary level surveys were undertaken at the 40000:1 scale equating to approximately 1.5 surveys per 100 Ha (Figure 4). Sites were chosen to capture sufficient representation of the vegetation communities present. Vegetation was assessed against RE descriptions in the Regional Ecosystem Description Database version 12.0 (REDD)⁸. Species lists were recorded at all relevant sites to both confirm RE description and provide species list for rehabilitation methodology. Should RE boundaries require re-mapping, a more comprehensive 5000:1 scale vegetation survey with will be required.

3.2.3. Rehabilitation monitoring

3.2.3.1. BioCondition Assessment

BioCondition Assessment was used as the standardised methodology of choice for assessing the values and condition of reference and rehabilitation sites in and completed in accordance with the guideline document *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre, et. al, 2015). BioCondition assessment provides a way of assessing vegetation condition utilising key attributes that can be rapidly assessed in field (Eyre, et. al, 2015). Eucalypt tree, non-eucalypt tree and shrub species stem counts were also recorded as additional attributes relevant to the establishment of rehabilitation sites.

3.2.3.2. Reference sites

Three reference (analogue) sites were surveyed in accordance with the *Method for the Establishment and Survey of Reference Sites for BioCondition. Version 3.* (Eyre, et.al, 2017), and were assessed against benchmarks provided by the Queensland Herbarium to ensure appropriateness of the site and to establish local representation of the RE. Results from these assessments were used to determine acceptance criteria for rehabilitation sites (section 4.4).

3.2.3.3. Rehabilitation sites

One BioCondition assessment was conducted on a previously rehabilitated waste rock dump. The site was assessed against the selection criteria developed from the benchmark and reference site data (see section 4.4) to inform rehabilitation condition and recommendations for management actions.

3.2.3.4. Rehabilitation Analogue Site Selection

Three analogue (reference) sites were chosen to provide benchmarks for rehabilitation acceptance criteria (Figure 5). Sites were chosen to be representative of 'best on offer' remnant vegetation while ensuring that topography and soil type were similar to those conditions that would be seen in rehabilitation areas (e.g. waste rock dumps) to ensure the suitability of species recommended for rehabilitation as per the guideline document *Mine rehabilitation - Leading Practice Sustainable Development Program for the mining industry* (Australia. Dept. of Industry, Tourism and Resources. (2006).

3.2.4. Acceptance Criteria

Acceptance criteria are the outcome measures by which the rehabilitation of land is determined to be successful and therefore deemed to be complete in accordance with the conditions of an environmental authority. Acceptance criteria for rehabilitation establishment was developed using the results of the analogue BioCondition assessments. BioCondition Benchmarks for RE 11.7.2 have been developed by the Queensland Herbarium and are available in version 3.2 of the *BioCondition Benchmarks Database* (Queensland Herbarium, 2021). Benchmarks for each attribute relevant to the establishment of a rehabilitation site were used to determine acceptance criteria. Acceptance criteria was partially calculated using remnant vegetation definition values as per the *Vegetation Management Act 1999* which is:

‘vegetation, part of which forms the predominant canopy of the vegetation—

- (a) covering more than 50% of the undisturbed predominant canopy; and
- (b) averaging more than 70% of the vegetation’s undisturbed height; and
- (c) composed of species characteristic of the vegetation’s undisturbed predominant canopy.’

Acceptance criteria for other BioCondition attributes such as species richness and ground cover were based on the locally adapted benchmark measures as per the results of the reference site assessments.

Acceptance criteria for attributes additional to those of the BioCondition assessment were calculated as follows:

- Eucalypt tree stems per hectare – 33 % of rounded reference site averages;
- Non-eucalypt tree stems per hectare – 80% of rounded reference site averages; and
- Shrub stems per hectare – 50% of rounded reference site averages.

Sites achieving the prescribed acceptance criteria for a minimum period of three years are typically considered complete. Monitoring of rehabilitation sites is required at least annually for the period up to the determination of the site being complete.

4. Results

4.1. Desktop analysis

4.1.1. Climate

The Project is located in the Brigalow Belt bioregion, which is characterised by distinct wet and dry seasons, with hot summer and mild winter temperatures. The nearest Bureau of Meteorology (BoM) weather station is at the Collinsville Post Office, Queensland (Station ID: 033013), approximately 85 km north-east of the Project. Climate statistics are available from 1939 to 2021 (rainfall) and 1955 to 2021 (temperature). The mean maximum temperature for the summer period (December to February) is 33.5 °C, and the mean minimum monthly temperature for the same period is 21.7°C. The mean maximum monthly temperature for the winter period (June to August) is 25.7 °C, and the mean minimum monthly temperature for the same period is 10.1 °C. Mean annual rainfall for Collinsville is 701.7 mm with 52 days of rainfall ≤ 1 mm.

Climate data accessed via the Queensland Government's SILO database for location -21.10; 147.25 between 1955 to present day indicated a mean annual rainfall of 569mm and mean annual average evaporation of 2031mm (QLD 2021). This modelled data is consistent with the ephemeral nature of the area.

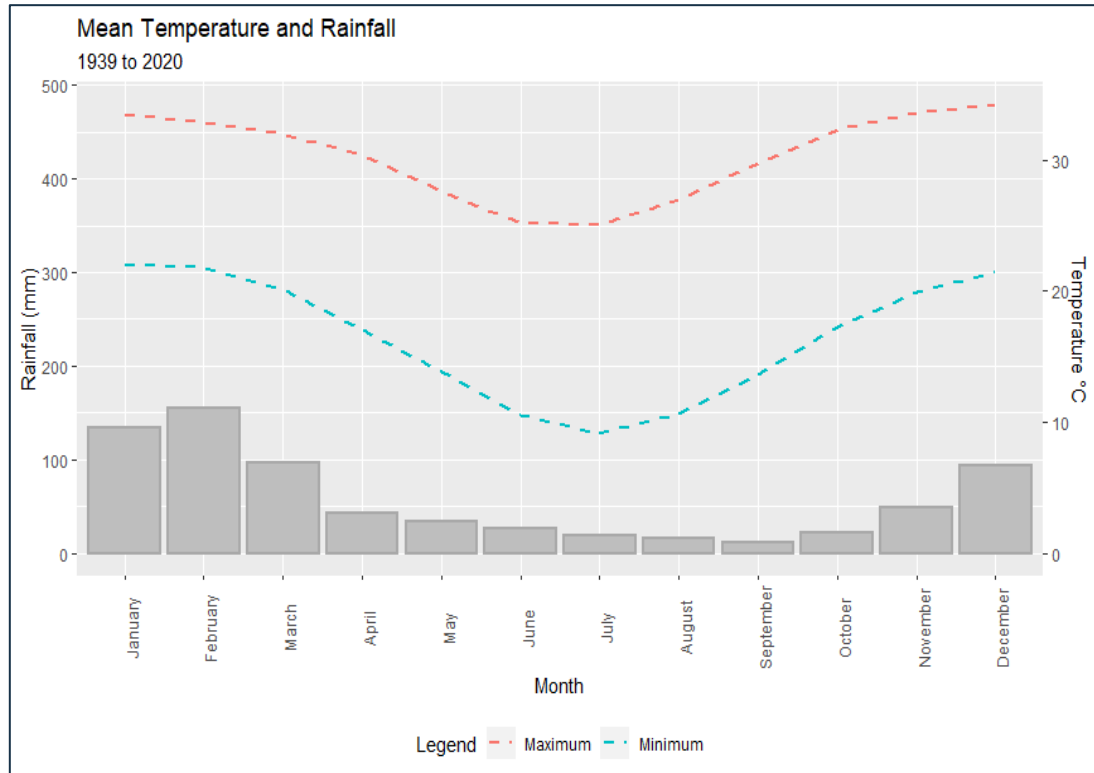


Figure 2 Climate averages for Collinsville

4.1.2. Topography

Regionally the Project lies to the east of the Great Dividing Range and is surrounded by low mountains ranging from 296 m AHD (Rodborough Hill) to 552 m AHD (Mount Landsborough). The topography of ML1079 is variable with rolling rises and hills dominating the site, transitioning to flats and plains. The highest local feature is ~290m AHD located directly north of Pit B and east of Pit A, which then transitions to ~260m AHD north and south of the lease.

4.1.3. Geological setting

The Project is situated in the Drummond Basin, a 26,000 km² area of central Queensland. The Drummond Basin is from the Upper Devonian to Lower Carboniferous periods that underwent three cycles (Olgers 1969). The Project has been historically described as a low-grade, low-sulfidation epithermal system, which lies within cycle one rocks in the central part of the eastern Drummond Basin, and close to the basal unconformity with basement rocks of the Anakie Inlier (NRC 2026).

ML1079 is predominately situated in the Suttor Formation and bordered to the northwest and southeast by the Rosetta Creek Formation (Queensland Government, 2021). The Suttor Formation is a sedimentary rock of the Palaeocene/ Eocene epoch that is described as quartz sandstone, clayey sandstone, mudstone and conglomerate, fluvial and lacustrine sediments with minor interbedded basalt. The Rosetta Formation is mixed volcanic and sedimentary rocks of the Late Devonian period and is described as siltstone to pebbly sandstone with locally abundant plant fossils, and numerous, relatively thin rhyolitic ignimbrite sheets.

4.1.4. Soil types and properties

A desktop analysis of detailed surface soil and geological mapping available via Queensland Globe (QLD, 2021) indicate the following soil and surface geology types. The predominant surface geologies across the project are quartz sandstone, clayey sandstone, mudstone and conglomerate, and fluvial and lacustrine sediments. Siltstone to pebbly sandstone, with relatively thin rhyolitic ignimbrite sheets are present at the northern end of the project, and the south-eastern corner. A small portion of clay, silt, sand, gravel (flood plain alluvial) occurs in the very northern end of the Project, and clay, silt, sand, and gravel (colluvial/residual deposits) occur in a very small amount on the south-western edge of the Project. Three soil types have been mapped within the mining lease of the Project (Table 3). The predominant soil type for the Project is hard pedal, mottled-yellow duplex soils (Tb119). Bleached sands (Cd14) are present in the south-eastern corner of the Project, and a small section of hard pedal yellow duplex soils (SI21) in the north-western corner.

Table 3: Summary of soil types and descriptions of the Project area

Soil Code	Soil Type	General Description
Cd14	Uniform coarse, non calc, A2 horizon conspic bleached with non calc pan below A2 horizon	Bleached sands
Tb119	Duplex yellow-grey, hard setting A horizon, A2 horizon conspic bleached, acid pedal mottled B horizon	Hard pedal mottled-yellow duplex soils
SI21	Duplex yellow-grey, hard setting A horizon, A2 horizon conspic bleached, alk pedal whole col B horizon	Hard pedal yellow duplex soils

4.1.5. Agricultural Land Class

The predominant agricultural land class on the Project and surrounding region is Class C. Classes C1, C2, and C3 can be found in the vicinity of the Project (Table 4). C3 is the dominant subclass within the mining lease, with the presence of a small patch of C2 in the north-western corner. There is little to no high-quality agricultural land in the region. The nearest areas of regional interest are located approximately 70km south-east of the Project, and as such are unlikely to be impacted by Project activities.

Table 4: Agricultural Land Classes and Description

Agricultural Land Class	Description
C1	Pasture land - sown pastures, and native pastures on high fertility soils
C2	Pasture land - native pastures
C3	Pasture land - native pastures, light grazing in accessible areas

4.1.6. Site hydrology and fluvial networks

The Project lies within the Belyando Suttor sub-catchment of the Burdekin catchment. Rosetta Creek is the major fluvial system draining into Suttor River which in turn flows into the Burdekin Dam. The Project overlies an area of gently sloping terrain, draining northwest and south west via several minor drainage lines, including Sugarbag Creek, which drain into Rosetta Creek. Existing water management infrastructure, including the TSF, were constructed to include clean water diversions that divert water around the site and into Sugarbag Creek.

The local drainage features are predominately of the first stream order and ephemeral in nature, typically flowing for short durations immediately following rainfall and remaining dry for the rest of the year. Some pools do persist along Sugarbag Creek however none of these are permanent.

4.1.7. Land Zones

Five land zones were identified within the Project ML: land zone 11, land zone 3, land zone 4, land zone 5, and land zone 7. Land zone 11 is characterised by metamorphosed rocks, forming ranges, hills and lowlands. Soils are typically of low to moderate fertility (Wilson and Taylor, 2012). Land zone 3 is characterised by recent Quaternary systems, including closed depressions, inland lakes, paleo-estuarine deposits under current freshwater influence. More generally described as alluvial river and creek flats (Wilson and Taylor, 2012). Land zone 4 is characterised by Tertiary to early Quaternary clay deposits. These deposits typically form level or gently undulating plains, not related to recent Quaternary alluvial systems. (Wilson and Taylor, 2012). Land zone 5 is characterised by Tertiary to early Quaternary uniform or near level, or gently undulating plains. Soils are typically sandy or loamy soils, and there may be a duricrust at depth. Land zone 7 is characterised by Cainozoic duricrusts that may form on a variety of rock types, often forming mesas or scarps. More generally described as ironstone jump-ups (Wilson and Taylor, 2012).

4.1.8. Vegetation and ecological communities

The Project is located within the Brigalow Belt bioregion (Bordering the Wyarra Hills and Beylondo Downs subregion). *Vegetation Management Regional Ecosystem (RE) map - version 12.0* indicates the Project is located within a mosaic of remnant and non-remnant vegetation (Figure 3). The mapped remnant vegetation areas are comprised of both homogenous (single RE) and heterogenous (multiple RE) polygons with apportioned values in terms of estimated percentage representation. (QLD, 2021). One endangered RE: 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains (76.53 ha) and three of concern REs (VM class): 11.11.10 - *Eucalyptus melanophloia* woodland on deformed and metamorphosed sediments and interbedded volcanics (41.81 ha); 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains (104.59); and 11.5.10 - *Melaleuca tamariscina* tall open shrubland to low woodland on Cainozoic sand plains and/or remnant surfaces (17.14 ha); are mapped within the ML (Table 5). A total area of 240 ha is mapped as comprised of or potentially comprised of endangered and of concern regional ecosystems.

It is noted that a property map of assessable vegetation (PMAV) was completed in 2006 to lock in areas mapped as category X, non-remnant vegetation.

Table 5 Desktop analysis regional ecosystems

Regional Ecosystem	Description	Vegetation Management Act Class	Biodiversity Status	Sum of Area (ha)
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	104.59
11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Endangered	Endangered	76.53
11.5.10	<i>Melaleuca tamariscina</i> tall open shrubland to low woodland on Cainozoic sand plains and/or remnant surfaces	Of concern	Of concern	17.14
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	370.42
11.7.3	<i>Eucalyptus persistens</i> , <i>Triodia mitchellii</i> open woodland on stripped margins of Cainozoic lateritic duricrust	Least concern	No concern at present	138.92
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Least concern	No concern at present	104.89
11.11.10	<i>Eucalyptus melanophloia</i> woodland on deformed and metamorphosed sediments and interbedded volcanics	Of concern	Of Concern	41.81
Non-remnant	None	None	none	473.3

4.1.9. Environmentally Sensitive Areas

Desktop review identified an environmentally sensitive area within the mining lease, and another within 2 km. Both ESAs were classified as “Endangered Regional Ecosystems – regrowth and remnant”. Endangered REs are considered Category B ESAs under the EP Act (Appendix A).

4.1.10. Matters of National Environmental Significance

A protected matters search of the project area including a 10km buffer identified several Matters of National Environmental Significance (MNES) as known to occur or possibly occurring within the search area (Table 6, Appendix B). The PMST report indicated two threatened ecological communities, seventeen listed threatened species, and 10 migratory species as MSES for consideration. Listed flora species are addressed below in sections 4.1.10.2 and 4.2.3.2. Listed fauna species are not addressed further as part of this report though incidental sightings were recorded during field surveys for reference.

Table 6 MNES Search Summary

MNES Search Summary	
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	2
Listed Threatened Species	17
Listed Migratory Species	10

4.1.10.1. Threatened Ecological Communities

Two listed threatened ecological communities were identified as being known to occur in the region: Brigalow (*Acacia harpophylla* dominant and co-dominant), first listed in 2001 (DAWE 2013); and Poplar Box Grassy Woodland on Alluvial Plains, which was newly listed in 2019 (DAWE 2019). Regional ecosystems associated with both communities are currently mapped within the Project ML (Table 7).

Table 7 Listed Threatened Ecological Communities

Name	Status	Description	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered (as of 2001)	Ranges from open woodland to open forest, characterised by the presence of Brigalow (Acacia harpophylla) as one of the three most dominant trees usually along with other Acacia, Eucalyptus, or Casuarina cristata. Relevant associated RE/s: 11.4.9.	Community known to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered (as of 2019)	Typically, grassy woodland with a canopy dominated by Eucalyptus populnea. Relevant associated RE/s: 11.3.2.	Community likely to occur within area

4.1.10.2. EPBC listed Flora

Three threatened flora species are listed as potentially present within 10km of the Project area.

Table 8: Listed Threatened Plant Species

Name	EPBC Status	NC Status	Act of Occurrence	Justification
Dichanthium setosum Bluegrass	Vulnerable	No concern	Possible	No records within 50km, suitable habitat mapped in region.
Eucalyptus raveretiana Black Ironbox	Vulnerable	No concern	Unlikely	No records within 50km, suitable habitat not mapped.
Samadera bidwillii Quassia	Vulnerable	No concern	Unlikely	No records within 50km, but suitable habitat mapped

Dichanthium setosum

Dichanthium setosum is an erect perennial grass to 30–70 cm (~1 m) tall commonly referred to as bluegrass. Bluegrass has leaves 2-3 mm wide, which are slightly rough to rough with tubercle-based hairs or can be glabrous, leaf sheaths are glabrous. Nodes of the erect stems are bearded and the ligule a fringed or ciliate membrane. The inflorescence is single or 2-3 branched, with hairs on the surface of the lower glume and an awn to 25 mm. (Sharpe and Simon, 2002, Jacobs and Wall, 2021, DAWE, 2021). The species typically occurs on heavy cracking clays or alluvium soils in woodland dominated by acacia or eucalyptus species (DAWE, 2021). Queensland distribution includes locations in the Brigalow Belt, Cape York Peninsula, Desert. No ALA records are reported within 50 km of the Project. The closest record occurs near Lake Dalrymple approximately 60 km north. Modelled potential habitat is mapped across much of the Project ML. Likelihood of occurrence within the Project area is considered 'possible'.

Eucalyptus raveretiana

Eucalyptus raveretiana is a medium-sized eucalypt tree growing up to 30 m tall with dark grey, rough, thick, longitudinally fissured bark on most or all of trunk and often on bases of large branches. Smooth bark persisting beyond the rough barked stocking is white to pale blue. (Euclid 2021, DAWE, 2021). Juvenile leaves are ovate and up to 10 cm x 3 cm. The adult leaves are up to 15 cm, narrower than the juvenile and discolourous dark blue/green above and paler below. Oil dots are small, intersecting the veins and island. Leaves are a dull dark blueish green on the upper surface with a paler underside. The inflorescence is terminal and compound with up to 7 buds per umbel. Buds and fruit are small < 0.5 cm. The bud operculum conical and the capsule valves exerted. Flowers are white. (Euclid, 2021, DES, 2021). The species has a varied soil preference ranging from sand to heavy clay, often growing along watercourses and occasionally river flats or open woodland. It is widely distributed in coastal and subcoastal Queensland from south of Townsville to Rockhampton (DAWE, 2021). There is one record located at the Burdekin Dam approximately 50 km from the Project area and modelled potential habitat is mapped along larger waterways adjacent to the Project. Likelihood of occurrence is considered 'possible' for the Project site.

Samadera bidwillii

Samadera bidwillii (formerly *Quassia bidwillii*) is a medium shrub to small tree (up to 6 m). One to several flowers emerge from the leaf axis on a 1-4 mm pedicel and are small and white with calyx bordered red or darkening to red on occasion. Fruit are group of 1-4 winged mericarp green when young and aging to yellow-red. Leaves are discolourous, being paler beneath with obvious venation. Lenticels are obvious on the branches, especially on the new growth, which is covered in pale brown, downy hairs (DAWE, 2008). *S.bidwillii* has been recorded in the dry rainforests and vine thickets in coastal islands off Mackay and south to Gympie. There are no records of *S.bidwillii* within 280 km of the Project and suitable habitat is not present nor modelled in the area. *S.bidwillii* is considered to be very 'unlikely' to be present in the Project area.

4.1.11. Matters of State Environmental Significance

The MSES Report indicated that Wildlife habitat (endangered or vulnerable) is present in the south-eastern corner of the ML. This mapped habitat area is modelled for the vulnerably listed ornamental snake (*Denisonia maculata*). Records of the ornamental snake occur in similar habitat within 50 km of the Project.

Regulated vegetation (category B - endangered or of concern) was also identified within the ML in MSES reports.

Wildlife habitat suitability models indicated habitat suitability for two threatened flora species: *Boronia keysii* (vulnerable); and *Melaleuca irbyana* (endangered); however, neither species has been recorded within several hundred kilometres of the project area.

4.2. Field results

Field based ground-truthing surveys of the Project area were undertaken by two ecologists in July 2021.

4.2.1. Ground-truthed Regional Ecosystems

A number of inconsistencies in the regional ecosystem mapping were observed during the the ground truthing surveys. Notably, an area currently mapped as endangered RE 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains (also identified as a TEC, a category B ESA, an MSES and as Wildlife habitat (endangered or vulnerable)) in the southern section of the mining was ground-truthed as land zone 7: Cainozoic duricrusts. The RE for this area is therefore more consistent with Least Concern RE 11.7.2 - *Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone (Figure 4).

Also noteworthy is an area in the northern section of the ML, much of which is currently mapped as of concern RE 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains (also identified as a TEC, and an MSES) which was ground-truthed as least concern RE 11.3.10 - *Eucalyptus brownii* woodland on alluvial plains (Figure 4).

Several other areas were ground-truthed as land zone 7, consisting of a mosaic community of REs 11.7.4 - *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust (VM Act least concern) and 11.7.5 - Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks (VM Act least concern). These REs are not currently mapped for the Project area (Figure 4).

With the exception of the above-mentioned observations, REs were generally consistent with the mapped regional ecosystems. Where additional impacts to remnant vegetation are indicated, a more comprehensive survey of the vegetation likely to be impacted is recommended.

4.2.2. Environmentally Sensitive Areas

The category B ESA mapped for the project area is associated with the currently mapped endangered RE 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains. Vegetation in this area was ground-truthed as 11.7.2 and should therefore not be considered a category B ESA under the EP Act.

4.2.3. Matters of National Environmental Significance

4.2.3.1. Threatened Ecological Communities

While regional ecosystems known to be associated with the two listed threatened ecological communities Brigalow (*Acacia harpophylla* dominant and co-dominant) (RE 11.4.9), and Poplar Box Grassy Woodland on Alluvial Plains (RE 11.3.2) are currently mapped for the Project ML, ground-truthing observations indicate that changes to the mapping are required.

RE 11.4.9 was ground-truthed as not present within the ML (confirmed as RE 11.7.2) and therefore the Brigalow TEC also does not occur.

RE 11.3.2 was ground-truthed in some locations as consisting instead of *Eucalyptus brownie* and therefore RE 11.3.10 and not consistent with the Poplar Box Grassy Woodland on Alluvial Plains TEC (Figure 4). Other areas mapped as 11.3.2 require further assessment to determine the status of the RE in accordance with the approved conservation advice (Dept. of Environment (2019)).

4.2.3.2. EPBC Listed Flora

All habitat types were visited during the field surveys. No listed threatened flora species were observed during these surveys.

4.2.3.3. Flora Species list

A total of 350 flora species were identified within the project area and was comprised of 56 exotic weed species and 294 native species. The following restricted invasive and other invasive weed species were recorded:

- Restricted invasive:
 - o Lantana (*Lantana camara*);
 - o Parthenium (*Parthenium hysterophorus*)
 - o Rubbervine (*Cryptostegia grandiflora*)
 - o Rat's tail grass (*Sporobolus natalensis*)
 - o Snakeweed (*Stachytarpheta jamaicensis*)
- Other invasive

- o Mimosa bush (*Vachellia farnesiana*)
- o Noogoora burr (*Xanthium occidentale*)

A comprehensive species list is included in Appendix D. This species list was used to develop propose species for rehabilitation (see section 4.5).

4.2.4. Matters of State Environmental Significance

The MSES Report indicated that Wildlife habitat (endangered or vulnerable) is present in the south-eastern corner of the ML. This mapped habitat area is modelled for the vulnerably listed ornamental snake (*Denisonia maculata*). While this mapped habitat relates to the mapped RE 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains, which was ground-truthed during field surveys as RE 11.7.2 - *Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone, the ornamental snake has been recorded in similar habitat and therefore remains a species for consideration.

Regulated vegetation (category B - endangered or of concern) was also identified within the ML in MSES reports. The area currently mapped as RE 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains, was ground-truthed during field surveys as least concern RE 11.7.2 - *Acacia* spp. woodland on Cainozoic lateritic duricrust. Some areas of RE 11.3.2- *Eucalyptus populnea* woodland on alluvial plains were ground-truthed as least concern RE 11.3.10 - *Eucalyptus brownii* woodland on alluvial plains. Remaining areas not ground-truthed should be considered to remain category B of concern until otherwise confirmed.

No additional MSES were observed during the field-based surveys.

4.3. Rehabilitation monitoring

Rehabilitation and analogue monitoring sites were established and assessed as part of the field surveys undertaken in July 2021. Sites were assessed using BioCondition methodology and the collection of other appropriate attributes (see section 3.2.3.1). Data from analogue sites was used to develop acceptance criteria against which rehabilitation sites could be assessed. Site locations for each of the rehabilitation and analogue sites are included in Table 9

Table 9: Rehabilitation and analogue site locations

Name	Type	Latitude	Longitude
WA1 End	analogue	-21.1203736	147.2739684
WA1 Start	analogue	-21.1204735	147.2729814
WA2 End	analogue	-21.1100172	147.2663735
WA2 Start	analogue	-21.1105862	147.2671208
WA3 End	analogue	-21.1156580	147.2524314

Name	Type	Latitude	Longitude
WA3 Start	analogue	-21.1157310	147.2533743
WRH1 End	rehab	-21.1150082	147.2625682
WRH1 Start	rehab	-21.1157872	147.2620647



Client: SMO
Project number: 2020.10003
Coordinate Reference System: GDA 94 55K
14 December 2021

Map provided for interpretation purposes only.

Print as A3



Figure 5. Wirralie Gold Mine Rehabilitation and Analogue sites

- | Rehabilitation monitoring | Regional Ecosystems |
|---------------------------|---------------------|
| analogue | E-dom |
| rehab | E-subdom |
| ML1079 | LeastC |
| RE Edits | O-dom |
| | O-subdom |
| | non-rem |

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Digital data for this report is available on the Queensland Government Spatial Portal at <http://www.information.qld.gov.au>.



4.3.1. Analogue Sites

Three analogue sites were assessed, and the average of both sites presented below. analogue site BioCondition results are presented in Figure 6 and Figure 7. The complete data set is provided in Appendix C.

The average BioCondition scores for the analogue sites were used in conjunction with Regional Ecosystem benchmarks provided by the Queensland Herbarium to develop a rehabilitation acceptance criterion. This aim of this completion criteria is to provide a standardised way to measure and track rehabilitation success, working towards completion targets that are realistic for the area being rehabilitated, and representative of similar vegetation communities in the surrounding area.

Proposed acceptance criteria were calculated from the results of the analogue site assessments and have been outlined in Section 4.4



Figure 6 Representative vegetation of the analogue sites

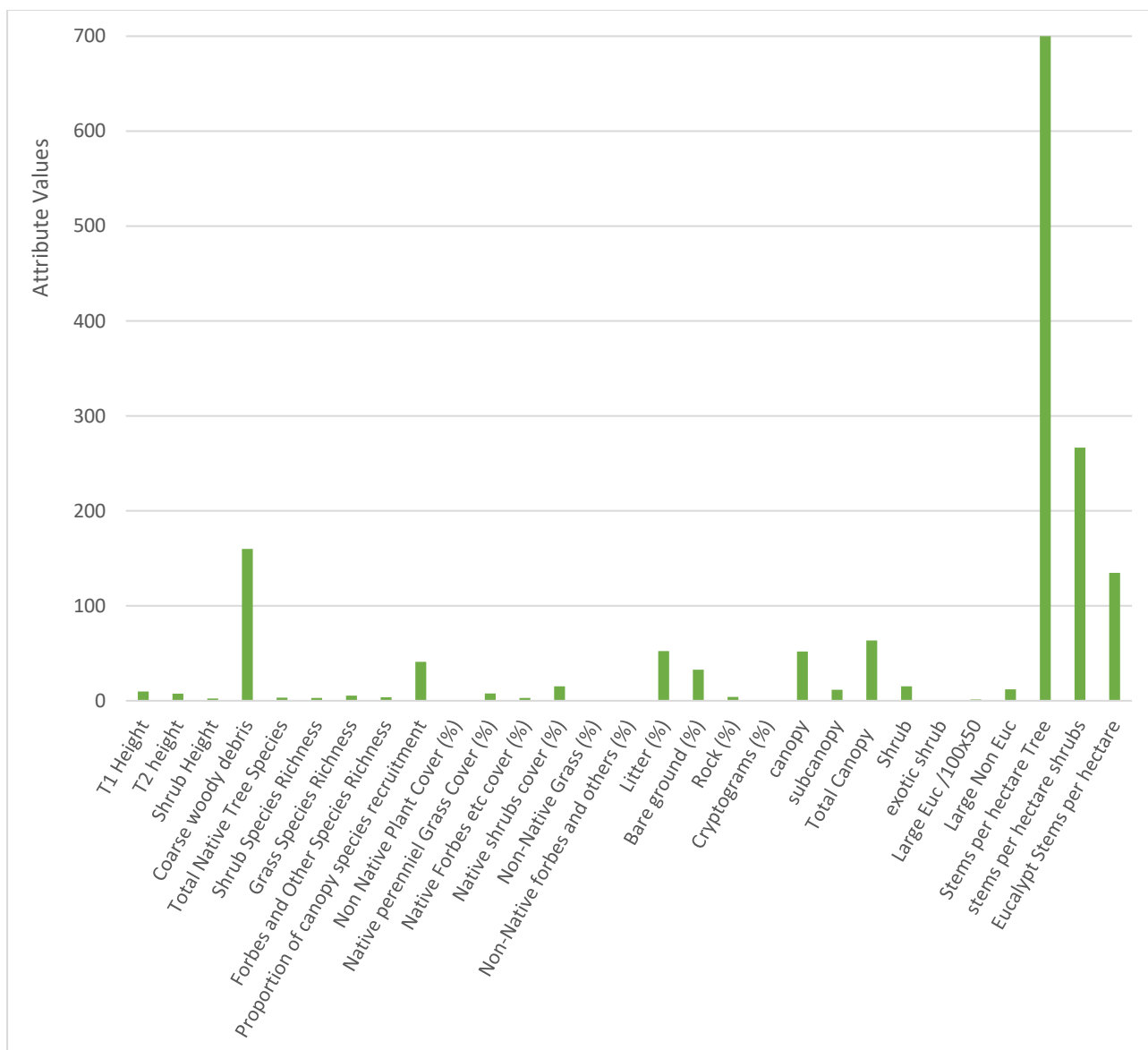


Figure 7: Analogue site BioCondition results

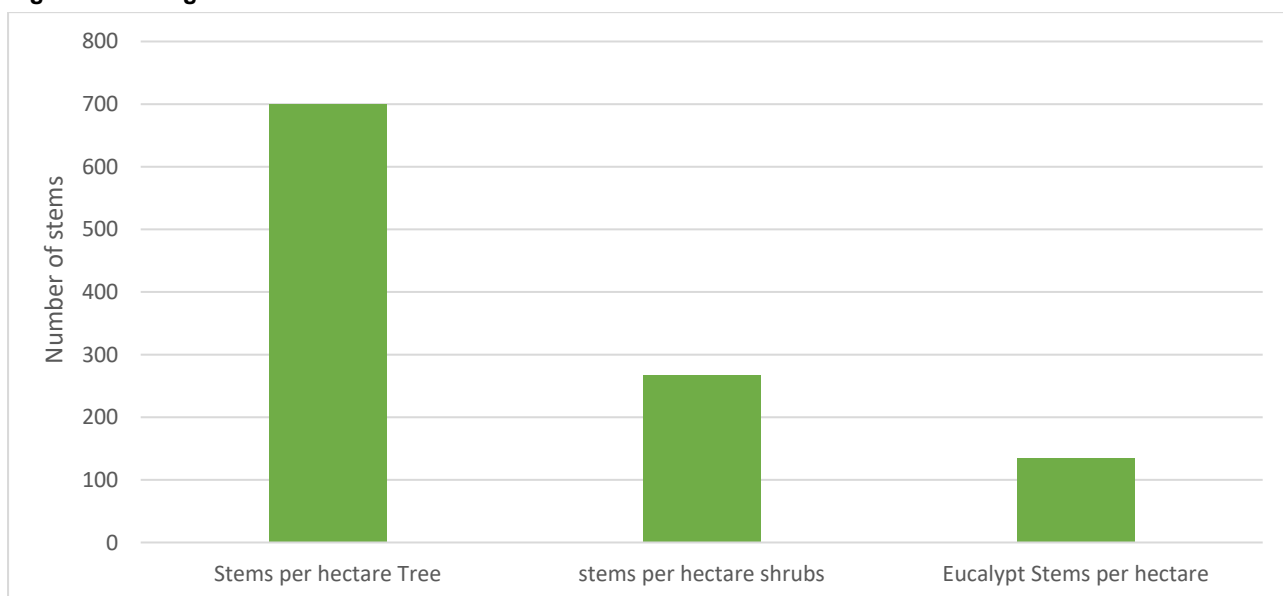


Figure 8: Analogue BioCondition assessment - stem count results

4.3.2. Rehabilitation – Waste Rock Sites

One monitoring transect (WRH 1) was established on a previously rehabilitated waste rock dump and assessed using the adapted BioCondition assessment methodology. Results from this survey were compared with the proposed acceptance criteria are summarised below. The complete data set has been provided in IntroductionC.

WRH1 species richness for trees, grasses, and forbes and other species, were either equal to or exceeding the acceptance criteria, with species richness for shrubs being only slightly less than that of the acceptance criteria (Figure 10). The dominant canopy species of WRH1 however, have not yet achieved the acceptance criteria for height.

Cover percentage for all strata is well below proposed acceptance criteria, indicating that while sufficient species are present to meet the richness criteria, they do not provide cover to achieve completion in this criterion (Figure 10). The results of the stem counts presented in Figure 11 show stem counts across the site to be higher than acceptance criteria.

Results of the assessment indicate that the rehabilitation site has not yet achieved maturity, there is sufficient species representation to reach maturity and achieve completion in due time.

It was also noted during the field surveys that rabbit scatts were abundant and likely to impact the rehabilitation site. Management of this pest species is likely to improve ground cover recruitment and health, and aid in restoring natural ecosystems to rehabilitation areas (Cooke, 2011).



Figure 9 Representative vegetation of the rehabilitation site WRD1

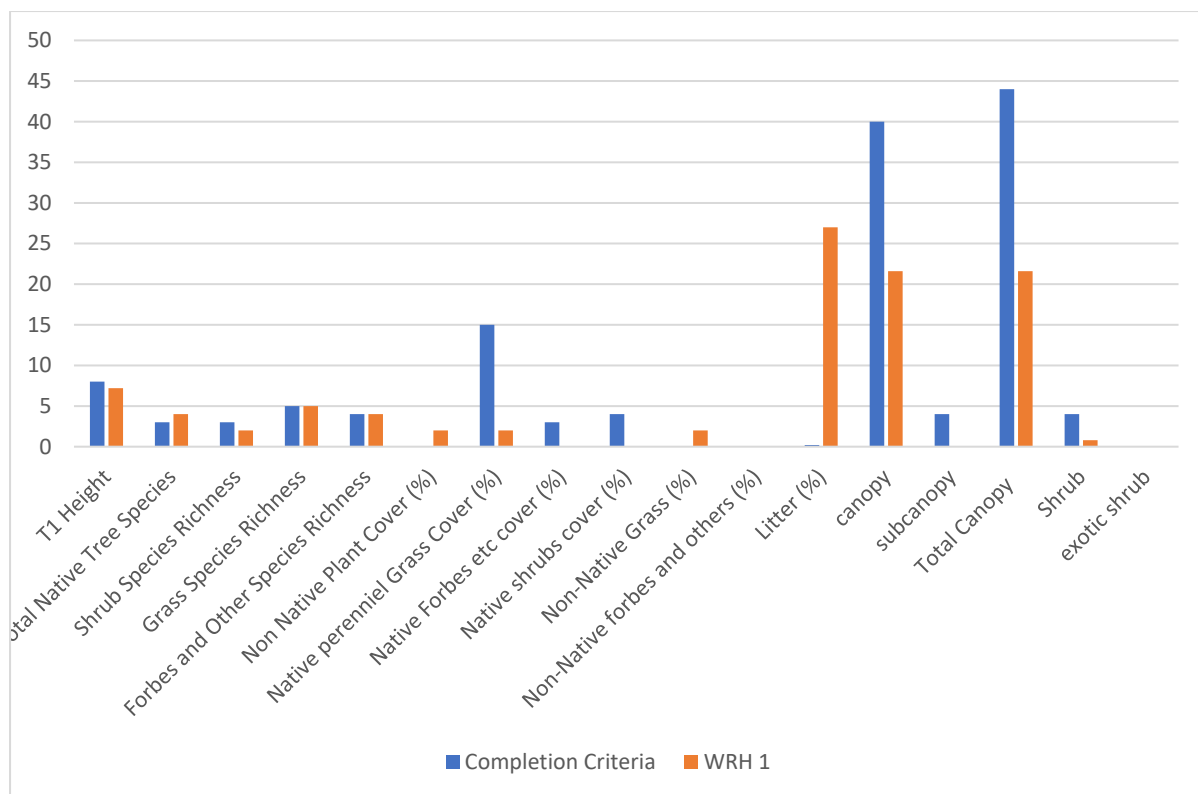


Figure 10 WRH 1 BioCondition results compared with rehabilitation acceptance criteria outcomes.

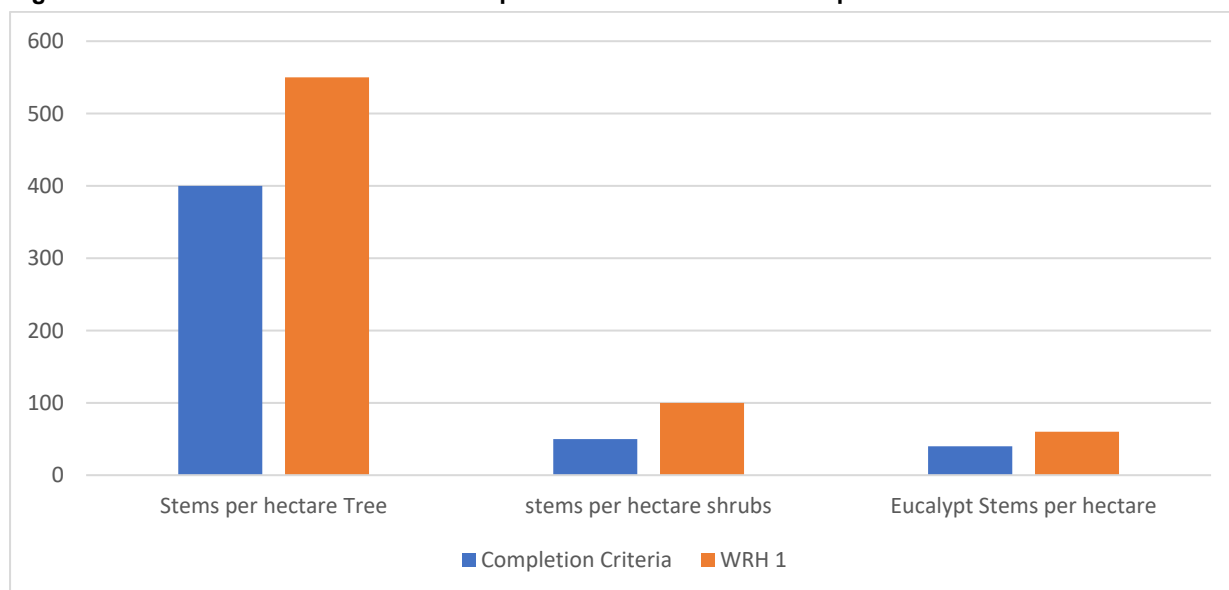


Figure 11 WRH 1 BioCondition stem count results compared with rehabilitation completion criteria outcomes, with x being the criteria being assessed, and y being the BioCondition score for each criterion.

4.4. Proposed Rehabilitation Acceptance Criteria

Acceptance criteria are rehabilitation performance goals presented as criterion completion scores for relevant attributes of vegetation. They provide measures: to which rehabilitation progress can be compared to determine success of the rehabilitation; to identify the need for intervention and management actions; and by which rehabilitated land is deemed to be complete.

The following acceptance criteria have been derived from Queensland Herbarium Benchmarks for regional ecosystems and adjusted for local representation of vegetation based the results of reference site BioCondition assessments (Table 10).

Table 10 Completion Criteria Summary

Criterion	Completion Score
T1 Height	8
Total Native Tree Species	3
Shrub Species Richness	3
Grass Species Richness	5
Forbes and Other Species Richness	4
Non-native Plant Cover (%)	20
Native Perennial Grass Cover (%)	15
Native Forbes and Other Species Cover (%)	3
Native Shrubs Cover (%)	4
Non-native Grass Cover (%)	<15
Non-native Forbes and Other Species Cover (%)	<5
Litter (%)	20
Canopy	40
Subcanopy	4
Total Canopy	44
Shrub	4
Exotic Shrub	<5
Stems/hectare (tree)	400
Stems/hectare (shrub)	50
Stems/hectare (eucalypt)	40

Rehabilitation achieving these criterion for a period of three years could be considered self-sustaining and likely to persist in the long term and may be deemed to be complete in accordance with the conditions of the EA.

4.5. Proposed Rehabilitation Species List

The following list of flora species that have been proposed as suitable species for rehabilitation for the Project area (Table 11). These species were identified in the analogue sites during surveys and were determined to be suitable for conditions found on the waste rock rehabilitation sites.

It is recommended that where possible seeds for these species be collected locally to ensure adaptation to the local environment. Not all recommended species are required for successful rehabilitation, but it is recommended to achieve as high a species richness as is practical.

Table 11 Proposed rehabilitation species list for the Project.

Family	Species Name	Common Name
Eucalypt trees		
Myrtaceae	<i>Eucalyptus brownii</i>	Reid River Box
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint
Myrtaceae	<i>Corymbia dallchiana</i>	
Myrtaceae	<i>Eucalyptus melanophloia</i>	
Myrtaceae	<i>Eucalyptus persistens</i>	
Myrtaceae	<i>Eucalyptus thozetiana</i>	
Large shrubs/ small trees		
Mimosaceae	<i>Acacia catenulata</i>	Bendee
Mimosaceae	<i>Acacia decora</i>	Pretty Wattle
Mimosaceae	<i>Acacia excelsa</i>	
Mimosaceae	<i>Acacia flavescens</i>	Toothed wattle
Mimosaceae	<i>Acacia holosericea</i>	
Mimosaceae	<i>Acacia julifera</i>	
Mimosaceae	<i>Acacia leicocalyx</i>	
Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle
Mimosaceae	<i>Acacia macradenia</i>	Zig-zag wattle
Mimosaceae	<i>Acacia oswaldii</i>	Miljee
Mimosaceae	<i>Acacia rhodoxylon</i>	Ringy rosewood
Mimosaceae	<i>Acacia salicina</i>	Doolan
Mimosaceae	<i>Acacia shirleyi</i>	Lancewood
Mimosaceae	<i>Acacia sparsiflora</i>	
Picrodendraceae	<i>Petalostigma pubescens</i>	Quinine tree
Pittosporaceae	<i>Pittosporum spinescens</i>	
Rhamnaceae	<i>Ventilago viminalis</i>	Supplejack
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree
Rubiaceae	<i>Larsenaikia ochreatea</i>	

Family	Species Name	Common Name
Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	
Sapindaceae	<i>Atalaya hemiglauca</i>	
Scrophulariaceae	<i>Eremophila mitchellii</i>	
Ulmaceae	<i>Trema tomentosa</i> var. <i>aspera</i>	
Small shrubs/ herbs		
Malvaceae	<i>Hibiscus sturtii</i>	
Malvaceae	<i>Hibiscus meraukensis</i>	Merauke hibiscus
Mimosaceae	<i>Neptunia gracilis</i>	
Moraceae	<i>Ficus opposita</i>	
Plumbaginaceae	<i>Plumbago zeylanica</i>	Native plumbago
Polygalaceae	<i>Polygala triflora</i>	
Sparrmanniaceae	<i>Grewia latifolia</i>	Dysentery plant
Grasses		
Poaceae	<i>Aristida jerichoensis</i>	
Poaceae	<i>Eragrostis sororia</i>	
Poaceae	<i>Eriachne mucronata</i>	
Poaceae	<i>Chrysopogon filipes</i>	
Poaceae	<i>Cymbopogon obtectus</i>	
Poaceae	<i>Leptochloa digitata</i>	
Poaceae	<i>Paspalidium distans</i>	Shotgrass
Poaceae	<i>Paspalidium gracile</i>	Slender panic
Poaceae	<i>Tragus australianus</i>	Small burr grass
Poaceae	<i>Cymbopogon refractus</i>	Barbed-wire grass
Poaceae	<i>Eragrostis lacunaria</i>	Purple lovegrass
Poaceae	<i>Eragrostis tenellula</i>	Delicate lovegrass
Poaceae	<i>Panicum decompositum</i>	
Poaceae	<i>Sporobolus contiguus</i>	
Poaceae	<i>Tripogon loliiformis</i>	Five minute grass
Poaceae	<i>Heteropogon contortus</i>	Black spear grass
Poaceae	<i>Aristida caput-medusae</i>	
Poaceae	<i>Bothriochloa decipiens</i>	
Poaceae	<i>Bothriochloa ewartiana</i>	Desert bluegrass
Poaceae	<i>Dactyloctenium radulans</i>	Button grass
Poaceae	<i>Paspalidium caespitosum</i>	Brigalow grass
Poaceae	<i>Themeda triandra</i>	Kangaroo grass
Poaceae	<i>Aristida calycina</i>	

5. Conclusion and Recommendations

Field surveys were undertaken at Wirralie Gold Mine in July 2022. The surveys included:

- Ground-truthing of regional ecosystems
- Ground-truthing MSES
- Establishing and monitoring rehabilitation and analogue sites.

Ground-truthing surveys identified the following:

- The vegetation communities present on site were generally consistent with the mapped regional ecosystems with the following exceptions:
 - o Endangered RE 11.4.9 was found to be not present, being ground-truthed as least concern RE 11.7.2;
 - o Of concern RE 11.3.2 was found to be incorrectly mapped in some areas and was identified instead as least concern RE 11.3.10;
- The Brigalow TEC was not found to be present on site;
- The Poplar Box Grassy Woodland on Alluvial Plains TEC was found not to occur in a large area in the north of the Project ML previously mapped as the TEC associated RE 11.3.2. Other areas of the Project ML still contain mapped areas of RE 11.3.2 and should be considered prior to disturbance.

Rehabilitation site establishment and monitoring found the following;

- Species richness of WRH1 sufficient to achieve the acceptance criterion however the site is not sufficiently mature to achieve the height criterion.
- Low levels of ground cover may be a result of intensive grazing from European rabbits (*Oryctolagus cuniculus*). Several individuals were observed, and extensive evidence of species presence was observed in the form of large amounts of scat (recent and aged), and evidence of grazing on new growth.
- Ongoing rehabilitation monitoring should be undertaken to determine trends in how rehabilitation is progressing towards rehabilitation completion criteria, and inform when intervention may be required if negative trends are observed.

The following recommendations are made regarding vegetation within the Project ML:

- Where additional impacts to remnant vegetation are indicated, a more comprehensive survey of the vegetation likely to be impacted is recommended;
- The TEC status of any vegetation mapped as RE 11.3.2 should be assessed prior to any potential disturbance.

- It is recommended that REs be updated to align with ground-truthed data via a PMAV, to provide accurate mapping and information for appropriate management of vegetation communities;

Rehabilitation monitoring and analogue reference sites were established and recommendations for rehabilitation acceptance criteria and flora species suitable for rehabilitation are provided in sections 4.4 and 4.5 of the report. Rehabilitation and analogue sites should be monitored annually in accordance with the conditions of the EA.

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Appendix A – Environmentally Sensitive Area map

Appendix B – Protected Matters Search

Appendix C – Vegetation Survey Results Summary

Table 12: BioCondition survey results summary.

Transect Number	WA 1	WA 2	WA 3	Average analogue sites	Benchmark	Rounded score	Success criteria	WRH 1
RE	11.7.2	11.7.2	11.7.2					
T1 Height (range)	9.5 (8-11)	9.8 (7.5-12)	10.2 (9-11)	9.83	15	9.8	8	7.2
T2 height (range)			7.5 (6-8)	7.50	5			
Shrub Height	1.8	2.1	3.2	2.37				
Coarse woody debris	148	65.4	266.4	159.93	1214			2.4
Total Native Tree Species	2	3	5	3.33	3	3	3	4
Shrub Species Richness	1	3	5	3.00	4	3	3	2
Grass Species Richness	6	4	6	5.33	5	5	5	5
Forbes and Other Species Richness	4	3	4	3.67	5	4	4	4
Proportion of canopy species recruitment	50	33	40	41.00				50
Non-native Plant Cover (%)	0	0	0	0.00			<20%	2
Native perennial Grass Cover (%)	20	3	0	7.67	15	8	15	2
Native Forbes etc cover (%)	5	0	4	3.00		3	3	0
Native shrubs cover (%)	7.9	7.1	30.4	15.13		15	4	0
Non-Native Grass (%)	0	0	0	0.00	0		<15%	2
Non-Native forbes and others (%)	0	0	0	0.00	0		<5%	0
Litter (%)	56	71	30	52.33	20	50	20%	27
Bare ground (%)	19	21	58	32.67				66
Rock (%)	0	5	7	4.00				3
Cryptograms (%)	0	0	1	0.33				0
canopy	59.3	66.9	29.2	51.80	40	50	40	21.6
subcanopy	0	0	34.9	11.63	4	10	4	0
Total Canopy	59.3	66.9	64.1	63.43	44	60	44	21.6
Shrub	7.9	7.1	30.4	15.13	4	15	4	0.8
exotic shrub	0	0	0	0.00			<5%	0
Large Euc /100x50	0	0	4	1.33	10			0
Large Non Euc	16	3	17	12.00	26			0
Tree stems/ha	440	920	740	700.00		500	400	550
Shrub stems/ha	40	320	440	266.67		100	50	100
Eucalypt Stems/ha	4	240	160	134.67		120	40	60

Appendix D – Flora Species List

Table 13: flora species list

Family	Scientific Name	Common Name
Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower
Acanthaceae	<i>Rostellularia adscendens</i>	
Aizoaceae	<i>Tetragonia tetragonoides</i>	New Zealand spinach
Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed
Aizoaceae	<i>Trianthema triquetra</i>	red spinach
Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed
Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed
Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry
Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed
Amaranthaceae	<i>Ptilotus semilanatus</i>	
Apocynaceae	<i>Carissa ovata</i>	currantbush
Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine
Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod
Asteraceae	<i>Bidens pilosa</i>	
Asteraceae	<i>Camptacra barbata</i>	
Asteraceae	<i>Centipeda minima subsp. minima</i>	
Asteraceae	<i>Coronidium lanosum</i>	
Asteraceae	<i>Cyanthillium cinereum</i>	
Asteraceae	<i>Eclipta prostrata</i>	white eclipta
Asteraceae	<i>Glossocardia bidens</i>	native cobbler's pegs
Asteraceae	<i>Glossocardia refracta</i>	
Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed
Asteraceae	<i>Peripleura hispidula</i>	
Asteraceae	<i>Peripleura obovata</i>	
Asteraceae	<i>Pluchea dentex</i>	bowl daisy
Asteraceae	<i>Pluchea xanthina</i>	
Asteraceae	<i>Pterocaulon redolens</i>	
Asteraceae	<i>Pterocaulon serrulatum</i>	
Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle
Asteraceae	<i>Tridax procumbens</i>	tridax daisy
Asteraceae	<i>Xanthium occidentale</i>	
Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine
Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda
Boraginaceae	<i>Heliotropium cunninghamii</i>	
Boraginaceae	<i>Heliotropium indicum</i>	
Byttneriaceae	<i>Seringia hookeriana</i>	
Byttneriaceae	<i>Waltheria indica</i>	
Cactaceae	<i>Harrisia martinii</i>	
Cactaceae	<i>Opuntia stricta</i>	prickly pear

Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear
Caesalpiniaceae	<i>Cassia brewsteri</i>	
Caesalpiniaceae	<i>Chamaecrista rotundifolia</i>	
Caesalpiniaceae	<i>Lysiphyllum carronii</i>	ebony tree
Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony
Caesalpiniaceae	<i>Senna artemisioides subsp. filifolia</i>	
Caesalpiniaceae	<i>Senna artemisioides subsp. zygophylla</i>	
Caesalpiniaceae	<i>Senna gaudichaudii</i>	
Caesalpiniaceae	<i>Senna magnifolia</i>	
Caesalpiniaceae	<i>Senna occidentalis</i>	coffee senna
Caesalpiniaceae	<i>Senna planitiicola</i>	
Capparaceae	<i>Capparis arborea</i>	brush caper berry
Capparaceae	<i>Capparis lasiantha</i>	nipan
Capparaceae	<i>Capparis loranthifolia</i>	
Capparaceae	<i>Capparis mitchellii</i>	
Caryophyllaceae	<i>Polycarpaea spirostylis</i>	
Celastraceae	<i>Denhamia oleaster</i>	
Celastraceae	<i>Denhamia sp. (Mt Coolon D.Corr PA409)</i>	
Chenopodiaceae	<i>Atriplex lindleyi</i>	
Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush
Chenopodiaceae	<i>Dysphania carinata</i>	
Chenopodiaceae	<i>Einadia nutans subsp. eremaea</i>	
Chenopodiaceae	<i>Einadia nutans subsp. linifolia</i>	
Chenopodiaceae	<i>Enchylaena tomentosa</i>	
Chenopodiaceae	<i>Maireana enchylaenoides</i>	
Chenopodiaceae	<i>Maireana microphylla</i>	
Chenopodiaceae	<i>Salsola australis</i>	
Chenopodiaceae	<i>Sclerolaena anisacanthoides</i>	yellow burr
Chenopodiaceae	<i>Sclerolaena bicornis</i>	
Chenopodiaceae	<i>Sclerolaena muricata var. muricata</i>	
Chenopodiaceae	<i>Sclerolaena ramulosa</i>	
Chenopodiaceae	<i>Sclerolaena tricuspis</i>	giant red burr
Cleomaceae	<i>Arivela viscosa</i>	
Colchicaceae	<i>Iphigenia indica</i>	
Combretaceae	<i>Combretum indicum</i>	
Combretaceae	<i>Terminalia oblongata</i>	
Commelinaceae	<i>Cyanotis axillaris</i>	
Convolvulaceae	<i>Bonamia media</i>	
Convolvulaceae	<i>Evolvulus alsinoides</i>	
Convolvulaceae	<i>Ipomoea nil</i>	
Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine
Convolvulaceae	<i>Jacquemontia paniculata</i>	
Cucurbitaceae	<i>Diplocyclos palmatus subsp. palmatus</i>	

Cyperaceae	<i>Bulbostylis barbata</i>	
Cyperaceae	<i>Cyperus dactyloides</i>	
Cyperaceae	<i>Cyperus difformis</i>	rice sedge
Cyperaceae	<i>Cyperus fulvus</i>	
Cyperaceae	<i>Cyperus haspan</i>	
Cyperaceae	<i>Cyperus iria</i>	
Cyperaceae	<i>Cyperus javanicus</i>	
Cyperaceae	<i>Cyperus trinervis</i>	
Cyperaceae	<i>Eleocharis philippinensis</i>	
Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush
Cyperaceae	<i>Scleria sphacelata</i>	
Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony
Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree
Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha
Euphorbiaceae	<i>Euphorbia</i>	
Euphorbiaceae	<i>Euphorbia drummondii</i>	
Euphorbiaceae	<i>Euphorbia hirta</i>	
Euphorbiaceae	<i>Euphorbia macdonaldii</i>	
Euphorbiaceae	<i>Euphorbia tannensis</i>	
Fabaceae	<i>Aeschynomene americana</i>	
Fabaceae	<i>Aeschynomene brevifolia</i>	
Fabaceae	<i>Crotalaria mitchellii</i>	
Fabaceae	<i>Crotalaria montana</i>	
Fabaceae	<i>Crotalaria verrucosa</i>	
Fabaceae	<i>Cullen australasicum</i>	
Fabaceae	<i>Cullen cinereum</i>	
Fabaceae	<i>Fabaceae</i>	
Fabaceae	<i>Galactia tenuiflora</i>	
Fabaceae	<i>Glycine tomentella</i>	woolly glycine
Fabaceae	<i>Indigofera colutea</i>	sticky indigo
Fabaceae	<i>Indigofera linifolia</i>	
Fabaceae	<i>Indigofera linnaei</i>	Birdsville indigo
Fabaceae	<i>Indigofera pratensis</i>	
Fabaceae	<i>Macroptilium atropurpureum</i>	siratro
Fabaceae	<i>Rhynchosia minima</i>	
Fabaceae	<i>Rhynchosia minima</i>	
Fabaceae	<i>Sesbania cannabina</i>	
Fabaceae	<i>Stylosanthes hamata</i>	
Fabaceae	<i>Stylosanthes scabra</i>	
Fabaceae	<i>Tephrosia brachyodon</i>	
Fabaceae	<i>Tephrosia filipes forma vestita</i>	
Fabaceae	<i>Vigna lanceolata</i>	
Lamiaceae	<i>Basilicum polystachyon</i>	

Lamiaceae	<i>Clerodendrum floribundum</i>	
Lamiaceae	<i>Glossocarya hemiderma</i>	
Lamiaceae	<i>Leucas lavandulifolia</i>	
Lamiaceae	<i>Ocimum caryophyllum</i>	
Loranthaceae	<i>Amyema congener</i>	
Loranthaceae	<i>Amyema quandang</i>	
Loranthaceae	<i>Amyema quandang</i>	broad-leaved grey mistletoe
Loranthaceae	<i>Dendrophthoe glabrescens</i>	
Malvaceae	<i>Abutilon hannii</i>	
Malvaceae	<i>Abutilon otocarpum</i>	
Malvaceae	<i>Abutilon oxycarpum</i>	
Malvaceae	<i>Abutilon subviscosum</i>	
Malvaceae	<i>Gossypium australe</i>	
Malvaceae	<i>Hibiscus meraukensis</i>	Merauke hibiscus
Malvaceae	<i>Hibiscus sturtii</i>	
Malvaceae	<i>Sida acuta</i>	spinyhead sida
Malvaceae	<i>Sida aprica</i>	
Malvaceae	<i>Sida atherophora</i>	
Malvaceae	<i>Sida cordifolia</i>	
Malvaceae	<i>Sida corrugata</i>	
Malvaceae	<i>Sida fibulifera</i>	
Malvaceae	<i>Sida hackettiana</i>	
Malvaceae	<i>Sida rhombifolia</i>	
Malvaceae	<i>Sida rohlenae</i>	
Malvaceae	<i>Sida spinosa</i>	spiny sida
Marsileaceae	<i>Marsilea drummondii</i>	common nardoo
Meliaceae	<i>Owenia acidula</i>	emu apple
Menyanthaceae	<i>Nymphoides crenata</i>	wavy marshwort
Mimosaceae	<i>Acacia blakei</i>	
Mimosaceae	<i>Acacia cambagei</i>	gidgee
Mimosaceae	<i>Acacia catenulata</i>	bendee
Mimosaceae	<i>Acacia conferta</i>	
Mimosaceae	<i>Acacia decora</i>	pretty wattle
Mimosaceae	<i>Acacia excelsa</i>	
Mimosaceae	<i>Acacia flavescens</i>	toothed wattle
Mimosaceae	<i>Acacia fodinalis</i>	
Mimosaceae	<i>Acacia harpophylla</i>	brigalow
Mimosaceae	<i>Acacia holosericea</i>	
Mimosaceae	<i>Acacia jackesiana</i>	
Mimosaceae	<i>Acacia julifera</i>	
Mimosaceae	<i>Acacia julifera</i>	
Mimosaceae	<i>Acacia leiocalyx</i>	
Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle

Mimosaceae	<i>Acacia macradenia</i>	zig-zag wattle
Mimosaceae	<i>Acacia oswaldii</i>	miljee
Mimosaceae	<i>Acacia rhodoxylon</i>	ringy rosewood
Mimosaceae	<i>Acacia rhodoxylon x Acacia shirleyi</i>	
Mimosaceae	<i>Acacia salicina</i>	doolan
Mimosaceae	<i>Acacia shirleyi</i>	lancewood
Mimosaceae	<i>Acacia sparsiflora</i>	
Mimosaceae	<i>Archidendropsis basaltica</i>	red lancewood
Mimosaceae	<i>Neptunia gracilis</i>	
Mimosaceae	<i>Vachellia bidwillii</i>	
Mimosaceae	<i>Vachellia farnesiana</i>	
Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed
Molluginaceae	<i>Glinus oppositifolius</i>	
Moraceae	<i>Ficus opposita</i>	
Myrtaceae	<i>Corymbia clarksoniana</i>	
Myrtaceae	<i>Corymbia dallachiana</i>	
Myrtaceae	<i>Corymbia erythrophloia</i>	variable-barked bloodwood
Myrtaceae	<i>Corymbia lamprophylla</i>	
Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket
Myrtaceae	<i>Eucalyptus brownii</i>	Reid River box
Myrtaceae	<i>Eucalyptus brownii x Eucalyptus persistens</i>	
Myrtaceae	<i>Eucalyptus camaldulensis subsp. acuta</i>	
Myrtaceae	<i>Eucalyptus cambageana</i>	Dawson gum
Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah
Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint
Myrtaceae	<i>Eucalyptus howittiana</i>	Howitt's box
Myrtaceae	<i>Eucalyptus melanophloia</i>	
Myrtaceae	<i>Eucalyptus melanophloia</i>	
Myrtaceae	<i>Eucalyptus persistens</i>	
Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum
Myrtaceae	<i>Eucalyptus shirleyi</i>	
Myrtaceae	<i>Eucalyptus thozetiana</i>	
Myrtaceae	<i>Eucalyptus whitei</i>	White's ironbark
Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo
Myrtaceae	<i>Melaleuca bracteata</i>	
Myrtaceae	<i>Melaleuca chisholmii</i>	
Myrtaceae	<i>Melaleuca pallescens</i>	
Myrtaceae	<i>Melaleuca tamariscina</i>	
Myrtaceae	<i>Melaleuca trichostachya</i>	
Myrtaceae	<i>Micromyrtus capricornia</i>	
Nyctaginaceae	<i>Boerhavia dominii</i>	
Olacaceae	<i>Ximenia americana</i>	

Oleaceae	<i>Jasminum didymum</i>	
Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose
Orchidaceae	<i>Cymbidium caniculatum</i>	Black orchid
Papaveraceae	<i>Argemone ochroleuca</i>	Mexican poppy
Passifloraceae	<i>Passiflora foetida</i>	
Phyllanthaceae	<i>Breynia oblongifolia</i>	
Phyllanthaceae	<i>Flueggea leucopyrus</i>	
Phyllanthaceae	<i>Phyllanthus carpentariae</i>	
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>	
Phyllanthaceae	<i>Phyllanthus virgatus</i>	
Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree
Pittosporaceae	<i>Bursaria incana</i>	
Pittosporaceae	<i>Pittosporum angustifolium</i>	
Pittosporaceae	<i>Pittosporum spinescens</i>	
Plantaginaceae	<i>Scoparia dulcis</i>	scoparia
Plumbaginaceae	<i>Plumbago zeylanica</i>	native plumbago
Poaceae	<i>Alloteropsis cimicina</i>	
Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass
Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass
Poaceae	<i>Aristida benthamii</i> var. <i>spinulifera</i>	
Poaceae	<i>Aristida calycina</i>	
Poaceae	<i>Aristida calycina</i>	
Poaceae	<i>Aristida caput-medusae</i>	
Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>	
Poaceae	<i>Aristida jerichoensis</i>	
Poaceae	<i>Aristida pernicioso</i>	
Poaceae	<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	
Poaceae	<i>Bothriochloa decipiens</i>	
Poaceae	<i>Bothriochloa ewartiana</i>	desert bluegrass
Poaceae	<i>Bothriochloa pertusa</i>	
Poaceae	<i>Brachyachne convergens</i>	common native couch
Poaceae	<i>Calyptochloa gracillima</i>	
Poaceae	<i>Cenchrus ciliaris</i>	
Poaceae	<i>Chloris divaricata</i>	
Poaceae	<i>Chloris gayana</i>	rhodes grass
Poaceae	<i>Chloris inflata</i>	purpletop chloris
Poaceae	<i>Chloris pectinata</i>	comb chloris
Poaceae	<i>Chrysopogon fallax</i>	
Poaceae	<i>Chrysopogon filipes</i>	
Poaceae	<i>Cleistochloa subjuncea</i>	
Poaceae	<i>Cymbopogon oblectus</i>	
Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass
Poaceae	<i>Cynodon dactylon</i>	

Poaceae	<i>Dactyloctenium radulans</i>	button grass
Poaceae	<i>Dichanthium annulatum</i>	sheda grass
Poaceae	<i>Dichanthium tenue</i>	small bluegrass
Poaceae	<i>Digitaria ammophila</i>	silky umbrella grass
Poaceae	<i>Digitaria bicornis</i>	
Poaceae	<i>Digitaria brownii</i>	
Poaceae	<i>Digitaria ciliaris</i>	summer grass
Poaceae	<i>Digitaria orbata</i>	
Poaceae	<i>Dinebra decipiens</i>	
Poaceae	<i>Dinebra ligulata</i>	
Poaceae	<i>Diplachne fusca</i> var. <i>fusca</i>	
Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass
Poaceae	<i>Enneapogon lindleyanus</i>	
Poaceae	<i>Enneapogon polyphyllus</i>	leafy nineawn
Poaceae	<i>Enneapogon virens</i>	
Poaceae	<i>Enteropogon ramosus</i>	
Poaceae	<i>Entolasia stricta</i>	wiry panic
Poaceae	<i>Eragrostis exigua</i>	
Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass
Poaceae	<i>Eragrostis leptostachya</i>	
Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass
Poaceae	<i>Eragrostis sororia</i>	
Poaceae	<i>Eragrostis spartinoides</i>	
Poaceae	<i>Eragrostis tenellula</i>	delicate lovegrass
Poaceae	<i>Eremochloa bimaculata</i>	poverty grass
Poaceae	<i>Eriachne mucronata</i>	
Poaceae	<i>Eriachne mucronata</i>	
Poaceae	<i>Eriachne obtusa</i>	
Poaceae	<i>Eriochloa procera</i>	slender cupgrass
Poaceae	<i>Eriochloa pseudoacrotricha</i>	
Poaceae	<i>Eulalia aurea</i>	silky browntop
Poaceae	<i>Heteropogon contortus</i>	black speargrass
Poaceae	<i>Leptochloa digitata</i>	
Poaceae	<i>Megathyrsus maximus</i> var. <i>maximus</i>	
Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>	
Poaceae	<i>Melinis repens</i>	red natal grass
Poaceae	<i>Mnesithea formosa</i>	
Poaceae	<i>Oxychloris scariosa</i>	winged chloris
Poaceae	<i>Panicum decompositum</i>	
Poaceae	<i>Panicum effusum</i>	
Poaceae	<i>Panicum larcomianum</i>	
Poaceae	<i>Paspalidium albobillosum</i>	
Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass

Poaceae	<i>Paspalidium distans</i>	shotgrass
Poaceae	<i>Paspalidium flavidum</i>	
Poaceae	<i>Paspalidium gracile</i>	slender panic
Poaceae	<i>Paspalum dilatatum</i>	paspalum
Poaceae	<i>Pseudoraphis spinescens</i>	spiny mudgrass
Poaceae	<i>Sporobolus actinocladus</i>	katoora grass
Poaceae	<i>Sporobolus australasicus</i>	
Poaceae	<i>Sporobolus caroli</i>	fairy grass
Poaceae	<i>Sporobolus contiguus</i>	
Poaceae	<i>Sporobolus coromandelianus</i>	
Poaceae	<i>Sporobolus natalensis</i>	
Poaceae	<i>Thellungia advena</i>	coolibah grass
Poaceae	<i>Themeda triandra</i>	kangaroo grass
Poaceae	<i>Tragus australianus</i>	small burr grass
Poaceae	<i>Triodia mitchellii</i>	buck spinifex
Poaceae	<i>Triodia pungens</i>	
Poaceae	<i>Tripogon loliiformis</i>	five minute grass
Poaceae	<i>Urochloa holosericea</i>	
Poaceae	<i>Urochloa mosambicensis</i>	sabi grass
Poaceae	<i>Urochloa panicoides</i>	
Poaceae	<i>Urochloa piligera</i>	
Polygalaceae	<i>Polygala triflora</i>	
Pontederiaceae	<i>Monochoria cyanea</i>	
Portulacaceae	<i>Portulaca oleracea</i>	pigweed
Portulacaceae	<i>Portulaca pilosa</i>	
Pteridaceae	<i>Cheilanthes nudiuscula</i>	
Pteridaceae	<i>Cheilanthes sieberi</i>	
Revegetation species	<i>Vegetation Layer</i>	Species number
Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree
Rhamnaceae	<i>Ventilago viminalis</i>	supplejack
Rubiaceae	<i>Larsenaikia ochreatea</i>	
Rubiaceae	<i>Oldenlandia corymbosa</i>	
Rubiaceae	<i>Psydrax johnsonii</i>	
Rubiaceae	<i>Spermacoce brachystema</i>	
Rutaceae	<i>Flindersia dissosperma</i>	
Rutaceae	<i>Flindersia maculosa</i>	leopardwood
Rutaceae	<i>Geijera parviflora</i>	wilga
Rutaceae	<i>Geijera salicifolia</i>	brush wilga
Rutaceae	<i>Phebalium glandulosum</i>	
Santalaceae	<i>Exocarpos latifolius</i>	
Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree
Sapindaceae	<i>Atalaya hemiglauca</i>	
Sapindaceae	<i>Dodonaea triangularis</i>	

Sapindaceae	<i>Dodonaea viscosa subsp. spatulata</i>	
Scrophulariaceae	<i>Eremophila mitchellii</i>	
Solanaceae	<i>Solanum ellipticum</i>	potato bush
Solanaceae	<i>Solanum galbinum</i>	
Solanaceae	<i>Solanum nigrum</i>	
Sparrmanniaceae	<i>Corchorus trilocularis</i>	
Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant
Sparrmanniaceae	<i>Triumfetta pentandra</i>	
Ulmaceae	<i>Trema tomentosa var. aspera</i>	
Verbenaceae	<i>Lantana camara</i>	lantana
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed