

Attachment 2: Flora and Vegetation Survey Report



Galah Rail Siding reconnaissance and targeted flora survey

Rio Tinto

DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

| Abbreviation | Description |
|--------------|---|
| ASRIS | Australian Soil Resource Information System |
| BAM Act | State <i>Biosecurity and Agriculture Management Act 2007</i> |
| BC Act | State <i>Biodiversity Conservation Act 2016</i> |
| BoM | Bureau of Meteorology |
| DAWE | Department of Agriculture, Water and the Environment |
| DBCA | Department of Biodiversity, Conservation and Attractions |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DEC | Department of Environment and Conservation |
| DoEE | Department of the Environment and Energy |
| DEWHA | Department of the Environment, Water, Heritage and the Arts |
| DPaW | Department of Parks and Wildlife |
| DPLH | Department of Planning, Lands and Heritage |
| DPIRD | Department of Primary Industries and Regional Development |
| DSEWPaC | Department of Sustainability, Environment, Water, Population and Communities |
| DoW | Department of Water |
| DWER | Department of Water and Environmental Regulation |
| ELA | Eco Logical Australia |
| EPA | Environmental Protection Authority |
| EP Act | State <i>Environmental Protection Act 1986</i> |
| EPBC Act | Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| ESA | Environmentally Sensitive Area |
| GDE | Groundwater Dependent Ecosystem |
| IDE | Inflow Dependant Ecosystem |
| IBRA | Interim Biogeographic Regionalisation for Australia |
| MNES | Matter of National Environmental Significance |
| NVCP | Native Vegetation Clearing Permit |
| NVIS | National Vegetation Information System |
| P | Priority |

| Abbreviation | Description |
|--------------|----------------------------------|
| PEC | Priority Ecological Community |
| PMST | Protected Matters Search Tool |
| TEC | Threatened Ecological Community |
| WAOL | Western Australian Organism List |
| WAH | Western Australian Herbarium |
| WAM | Western Australian Museum |
| WoNS | Weed of National Significance |

Executive Summary

Rio Tinto is preparing an application for a Native Vegetation Clearing Permit (NVCP) under Section 51A of the *Environmental Protection Act 1986* (EP Act) at the Galah rail siding situated between the Rio Tinto operated Tom Price East Main Line 83.5 - 84.75 Chainage and Warlu Road, approximately 65 km south-south-east of Karratha in Western Australia.

Eco Logical Australia (ELA) were engaged by Rio Tinto to undertake a desktop assessment, reconnaissance and targeted flora and vegetation survey and fauna habitat survey at the 11 ha Galah rail siding study area (the study area). The study area comprises two adjoining polygons; the southern polygon has an area of 5.1 ha and was sampled by ELA in August 2022, while the northern polygon has an area of 5.9 ha and was sampled by Rio Tinto in September 2022. Field data from both surveys have been compiled to inform this report. Results of the assessment and survey will assist in the preparation of the NVCP application.

A desktop assessment was undertaken, including a review of relevant databases and previous survey reports, to assess for the potential presence of significant flora and fauna species and ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the State *Biodiversity Conservation Act 2016* (BC Act) or by the Department of Biodiversity, Conservation and Attractions (DBCA).

A total of 113 flora taxa (109 native and four introduced) from 32 families and 74 genera were recorded across seven relevés undertaken over two surveys within the study area and from opportunistic collections. A total of four introduced flora were recorded, consisting of **Aerva javanica* (Kapok bush), **Cenchrus ciliaris* (Buffel grass), **Cenchrus setiger* (Birdwood grass) and **Rumex vesicarius* (Ruby Dock). None of the introduced species recorded within the study area are listed as WoNS or Declared Pests under the BAM Act.

No Threatened flora species listed under the EPBC Act or the BC Act, nor Priority listed species by DBCA were recorded within the study area from the field survey.

A pre-field flora likelihood assessment of 50 conservation significant flora species identified from the database searches assessed 13 flora species as having the Potential to Occur within the study area (four species listed by DBCA as Priority 1, seven as Priority 2 and two as Priority 4). The post-field likelihood assessment of conservation significant flora species identified one species, *Eragrostis crateriformis* (Listed by DBCA as Priority 3) as having Potential to Occur within the study area, most likely in vegetation community VT3. VT3 can be summarised as a *Eucalyptus victrix* community associated with a drainage landform. The remaining 49 species were assessed as Unlikely to Occur or Does not Occur.

Four vegetation communities were delineated and mapped within the study area, covering a total area of 8.5 ha (77.2 %). Vegetation community descriptions can be summarised as one *Acacia* on grassland community (VT1), one *Corymbia* on grassland community (VT2) and two *Eucalyptus* communities associated with drainage landforms (VT3 and VT4).

VT1 was the most widespread community, covering 6.4 ha (58.1 %) of the study area. The remaining 2.5 ha (22.8 %) comprised cleared areas for rail infrastructure, tracks, road verge and a pull-over bay with water standpipe.

A pre-field likelihood assessment of four conservation significant ecological communities identified in the database searches determined all four were unlikely to occur within the study area. All four communities are listed by DBCA as Priority ecological communities and none as Threatened under the EPBC Act or the BC Act. The post-field likelihood assessment determined all four do not occur within the study area.

Condition of vegetation within the study area ranged from Degraded to Good with the majority of intact vegetation recorded as being in Poor condition (5.9 ha; 53.9%). Cleared areas accounted for 2.5 ha (22.8%) of the combined study area. Disturbances within the study area included the presence of tracks, rail infrastructure, weeds and historical clearing.

An inventory of encountered vertebrate fauna species was not undertaken, as this was outside the scope of the current survey. A total of three fauna habitats containing two microhabitats were identified and mapped within the study area. The most widespread fauna habitat was Low Hills and Slopes which occurred across 8 ha (72.5 %) of the study area and included a Rock Pile microhabitat. Other habitats consisted of Major Drainage 0.5 ha (4.7 %) with the microhabitat Temporary ephemeral pools and the non-vegetated Disturbed 2.5 ha (22.8 %). The Rock Pile was not considered a significant habitat due to being a small, constructed landform in a previously disturbed area that does not represent potential habitat to conservation significant fauna species assessed to potentially occur within the study area.

A pre-field likelihood assessment of 34 conservation significant fauna species identified from the database searches assessed two species as Likely to Occur, eight species as having Potential to Occur and the remainder as Unlikely to Occur. Following the field survey, a post-field likelihood assessment determined four species as having the Potential to Occur and the remainder as Unlikely to Occur:

- Grey Falcon (*Falco hypoleucos*; listed as VU under the EPBC Act and BC Act);
 - Foraging habitat in Low Hills and Slopes.
 - Foraging, roosting and nesting habitat in Major Drainage.
- Australian Painted Snipe (*Rostratula australis*; listed as EN under the EPBC Act and BC Act);
 - Potential visitation of Temporary ephemeral pools.
- Oriental Pratincole (*Glareola maldivarum*; listed as MI under the EPBC Act and BC Act) and;
 - Potential visitation of Temporary ephemeral pools.
- Lined soil-crevice skink (*Notoscincus butleri*; listed as P4 by DBCA).
 - Preferred habitat in Low Hills and Slopes.

It should be noted that the study area has been previously cleared during construction of Warlu Rd and the rail line an estimated 12 to 15 years ago, so that current vegetation is mostly regenerated post clearance.

1. Introduction

1.1. Project background and study area location

Rio Tinto Iron Ore (Rio Tinto) operates rail lines throughout the Pilbara region of Western Australia. Eco Logical Australia (ELA) was engaged by Rio Tinto to undertake a desktop assessment and reconnaissance flora, vegetation and fauna habitat survey at the Galah rail siding on the Tom Price East Main Line 83.5 - 84.75 Chainage. Results of the assessment and survey will assist in the preparation of an application for a Native Vegetation Clearing Permit (NVCP) under Section 51A of the *Environmental Protection Act 1986* (EP Act).

The Galah rail siding study area (the study area) comprises two adjoining polygons totalling 11 ha in size and is situated between Warlu Rd and the Tom Price East Main Line 83.5 - 84.75 Chainage, approximately 65 km south-south-east of Karratha (Figure 1). The Southern polygon has an area of 5.1 ha and was sampled by ELA in August 2022, while the Northern polygon has an area of 5.9 ha and was sampled by Rio Tinto in September 2022. Field data from both surveys have been compiled to inform this report, therefore unless the distinction has been made in text specifically pertaining to the Northern polygon or Southern Polygon, information within this report refers to the combined study area.

1.2. Scope of survey

The objectives of this survey included:

- Undertake a desktop assessment to identify potential values pertaining to flora, vegetation, fauna, ecological communities and constraints within the project area;
- Undertake a Reconnaissance flora and vegetation survey and Targeted flora survey in accordance with the Environmental Protection Authority (EPA) *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016);
- Undertake a fauna habitat assessment in accordance with the EPA *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (2020);
- Submit all field data as per Rio Tinto data standards; and
- Prepare a report, detailing the findings of the survey.

This report is intended as a supporting document for an NVCP application by Rio Tinto and has been prepared on the basis of a review of existing information for the study area, combined with site field surveys.

1.3. Previous surveys

Several ecological surveys have been conducted previously in or around the study area (Table 1-1). The results of these surveys are summarised in section 4.1.1 and have been considered, where appropriate, in the interpretation of the current survey results.

Table 1-1: Summary of previous ecological surveys in the vicinity of the study area

| Author (year) | Survey Name | Study area, Survey type, Timing | Standard Guidance and Limitations |
|--|--|--|---|
| M.E. Trudgen & Associates and Ecaus (1998) | Flora and vegetation surveys of Orebody A and Orebody B in the West Angela Hill area, an area surrounding them, and of rail route options considered to link them to the existing Robe River Iron Associates rail line | <p>Areas:</p> <ol style="list-style-type: none"> Orebody A and Orebody B in the West Angela Hill area (ha) An area surrounding Orebody A and Orebody B The West Angelas Survey Area) (ha) Nine railway route sections for linking the mine sites to the existing Robe River Iron Associates rail line (ha) Access road from the Great Northern Hwy to the mine area <p>Type: Reconnaissance flora and vegetation</p> <p>Timing: Four surveys, all in 1997: 08-29 April, 13 May-11 June, 30 June-20 July, 18-28 September.</p> | <p>Standard Guidance: Not listed</p> <p>Limitations:</p> <ul style="list-style-type: none"> Vegetation mapping for the rail sections was done on black and white aerial photographic images. Areas with poor access were surveyed using helicopter which limited the selection of survey sites. Mapping was very broad-scale. |
| Ecologia Environmental Consultants (2000) | Robe Development Plan – Millstream-Chichester Rail Corridor Vegetation and Flora Survey, September 1999 | <p>Areas: 12 km linear corridor between chainage 83-98 kp, approx. 1 km wide running through Millstream-Chichester National Park, approx. 65 km south-east of Karratha.</p> <p>Type: Detailed flora and vegetation (15 quadrats measuring 100 x 100 m)</p> <p>Timing: 25-27 September 1999</p> | <p>Standard Guidance: CALM Pilbara biological survey guidelines (Van Leeuwen 2000).</p> <p>Limitations: Not listed</p> |
| Pilbara Iron (2008) | Botanical Survey Work for PA Infill 83.5 km AR-08-02948 | <p>Areas: At 83.5 km along the Dampier-Tom Price Mine Rail line (0.042 ha)</p> <p>Type: Reconnaissance vegetation and flora</p> <p>Timing: March 2008</p> | <p>Standard Guidance: Not listed</p> <p>Limitations: Not listed</p> |
| Biota Environmental Sciences (2008) | A vegetation and flora survey of the Rio Tinto rail duplication project – Cape Lambert to Emu Siding | <p>Areas: Existing Pilbara Iron Railway duplication area between Cape Lambert and Emu Siding.</p> | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Environmental Protection Authority (EPA) Position Statement No. 3 “Terrestrial |

| Author (year) | Survey Name | Study area, Survey type, Timing | Standard Guidance and Limitations |
|------------------------|---|---|--|
| Rio Tinto (2010) | Flora and vegetation of the proposed Rio Tinto rail duplication – Emu Siding to Rosella Siding: Additional Development Areas (NVCP supporting report) | <p>Type:</p> <ul style="list-style-type: none"> Detailed flora and vegetation (44 quadrats measuring 50x50m and 12 relevés) Targeted flora (foot traverses) – not systematic <p>Timing: 01-11 April 2008</p> | <p>Biological Surveys as an Element of Biodiversity Protection” (EPA 2002)</p> <ul style="list-style-type: none"> Guidance Statement No. 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia” (EPA 2004). <p>Limitations:</p> <ul style="list-style-type: none"> No quadrats were established in the southern 10 km of the study area. No floristic analysis conducted |
| Rio Tinto (2010a) | A Vegetation and Flora Survey of the Rio Tinto Rail Duplication – Emu Siding to Rosella Siding Development Areas | <p>Areas: 20 additional areas between Emu Siding and Rosella Siding</p> <p>Type:</p> <ul style="list-style-type: none"> Desktop assessment Reconnaissance vegetation and flora (foot traverses only) Targeted flora <p>Timing: 15-18 June 2009</p> | <p>Standard Guidance: Not listed</p> <p>Limitations:</p> <ul style="list-style-type: none"> Areas surveyed only once in a single season Vegetation units mapped partly using aerial photography |
| Biota Sciences (2010a) | Galah, Gull, Ibis-Koala and Rosella Rail Sidings Native Vegetation Clearing Permit Report | <p>Areas: 39 development areas between Emu Siding and Rosella Siding (83-242 km chainages) (2,145 ha)</p> <p>Type:</p> <ul style="list-style-type: none"> Desktop assessment Update of 2008 report Detailed flora and vegetation (35 quadrats and 3 relevés) Targeted flora and weeds (foot traverses) – not systematic <p>Timing: 5-13 May 2008 (36 areas) and 20 July 2008 (3 areas)</p> | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Environmental Protection Authority (EPA) Position Statement No. 3 “Terrestrial Biological Surveys as an Element of Biodiversity Protection” (EPA 2002) Guidance Statement No. 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia” (EPA 2004). <p>Limitations:</p> <ul style="list-style-type: none"> Vegetation units mapped partly using older (2004) aerial photography |
| Biota Sciences (2010b) | Galah, Gull, Ibis-Koala and Rosella Rail Sidings Native Vegetation Clearing Permit Report | <p>Areas:</p> <ul style="list-style-type: none"> Rail sidings at Galah (26.6 ha), Gull (90.1 ha), Ibis-Koala (1,104 ha) and Rosella (1,927 ha). <p>Type:</p> | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Not listed <p>Limitations:</p> |

| Author (year) | Survey Name | Study area, Survey type, Timing | Standard Guidance and Limitations |
|------------------------|--|--|--|
| Rio Tinto (2011) | Iron Ore Botanical Survey of proposed Borrow Pit Areas at Chainage 81.5 km and 83 km on the Dampier to Mt Tom Price Rail Line. | <p>Desktop assessment</p> <ul style="list-style-type: none"> Detailed flora and vegetation (3 quadrats and several relevés) in areas not previously mapped Targeted flora and weeds (foot traverses) in areas not previously mapped – not systematic <p>Timing: 12-19 May 2010</p> | <ul style="list-style-type: none"> Vegetation units mapped partly using older (2004) aerial photography Rainfall prior to the field survey was very low; likely not annual species were present or identifiable |
| Rio Tinto (2011) | Iron Ore Botanical Survey of proposed Borrow Pit Areas at Chainage 81.5 km and 83 km on the Dampier to Mt Tom Price Rail Line. | <p>Areas:</p> <ul style="list-style-type: none"> Two new borrow pits at chainages 81.5 and 83 km (total 95.81 ha) <p>Type:</p> <ul style="list-style-type: none"> Desktop assessment Detailed flora and vegetation (11 quadrats and 17 relevés) Targeted flora and weeds (foot traverses) – not systematic <p>Timing: 18-19 November 2010</p> | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Environmental Protection Authority (EPA) Position Statement No. 3 “Terrestrial Biological Surveys as an Element of Biodiversity Protection” (EPA 2002) Guidance Statement No. 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia” (EPA 2004). <p>Limitations:</p> <ul style="list-style-type: none"> No seasonal sampling component |
| Biota Sciences (2011a) | Environmental Millstream Rail Corridor Weed Survey - 69 km to 82 km | <p>Areas:</p> <ul style="list-style-type: none"> Proposed rail route from 69 to 82 km (plus 100 m buffer to the east) and borrow pits on the eastern side of the rail within Millstream-Chichester National Park <p>Type:</p> <ul style="list-style-type: none"> Desktop assessment Weed survey (foot traverses) <p>Timing: 19-21 April 2011</p> | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Not listed <p>Limitations:</p> <ul style="list-style-type: none"> The entire project area was not systematically searched. As a result of limited access the western side of the rail corridor was not surveyed. Some species that germinate specifically after winter rains may not have been detectable. |
| Biota Sciences (2011b) | Environmental Millstream Proposed Borrow Pits: Flora and Vegetation Report | <p>Areas:</p> <ul style="list-style-type: none"> Two new borrow pits at chainages 81.5 and 83 km (total 95.8 ha) <p>Type:</p> <ul style="list-style-type: none"> Desktop assessment Detailed flora and vegetation (7 quadrats, one relevé and 22 mapping notes) | <p>Standard Guidance:</p> <ul style="list-style-type: none"> Clarke, V. (2009). Standard Operating Procedure: Establishing Vegetation Quadrats. Prepared for Significant Species and Communities – Resource Conditioning and Monitoring Project, Department of Environment and Conservation. |

| Author (year) | Survey Name | Study area, Survey type, Timing | Standard Guidance and Limitations |
|------------------|---|--|--|
| Rio Tinto (2014) | Flora, Vegetation and Fauna Assessment: AutoHaul™ – Emu to Paraburdoo | <ul style="list-style-type: none"> Targeted flora and weeds (foot traverses) – not systematic <p>Timing: 13-15 June 2011</p> | <p>Limitations:</p> <ul style="list-style-type: none"> No direct sampling of fauna was undertaken; fauna habitats are based on desktop review with input from the botanical survey. <p>Standard Guidance:</p> <ul style="list-style-type: none"> Guidance Statement No. 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia” (EPA 2004). <p>Limitations:</p> <ul style="list-style-type: none"> Vegetation was drying with limited annual species present and low numbers of species in flower. Some sites were not accessible by foot and were assessed from a distance. |

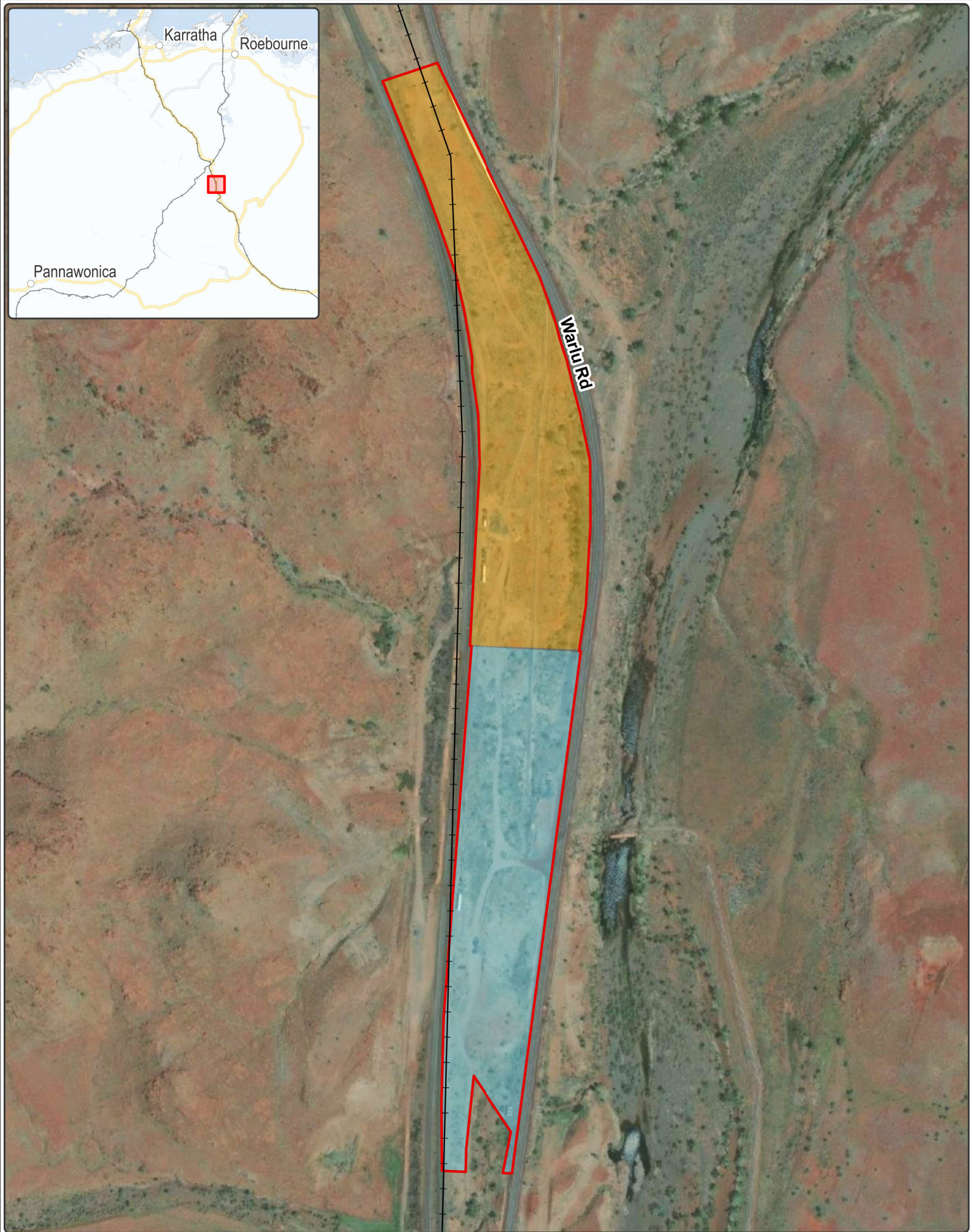
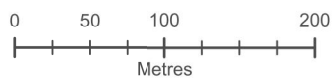


Figure 1: Location of the Galah rail siding study area

- Galah rail siding study area
- Northern polygon
- Southern polygon
- Railways



Datum/Projection:
GDA 1994 MGA Zone 50
22PER1360-ED Date: 16/02/2023



2. Site Overview

2.1. Interim Biogeographic Regionalisation for Australia (IBRA)

The current iteration of the Interim Biogeographic Regionalisation for Australia (IBRA), Version 7, classifies the landscapes of Australia into 89 bioregions based on factors such as climate, geography, vegetation and species information. These 89 bioregions are further refined into 419 sub-regions representing more localised and homogenous geomorphological units in each bioregion. IBRA divides Western Australia into 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation.

The Galah rail siding study area is situated within the Pilbara Bioregion and more specifically in the Chichester Subregion (DCCEEW 2022).

The Chichester subregion of the Pilbara bioregion is described by Environment Australia (2000) as “Archaean granite and basalt plains supporting shrub steppe characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grasses. Snappy Gum tree steppes occur on ranges.”

2.2. Climate

The climate of the Chichester subregion is described as semi-desert tropical and receives approximately 300 mm of annual rainfall (Kendrick & McKenzie 2001).

Bureau of Meteorology (BoM) records show the Millstream weather station (Station #5012, open 1987-present) to be the closest long-term weather station, approximately 35 km south of the study area. Millstream has a long-term average annual rainfall of 372 mm with the greatest average rainfall recorded over the months January to March (Figure 2).

In the 12 months prior to the August 2022 field survey (August 2021 to July 2022) 500.4 mm rainfall was recorded, significantly above the long-term average. May 2022 recorded an unusually large amount of rainfall, with 275 mm recorded in this month alone. In the three months prior to the August 2022 field survey (June - August) a total of 9.2 mm rainfall was recorded, below the long-term average of 48.9 mm. An additional 19 mm rainfall was recorded in early September before the Northern polygon field survey, so that a total of 23 mm rainfall was recorded in the three months prior to the September 2022 field survey (July - September), slightly above the long term average of 21.5 mm for the same period (BoM, 2022a).

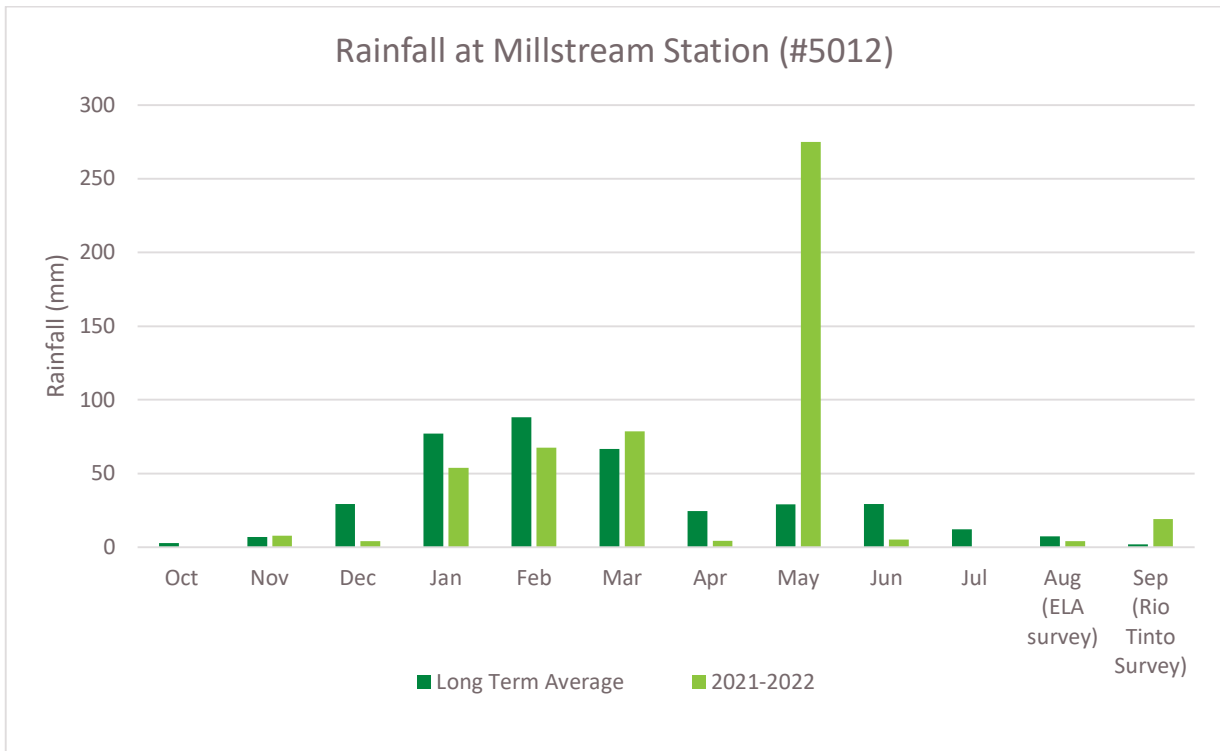


Figure 2: Rainfall records at Millstream Weather Station (BoM #50121), 1987-present

2.3. Geology, Landforms and Soils

The Chichester subregion is underlain by the northern section of the Pilbara Craton. Significant areas of basaltic ranges interrupt undulating Archaean granite and basalt plains (Kendrick & McKenzie 2001). Most of the study area is underlain by Quaternary clay, silt and sand, with gravel in creeklines over Archaean felsic agglomerates and pyroclastic rocks (Figure 3); Department of Mines, Industry Regulation and Safety 2004).

The study area is situated at the northern edge of the Chichester range where the Harding River exits the range and flows across flatter areas to the north. The Harding River is located 50-100 m to the east of the study area and a steep hillslope rising to approximately 260 m elevation is to the west. The study area includes the railway line embankment to the west and the road embankment to the east; the majority comprises undulating lower slopes and narrow alluvial flats, although its topography has been highly modified.

One mapped soil unit, namely Gf1, covers the entire study area (Australian Soil Resource Information System 2022). Unit Gf1 comprises steep ranges on basic lavas along with dolomites, tuff, banded iron formations, and dolerite dykes, with some narrow valley plains and high-level gently undulating areas of limited extent. The soils are generally shallow and stony and there are large areas without soil cover. Chief soils are brown loams along with significant areas of earthy loam soils.

2.4. Land Systems

Soil Landscape Mapping - Systems mapping, prepared by the Department of Primary Industries and Regional Development (DPIRD), provides an inventory and condition survey of lands at a 1: 250 000 scale (DPIRD 2022). One mapped land system, namely Rocklea, overlaps the entire study area (Figure 3). The

Rocklea system comprises basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (DPIRD 2022).

2.5. Pre-European vegetation

Vegetation type and extent have been mapped at a 1:1,000,000 scale across the Pilbara by Beard (1975) who categorised vegetation into broad vegetation associations. Based on this mapping, the DPIRD has compiled a list of vegetation extent and types across WA (Shepherd et al. 2002).

One Pre-European vegetation association, Chichester Plateau 587, is mapped over the study area (DPIRD 2019; Figure 4). Chichester Plateau 587 comprises Mosaic of *Eucalyptus leucophloia* scattered low trees over *Triodia wiseana* hummock grassland, with *Acacia pyrifolia* scattered shrubs over *Triodia pungens* hummock grassland. This vegetation association has 99.99% of its estimated original area remaining within the Chichester subregion (Government of Western Australia 2019).

2.6. Hydrology

The Galah rail siding study area is located within the Harding Dam catchment and more specifically the Upstream Cooya Pooya sub-catchment (DWER 2018a). The study area is 50-100 m east of, and runs parallel to the Harding River (DWER 2018b), although it is separated by Warlu Rd. A small tributary flows from hills to the west through to the southern most portion of the study area and subsequently through a culvert under Warlu Rd into Harding River. This feature is located on the southern margin of the Southern polygon in Figure 1.

The study area lies within a low potential terrestrial Groundwater Dependent Ecosystem (GDE) (Figure 5) and has an Inflow Dependent Ecosystem (IDE) likelihood of 7 (BoM 2022b). The GDE Atlas (BoM 2022b) described the IDE likelihood as a range of values between 1 and 10 (low to high) that express the likelihood that landscapes are accessing water in addition to rainfall. A score of 10 indicates landscapes that are most likely to access additional water sources, which may be soil water, surface water, or groundwater.

2.7. Areas of Significance

The study area partially lies within the bounds of Millstream Chichester National Park. A total of 2.25 ha (44.1 %) of the Southern polygon and 2.46 ha (41.7 %) of the Northern polygon, or 4.71 ha (42.8 %) of the combined study area falls within the National Park, with the remainder of the study area (6.29 ha; 57.2 %) situated within the excised areas for the rail line corridor and Warlu Rd (recently re-named as Manuwarra Red Dog Hwy). The entire study area is situated within the Environmentally Sensitive Area (ESA) that corresponds to Millstream Chichester National Park (Figure 6).

There are no known wetlands of significance or Ramsar sites within the study area; the nearest is Millstream Pools, approximately 35 km south (upstream) of the study area (DBCA 2022h).

The study area lies within the Harding Dam Priority 1 Public Drinking Water Source Area (DWER 2022).

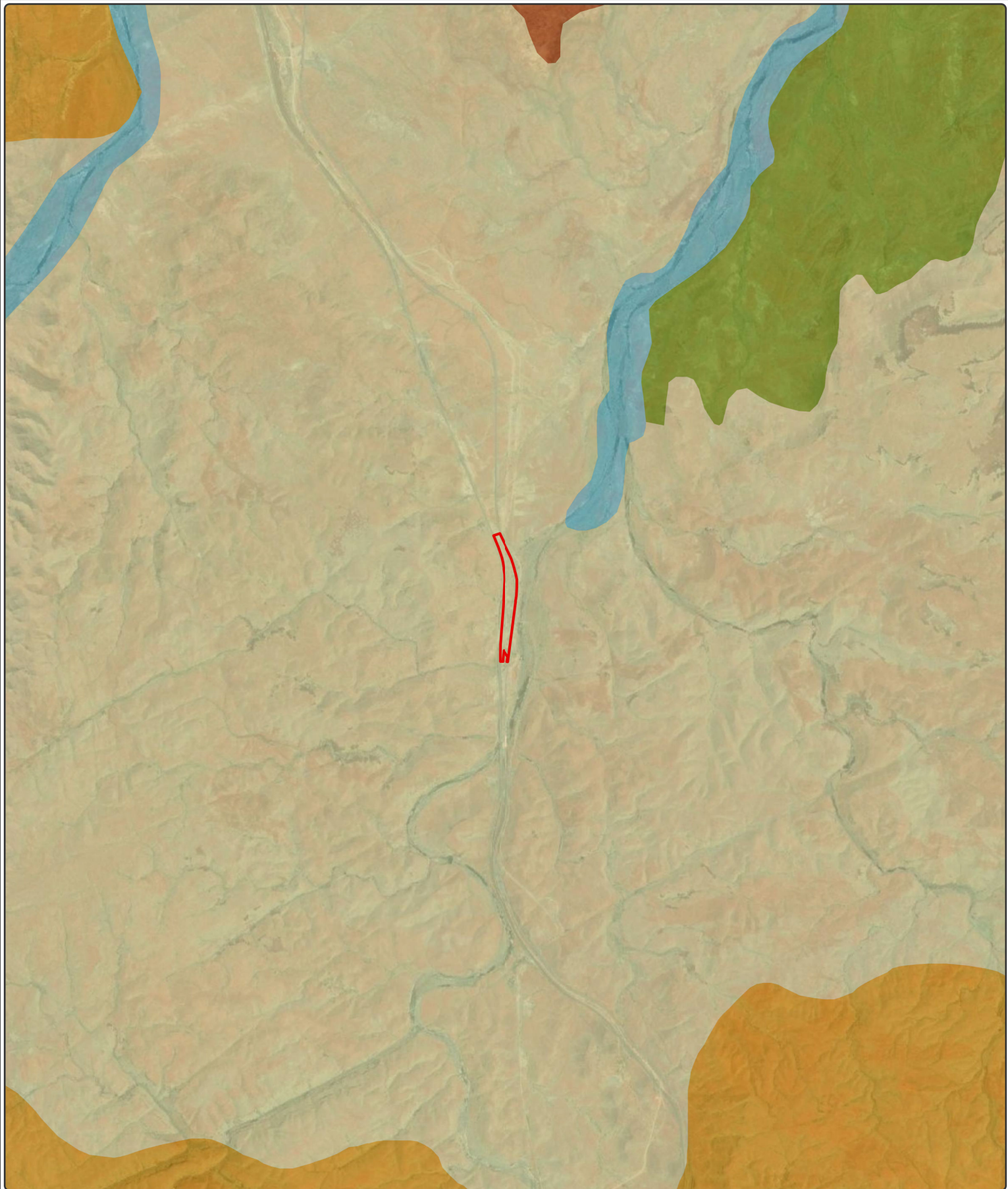





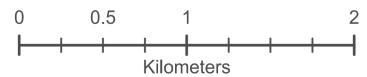


Figure 3: Geology and land systems in the vicinity of the Galah rail siding study area

 Galah rail siding study area

Land Systems (DPIRD)

-  Boolaloo System
-  Capricorn System
-  River System
-  Rocklea System
-  Ruth System



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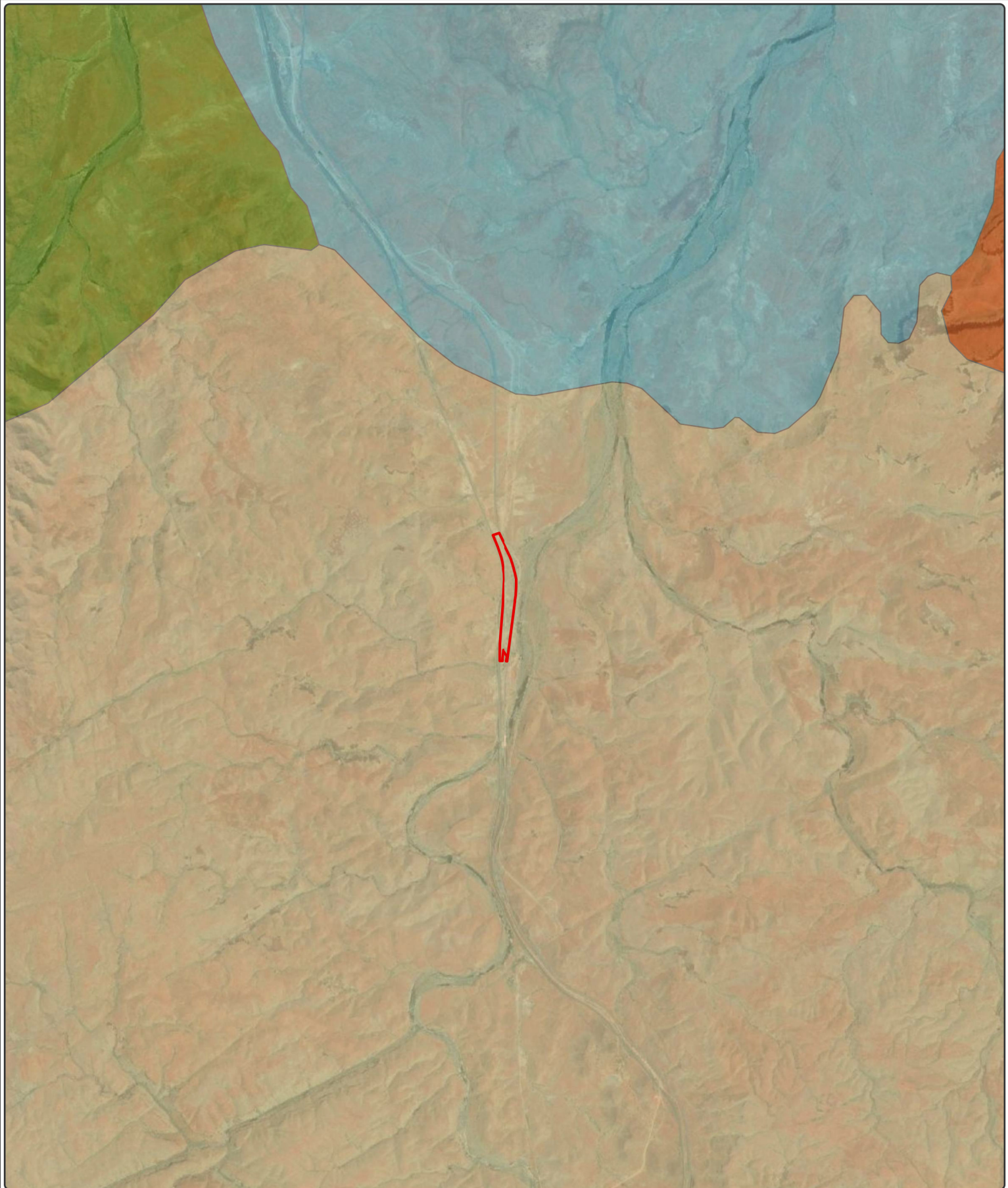


Figure 4: Pre-European vegetation in the vicinity of the Galah rail siding study area

- Galah rail siding study area
- Pre-European vegetation**
- Abydos Plain - Chichester
- Abydos Plain - Chichester 152
- Abydos Plain - Chichester 93
- Chichester Plateau 587



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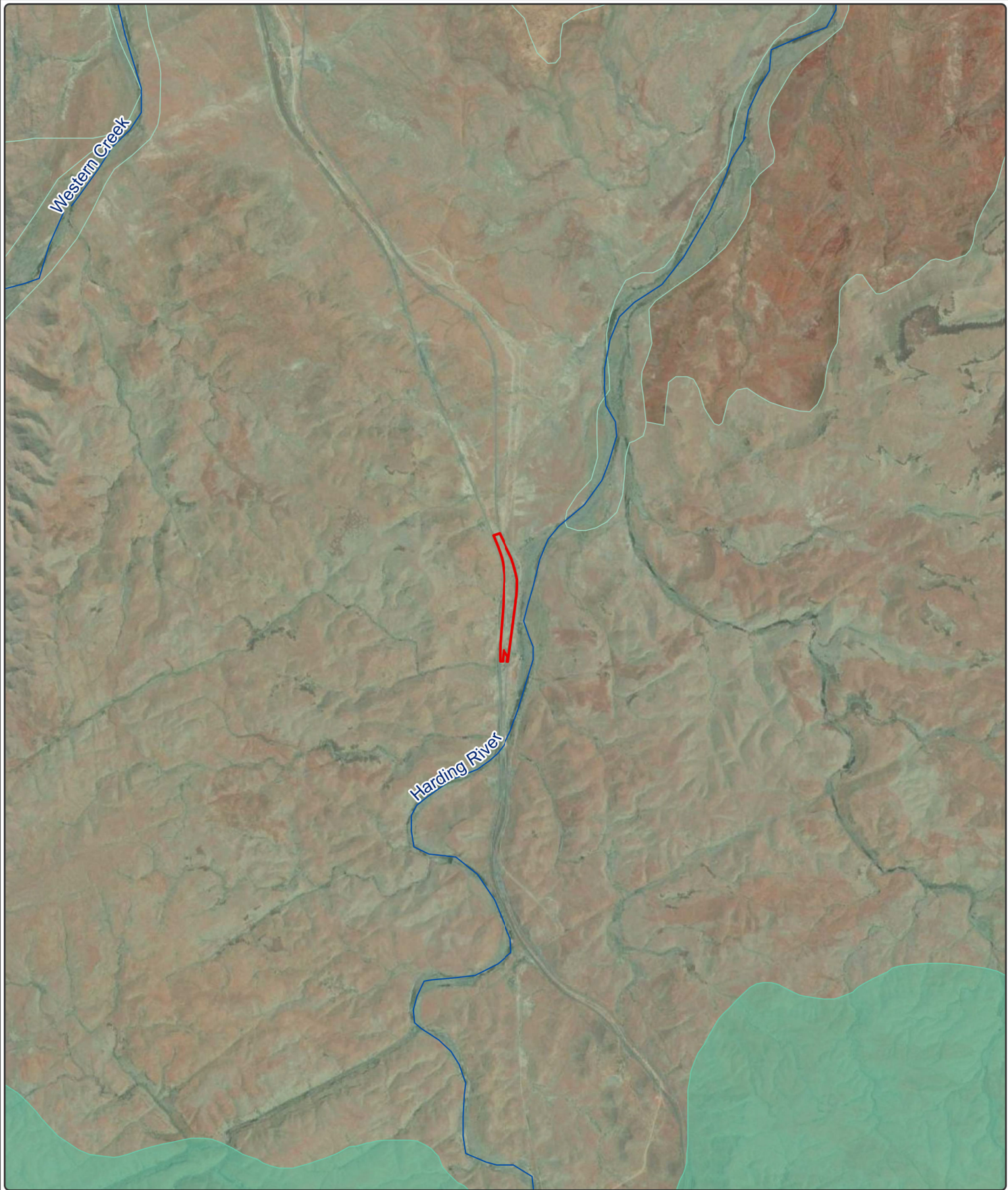


Figure 5: Terrestrial GDE of the Galah rail siding study area

- Galah rail siding study area
- Groundwater Dependent Ecosystems (GDE)**
- Moderate potential
- Low potential



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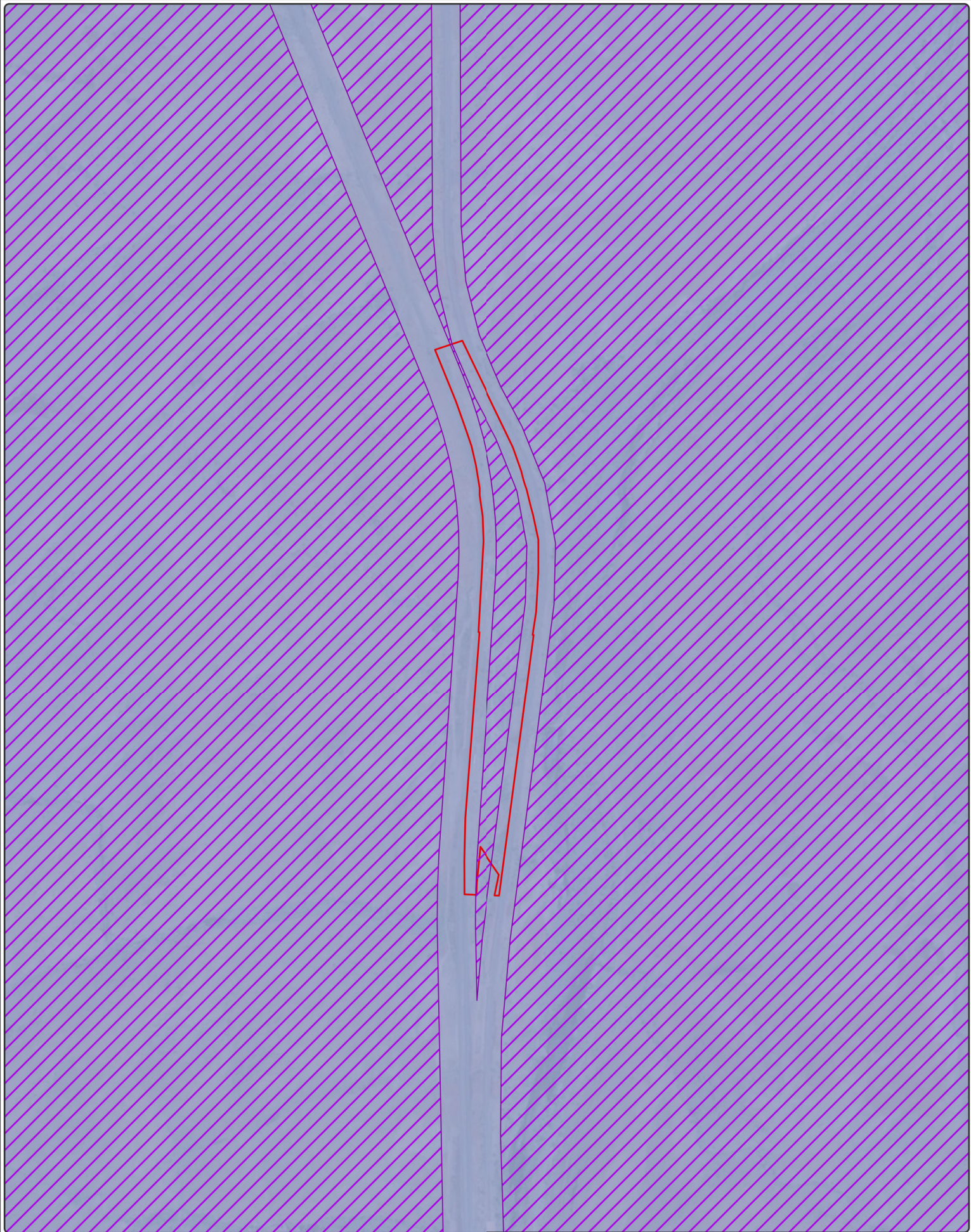



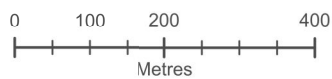


Figure 6: Millstream Chichester National Park

-  Galah rail siding study area
-  Millstream Chichester National Park Environmentally Sensitive Area (ESA)
-  Millstream Chichester National Park



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3. Methods

3.1. Desktop review

3.1.1. Database searches

The following Commonwealth and State databases were searched for information relating to significant flora, fauna and ecological communities in order to compile and summarise existing data to inform the field survey (Table 3-1). Applied search buffers used are considered suitable based on flora and fauna assemblages expected to occur within the study area. It should be noted that buffers for the DBCA database searches are selected by DBCA on a case-by-case basis and are therefore not always consistent with other searches undertaken in the area. Results of the database searches are given in Appendix C.

Table 3-1: Database searches undertaken for the Galah rail siding study area

| Database | Reference | Buffer (km) |
|--|------------|-------------------|
| Atlas of Living Australia database | ALA 2022 | 20 |
| Commonwealth EPBC Act PMST for Matters of National Environmental Significance (MNES), including any Threatened species and communities listed under the EPBC Act. ¹ | DAWE 2022 | 20 |
| DBCA Threatened and Priority flora database searches for Declared Rare Flora listed under the EPBC Act or latest WA Wildlife Conservation (Rare Flora) Notice and Priority Flora. (Ref: 34-0822FL) | DBCA 2022a | 100 |
| DBCA Threatened and Priority fauna database searches for Scheduled Fauna listed under the EPBC Act or latest WA Wildlife Conservation (Specially Protected Fauna) Notice and Priority Fauna (ref: FAUNA#7260). | DBCA 2022b | 40 |
| DBCA Threatened and Priority Ecological Community (TEC and PEC) buffers and boundaries in WA database search. (Ref: 21-0822EC) | DBCA 2022c | 65 |
| Western Australian Herbarium Florabase database search query Conservation code: Any, Distribution : IBRA (PIL), Intersect. | WAH 1998- | Pilbara bioregion |
| Rio Tinto environmental database search | Rio Tinto | 5km |

Aerial photography for the combined study area was reviewed to identify land use patterns, the extent of vegetation, relevant landscape/catchment matters and any other relevant issues where possible.

3.1.2. Literature review

Several previous flora and vegetation surveys have been conducted within, overlapping or in the vicinity of the study area (Table 1-1). The survey reports were reviewed for information relevant to the current survey and results incorporated where appropriate.

¹ EPBC Act Protected Matters Report was created on 20 May 2022, before DAWE became Department of Climate Change, Energy, the Environment and Water (DCCEEW).

3.1.3. Likelihood of occurrence assessment

A likelihood of occurrence assessment was undertaken, both pre-field and post field, to identify significant flora and fauna species that possibly occur within the study area, identified from a review of key datasets and literature, as specified above. The pre-field likelihood of occurrence assessment was conducted only for the Southern polygon, as the Northern polygon was added to the project following the field survey conducted by ELA. The post-field assessment was conducted inclusive of both areas. Marine species were not considered in the likelihood of occurrence assessment as the study area does not contain core habitat that these species solely rely on for survival.

Conservation codes, categories and criteria for flora and fauna protected under the EPBC Act and the BC Act are provided in Appendix A (DBCA 2022i, DEC 2013). Criteria used for this assessment is presented in Appendix B.

3.2. Field survey

3.2.1. Survey team and timing

The field survey of the Southern polygon area was conducted by ELA Botanists Daniel Brassington and Emily Chetwin on 15-16 August 2022, and field survey of the Northern polygon was conducted by Rio Tinto personnel Julijanna Hantzis (Botanist) and Daenia Dundon over a single day on 28 September 2022. The survey team's relevant qualifications, experience and licences are provided in Table 3-2 (Rio Tinto personnel details provided by Rio Tinto).

Table 3-2: Survey team

| Name | Qualification | Relevant experience | Licences |
|--------------------|--|---|---|
| Daniel Brassington | BSc. Hons. Environmental Science | Daniel has more than 10 years' experience in botanical surveys and environmental services throughout Western Australia. This includes baseline vegetation studies, threatened and priority flora surveys, weed surveys, rehabilitation and vegetation monitoring. Daniel has undertaken botanical surveys in the Pilbara IBRA bioregion since 2007. | Flora scientific collection licence: SL012503 Threatened Flora Licence: TFL 15-1920 |
| Emily Chetwin | MSc. Geology | Emily is a botanist with over four years' experience undertaking flora and vegetation surveys across multiple bioregions of Western Australia. This includes Detailed and Reconnaissance baseline flora and vegetation surveys, targeted surveys, rehabilitation and vegetation monitoring and assessment, habitat and bushland condition assessments. Emily has undertaken several botanical surveys in the Pilbara IBRA bioregion since 2018. | Flora scientific collection licence: FB62000026-3 Threatened Flora Licence: TFL-124-2021 |
| Julijanna Hantzis | BSc. Environmental Biology | Julijanna has five years' experience conducting flora and vegetation surveys in the Pilbara. | Flora collection licence: FB62000132-2 |
| Daenia Dundon | BSc (Zoology and Conservation Biology) | Daenia has four years of experience conducting fauna surveys, including some riparian vegetation monitoring and targeted weed surveys in the Pilbara. | |

Survey timing was not consistent with the EPA recommendations for undertaking Detailed and Targeted flora and vegetation survey in the Eremaean botanical province i.e., 6-8 weeks post wet season (March to June; EPA 2016); however, very high rainfall in May 2022 (Figure 2) resulted in conditions still considered suitable for floristic surveys with late season flowering occurring.

3.2.2. Reconnaissance flora and vegetation survey

A Reconnaissance flora and vegetation survey was conducted in accordance with the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016). The survey included:

- Description and mapping of vegetation types, including the presence of any TECs or PECs, or wetland/riparian habitat, and compilation of a species inventory;
- Vegetation condition mapping adapted from Trudgen (1988; EPA 2016); and
- Identification and mapping of any introduced flora (weed) species.

The survey involved the use of relevés with an approximate 25 m radius. Dominant vegetation communities were described, with respect to dominant species, structure and overall condition. Representative photographs of the sampled vegetation were taken at each relevé. Where relevant, opportunistic sampling of species not recorded within the quadrats was undertaken to supplement the existing list of species recorded from within the study area.

A total of four relevés were established by ELA across the Southern polygon area. The following data were recorded within each relevé:

- Broad vegetation type based on an assessment of the dominant flora species for the three traditional strata (upper, mid and ground) and their extent;
- Compilation of a flora species inventory (angiosperm and gymnosperm) of both native and introduced species;
- Broad vegetation condition mapping, including the location of any identified WoNS or Declared Pests listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and a description of disturbances;
- Relevant relevé site data, including location coordinates, a site photograph, landform, soil, geology, fire history, drainage, slope etc. and any other applicable observational data;
- Presence of significant flora and vegetation listed under the EPBC Act, the BC Act or by DBCA; and
- Presence of any TECs, PECs and any other areas of ecological importance (such as EPBC listed ecological communities, Bush Forever sites, National Parks, wetlands, Environmental Protection Policy Areas, and Environmentally Sensitive Areas).

One vegetation community was unable to be accessed in the field, so the relevé (ELA R04) was recorded for the community from a nearby vantage point with good visibility of the community.

An additional three relevés were established by Rio Tinto in the Northern polygon in accordance with Rio Tinto data collection standards. The location of all relevés are shown in Figure 7 and the relevé data presented in Appendix I.

3.2.3. Targeted flora survey

A Targeted flora survey was also undertaken across the study area to assess the presence of significant flora and ecological communities within areas considered suitable habitat. Potentially occurring species, communities and associated suitable habitat were determined during the desktop likelihood assessment. The targeted flora survey involved personnel walking meandering traverses, with spacing dependent on the presence of suitable habitat for target species and communities. All encountered significant flora and vegetation were recorded by taking the coordinates of each individual and/or a centroid coordinate location for a group of individuals (>100) within a 20 m radial circumference, to enable mapping of individual locations and/or population extents.

The study area was traversed in two separate surveys. The survey conducted by ELA in August 2022 traversed the Southern polygon and the survey conducted by Rio Tinto in September 2022 traversed the Northern polygon. The northern portion of the Northern polygon also traversed by ELA in August 2022 as it was part of a concurrent targeted survey in the area conducted for Rio Tinto (ELA 2022). Targeted survey effort is presented in Figure 7 as the GPS tracklog recorded during fieldworks.

Flora species able to be identified in the field were recorded, and specimens of unfamiliar species and suspected priority or threatened flora were collected for later identification by Rio Tinto's sponsored taxonomist based at the Western Australian Herbarium (WAH). All collections were assigned a unique collecting number. For significant flora identified in the field, the following was recorded:

- A colour photograph;
- GPS location;
- Population size estimate;
- Location of population boundaries;
- Associated habitat/landscape element;
- Time and date observed;
- Observer details; and
- A specimen suitable for use as a reference specimen (if appropriate to do so for significant flora)

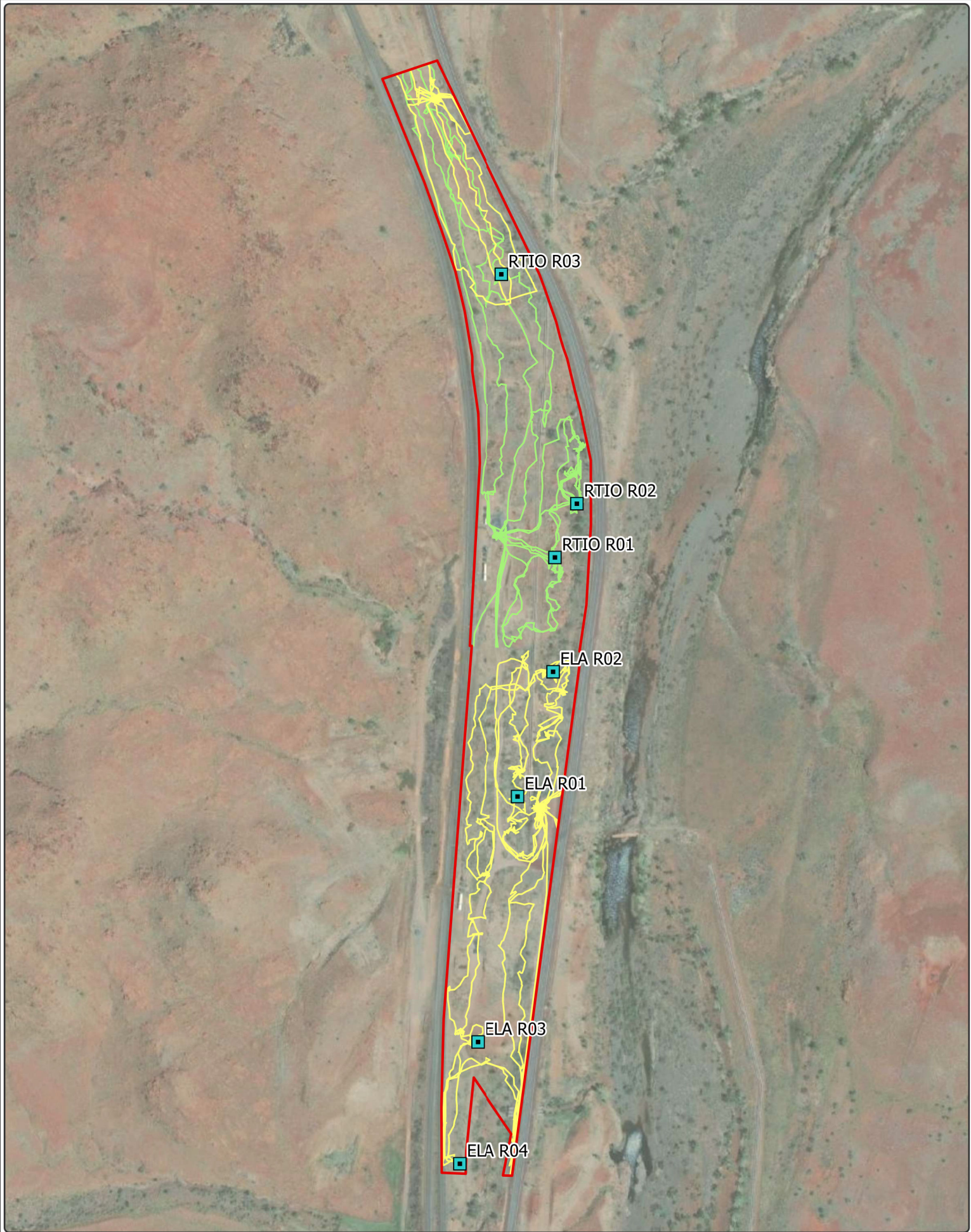
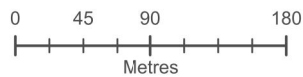


Figure 7: Survey effort

- ▭ Galah rail siding study area
- ▣ Relevé locations
- Tracklog**
- Eco Logical Australia
- Rio Tinto



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3.2.4. Flora identification and nomenclature

Flora specimen identification following the field survey was undertaken by taxonomic specialists at the WAH. Any suspected Threatened or Priority flora specimens were submitted to the Rio Tinto sponsored taxonomists at the WAH for identification. Suitable material that meets WAH specimen lodgement requirements, such as flowering material and range extensions, will be submitted along with Threatened and Priority Report forms to DBCA, as required by conditions of collection licences issued under the BC Act.

Nomenclature used for the flora species within this report follows the WA Plant Census as available on FloraBase (WAH 1998-).

3.2.5. Interpretation of vegetation communities

Vegetation communities were defined on the basis of relevé data and as such are broadly described using dominant flora species for each of upper, mid and lower strata, along with informal field observations and photographs, and aerial imagery.

3.2.6. Fauna habitat assessment

The fauna habitat assessment was conducted in accordance with the EPA *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) with the classification of fauna habitat following Rio Tinto's *RTIO Fauna Habitat Guidelines and Definitions*. The fauna habitat assessment involved personnel walking meandering traverses through the study area, delineating and mapping fauna habitat.

Fauna habitats were assessed for their ability to support and sustain populations of fauna, along with an assessment of the likelihood of occurrence of conservation significant fauna species. The habitat characteristics and fauna database records used in assessing likelihood of occurrence for fauna included:

- Vegetation community, structure and condition;
- Soil and landform type;
- Extent and connectivity of habitat;
- Fauna species habitat preferences;
- Proximity of significant fauna records; and
- Signs of species presence.

3.3. Limitations

The EPA Technical Guidance documents (EPA 2016, 2020) recommend including discussion of the limitations of the survey methods used. An assessment of potential constraints and limitations of this survey are summarised in Table 3-3.

Table 3-3: Survey limitations

| Potential survey limitation | Impact on survey |
|--|---|
| Sources of information and availability of contextual information (i.e., pre-existing background versus new material). | Not a limitation. Land system mapping (DPIRD 2022a) and broad-scale vegetation mapping (DPIRD 2019) were available at a scale of 1:1,000,000. Soil and landform mapping was also available. Several previous ecological surveys in the vicinity of the Galah rail siding study area were available. Available information was sufficient to provide context at varying scales and therefore was not considered a limitation. |

| Potential survey limitation | Impact on survey |
|---|--|
| Scope (i.e., what life forms, etc., were sampled). | Not a limitation. The survey requirement of a Reconnaissance and Targeted flora and vegetation survey and the habitat assessment component of a basic fauna survey in accordance with relevant State and Commonwealth legislation and EPA guidance was adequately met. |
| Proportion of flora collected and identified (based on sampling, timing and intensity). | Not a limitation. A Reconnaissance level survey aims to undertake low intensity sampling in order to verify desktop assessment results (including clarifying potential for significant flora), characterise flora, delineate vegetation units and describe the general vegetation characteristics. Data recorded were sufficient to meet these outcomes with a final count of 113 taxa recorded by three botanists with a minimum of four years' experience during a season with sufficient rainfall to promote flowering of perennial species. Of the 113 taxa, only five could not be positively identified to species level. |
| Completeness and further work which might be needed (i.e., was the relevant study area fully surveyed). | Not a limitation. The study area was sufficiently covered to meet requirements outlined in the scope of works. Site selection and replication was considered adequate to accurately analyse and discriminate sites based on species composition and subsequently delineate vegetation type boundaries. VT3 was not traversed due to access restrictions, however an assessment of vegetation assemblage was able to be made visually from nearby accessible areas. |
| Mapping reliability. | Not a limitation. Coverage of the study area was considered adequate. High quality aerial maps were used for both the survey and subsequent vegetation mapping. |
| Timing, weather, season, cycle. | Not a limitation. The field survey of the Southern polygon was undertaken in August, outside the appropriate season as specified by the EPA Technical Guidance (EPA 2016, 2020). However, the very high rainfall 3 months prior to the field survey meant that conditions were still considered suitable for floristic surveys with late season flowering occurring. Photographic records and presence of annual species in relevé data indicate appropriate conditions continued during the survey of the Northern polygon in September. |
| Disturbances (fire, flood, accidental human intervention, etc.). | Not a limitation. Disturbances within the combined study area included widespread historical clearing for a rail line, road and water pipeline, and significant invasion by weeds. However, the vegetation within the study area has regenerated to an extent in the time since original clearing. These disturbances did not negatively impact the ability to meet objectives outlined in the scope of works. |
| Intensity (in retrospect, was the intensity adequate). | Not a limitation. The survey effort was adequately met. The area was searched for significant flora species by field staff undertaking meandering traverses spaced adequately apart across the study area. This method provides an accurate assessment of habitat characteristics and likelihood of significant species. The number of relevés established was sufficient, given survey geometry and the restricted extent of some vegetation types, to determine the broad vegetation types present (including their structurally and compositionally dominant species) and to identify any vegetation of significance. |
| Resources (i.e., were there adequate resources to complete the survey to the required standard). | Not a limitation. The number of personnel conducting this field survey in the given time was adequate to undertake the required level of survey. Additional resources, including equipment available, additional support and personnel were adequate. |
| Access problems (i.e., ability to access survey area). | Not a limitation. Relevant areas within the Galah rail siding study area were able to be accessed and surveyed. |
| Experience levels (e.g., degree of expertise in plant identification to taxon level). | Not a limitation. The personnel conducting this field survey were all suitably qualified to identify specimens, having previously undertaken flora and fauna surveys in the Pilbara bioregion of Western Australia. ELA botanists did not have experience with identification of fauna species in the field, therefore the scope of works is limited to fauna habitat and likelihood assessment. |

4. Results

4.1. Desktop Assessment

4.1.1. Previous surveys

The results of previous surveys conducted in or around the Galah rail siding study area are summarised in Table 4-1.

4.1.2. Vegetation

Vegetation within the Galah rail siding study area was previously mapped by Biota (2010) as part of a broader flora and fauna survey in 2010. Three mapping units were recorded for the area:

- Disturbed;
- TERcAtrTwCE: *Terminalia canescens* low open woodland over *Acacia trachycarpa* tall open shrubland over *Triodia wiseana* open hummock grassland and **Cenchrus ciliaris*, **C. setiger* tussock grassland; and
- ChApyAbTw: *Corymbia hamersleyana* scattered low trees over *Acacia pyrifolia*, *A. bivenosa* scattered shrubs over *Triodia wiseana* hummock grassland.

Majority of the area was mapped at the time as Disturbed (Biota 2010).

4.1.3. Flora of conservation significance

An initial 50 conservation significant flora species were identified as possibly occurring within the 100 km desktop study area, based on the database searches undertaken in Section 3.1.1. All taxa were listed as Priority (P) flora by DBCA and no species were listed as Threatened under the EPBC Act or the BC Act. A pre-survey likelihood of occurrence assessment was undertaken for significant flora species identified from the desktop assessment (Appendix D) for the Southern polygon only. The Northern polygon was not included in the pre-survey likelihood as the area was not a component of the project at that time.

The pre-survey flora likelihood assessment (Appendix D), determined 13 species as having Potential to occur within the Southern polygon area, as listed below:

- *Euphorbia inappendiculata* var. *inappendiculata* (listed as P2 by DBCA)
- *Paspalidium retiglume* (listed as P2 by DBCA)
- *Pentalepis trichodesmoides* subsp. *hispida* (listed as P2 by DBCA)
- *Trianthema* sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023) (listed as P2 by DBCA)
- *Eragrostis crateriformis* (listed as P3 by DBCA)
- *Eragrostis surreyana* (listed as P3 by DBCA)
- *Euphorbia stevenii* (listed as P3 by DBCA)
- *Euploca mutica* (listed as P3 by DBCA)
- *Indigofera rivularis* (listed as P3 by DBCA)
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (listed as P3 by DBCA)
- *Triodia basitricha* (listed as P3 by DBCA)
- *Goodenia nuda* (listed as P4 by DBCA at the time of the survey, now delisted)
- *Rhynchosia bungarensis* (listed as P4 by DBCA)

This assessment was based on the presence of potentially suitable habitat within the study area, and proximity and recency of records. Clusters of the flora species records occur approximately 75 km northwest on the Burrup Peninsula, approximately 35 km south at Millstream Pools and approximately 95 km southwest along Bungaroo Creek in the Hamersley Range.

No conservation significant flora have previously been recorded within the study area with the closest record being the Priority 3 species *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479), located 13.5 km to the south-east of the study area.

The post-survey flora likelihood analysis is described in section 4.2.1.2 below.

4.1.4. Fauna of conservation significance

An initial 34 conservation significant fauna species were identified as possibly occurring within the 40 km desktop study area, based on the database searches undertaken in Section 3.1.1. These taxa comprised 25 species listed under both the EPBC Act and BC Act, two species listed under the EPBC Act only and seven species listed as Priority fauna by DBCA. A pre-survey likelihood of occurrence assessment was undertaken for conservation significant fauna species identified from the desktop assessment (Appendix E) for the Southern polygon area only. The Northern polygon was not included in the pre-survey likelihood as the area was not a component of the project at that time.

Following pre-survey likelihood of occurrence assessment, two species were assessed as Likely to occur within the Southern polygon study area:

- Northern Quoll (*Dasyurus hallucatus*; listed as EN under the EPBC Act and BC Act); and
- Pebble-mound Mouse (*Pseudomys chapmanii*; listed as P4 by DBCA).

Eight species were assessed as having Potential to occur within the Southern polygon study area, namely:

- Grey Falcon (*Falco hypoleucos*; listed as VU under both the EPBC Act and BC Act);
- Oriental Pratincole (*Glareola maldivarum*; MI under the EPBC Act and BC Act);
- Northern short-tailed mouse (*Leggadina lakedownensis*; P4 by DBCA);
- Pilbara Olive Python (*Liasis olivaceus barroni*; VU under both the EPBC Act and BC Act);
- Ghost Bat (*Macroderma gigas*; VU under both the EPBC Act and BC Act);
- Greater Bilby (*Macrotis lagotis*; VU under both the EPBC Act and BC Act);
- Lined soil-crevice skink (*Notoscincus butleri*; P4 by DBCA); and
- Pilbara Leaf-nosed Bat (*Rhinonictis aurantia* (Pilbara form); VU under both the EPBC Act and BC Act).

This assessment was based on the presence of potentially suitable habitat within the Southern polygon study area and proximity and recency of records. The likelihood assessment was re-assessed following the field survey and the post-survey fauna likelihood analysis is described in section 4.2.4.2 below and detailed in (Appendix E).

4.1.5. Conservation significant ecological communities

A total of four significant ecological communities were identified as possibly occurring within the 65 km radius of the desktop study area based on the database searches undertaken in Section 3.1.1. All four communities are listed by DBCA as Priority Ecological Communities (PEC) and none as Threatened under the EPBC Act or the BC Act. A pre-survey likelihood of occurrence assessment was undertaken for conservation significant communities identified from the desktop assessment (Appendix F).

Following the pre-survey likelihood of occurrence assessment, all four identified communities were assessed as Unlikely to occur within the Southern polygon as suitable habitat was considered unlikely to be present. The Northern polygon was not included in the pre-survey likelihood assessment as the area was not a component of the project at that time.

Table 4-1: Results of previous surveys conducted in the vicinity of the study area

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|---|--|--|---|
| M.E. Trudgen & Associates (1998) | Flora and vegetation surveys of Orebody A and Orebody B in the West Angela Hill area, an area surrounding them, and of rail route options considered to link them to the existing Robe River Iron Associates rail line | <p>Threatened species recorded in the rail survey areas:</p> <p>None</p> <p>Priority species recorded in the rail survey areas:</p> <p>12 (none of which are now priority listed)</p> | <p>Vegetation supergroups recorded in the rail survey areas</p> <ul style="list-style-type: none"> Vegetation of major and moderate flowlines (<i>Eucalyptus</i>, <i>Corymbia</i> and <i>Melaleuca</i> species; <i>Acacia arida</i>; <i>Eriachne benthamii</i>) Vegetation of iron bearing formations (<i>Triodia wiseana</i> and <i>T. brizoides</i>; <i>Acacia maitlandii</i> and <i>A. monticola</i>; <i>Eucalyptus leucophloia</i>). Vegetation of plains, low foothills and escarpments (<i>Acacia bivenosa</i>, <i>A. synchronica</i>, <i>A. xiphophylla</i>; <i>Triodia wiseana</i>, <i>T. brizoides</i>, <i>T. pungens</i>, <i>T. longiceps</i>). Vegetation of the Chichester Ranges volcanic formations and their derivatives (<i>Triodia wiseana</i>, <i>Astrebla</i>, <i>Chrysopogon</i>, <i>Iseilema</i>, <i>Dichanthium</i>, <i>Panicum</i>, <i>Swainsona</i>, <i>Eriachne benthamii</i>, <i>Indigofera trita</i>, <i>Ptilotus gomphrenoides</i>, <i>Sida fibulifera</i>). |
| Ecologia Environmental Consultants (2000) | Robe Development Plan – Millstream-Chichester Rail Corridor Vegetation and Flora Survey, September 1999 | <p>Flora:</p> <p>170 taxa from 41 families and 97 genera</p> <p>Threatened species:</p> <p>None</p> <p>Priority species:</p> <p>None</p> <p>Introduced flora:</p> <p><i>*Cenchrus ciliaris</i>, <i>*Aerva javanica</i>, <i>*Rumex vesicaria</i>, <i>*Centaurium spicatum</i>, <i>*Vachellia farnesiana</i></p> | <p>Vegetation communities:</p> <ul style="list-style-type: none"> Creeklines with well-defined beds: scattered to moderately dense <i>Eucalyptus victrix</i> over scattered shrubs over scattered to sparse <i>Triodia wiseana</i>. Broad upperslope flowlines: scattered, low <i>Corymbia semiclara</i> and <i>E. leucophloia</i> over scattered shrubs ad moderately dense <i>T. wiseana</i> and scattered to open <i>T. pungens</i>. Gentle slopes/basalt rises: scattered to sparse <i>Acacia holosericea</i> and <i>A. inaequilatera</i> over mixed scattered shrubland over moderately dense <i>T. wiseana</i> with scattered <i>Aristida contorta</i> and <i>Cymbopogon ambiguus</i>. Erosional spurs/flats surface of remnant plateau: scattered to open <i>Cajanus cinereus</i> shrubs and <i>Trichodesma zeylanica</i> herbs over a moderately dense ground cover of <i>T. wiseana</i>. |
| Pilbara Iron (2008) | Botanical Survey Work for PA Infill 83.5 km AR-08-02948 | <p>Flora:</p> <p>20 native taxa from 12 families and 19 genera</p> <p>Threatened species:</p> <p>None</p> <p>Priority species:</p> <p>None</p> <p>Introduced flora:</p> <p>At 83.5 km along the Dampier-Tom Price Mine Rail line (0.042 ha)</p> | <p>Vegetation communities:</p> <ul style="list-style-type: none"> Stony slope: <i>Hakea lalea</i> scattered low trees over <i>Corchorus lasiocarpus</i> subsp. <i>parvus</i> low scattered shrubs over <i>Triodia wiseana</i> hummock grassland over various scattered herbs. |

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|-------------------------------------|---|--|--|
| Biota Environmental Sciences (2008) | <p>A vegetation and flora survey of the Rio Tinto rail duplication project – Cape Lambert to Emu Siding</p> <p>Areas: Existing Pilbara Iron Railway duplication area between Cape Lambert and Emu Siding.</p> | <p>Flora: 369 native taxa from 57 families and 145 genera</p> <p>Threatened species: None</p> <p>Priority species, none of which are now Priority listed: <i>Nicotiana heterantha</i>, <i>Hibiscus brachysiphonius</i></p> <p>Introduced flora: 17 species Declared Pests: *<i>Opuntia</i> sp.</p> <p>Serious environmental weeds: *<i>Aerva javanica</i>, *<i>Cenchrus ciliaris</i>, *<i>Cenchrus setiger</i></p> <p>Other weeds: *<i>Citrullus colocynthis</i>, *<i>Cucumis melo</i> subsp. <i>agrestis</i>, *<i>Cucumis</i> sp., *<i>Cynodon dactylon</i>, *<i>Echinochloa colona</i>, *<i>Malvastrum americanum</i>, *<i>Passiflora foetida</i> var. <i>hispidula</i>, *<i>Phyla nodiflora</i>, *<i>Setaria verticillata</i>, *<i>Sigesbeckia orientalis</i>, *<i>Vachellia farnesiana</i>, *<i>Vitex trifolia</i> var. <i>subtrisetata</i></p> | <p>Vegetation types in the vicinity of the survey area:</p> <ul style="list-style-type: none"> Open shrublands of various combinations of <i>Acacia arida</i>, <i>A. bivenosa</i>, <i>A. inaequilatera</i>, <i>A. pyrifolia</i> over hummock grasslands of <i>Triodia wiseana</i> and/or <i>T. epactia</i> on stony hills and plains throughout the corridor. <i>Triodia angusta</i> hummock grasslands on plains with a calcareous clay-loam substrate; Woodlands to tall shrublands dominated by <i>Terminalia canescens</i> or <i>Acacia coriacea</i> subsp. <i>coriacea</i>, <i>Dichrostachys spicata</i> and <i>Ehretia saligna</i> over open hummock grasslands of <i>Triodia wiseana</i> on rockpiles; <i>Eragrostis xerophila</i> tussock grasslands, annual grasslands and/or <i>Triodia wiseana</i> hummock grasslands interspersed with herblands, sometimes with an overstorey of Shalewood (<i>Acacia xiphophylla</i>), on heavy clay soils; Riverine woodlands dominated by <i>Eucalyptus camaldulensis</i>, <i>E. victrix</i> and/or <i>Terminalia canescens</i> over various shrubs including <i>Acacia ampliceps</i>, <i>A. pyrifolia</i>, <i>A. trachycarpa</i> and <i>Melaleuca glomerata</i> over sedgeland, <i>Triodia</i> hummock grasslands and/or *<i>Cenchrus</i> tussock grasslands in major drainage features; Low open woodlands of <i>Corymbia hamersleyana</i> over dense tall shrublands of various species such as <i>Acacia anastrocarpa</i>, <i>A. bivenosa</i>, <i>A. coriacea</i> subsp. <i>pendens</i>, <i>A. pyrifolia</i> and <i>A. trachycarpa</i> over <i>Triodia</i> hummock grasslands and/or tussock grasslands of *<i>Cenchrus</i> or native species in minor flowlines. |
| Rio Tinto (2010) | <p>Flora and vegetation of the proposed Rio Tinto rail duplication – Emu Siding to Rosella Siding: Additional Development Areas (NVCP supporting report)</p> <p>Areas: 20 additional areas between Emu Siding and Rosella Siding</p> | <p>Flora: 221 native taxa from 45 families and 108 genera</p> <p>Threatened species: None</p> <p>Priority species: 3 <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3), <i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) (P3), <i>Goodenia nuda</i> (P4).</p> <p>Introduced flora: 13 species *<i>Aerva javanica</i>, *<i>Alysicarpus ovalifolius</i>, *<i>Bidens bipinnata</i>, *<i>Cynodon dactylon</i>, *<i>Cenchrus ciliaris</i>,</p> | <p>Vegetation types. 42 total, summarised as:</p> <ul style="list-style-type: none"> Vegetation of stony hills and plains: Hummock grasslands dominated by <i>Triodia epactia</i>; Hummock grasslands dominated by <i>T. wiseana</i>; Hummock grasslands dominated by <i>T. angusta</i>; Mulga woodlands; Rockpiles on stony hillslopes. Vegetation of clayey plains: Tussock grasslands; Mosaic hummock and tussock grasslands. Vegetation of drainage areas: Major creekline with <i>Eucalyptus camaldulensis</i> var. <i>refulgens</i>; Major to moderate creeklines dominated by <i>E. victrix</i>; Major to moderate creeklines dominated by <i>E. xerothermica</i>; Moderate-sized and minor flowlines. Streambeds. |

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|--------------------------------------|--|---|--|
| Biota Environmental Sciences (2010a) | A Vegetation and Flora Survey of the Rio Tinto Rail Duplication – Emu Siding to Rosella Siding Development Areas | <p><i>*Citrus colocythis</i>, <i>*Cucumis melo</i>, <i>*Malvastrum Americanum</i>, <i>*Merremia dissecta</i>, <i>*Sonchus oleraceus</i>, <i>*Vachellia farnesiana</i>.</p> | <ul style="list-style-type: none"> Disturbed ground. <p>Fauna habitat types:</p> <ul style="list-style-type: none"> shrub-steppe and hummock grass-steppe vegetation on steep to gentle rocky basalt slopes, tussock grassland on plateaus and valley floors with cracking clay or stony clay soils, mulga shrublands, and major, moderate-sized and minor flowlines supporting open woodland and scrubland riparian vegetation. |
| Biota Environmental Sciences (2010a) | 39 development areas between Emu Siding and Rosella Siding (83-242 km chainages) (2,145 ha) | <p>Flora: 473 native taxa from 58 families and 176 genera</p> <p>Threatened species: None</p> <p>Priority species: 6</p> <p><i>Josephinia eugeniae</i> (no longer Priority listed), <i>Dalichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP1479) (P3), <i>Polymeria longifolia</i> (no longer Priority listed), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3), <i>Thymeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3), <i>Goodenia nuda</i> (P4).</p> <p>Introduced flora: 19 species</p> <p><i>*Aerva javanica</i>, <i>*Bidens bipinnata</i>, <i>*Cenchrus ciliaris</i>, <i>*Cenchrus setiger</i>, <i>*Chloris virgata</i>, <i>*Citrus colocythis</i>, <i>*Crotalaria juncea</i>, <i>*Cucumis melo subsp. agrestis</i>, <i>*Cucumis sp.</i>, <i>*Cynodon dactylon</i>, <i>*Echinochloa colona</i>, <i>*Flaveria trinervia</i>, <i>*Lactuca sp.</i>, <i>*Malvastrum americanum</i>, <i>Portulaca oleracea</i> (no longer a weed), <i>*Rumex vesicaria</i>, <i>*Setaria verticillata</i>, <i>*Tribulus terrestris</i>, <i>*Vachellia farnesiana</i></p> | <p>Vegetation types. 49 total, summarised as:</p> <ul style="list-style-type: none"> <i>Triodia wisecana</i> and/or <i>T. epactia</i> hummock grasslands (less commonly <i>T. angusta</i> or <i>T. brizoides</i>) with a scattered to moderately dense shrub overstorey dominated by varying proportions of <i>Acacia acradenia</i>, <i>A. ancistrocarpa</i>, <i>A. arida</i>, <i>A. atkinsiana</i>, <i>A. bivenosa</i>, <i>A. dictyophleba</i>, <i>A. inaequilatera</i>, <i>A. maitlandii</i> and/or <i>A. trachycarpa</i> on stony plains and low stony rises; Tall shrublands of Snakewood (<i>Acacia xiphophylla</i>) or Mulga (<i>A. aneura</i>) over various spinifex species on stony plains and low rises with a higher clay content; Tussock grasslands with patches of hermland on areas of heavy clay; Open woodlands to open forests of <i>Eucalyptus camaldulensis</i> var. <i>obtuse</i> and/or <i>E. victrix</i> over mixed shrubs, sedges and/or grasses in major creeks; and Low open woodlands of <i>Corymbia hamersleyana</i> and/or <i>Eucalyptus xerothermica</i> over tall open scrub of species such as <i>Gossypium robinsonii</i>, <i>Grevillea wickhamii</i> and/or various wattles (particularly <i>Acacia monticola</i>, <i>A. pyrifolia</i>, <i>A. trachycarpa</i> and <i>A. tumida</i> var. <i>pilbarensis</i>) over hummock and tussock grasses in minor flowlines. |
| Biota Environmental Sciences (2010a) | Galuh, Gull, Ibis-Koala and Rosella Rail Sidings Native Vegetation Clearing Permit Report | <p>Flora: 573 native taxa from 62 families and 203 genera (including previous mapping in the survey areas)</p> | <p>Vegetation types. 40 total, summarised as:</p> <p>PEC:</p> |

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|----------------------|---|---|--|
| Sciences (2010b) | <p>Areas:</p> <p>Rail sidings at Galah (26.6 ha), Gull (90.1 ha), Ibis-Koala (1,104 ha) and Rosella (1,927 ha).</p> | <p>223 native taxa from 42 families and 111 genera (recorded in the current survey)</p> <p>Threatened species:</p> <p>None</p> <p>Priority species: 4</p> <p><i>Astrelba lappacea</i> (P3), <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3), <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3), <i>Goodenia nuda</i> (P4).</p> <p>Introduced flora: 17 species</p> <p>Declared Plant: *<i>Parkinsonia aculeata</i></p> <p>Serious environmental weeds: *<i>Aerva javanica</i>, *<i>Cenchrus ciliaris</i>, *<i>Cenchrus setiger</i>, *<i>Rumex vesicaria</i></p> <p>Other weeds: *<i>Bidens bipinnata</i>, *<i>Chloris virgata</i>, *<i>Citrullus colocynthis</i>, *<i>Cucumis melo</i> subsp. <i>agrestis</i>, *<i>Cucumis</i> sp., *<i>Cynodon dactylon</i>, *<i>Echinochloa colona</i>, *<i>Malvastrum americanum</i>, <i>Portulaca oleracea</i> (no longer a weed), *<i>Trianthema portulacastrum</i>, *<i>Tribulus terrestris</i>, *<i>Vachellia farnesiana</i>.</p> | <p>Brockman Iron cracking clay communities of the Hamersley Range (P1) – potentially represented by vegetation unit ASsp.</p> <p>Other conservation significance:</p> <ul style="list-style-type: none"> Linear mulga groves; Intergrove mulga community; Riparian vegetation in major creeklines dominated by <i>Eucalyptus victrix</i>. <p>Main groups:</p> <ul style="list-style-type: none"> Vegetation of stony hills and plains: Vegetation of moderate hills; Hummock grasslands dominated by <i>Triodia angusta</i>; Hummock grasslands dominated by <i>Triodia epactia</i>; Hummock grasslands dominated by <i>Triodia wiseana</i>; Snakewood shrublands. Vegetation of clayey plains: Tussock grasslands; Mulga shrubland. Vegetation of drainage areas: Major to Moderate sized drainage areas dominated by <i>Eucalyptus victrix</i>; Moderate sized and Minor drainage areas. <p>Fauna habitats:</p> <ul style="list-style-type: none"> <i>Acacia</i> sp. open shrubland over Spinifex (<i>Triodia</i> sp.) hummock grassland on loamy plains; Mulga woodland (<i>Acacia aneura</i>) over tussock grassland on plains; open mixed tussock grassland adjacent to creek line on cracking clay; and sparse Bloodwood (<i>Corymbia</i> sp.) over scattered <i>Grevillea</i> sp. shrubland over Spinifex (<i>Triodia</i> sp.) hummock grassland on stones/cobbles. <p>Vegetation units. 7 total, summarised as:</p> <p>Conservation significance:</p> <p>MgTICEaCv: <i>Melaleuca glomerata</i> shrubland over <i>Triodia longiceps</i> scattered hummock grasses over *<i>Cenchrus ciliaris</i>, <i>Eulalia aurea</i> tussock grassland and <i>Cyperus vaginatus</i> very open sedges. Contains a permanent/semi-permanent soak.</p> <p>Other units:</p> <ul style="list-style-type: none"> Rolling stony basalt hills: <i>Corymbia hamersleyana</i> scattered low trees over <i>Triodia</i> hummock grassland with scattered <i>Acacia</i> spp. Flat, calcrete-induced creek terraces: <i>Triodia</i> hummock grassland with scattered <i>Acacia</i> spp. |
| Rio Tinto Ore (2011) | <p>Botanical Survey of proposed Borrow Pit Areas at Chainage 81.5 km and 83 km on the Dampier to Mt Tom Price Rail Line.</p> <p>Areas:</p> <p>Two new borrow pits at chainages 81.5 and 83 km (total 95.81 ha)</p> | <p>Flora:</p> <p>94 native taxa from 28 families and 60 genera</p> <p>Threatened species:</p> <p>None</p> <p>Priority species:</p> <p>None</p> <p>Introduced flora: 4 species</p> <p>*<i>Aerva javanica</i>, *<i>Cenchrus ciliaris</i>, *<i>Cenchrus setiger</i>, <i>Portulaca oleracea</i> (no longer a weed)</p> | <p>Vegetation units. 7 total, summarised as:</p> <p>Conservation significance:</p> <p>MgTICEaCv: <i>Melaleuca glomerata</i> shrubland over <i>Triodia longiceps</i> scattered hummock grasses over *<i>Cenchrus ciliaris</i>, <i>Eulalia aurea</i> tussock grassland and <i>Cyperus vaginatus</i> very open sedges. Contains a permanent/semi-permanent soak.</p> <p>Other units:</p> <ul style="list-style-type: none"> Rolling stony basalt hills: <i>Corymbia hamersleyana</i> scattered low trees over <i>Triodia</i> hummock grassland with scattered <i>Acacia</i> spp. Flat, calcrete-induced creek terraces: <i>Triodia</i> hummock grassland with scattered <i>Acacia</i> spp. |

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|--------------------------------------|--|---|--|
| Biota Environmental Sciences (2011a) | Millstream Rail Corridor Targeted Weed Survey – 69 km to 82 km Areas: Proposed rail route from 69 to 82 km (plus 100 m buffer to the east) and borrow pits on the eastern side of the rail within Millstream-Chichester National Park | Introduced flora: 17 species Serious environmental weeds: * <i>Aerva javanica</i> , * <i>Cenchrus ciliaris</i> , * <i>Cenchrus setiger</i> , * <i>Rumex vesicaria</i> Other weeds: * <i>Citrullus colocynthis</i> , * <i>Citrullus lanatus</i> , * <i>Cucumis melo</i> subsp. <i>agrestis</i> , * <i>Cynodon dactylon</i> , * <i>Echinochloa colona</i> , * <i>Flaveria trinervia</i> , * <i>Malvastrum americanum</i> , * <i>Melochia pyramidata</i> , * <i>Passiflora foetida</i> , <i>Portulaca oleracea</i> (no longer a weed), * <i>Setaria verticillata</i> , * <i>Sonchus oleraceus</i> , * <i>Vachellia farnesiana</i> . | <ul style="list-style-type: none"> Minor flow lines: shrublands of <i>Acacia</i> spp. and <i>Melaleuca glomerata</i> with mixed hummock and tussock grass groundcover. <p>Priority Fauna</p> <ul style="list-style-type: none"> Star Finch (<i>Neochmia ruficauda subclarescens</i>) (no longer P listed) - observed Western Pebble-Mound Mouse (<i>Pseudomys chapmani</i>) (P4) – inactive mound <p>Fauna habitats:</p> <ul style="list-style-type: none"> Stony basalt hills and slopes with <i>Corymbia hamersleyana</i> scattered low trees over scattered <i>Acacia</i> shrubs over <i>Triodia wiseana</i> hummock grassland Minor creeklines and creek terraces of <i>Acacia trachycarpa</i>, <i>Melaleuca glomerata</i> or <i>Acacia bivenosa</i> shrublands over hummock and tussock grasses. |
| Biota Environmental Sciences (2011b) | Millstream Proposed Borrow Pits: Flora and Vegetation Report Areas: Two new borrow pits at chainages 81.5 and 83 km (total 95.8 ha) | Flora: 137 native taxa from 38 families and 85 genera Threatened species: None Priority species: None Introduced flora: 5 species | <p>Vegetation units. 9 total, summarised as:</p> <ul style="list-style-type: none"> Vegetation of plains and low stony hills Vegetation of plains and drainage depressions Vegetation of minor creeklines <p>Fauna habitats:</p> |

| Author (year) | Survey Name & Survey Areas | Flora | Vegetation and habitat |
|------------------|---|--|---|
| Rio Tinto (2014) | Flora, Vegetation and Fauna Assessment: AutoHaul™ – Emu to Paraburdoo | <p>Flora: 219 native taxa from 38 families and 85 genera</p> <p>Threatened species: None</p> <p>Priority species: None</p> <p>Introduced flora: 16 species *<i>Aerva javanica</i>, *<i>Arundo donax</i>, *<i>Bidens bipinnata</i>, *<i>Cenchrus ciliaris</i>, *<i>Cenchrus setiger</i>, *<i>Cucumis melo subsp. agrestis</i>, *<i>Cynodon dactylon</i>, *<i>Euphorbia cyathophora</i>, *<i>Flaveria trinervia</i>, *<i>Leucaena leucocephala</i>, *<i>Malvastrum americanum</i>, *<i>Portulaca oleracea</i> (no longer a weed), *<i>Rumex vesicaria</i>, *<i>Sonchus oleraceus</i>, *<i>Vachellia farnesiana</i>, *<i>Washingtonia filifera</i>.</p> | <ul style="list-style-type: none"> Stony plains and low stony hills: supporting <i>Corymbia hamersleyana</i> scattered low trees over <i>Hakea lorea</i> subsp. <i>lorea</i>, <i>Grevillea wickhamii</i>, <i>Acacia</i> spp. shrubland over <i>Triodia wiseana</i> hummock grassland; Plains and drainage depressions: supporting <i>Corymbia hamersleyana</i> scattered low trees over <i>Acacia bivenosa</i>, <i>Melaleuca glomerata</i> shrubland over <i>Triodia longiceps</i> and/or <i>T. wiseana</i> hummock grassland; Minor creeklines: supporting <i>Corymbia hamersleyana</i> scattered low trees over <i>Hakea lorea</i> subsp. <i>lorea</i>, <i>Grevillea wickhamii</i>, <i>Melaleuca</i> spp., <i>Acacia</i> spp. open to tall open shrubland over <i>Triodia</i> spp. hummock grassland (with *<i>Cenchrus ciliaris</i> tussock grasses in places). |

Vegetation units:
Mostly disturbed

Fauna habitat:
None considered critical for species of conservation significance.

4.2. Field Survey

4.2.1. Flora

4.2.1.1. Flora overview

A total of 113 flora taxa (109 native and four introduced) from 32 families and 74 genera were recorded across seven relevés undertaken over two surveys within the study area and from opportunistic collections. Families with the highest number of species included Fabaceae (24 species), Poaceae (14 species) and Malvaceae (nine species). *Acacia* was the best represented genus with seven species, while *Euphorbia*, *Indigofera* and *Senna* all had four species recorded. A full species list is provided in Appendix G, species by relevé matrix is provided in Appendix H and relevé data are provided in Appendix I.

4.2.1.2. Conservation significant flora

No Threatened flora species listed under the EPBC Act or the BC Act, nor Priority listed species by DBCA were recorded within the study area.

A post-survey flora likelihood of occurrence assessment was undertaken following the field survey for both the Southern polygon and the Northern polygon (combined as 'the study area'). Following the post-survey flora likelihood of occurrence assessment, one significant flora species identified from the desktop assessment (see Section 4.1.3) is considered to have the potential to occur within the study area. The Priority three grass species *Eragrostis crateriformis* is known to occur in a variety of drainage habitats such as creek banks, drainage lines, depressions and floodplains (WAH 1998-) that are represented by VT3 and VT4 within the study area. While VT4 was traversed and the species not recorded, the small amount of river bed and bank on the southern margin of the study area representing VT3 has the potential to support *Eragrostis crateriformis*.

The remaining species are considered as Unlikely to occur or Does not Occur within the combined study area due to survey effort, lack of suitable habitat for these species and age/proximity to previous records. The complete flora likelihood of occurrence assessment is provided in Appendix D.

The unusually high rainfall in May 2022 resulted in widespread fresh growth and flowering in vegetation during the field survey, which allowed for positive identification of plants such as grasses and some annual species.

4.2.1.3. Introduced flora

A total of four introduced flora were recorded within the Galah rail siding study area, **Aerva javanica* (Kapok bush), **Cenchrus ciliaris* (Buffel grass), **Cenchrus setiger* (Birdwood grass) and **Rumex vesicarius* (Ruby Dock). None of the introduced species recorded within the study area are listed as WoNS or Declared Pests under the BAM Act (DPIRD 2022b). Introduced flora locations are listed in Appendix J and shown in Figure 8.

A gap is shown in the extent of introduced flora records displayed in the Northern polygon in Figure 8. This is not due to a lack of introduced flora in that area, rather a slight difference in survey methodology between the August 2022 and September 2022 surveys. In August 2022, ELA recorded opportunistic GPS waypoints with weed presence during traverses undertaken across the area. Similarly, the north section of the Northern polygon was traversed as part of a concurrent targeted flora survey by ELA also recorded weed presence. In September 2022 Rio Tinto used a methodology where weed presence was



incorporated into representative relevé site data, rather than additional points for weed presences. Both methods are compliant with survey guidelines described in the Technical Guidance (EPA 2016) and both indicate that species such as **Cenchrus ciliaris* are widespread in the study area.


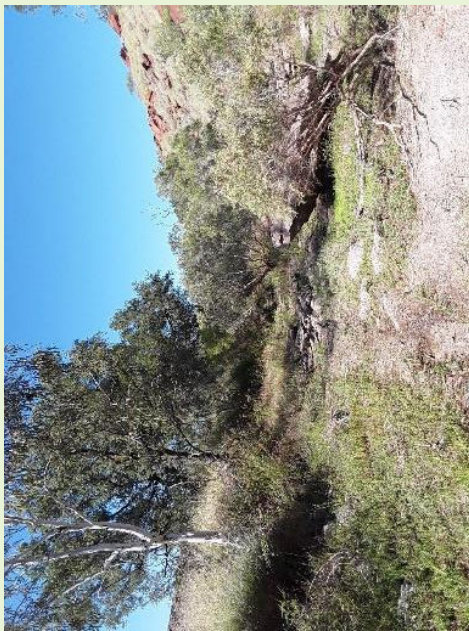
4.2.2. Vegetation Communities

Four vegetation communities were delineated and mapped within the study area, covering a total area of 8.5 ha (77.2 %). The four communities are described in Table 4-2 and displayed in Figure 9. The majority of the vegetated area contained vegetation type 1 (VT1) (6.4 ha; 58.1 %). The remaining 2.5 ha (22.8 %) comprised cleared areas for rail infrastructure, tracks, road verge and a pull-over bay with water standpipe.

Following the field survey, no ecological communities listed as Threatened or Priority under the EPBC Act or the BC Act occurred or were inferred to occur within the study area, as suitable habitat and indicative assemblages of flora species were not encountered (Appendix F).

Table 4-2: Vegetation communities within the study area

| Vegetation Code | Vegetation Description | Condition | Relevés | Area | Photograph |
|-----------------|---|-----------------------------|--|---------------------------|--|
| VT1 | <p><i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>A. trachycarpa</i> and <i>A. pyrifolia</i> sparse shrubland over *<i>Cenchrus ciliaris</i>, <i>Triodia wiseana</i> and <i>T. epactia</i> hummock grassland to open hummock grassland.</p> <p>This community has a higher cover of shrubs and greater *<i>C. ciliaris</i> abundance in low lying, water collecting areas, while the shrub cover can be reduced to isolated shrubs on slopes and rises.</p> <p>Other common species include <i>Senna artemisioides</i> subsp. <i>oligophylla</i>.</p> | <p>Good, Poor, Degraded</p> | <p>ELA-01, ELA-02, RTIO-03</p> | <p>6.39 ha 58.09%</p> |  |
| VT2 | <p><i>Corymbia hamersleyana</i> isolated trees over <i>Triodia wiseana</i>, <i>T. epactia</i> and *<i>Cenchrus ciliaris</i> open hummock grassland.</p> <p>Scattered <i>Acacia</i> and <i>Corchorus</i> spp. shrubs can occur in the mid strata.</p> <p>Occurs on rocky basaltic slopes and rises.</p> | <p>Good, Degraded</p> | <p>ELA-03, RTIO-01</p> | <p>1.59 ha 14.45%</p> |  |

| Vegetation Code | Vegetation Description | Condition | Relevés | Area | Photograph |
|-----------------|---|---------------------|--------------|-------------------|--|
| VT3 | <p><i>Eucalyptus victrix</i> and <i>Terminalia canescens</i> open woodland over <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>A. pyrifolia</i> tall sparse shrubland over *<i>Cenchrus ciliaris</i>, <i>Triodia epactia</i> and <i>T. wiseana</i> open hummock grassland.</p> <p>This is part of a tributary creek line feeding into the Harding River and would be inundated following rainfall.</p> | Good | ELA-04 | 0.02 ha 0.18% |  |
| VT4 | <p><i>Eucalyptus camaldulensis</i> open woodland over <i>Melaleuca linophylla</i> and <i>Terminalia circumalata</i> tall sparse shrubland over <i>Cyperus vaginatus</i> and <i>Schoenoplectus subulatus</i> tall sparse sedgeland over *<i>Cenchrus ciliaris</i> and *<i>C. setiger</i> sparse hummock grassland over <i>Marsilea</i> sp. and <i>Ammannia multiflora</i> sparse forbland.</p> <p>This is a water ponding area with ephemeral pools that drain through a culvert into the Harding River.</p> | Poor | RTIO-02 | 0.5 ha 4.55% |  |
| Cleared | Areas currently cleared for tracks or infrastructure | Completely Degraded | - | 2.51 ha 22.82% | |
| | | | Total | 11.0 | |

4.2.3. Vegetation Condition

Condition of vegetation within the study area ranged from Degraded to Good based on the adaptation of the Trudgen (1988) scale in the Technical Guidance (EPA 2016). The majority of the intact vegetation within the combined study area was recorded as being in Poor condition (5.9 ha; 53.9%). Cleared areas accounted for 2.5 ha (22.8%) of the combined study area. Disturbances within the combined study area included the presence of tracks, rail infrastructure, weeds and historical clearing. A summary of vegetation condition extent is listed in Table 4-3 and displayed in Figure 10.

Table 4-3: Vegetation Condition summary table

| Vegetation Condition | Vegetation Code | Relevés | Area (ha) |
|----------------------|-----------------|--|--------------|
| Excellent | n/a | nil | 0 |
| Very Good | n/a | nil | 0 |
| Good | VT1, VT2, VT3 | ELA-03, ELA-04, RTIO-01 | 1.6 (14.6 %) |
| Poor | VT1, VT4 | ELA-01, ELA-02, ELA-04, RTIO-02, RTIO-03 | 5.9 (53.9 %) |
| Degraded | VT1, VT2 | nil | 1.0 (8.7 %) |
| Completely Degraded | Cleared | nil | 2.5 (22.8 %) |
| | | Total | 11.3 |

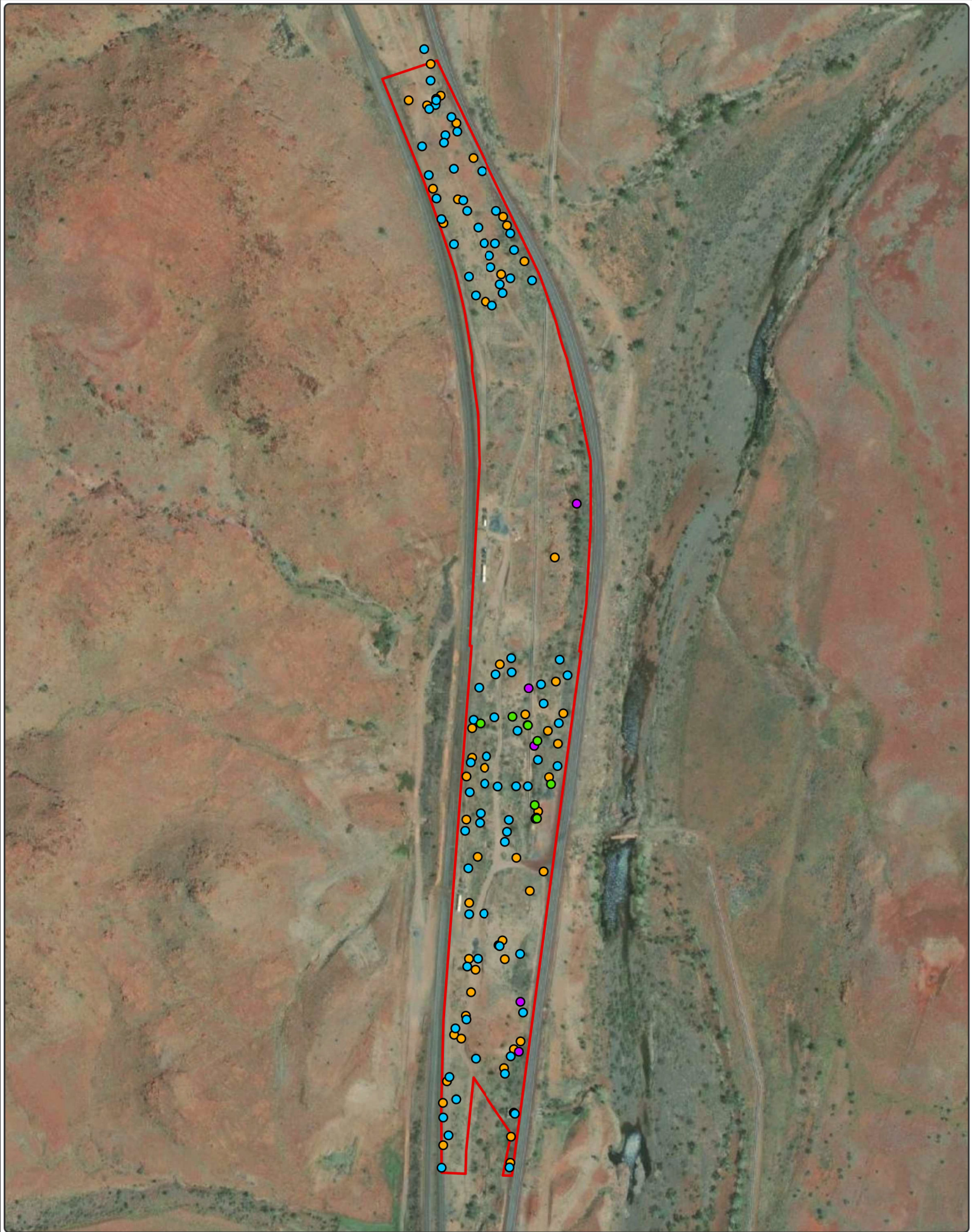
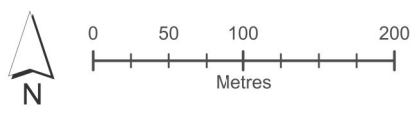


Figure 8: Introduced flora within the Galah rail siding study area

- Galah rail siding study area
- *Aerva javanica*
- *Cenchrus ciliaris*
- *Cenchrus setiger*
- *Rumex vesicarius*



Datum/Projection:
GDA 1994 MGA Zone 50
22PER1360-ED Date: 16/02/2023



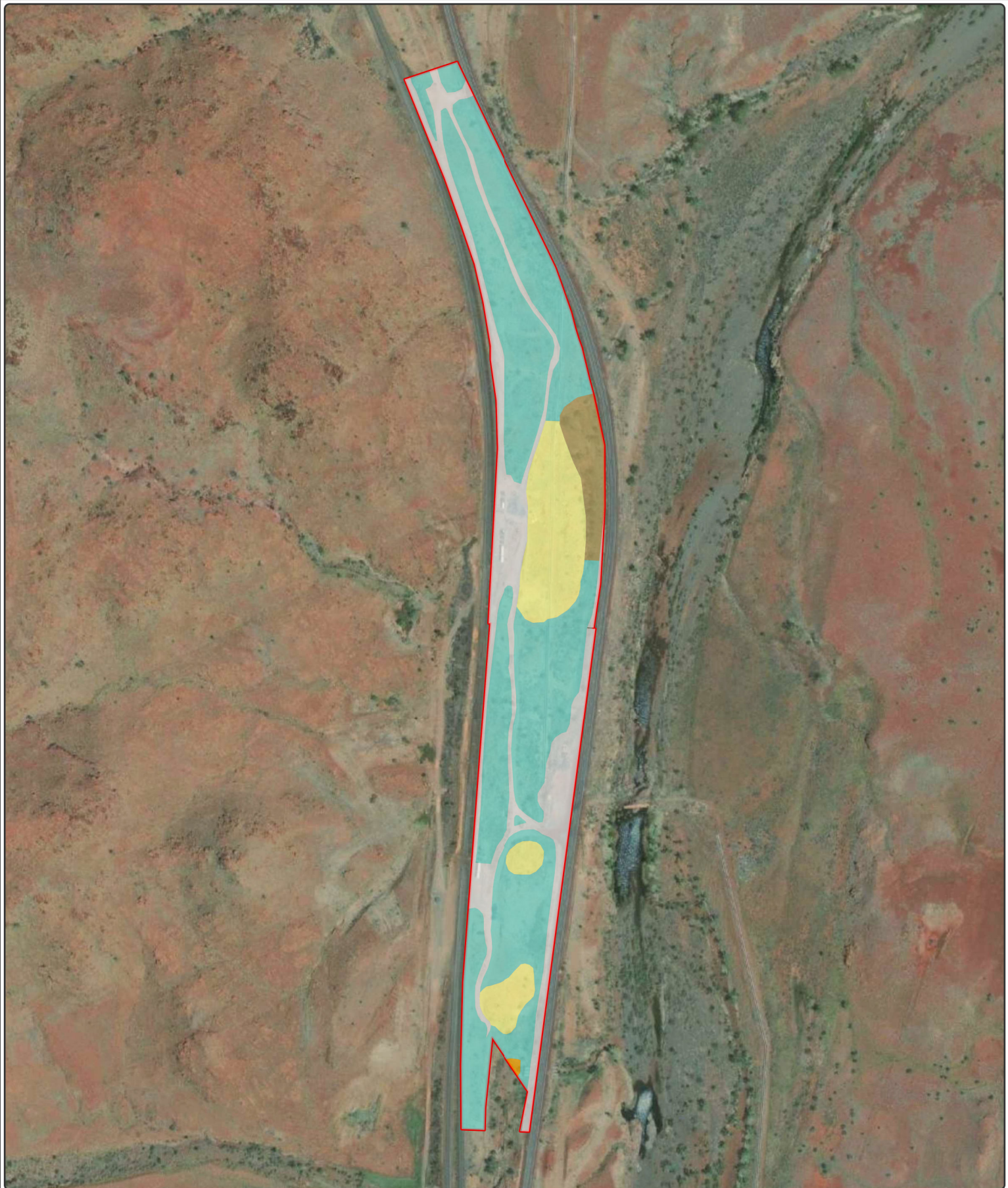





Figure 9: Vegetation communities within the Galah rail siding study area


 Galah rail siding study area

Vegetation Communities

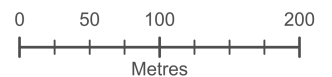
 VT1: *Acacia coriacea* subsp. *pendens*, *A. trachycarpa* and *A. pyrifolia* sparse shrubland over **Cenchrus ciliaris*, *Triodia wiseana* and *T. epactia* hummock grassland to open hummock grassland

 VT2: *Corymbia hamersleyana* isolated trees over *Triodia wiseana*, *T. epactia* and **Cenchrus ciliaris* open hummock grassland.

 VT3: *Eucalyptus victrix* and *Terminalia canescens* open woodland over *Acacia coriacea* and *A. pyrifolia* tall sparse shrubland over **Cenchrus ciliaris*, *Triodia epactia* and *T. wiseana* open hummock grassland.

 VT4: *Eucalyptus camaldulensis* open woodland over *Melaleuca linophylla* and *Terminalia circumalata* tall sparse shrubland over *Cyperus vaginatus* and *Schoenoplectus subulatus* tall sparse sedgeland over **Cenchrus ciliaris* and **C. setiger* sparse hummock grassland over *Marsilea* sp. and *Ammannia multiflora* sparse forbland

 Cleared



Datum/Projection:
GDA 1994 MGA Zone 50
22PER1360-ED Date: 28/02/2023







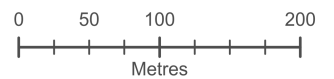


Figure 10: Vegetation condition within the Galah rail siding study area

 Galah rail siding study area

Vegetation Condition

-  Good
-  Poor
-  Degraded
-  Completely Degraded



Datum/Projection:
GDA 1994 MGA Zone 50
22PER1360-RD Date: 16/02/2023



4.2.4. Fauna

4.2.4.1. Fauna overview

Three fauna habitats containing two microhabitats were recorded within the study area classified according to Rio Tinto's *RTIO Fauna Habitat Guidelines and Definitions*. Observations were made of several birds and skinks present during the field survey. As per the scope of works, no fauna inventory was undertaken during the field survey.

4.2.4.2. Conservation Significant fauna

A post-survey fauna likelihood of occurrence assessment was undertaken following the field survey. Following this assessment, four of the 34 significant fauna species identified from the desktop assessment (see Section 4.1.4) have the potential to occur within the combined study area, namely:

- Grey Falcon (*Falco hypoleucos*; listed as VU under the EPBC Act and BC Act);
- Australian Painted Snipe (*Rostratula australis*; listed as EN under the EPBC Act and BC Act);
- Oriental Pratincole (*Glareola maldivarum*; listed as MI under the EPBC Act and BC Act) and
- Lined soil-crevice skink (*Notoscincus butleri*; listed as P4 by DBCA).

Characteristics and habitat preferences for these species are discussed further in Section 5.2.1. This assessment is based on suitable habitat present and proximity to previous records. The remaining 30 significant fauna species were considered as unlikely to occur within the combined study area due to lack of suitable habitat for these species, adequacy of survey effort undertaken and proximity to previous records. The complete fauna likelihood of occurrence assessment is provided in Appendix E.

4.2.4.3. Fauna habitat

Three fauna habitats were identified and mapped within the study area. Major Drainage and Low Hills and Slopes, containing the microhabitats Temporary ephemeral pools and a Rock Pile, covered a total area of 8.5 ha (77.3%; Table 4-4, Figure 11). The remaining 2.5 ha (22.8%) comprised Disturbed habitat. The most widespread habitat were Low Hills and Slopes which occurred across 72.5% of the study area.

Habitat values within the study area ranged from Null to Moderate value according to Rio Tinto's *RTIO Fauna Habitat Guidelines and Definitions*. The Major Drainage was of moderate habitat value and the Low Hills and Slopes was of low habitat value. Disturbed areas are categorised as null habitat value.

Table 4-4: Fauna habitats recorded within the study area

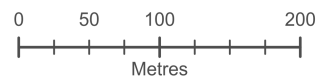
| Fauna habitat | Description | Potential Significant Fauna | Extent | Photograph |
|-----------------------------|---|--|--------------------------|--|
| <p>Low Hills and Slopes</p> | <p>This habitat is comprised of vegetation communities VT1 and VT2: <i>Acacia</i> shrubland over hummock grassland: This habitat contains <i>Acacia coriacea</i>, <i>A. trachycarpa</i> and <i>A. pyrifolia</i> over <i>Cenchrus</i> and <i>Triodia</i> spp. hummock grassland on slopes and depressions. Shrubs can be reduced to scattered individuals on slopes and rises, while low lying, water collecting areas tend to have much denser shrub strata and grasslands.</p> <p><i>Corymbia</i> scattered trees over hummock grassland: <i>Corymbia hamersleyana</i> isolated trees over <i>Triodia</i> spp. and <i>Cenchrus ciliaris</i> hummock grassland on rocky basaltic slopes and rises</p> <p>This habitat contains the Rock Pile microhabitat, a pile of cobbles and boulders pushed up during infrastructure works. Located at UTM: 50K 507434 m E, 7648085 m N (Code: RP)</p> <p>Habitat value: Low</p> | <p><i>Falco hypoleucos</i> (Foraging)</p> <p><i>Notoscincus butleri</i> (Preferred habitat)</p> | <p>8 ha 72.5 %</p> |  |
| <p>Major Drainage</p> | <p>This habitat is comprised of vegetation communities VT3 and VT4</p> <p>This habitat contains <i>Eucalyptus camaldulensis</i> or <i>E. victrix</i> trees fringing water holding or channelling areas. Tall shrubs include <i>Terminalia canescens</i>, <i>T. circumalata</i>, <i>Melaleuca linophylla</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Brachychiton acuminatus</i>.</p> <p>These areas have standing or flowing water for portions of the year and support the Microhabitat <i>Temporary ephemeral pools</i>.</p> <p>Habitat value: Moderate</p> | <p><i>Falco hypoleucos</i> (Foraging, Roosting, Nesting)</p> <p><i>Glareola maldivarum</i> and <i>Rostratula australis</i> (Potential visitation of Temporary ephemeral pools)</p> | <p>0.5 ha 4.7 %</p> |  |
| <p>Disturbed</p> | <p>Includes cleared areas, road surface, road verge, tracks, infrastructure, rail line.</p> <p>Habitat value: Null</p> | <p>Nil</p> | <p>2.5 ha 22.8 %</p> | <p>N/A</p> |
| <p>Total</p> | | | <p>11.0 ha</p> | |



Figure 11: Fauna habitat within the Galah rail siding study area

- Galah rail siding study area
- RockPile

- Fauna Habitats**
- Major Drainage
 - Low Hills and Slopes
 - Disturbed



Datum/Projection:
GDA 1994 MGA Zone 50
22PER1360-ED Date: 16/02/2023



5. Discussion

5.1. Vegetation communities

As previously recorded by Biota (2010), majority of the study area was mapped as disturbed. Construction of both Warlu Road on the eastern border of the study area and the Rail Line (with embankment) on the western border of the study area are the most likely drivers of this historical disturbance; with the most recent widescale disturbance event occurring an estimated 12 to 15 years ago based on visible evidence of disturbance, tree height and historical imagery. Vegetation communities VT1, VT2 and VT4 have all regenerated post disturbance, sufficient that the overall vegetation structure is present in each community similar to undisturbed areas outside the study area (pers. obs).

The relatively recent regeneration of vegetation across the study area is also evident in overstorey stratum tree height. *Eucalyptus* and *Corymbia* species are noticeably smaller than expected for mature individuals, for example, *Corymbia hamersleyana* in ELA R03 is 4 m high, while the species is known to grow to 10 m (WAH 1998-). Overall, regeneration throughout the study area over the preceding 12 to 15 years indicates that potential disturbance activities have good scope for post-disturbance regeneration of native vegetation.

Changes in landform due to raising the road embankment resulted in a narrow depression in the Northern polygon adjacent to the road with a culvert installed allowing drainage into the Harding River to the east. Over time, this has regenerated into an ephemeral water holding area with riparian flora species such as *Eucalyptus camaldulensis*, *Melaleuca linophylla* and *Typha orientalis* which represent VT4. Given that there was no record of similar vegetation in the area during the study conducted by Biota (2010), this community is unlikely to have occurred in the study area prior to construction of Warlu Road and is the result of a constructed drainage landform.

Unlike VT4, VT3 occurs within a natural drainage line landform that was present prior to disturbance events in the area and can be considered an established and relatively stable community. Some historical disturbance has occurred due to construction of road and rail embankments with installation of large culverts to allow un-interrupted flow of water beneath road and rail.

5.2. Fauna

5.2.1. Fauna of conservation significance

The Oriental Pratincole (*Glareola maldivarum*; listed as MI under the EPBC Act and BC Act) and Australian Painted Snipe (*Rostratula australis*; listed as EN under the EPBC Act and BC Act) are both wading birds known to utilise a variety of terrestrial aquatic habitats. The Temporary ephemeral pools within the Major Drainage habitat may provide temporary habitat for resting or foraging if these species move through the area while there is water present. There were records of both species as recently as 2011 approximately 15 and 10 km away respectively, making the study area within potential flight distance. As such, while these species were determined as having the Potential to Occur (Appendix E), the habitat is very restricted within the study area and while it may present a temporary stop-over point for these species, would not constitute significant habitat.

The Lined soil-crevice skink (*Notoscincus butleri*; listed as P4 by DBCA) is widespread throughout the Pilbara and has a preferred habitat of stony spinifex grassland. The Low Hills and Slopes habitat within the study area represents suitable habitat as the majority is various shrubs and low trees over spinifex with photographic evidence (Appendix I) showing the ground in most relevés to be quite rocky. The species has 23 records within 40 km (DBCA 2022b) therefore it was determined as Potential to Occur within the study area, with the highest probability of occurring in the Low Hills and Slopes.

The Grey Falcon (*Falco hypoleucos*; listed as VU under the EPBC Act and BC Act) is a wide-ranging bird of prey that is known to favour lightly timbered and un-timbered lowland plains that are crossed by tree-lined watercourses in arid or semi-arid areas with an average annual rainfall less than 500 mm (BirdLife International 2022). The Grey Falcon was assessed to potentially occur due to the collective habitats within the study area matching this broad habitat description, and one record of the species approximately 30 km from the study area (DBCA 2022b). All habitats within the study area may offer foraging habitat while the larger trees in the Major Drainage habitat may offer roosting and nesting habitat, however given the general young age of the vegetation within the study area post disturbance, it's unlikely to represent core habitat for the species.

5.2.2. Fauna Habitat

The Major Drainage habitat is made up of vegetation communities VT3 and VT4, both featuring a drainage landform with ephemeral water flow fringed by *Eucalyptus* trees. The ephemeral water holding area in the Northern polygon supporting VT4 retains standing water for an extended period following rain, sufficient for establishment of several riparian flora species and can be considered a Temporary ephemeral pool. As such, it holds low potential to be used by waterbirds or wading birds as a temporary stop-over or resting place. Similarly, VT3 is a tributary drainage line feeding into the Harding River and forms a similar ephemeral water holding habitat, but one that drains more readily into the Harding River.

Of the significant fauna species assessed in the fauna likelihood of occurrence assessment (Appendix E), several utilise riparian and wetland habitats somewhat similar to the Major Drainage habitat. Majority of these were assessed as unlikely to occur in the study area due to the extremely restricted extent of the habitat (0.5 ha), combined with nearby presence of the Harding River which potentially contains more extensive wetland or riparian zones and a lack of nearby records.

Rio Tinto's *RTIO Fauna Habitat Guidelines and Definitions* lists Rock Piles as a significant habitat. The rock pile within the study area has not been considered significant due to the origin, size and placement within the landscape. The Rock Pile within the study area is a small pile of local cobbles and boulders pushed up during earthworks, likely as part of rail infrastructure construction. The area is not coastal, the study area situated approximately 65 km south of Karratha and there were no conservation significant fauna species determined as Potential to Occur that specifically utilise Rock Piles. The study area is also bordered to the east and west by rail and road infrastructure, which create a natural barrier.

5.3. Summary of flora, vegetation, and fauna habitat values

The Galah Rail Siding study area consists of 11 ha of land and includes the following flora, vegetation and fauna habitat values:

- 8.5 ha of intact native vegetation;
- 113 flora species representing 32 families and 74 genera;
- Four vegetation communities (not including cleared areas), ranging in condition from Good to Degraded:
 - VT1 (6.4 ha representing 58.1% of the study area): *Acacia coriacea* subsp. *pendens*, *A. trachycarpa* and *A. pyrifolia* sparse shrubland over **Cenchrus ciliaris*, *Triodia wiseana* and *T. epactia* hummock grassland to open hummock grassland;
 - VT2 (1.6 ha representing 14.4% of the study area): *Corymbia hamersleyana* isolated trees over *Triodia wiseana*, *T. epactia* and **Cenchrus ciliaris* open hummock grassland;
 - VT3 (0.02 ha representing 0.18% of the study area): *Eucalyptus victrix* and *Terminalia canescens* open woodland over *Acacia coriacea* subsp. *pendens* and *A. pyrifolia* tall sparse shrubland over **Cenchrus ciliaris*, *Triodia epactia* and *T. wiseana* open hummock grassland; and
 - VT4 (0.5 ha representing 4.5% of the study area): *Eucalyptus camaldulensis* open woodland over *Melaleuca linophylla* and *Terminalia circumalata* tall sparse shrubland over *Cyperus vaginatus* and *Schoenoplectus subulatus* tall sparse sedgeland over **Cenchrus ciliaris* and **C. setiger* sparse hummock grassland over *Marsilea* sp. and *Ammannia multiflora* sparse forbland.
- Three fauna habitats:
 - Low Hills and Slopes (8 ha representing 72.5% of the study area). This fauna habitat is represented by vegetation communities VT1 and VT2 and contains a microhabitat Rock Pile;
 - Major Drainage (0.5 ha representing 4.7% of the study area). This fauna habitat is represented by vegetation communities VT3 and VT4 and contains the microhabitat Temporary ephemeral pools; and
 - Disturbed (2.5 ha representing 22.8 % of the study area). This fauna habitat is made up of cleared, infrastructure and track areas.

6. References

- Atlas of Living Australia (ALA). 2022. *Biodiversity database*. Available: <https://www.ala.org.au/>.
- Australian Soil Resource Information System (ASRIS). 2022. *Atlas of Australian Soils*. Available: <https://www.asris.csiro.au/themes/Atlas.html>.
- Beard, J.S. 1975. *Vegetation survey of Western Australia. Western Australia 1: 1 000 000 vegetation series and explanatory notes. Sheet 5, Pilbara*. University of Western Australia Press, Nedlands, WA.
- Biota Environmental Sciences (Biota). 2011a. *Millstream Rail Corridor Targeted Weed Survey - 69 km to 82 km*. Unpublished report prepared for Rio Tinto Iron Ore, August 2011.
- Biota Environmental Sciences (Biota). 2011b. *Millstream Proposed Borrow Pits: Flora and Vegetation Report*. Unpublished report prepared for Rio Tinto Iron Ore, December 2011.
- Biota Environmental Sciences (Biota). 2010a. *A Vegetation and Flora Survey of the Rio Tinto Rail Duplication – Emu Siding to Rosella Siding Development Areas*. Unpublished report prepared for Rio Tinto Iron Ore, May 2010.
- Biota Environmental Sciences (Biota). 2010b. *Galah, Gull, Ibis-Koala and Rosella Rail Sidings Native Vegetation Clearing Permit Report*. Unpublished report prepared for Rio Tinto, August 2010.
- Biota Environmental Sciences (Biota). 2008. *A vegetation and flora survey of the Rio Tinto rail duplication project – Cape Lambert to Emu Siding*. Unpublished report prepared for Rio Tinto Iron Ore, August 2008.
- BirdLife International. 2022. *Species factsheet: Falco hypoleucos*. Accessed 21/12/2022 from: <http://www.birdlife.org>
- Bureau of Meteorology (BoM) 2022a. *Climate Data Online*. Accessed 11 August 2022 from: <http://www.bom.gov.au/climate/data/index.shtml>
- Bureau of Meteorology (BoM). 2022b. *Groundwater Dependent Ecosystems Atlas*. Available from: <http://www.bom.gov.au/water/groundwater/gde/>.
- Commonwealth of Australia. 2001-2005. *National Objectives and Targets for Biodiversity Conservation*. Natural Heritage Trust and Biodiversity Policy Branch, Canberra.
- Department of Biodiversity, Conservation and Attractions (DBCA). 2019. *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)*. Current as of April 2019.
- Department of Agriculture, Water and the Environment (DAWE) 2022. *Protected Matters Search Tool*. Available: <https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool>
- Department of Biodiversity, Conservation and Attractions (DBCA). 2022a. *Threatened and Priority Flora database search*. Reference number 34-0822FL. Department of Biodiversity, Conservation and Attractions, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA). 2022b. *Threatened and Priority Fauna database search*. Reference number FAUNA#7260. Perth, Western Australia.

Department of Biodiversity, Conservation and Attractions (DBCA). 2022c. *Threatened and Priority Communities database search*. Reference number 21-0822EC. Department of Biodiversity, Conservation and Attractions, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA). 2022d. *DBCA - Legislated Lands and Waters (DBCA-011)*. Available: <https://catalogue.data.wa.gov.au/dataset/dbca-legislated-lands-and-waters>.

Department of Biodiversity, Conservation and Attractions (DBCA). 2022e. *Priority Ecological communities for Western Australia Version 33*. Species and Communities Program. Accessed 11 August 2022 from: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities>

Department of Biodiversity, Conservation and Attractions (DBCA). 2022f. *Threatened and Priority Fauna List*. Update 13/06/2022. Accessed 20220811 from: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals>

Department of Biodiversity, Conservation and Attractions (DBCA). 2022g. *Threatened and Priority Flora List*. Update 27 June 2022. Accessed 20220811 from: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants>

Department of Biodiversity, Conservation and Attractions (DBCA). 2022h. *Directory of Important Wetlands in Australia (DBCA-045)*. Available from: <https://catalogue.data.wa.gov.au/dataset/directory-of-important-wetlands-in-western-australia>. Accessed 01/09/2022.

Department of Biodiversity, Conservation and Attractions (DBCA). 2022i. *Conservation Codes For Western Australian Flora and Fauna*. Available: <https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation%20code%20definitions.pdf>

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2022. *Australia's bioregions (IBRA)*. Accessed: <https://www.dcceew.gov.au/environment/land/nrs/science/ibra>

Department of Environment and Conservation (DEC). 2013. *DEFINITIONS, CATEGORIES AND CRITERIA FOR THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES*. Available: https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/definitions_categories_and_criteria_for_threatened_and_priority_ecological_communities.pdf

Department of Mines, Industry Regulation and Safety. 2004. *Geology of WA 1:250,000. Pyramid sheet*. Available: <https://catalogue.data.wa.gov.au/dataset/1-250-000-geological-series-map-pyramid-ed2-sf50-07>.

Department of Primary Industries and Regional Development (DPIRD). 2019a. *Pre-European Vegetation (DPIRD-006)*. Available from: <https://catalogue.data.wa.gov.au/dataset/pre-european-dpird-006>.

Department of Primary Industries and Regional Development (DPIRD). 2019b. *Soil landscape land quality - Salinity Risk (DPIRD-009)*. Available: <https://catalogue.data.wa.gov.au/dataset/soil-landscape-land-quality-salinity-risk>.

Department of Primary Industries and Regional Development (DPIRD). 2019c. *Soil landscape land quality - Flood Risk (DPIRD-007)*. Available: <https://catalogue.data.wa.gov.au/dataset/soil-landscape-land-quality-flood-risk>.

Department of Primary Industries and Regional Development (DPIRD). 2022a. *Soil Landscape Mapping – Systems (DPIRD-064)*. Available from: <https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-systems>.

Department of Primary Industries and Regional Development (DPIRD). 2022b. *Western Australian Organism List*. Available from: <https://www.agric.wa.gov.au/organisms>

Department of Water and Environmental Regulation (DWER). 2017. *Acid Sulfate Soil Risk Map 100K (DWER-048)*. <https://catalogue.data.wa.gov.au/dataset/acid-sulfate-soil-risk-map-100k-dwer-048>.

Department of Water and Environmental Regulation (DWER). 2018a. *Hydrographic Catchments – Subcatchments (DWER-030)*. Available from: <https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-subcatchments>.

Department of Water and Environmental Regulation (DWER). 2018b. *Hydrography, Linear (Hierarchy) (DWER-031)*. Available from: <https://catalogue.data.wa.gov.au/dataset/hydrography-linear-hierarchy>.

Department of Water and Environmental Regulation (DWER). 2021. *Clearing Regulations – Environmentally Sensitive Areas (DWER-046)*. Available from: <https://catalogue.data.wa.gov.au/dataset/clearing-regulations-environmentally-sensitive-areas-dwer-046>.

Department of Water and Environmental Regulation (DWER). 2022a. *Public Drinking Water Source Areas (DWER-033)*. Available from: <https://catalogue.data.wa.gov.au/dataset/public-drinking-water-source-areas>

Department of Water and Environmental Regulation (DWER). 2022b. *Native vegetation policy for Western Australia May 2022*. Available from: <https://www.wa.gov.au/service/environment/environment-information-services/native-vegetation-policy-western-australia>

Ecologia Environmental Consultants. 2000. *Robe Development Plan – Millstream-Chichester Rail Corridor Vegetation and Flora Survey, September 1999*. Unpublished report prepared for Robe River Mining Co. Pty Ltd, February 2001.

Environment Australia 2000. *Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1. - Summary Report*. Department of Environment and Heritage, Canberra.

Environmental Protection Authority (EPA). 2020. *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment*. Perth, Western Australia.

Environmental Protection Authority (EPA). 2016. *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Perth, Western Australia.

Government of Western Australia 2019. *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>.

Kendrick, P. and McKenzie, N. 2001. *Pilbara 1 (PIL1 – Chichester subregion)*. In: CALM (Ed) 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002', pp. 547 – 558. Department of Conservation and Land Management, Perth, Western Australia.

M.E. Trudgen & Associates and Ecaus. 1998. *Flora and vegetation surveys of Orebody A and Orebody B in the West Angela Hill area, an area surrounding them, and of rail route options considered to link them to the existing Robe River Iron Associates rail line*. Unpublished report prepared for Robe River Iron Associates, March 1998.

Pilbara Iron. 2008. *Botanical Survey Work for PA Infill 83.5km AR-08-02948*. Rio Tinto Doc Number: 2008/003, RTIO-HSE-0037313.

Rio Tinto. 2014. *Flora, Vegetation and Fauna Assessment: AutoHaul™ – Emu to Paraburdoo*. RTIO-HSE-0208458, January 2014.

Rio Tinto Iron Ore (Rio Tinto). 2011. *Botanical Survey of proposed Borrow Pit Areas at Chainage 81.5 km and 83 km on the Dampier to Mt Tom Price Rail Line*. Report Prepared by S. Luccitti, January 2011.

Rio Tinto 2010. *Flora and vegetation of the proposed Rio Tinto rail duplication – Emu Siding to Rosella Siding: Additional Development Areas (NVCP supporting report)*. Report Prepared by S. Luccitti, RTIO-HSE-0086230, January 2010.

Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. 2002. *Native Vegetation in Western Australia – Extent, Type and Status*. Resource Management Technical Report 249, Department of Agriculture, Western Australia.

Trudgen, M.E. 1988. *A report on the flora and vegetation of the Port Kennedy area*. Unpublished report prepared for Bowman Bishaw and Associates, West Perth, WA.

Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. 2004. *An inventory and condition survey of the Pilbara region, Western Australia*. Tech. Bull. 92. Department of Agriculture, South Perth, WA.

Waters and Rivers Commission. 1999. *Harding Dam water source protection plan – West Pilbara water supply scheme*. Water Resource Protection Series. Waters and Rivers Commission Report WRP15. Waters and Rivers Commission, East Perth, WA.

Western Australian Herbarium (WH). 1998-. *Florabase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. Available from: <https://florabase.dpaw.wa.gov.au/>.

Western Australian Museum (WAM). 2022. *WA Checklist for Terrestrial Vertebrates*. Department of terrestrial zoology, Western Australian Museum. Updated May 2022.

Appendix A Framework for conservation significant flora and fauna ranking

CATEGORIES OF THREATENED SPECIES UNDER THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT)

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act. Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

| Category | Definition |
|----------------------------|--|
| Extinct (EX) | There is no reasonable doubt that the last member of the species has died. |
| Extinct in the Wild (EW) | Taxa known to survive only in captivity or as a naturalised population well outside its past range; or taxa has not been recorded in its known and/or expected habitat at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form. |
| Critically Endangered (CE) | Taxa considered to be facing an extremely high risk of extinction in the wild. |
| Endangered (EN) | Taxa considered to be facing a very high risk of extinction in the wild. |
| Vulnerable (VU) | Taxa considered to be facing a high risk of extinction in the wild. |
| Near Threatened (NT) | Taxa has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future. |
| Least Concern (LC) | Taxa has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category. |
| Data Deficient (DD) | There is inadequate information to make a direct, or indirect, assessment of taxa's risk extinction based on its distribution and/or population status. |
| Not Evaluated (NE) | Taxa has not yet been evaluated against the criteria. |
| Migratory (MI) | Not an IUCN category. Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including: <ul style="list-style-type: none"> • the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal) for which Australia is a range state; • the agreement between the Government of Australian and the Government of the People's Republic of China for the Protection of Migratory Birds and their environment (CAMBA); • the agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); or • the agreement between Australia and the Republic of Korea to develop a bilateral migratory bird agreement similar to the JAMBA and CAMBA in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (ROKAMBA). |

CONSERVATION CODES FOR WESTERN AUSTRALIA FLORA AND FAUNA

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Specially protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

Threatened species (T)

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

| Category | Code | Description |
|-------------------------------|------|--|
| Critically Endangered species | CR | Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora. |
| Endangered species | EN | Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora. |

| Category | Code | Description |
|--------------------|------|--|
| Vulnerable species | VU | Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora. |

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild, as follows:

| Category | Code | Description |
|-----------------------------|------|---|
| Extinct species | EX | Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora. |
| Extinct in the wild species | EW | Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice. |

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

Categories are detailed below.

| Category | Code | Description |
|---|------|---|
| Migratory species | MI | <p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.</p> <p>Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p> |
| Species of special conservation interest (conservation dependent fauna) | CD | <p>Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).</p> <p>Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p> |
| Other specially protected species | OS | <p>Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).</p> <p>Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p> |

Priority species (P)

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

| Category | Code | Definition |
|------------|------|---|
| Priority 1 | P1 | <p>Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p> |
| Priority 2 | P2 | <p>Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p> |
| Priority 3 | P3 | <p>Poorly-known species</p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p> |
| Priority 4 | P4 | <p>Rare, Near Threatened and other species in need of monitoring</p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p> |

Appendix B Likelihood of occurrence assessment criteria

| Likelihood rating | Criteria |
|---|--|
| Recorded | The species has previously been recorded within the survey area from DBCA database search results and/or from previous surveys of the survey area, and/or the species has been confirmed through a current vouchered specimen at WA Herbarium. |
| Likely | <p>The species has not previously been recorded from within the survey area. However, (to qualify requires one or more criteria to be met):</p> <p>the species has been recorded in close proximity to the survey area, and occurs in similar habitat to that which occurs within the survey area;</p> <p>core habitat and suitable landforms for the species occurs within the survey area either year-round or seasonally. In relation to fauna species, this could be that a host plant is seasonally present on site, or habitat features such as caves are present that may be used during particular times during its life cycle e.g. for breeding. In relation to both flora and fauna species, it may be there are seasonal wetlands present; and</p> <p>there is a medium to high probability that a species uses the survey area.</p> |
| Potential | <p>The species has not previously been recorded from within the survey area. However, (one or more criteria requires to be met):</p> <p>targeted surveys may locate the species based on records occurring in proximity to the survey area and suitable habitat occurring in the survey area;</p> <p>the survey area has been assessed as having potentially suitable habitat through habitat modelling;</p> <p>the species is known to be cryptic and may not have been detected despite extensive surveys;</p> <p>the species is highly mobile and has an extensive foraging range so may not have been detected during previous surveys;</p> <p>The species has been recorded in the survey area by a previous consultant survey or there is historic evidence of species occurrence within the survey area. However, (one or more criteria requires to be met):</p> <p>doubt remains over taxonomic identification, or the majority of habitat does not appear suitable (although presence cannot be ruled out due to factors such as species ecology or distribution); and</p> <p>coordinates are doubtful.</p> |
| Unlikely | <p>The species has been recorded locally through DBCA database searches. However, it has not been recorded within the survey area and</p> <p>it is unlikely to occur due to the site lacking critical habitat, having at best marginally suitable habitat, and/or being severely degraded</p> <p>it is unlikely to occur due to few historic record/s and no other current collections in the local area.</p> <p>The species has been recorded within the bioregion based on literature review but has not been recorded locally or within the survey area through DBCA database searches.</p> <p>The species has not been recorded in the survey area despite adequate survey efforts, such as a standardised methodology or targeted searching within potentially suitable habitat.</p> |
| Does not occur (one or more criteria requires to be met). | <p>The species is not known to occur within the IBRA bioregion based on current literature and distribution.</p> <p>The conspicuous species has not been recorded in the survey area despite adequate survey efforts at an appropriate time of year to detect the species within potentially suitable habitat.</p> <p>The survey area lacks important habitat for a species that has highly selective habitat requirements.</p> <p>The species has been historically recorded within survey area or locally; however, it is considered locally extinct due to significant habitat changes such as land clearing and/or introduced predators.</p> |

Appendix C Database search records summary

The summary statistics for each database search are displayed in the tables below:

PROTECTED MATTERS SEARCH TOOL (PMST)

| Protected Matters Search Tool (PMST) Summary of findings (search undertaken 05/08/2022) | | | |
|---|-------|--|-------------------|
| Matters of National Environment Significance | Count | Further Details | Area |
| World Heritage Properties | 0 | | Galah 20km buffer |
| National Heritage Places | 0 | | Galah 20km buffer |
| Wetlands of International Importance (Ramsar Wetlands) | 0 | | Galah 20km buffer |
| Great Barrier Reef Marine Park | 0 | | Galah 20km buffer |
| Commonwealth Marine Area | 0 | | Galah 20km buffer |
| Listed Threatened Ecological Communities | 0 | | Galah 20km buffer |
| Listed Threatened Species | 11 | 6 Birds, 4 Mammals, 1 Reptile | Galah 20km buffer |
| Listed Migratory Species | 12 | All Bird species | Galah 20km buffer |
| Extra Information | | | |
| State and Territory Reserves | 1 | Millstream Chichester National Park | Galah 20km buffer |
| Regional Forest Agreements | 0 | | Galah 20km buffer |
| Nationally Important Wetlands | 0 | | Galah 20km buffer |
| EPBC Act Referrals | 3 | | Galah 20km buffer |
| Key Ecological Features | 0 | | Galah 20km buffer |
| Biologically Important Areas | 1 | <i>Ardeanna pacifica</i> (Wedge-tailed Shearwater) breeding known to occur | Galah 20km buffer |
| Bioregional Assessments | 0 | | Galah 20km buffer |
| Geological and Bioregional Assessments | 0 | | Galah 20km buffer |
| Other Matters Protected by the EPBC Act | | | |
| Commonwealth Lands | 0 | | Galah 20km buffer |
| Commonwealth Heritage Places | 0 | | Galah 20km buffer |
| Listed Marine Species | 17 | All Bird species | Galah 20km buffer |
| Whales and Other Cetaceans | 0 | | Galah 20km buffer |
| Critical Habitats | 0 | | Galah 20km buffer |
| Commonwealth Reserves Terrestrial | 0 | | Galah 20km buffer |
| Australian Marine Parks | 0 | | Galah 20km buffer |
| Habitat Critical to the Survival of Marine Turtles | 0 | | Galah 20km buffer |

ATLAS OF LIVING AUSTRALIA (ALA)

Atlas of Living Australia Database search summary (search undertaken 05/08/2022)

Galah 20km buffer

| | |
|--------------------------------|-----|
| Total No. Records | 826 |
| Kingdom Plantae Records | 396 |
| Number of flora species | 329 |
| Significant flora | 6 |

| Significant flora species | DBCAs Priority Listing | Galah 20km buffer |
|--|------------------------|-------------------|
| <i>Eragrostis crateriformis</i> | P3 | |
| <i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i> | P2 | Y |
| <i>Livistona alfredii</i> | P4 | Y |
| <i>Paspalidium retiglume</i> | P2 | Y |
| <i>Solanum albostellatum</i> | P3 | Y |
| <i>Swainsona thompsoniana</i> | P3 | |
| <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) | P3 | Y |
| <i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023) | P2 | |
| <i>Triodia basitricha</i> | P3 | Y |
| <i>Vigna triodiophila</i> | P3 | |

FLORABASE

Florabase summary of search results (search undertaken 05/08/2022)

Search Criterion

| | |
|-------------------|------------|
| Conservation Code | Any |
| Distribution | IBRA (PIL) |
| Operation | Intersect |

Outcome

| | |
|--------------------------|---|
| Total number of records: | 187 |
| Selection Methodology: | Visual inspection of species distribution and habitat description by experienced botanist |

| Scientific Name | Conservation Code |
|--|-------------------|
| <i>Cladium procerum</i> | P2 |
| <i>Dipteracanthus chichesterensis</i> | P1 |
| <i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479) | P3 |
| <i>Eragrostis surreyana</i> | P3 |
| <i>Euphorbia australis</i> var. <i>glabra</i> | P3 |
| <i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i> | P2 |

Florabase summary of search results (search undertaken 05/08/2022)

| | |
|---|----------------------------|
| <i>Euphorbia stevenii</i> | P3 |
| <i>Iotasperma sessilifolium</i> | P3 |
| <i>Ipomoea racemigera</i> | P2 |
| <i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i> | P2 |
| <i>Rhynchosia bungarensis</i> | P4 |
| <i>Seringia exastia</i> | De-listed (Ex. Threatened) |
| <i>Stackhousia clementii</i> | P3 |
| <i>Tephrosia lithosperma</i> | P1 |
| <i>Teucrium pilbaranum</i> | P2 |

RIO TINTO

Rio Tinto environmental database search summary

| | |
|-------------------------------|----------------------|
| Database searched: | RTIO_Flora_within5km |
| No records: | 2162 |
| No. records with WA_Cons_STA: | 9 |
| No. significant flora taxa | 6 |

| Scientific Name | Conservation Code | No. records |
|---|-------------------|-------------|
| <i>Gymnanthera cunninghamii</i> | P3 | 1 |
| <i>Rostellularia adscendens</i> var. <i>latifolia</i> | P3 | 2 |
| <i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) | P3 | 2 |
| <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) | P3 | 1 |
| <i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739) | P3 | 1 |
| <i>Goodenia nuda</i> | P4 | 2 |

DBCA DATABASE SEARCH

DBCA Flora Database search summary

| Database: | FL_WAHerb | FL_TPFL |
|---|---|--|
| Total number of records: | 333 | 21 |
| Total number of species: | 50 | 10 |
| Number of species close enough to survey areas to assess for likelihood (with approx. 30km): | 27 | 6 |
| Significant species list: | <i>Cladium procerum</i> (P2) | <i>Eragrostis crateriformis</i> (P3) |
| | <i>Dipteracanthus chichesterensis</i> (P1) | <i>Fimbristylis sieberiana</i> (P3) |
| | <i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) | <i>Goodenia nuda</i> (delisted – ex. P4) |
| | <i>Eragrostis crateriformis</i> (P3) | <i>Gymnanthera cunninghamii</i> (P3) |
| | <i>Eragrostis surreyana</i> (P3) | <i>Paspalidium retiglume</i> (P2) |
| | <i>Euphorbia australis</i> var. <i>glabra</i> (P3) | <i>Stackhousia clementii</i> (P3) |
| | <i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i> (P2) | |

| DBCA Flora Database search summary | | |
|------------------------------------|---|--|
| | <i>Euphorbia stevenii</i> (P3) | |
| | <i>Fimbristylis sieberiana</i> (P3) | |
| | <i>Goodenia nuda</i> (delisted – ex. P4) | |
| | <i>Gymnanthera cunninghamii</i> (P3) | |
| | <i>Iotasperma sessilifolium</i> (P3) | |
| | <i>Ipomoea racemigera</i> (P2) | |
| | <i>Livistona alfredii</i> (P4) | |
| | <i>Paspalidium retiglume</i> (P2) | |
| | <i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i> (P2) | |
| | <i>Rhynchosia bungarensis</i> (P4) | |
| | <i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) (P3) | |
| | <i>Solanum albobellatum</i> (P3) | |
| | <i>Stackhousia clementii</i> (P3) | |
| | <i>Swainsona thompsoniana</i> (P3) | |
| | <i>Tephrosia lithosperma</i> (P1) | |
| | <i>Teucrium pilbaranum</i> (P2) | |
| | <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3) | |
| | <i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023) (P2) | |
| | <i>Triodia basitricha</i> (P3) | |
| | <i>Vigna triodiophila</i> (P3) | |
| | | |

Appendix D Flora Likelihood Assessment

Search radius: DBCA 2022a (100km), DAWE 2022 (20km), ALA 2022 (20km)

| Species | Conservation status | | Description | Habitat | Likelihood Rating | |
|---|---------------------|---------------|--|---|---|---|
| | EPBC Act | BC Act / DBCA | | | Pre-Survey | Post survey |
| <i>Abutilon</i> sp. Pritzellianum (S. van Leeuwen 5095) | - | 3 | Shrub to 1.5m high. Fl. Orange, Apr-Jul. | Orange or brown-red sandplains in Acacia shrubland over Triodia grassland or open Eucalypt woodland over same. | Unlikely Two records (1982, 2014) 90-100km away. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Acacia dawsonia</i> | - | 3 | Spreading shrub, 0.3-1.5(-2) m high. Fl. yellow, Jul to Sep. | Stony red loamy soils. Low rocky rises, along drainage lines. | Unlikely One record (2006) ~85km away. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Acacia fecunda</i> | - | 1 | Erect, obconic shrub to 3 m high, bark grey, smooth becoming yellow-brown on upper branches; phyllodes more or less sub-glaucous with a slight sheen; inflorescence of spikes. Fl. yellow, May or Aug. | Quartzite gibbers over grey-red skeletal soil. Along shallow creeks and drainage lines, hills, road verges. | Unlikely Three records (2014-2017) ~90km away. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Atriplex lindleyi</i> subsp. <i>conduplicata</i> | - | 3 | Monoecious, short-lived annual or perennial, herb, ca 0.2 m high. | Crabhole plains. | Unlikely One record (2006) ~75km away on coastal plains. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Bothriochloa decipiens</i> var. <i>cloncurrensis</i> | - | 1 | Perennial, grass-like or herb, to 1.4 m high. Fl. green-yellow. | Eucalyptus open woodland over Acacia shrubland. Red-brown clay loam on plains or seasonally damp depressions. | Unlikely One record (1995) ~80km away. Suitable habitat may be present. | Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (which could not be accessed). |
| <i>Cladium procerum</i> | - | 2 | Densely tufted perennial, grass-like or herb (sedge), 2 m high. Fl. Nov (?). | Perennial pools. | Unlikely Several records (1969-2008) ~35km away. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Dicladanthera glabra</i> | - | 2 | Spreading perennial, herb or shrub, to 0.6(-1) m high. Fl. white/white-blue, Apr or Aug to Oct. | Alluvium. Along watercourses, near rock pools. | Unlikely One record (2015) ~95km away. Suitable habitat may be present. | Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (which could not be accessed). |
| <i>Dipteracanthus chichesterensis</i> | - | 1 | Spreading, glabrescent, perennial subshrubs to 30 cm tall, with short-lived, quadrangular stems. Fl. Mauve, Mar? | Red-brown cracking clay soils associated with basalts on the Chichester Plateau. The collections are from a variety of landforms on the plateau, including slopes, tablelands, benches and creek margins. | Unlikely Multiple records (1995-2013) ~75km away. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but potential habitat throughout study area. |
| <i>Dolichocarpa</i> sp. <i>Hammersley Station</i> (A.-A. Mitchell PRP 1479) | - | 3 | Small, spreading annual herb to 20cm high, much-branched from base. Fl. Blue or white, May-Sep. | Seasonally inundated clays on gibber plains. | Unlikely Two nearby older (1997) records ~14km and ~20km SE and one newer (2002) record ~20km SE. Multiple other records (1997-2020) 20-100km away. Suitable habitat unlikely to be present. | Unlikely Not recorded in this survey, no suitable habitat. |
| <i>Eragrostis crateriformis</i> | - | 3 | Annual, grass-like or herb, 0.17-0.42 m high. Fl. Jan to May or Jul. | Clayey loam or clay, Creek banks, depressions. | Potential One nearby older (1997) record ~15km NE and one (1997) ~21km SE. Suitable habitat may be present. | Potential Not recorded in this survey but VT3 and VT4 represent potential habitat, VT3 could not be accessed. |
| <i>Eragrostis lanicaulis</i> | - | 3 | Knotty or bulbous rhizomatous, perennial, grass-like or herb, 0.45-0.5 m high. Fl. Mar to May or Aug to Oct. | Red sandy clay. Flats. | Unlikely Two records (1921) on coast. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Eragrostis surreyana</i> | - | 3 | Small tufted annual grass to 10cm high. | Seepage areas near or on sheet rock and also in fine alluvial sand on banks of seasonal drainage lines. | Potential Multiple records (1991-2009) ~70-95km away. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed. |

| Species | Conservation status | | Description | Habitat | Likelihood Rating | |
|--|---------------------|-------------------|---|---|--|--|
| | EPBC Act | BC Act / DBCA | | | Pre-Survey | Post survey |
| <i>Eriochloa fatmensis</i> | - | 3 | Upright, annual grass, culms to 1.2m and leaves to 30cm. Fl. Mar? | Seasonally inundated areas, heavy clay soils. | Unlikely One record (1981) ~40km away. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Euphorbia australis</i> var. <i>glabra</i> | - | 3 | Prostrate, much-branched annual herb to 3cm. | Alluvial cracking clay loam in damp depression. | Unlikely Several records (1993-2004) ~40-95km away. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i> | - | 2 | Prostrate, much-branched herb. Stems to 30cm long. | Red loam in depressions in Triodia and Cenchrus grassland. | Potential One nearby older (1997) record ~17km NE. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present. |
| <i>Euphorbia stevenii</i> | - | 3 | Somewhat succulent perennial, herb, 0.1-0.5 m high. | Clay, sandy soils. Plains, gentle bedrock rises. | Potential One nearby older (1997) record ~18km NE. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present. |
| <i>Euploca mutica</i> | - | 3 | Grey-green perennial ascending herb to 30cm high. Fl. White, Jul? | Flats in red silty sand, in Triodia hummock grassland with emergent Acacia shrubs. | Potential Multiple recent records (2004-2014) ~80-95km away. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present. |
| <i>Fimbristylis sieberiana</i> | - | 3 | Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), 0.25-0.6 m high. Fl. brown, May to Jun. | Mud, skeletal soil pockets. Pool edges, sandstone cliffs. | Unlikely Several records (1976-2021) ~35km S. Suitable habitat unlikely to be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Glycine falcata</i> | - | 3 | Mat-forming perennial, herb, to 0.2 m high. Fl. blue-purple, May or Jul. | Black clayey sand. Along drainage depressions in crabhole plains on river floodplains. | Unlikely Two records (2011) ~40km NW. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Gomphrena axillaris</i> | - | 1 | Annual or occasionally biennial herb, erect, 10-30 cm high, up to 20 cm wide. Fl. Pale pink-white-pale brown, Mar-Aug. | Sub-saline habitats or margins of salt-lakes and hummock or tussock grasslands on sand. | Unlikely One record (2006) on coast. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Gomphrena cucullata</i> | - | 3 | Spreading or erect annual, herb, to 0.25 m high, bracteoles forming hoods over the tepals. Fl. white/pink/purple, Feb or May. | Red sandy loam, clayey sand. Open floodplains. | Unlikely Two records (2004, 2012) ~50-70km NW on coastal plains. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Gomphrena leptophylla</i> | - | 3 | Prostrate or erect to spreading annual, herb, to 0.15 m high. Fl. white, Mar to Sep. | Sand, sandy to clayey loam, granite, quartzite. Open flats, sandy creek beds, edges salt pans & marshes, stony hillsides. | Unlikely One record (2004) ~70km NW on coastal plains. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Goodenia berringhamensis</i> | - | 4 | Ascending annual, herb, 0.1-0.3 m high. Fl. yellow, Oct. | Red sandy loam. Along watercourses. | Unlikely One record (2011) ~90km S. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Goodenia nuda</i> | - | Delisted (ex. P4) | Erect to ascending herb, to 0.5 m high. Glabrous or with few simple and glandular hairs. Fl. yellow, Apr to Aug. | Seasonally inundated clay soils and drainage lines, often in mulga. Sometimes scoured river beds and hillsides. | Potential Multiple recent records (2004-2014) ~65-95km away. Suitable habitat may be present. | N/A Species has been delisted between initiation of this project and current. Was not recorded during field survey. |
| <i>Goodenia pallida</i> | - | 1 | Large glandular pubescent herb with long cauline leaves, to 0.5 m high. Fl. Purple-white, Aug. | Red soils. Acacia shrubland over grassland. | Unlikely One older record (1970) ~80km NW on coastal plains. Suitable habitat may be present. | Does not Occur Not recorded in this survey, no close records. This herb is of a size that would have been observed if present. |
| <i>Gymnanthera cunninghamii</i> | - | 3 | Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec. | Sandy soils in drainage lines. Eucalyptus woodland over Acacia shrubland over Triodia grassland. | Unlikely One recent record (2012) inland ~75km SW. Multiple other records (1818-2015) on offshore islands. Suitable habitat may be present. | Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (VT3, which could not be accessed). |
| <i>Helichrysum oligochaetum</i> | - | 1 | Erect annual, herb, to ca 0.25 m high. Fl. yellow, Aug to Nov. | Red clay. Alluvial plains. | Unlikely Two recent (2006, 2014) records inland ~85km SE. Two other records on coast. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |

| Species | Conservation status | | Description | Habitat | Likelihood Rating | |
|---|---------------------|---------------|----------------------|---|---|--|
| | EPBC Act | BC Act / DBCA | | | Pre-Survey | Post survey |
| <i>Indigofera rivularis</i> | - | 3 | DBCA 2022b | Along rocky creek-lines in open low woodland of eucalypts and Acacias on ironstone substrates. | Potential Multiple records (1998-2015) ~85-100km SW-SE. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but potential habitat (VT3) present in ephemeral drainage in south of study area (which could not be accessed). |
| <i>Iotasperma sessilifolium</i> | - | 3 | DBCA 2022b | Depressions, in swamps, on floodplains or around bores, in grassland or herbland communities. Soils are clays or clay-loams. | Unlikely One older record (1996) ~80km SE. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Ipomoea racemigera</i> | - | 2 | DBCA 2022b | Sandy soils along watercourses. | Unlikely One older record (1995) ~35km SE. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Livistona aifredii</i> | - | 4 | DBCA 2022b | Edges of permanent pools. | Unlikely Multiple records (1932-2015) ~35km S in Millstream NP. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This palm is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Owenia acidula</i> | - | 3 | DBCA 2022b | Clay. Floodplains, drainage lines. | Unlikely One older record (1990) ~35km S in Millstream NP on edge of river. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Paspalum retiglume</i> | - | 2 | ALA 2022, DBCA 2022b | Clay flats with cracking clays. Clay with rocky surface. Flats, hills, slopes, drainage lines. | Potential Two nearby older (1997) records ~16km and ~18km SE and one newer (2004) record ~17km SE. Two older records (1995, 1997) >60km SE. Suitable habitat may be present. | Unlikely Not recorded in this survey, potential habitat present on the banks of VT3 but area miniscule, covered in *Cenchrus and adjacent to large pipes, making it unlikely. |
| <i>Pentalepis trichodesmoides</i> subsp. <i>hispidia</i> | - | 2 | DBCA 2022b | Triodia hummock grassland, often in the understory of a shrubland of Acacia spp., Gossypium spp., Senna spp., Brachychiton spp. and Eucalyptus spp., on summits and slopes of low hills, on basaltic soils, at altitudes to 1150 m. | Potential One nearby older (1997) record ~19km E and one (1989) ~29km SE. More recent records (2013-2015) >30km SE. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Rhynchosia bungarensis</i> | - | 4 | DBCA 2022b | Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall. | Potential Multiple records (1962-2017), mostly on Burrup Peninsula but several recent records inland ~85-100km SW. Suitable habitat may be present. | Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed |
| <i>Sida</i> sp. <i>Barlee Range</i> (S. van Leeuwen 1642) | - | 3 | DBCA 2022b | Skeletal rocky red soils. Steep slopes and bases of breakaways in gorges. | Unlikely Two recent (2014, 2015) records ~100km SW. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Solanum albostellatum</i> | - | 3 | DBCA 2022b | Cracking clay soils on open floodplains in open scrubland over grasses. Associated species include Acacia spp., Aristida latifolia, Chrysopogon fallax and Triodia spp. | Unlikely Multiple recent records (2014-2018), mostly ~35-40km S. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Solanum</i> sp. <i>Red Hill</i> (S. van Leeuwen et al. PBS 5415) | - | 3 | DBCA 2022b | Skeletal red-brown soil over ironstone. Hill summits, slopes, rocky plains. Open Eucalyptus woodland over Triodia grassland. | Unlikely Two older (1998, 1999) records ~65-90km S. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Stachysia clementii</i> | - | 3 | DBCA 2022b | Skeletal soils. Sandstone hills. | Unlikely Three recent (2002-2013) records on Burrup Peninsula. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |

| Species | Conservation status | | Description | Habitat | Likelihood Rating | |
|---|---------------------|---------------|--|---|--|---|
| | EPBC Act | BC Act / DBCA | | | Pre-Survey | Post survey |
| <i>Swainsona thompsoniana</i> | - | 3 | A prostrate, annual herb, to 10 cm high. Stems terete, slightly ribbed. Leaves 1.5-2cm long with 3-6 pairs of leaflets; leaflets narrowly obovate to ovate, 4-13mm long x 2-4mm wide. Fl. Mauve-cream with yellow centres, Aug-Sep? | Open flood plains on heavy clay soils. | Unlikely One nearby older (1997) record ~20km E and one (1989) ~29km SE. More recent records (2004-2006) ~40km S. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Tephrosia lithosperma</i> | - | 1 | Low, spreading woody herb to subshrub, possibly annual, to 0.5 m tall, at least 0.3 m wide, with numerous slender stems. Fl. Pink-mauve-purple, Mar-Jul. | Stony and rocky slopes of variable geology (limestone, sandstone, basalt, laterite, quartz), but also from clay soils on plains beneath slopes. Grows in open savanna woodland or shrubland, frequently among spinifex. | Unlikely One older record (1997) ~45km SE. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. |
| <i>Tephrosia rosea</i> var. <i>Port Hedland</i> (A.S. George 1114) | - | 1 | Spreading shrub to 1.2m high and 1.2m wide. Fl. Pink, Mar-Sep. | Low shrubland near coast. Plains and dunes in red-brown sandy loam, yellow and red sand. | Unlikely Multiple records (1984-2012) on coast at Port Samson. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Terminalia supranitifolia</i> | - | 3 | Spreading, tangled shrub or tree, 1.5-3 m high. Fl. green-yellow, May or Jul or Dec. | Sand. Among basalt rocks on volcanic rockpiles or near rocky ridges in low hilly country near the coast. | Unlikely Multiple records (1971-2011) mostly on Burrup Peninsula but several recent (2010-2011) records ~95km W. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Teucrium pilbaranum</i> | - | 2 | Upright shrub, 0.2 m high. Fl. white, May or Sep. | Clay. Crab hole plain in a river floodplain, margin of calcrete table. | Unlikely Two older (1976, 1996) records ~35km S in Millstream NP on edge of river. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. No suitable habitat in the study area. |
| <i>Themeda</i> sp. <i>Hammersley Station</i> (M.E. Trudgen 11431) | - | 3 | Tussocky perennial, grass-like or herb, 0.9-1.8 m high. Fl. Aug. | Red clay. Clay pan, grass plain. | Potential One nearby older (1997) record ~18km SE and one newer (2002) record ~20km SE. Multiple other records (1966-2010) 20-100km away. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. |
| <i>Trianthema</i> sp. <i>Python Pool</i> (G.R. Guerin & M.E. Trudgen GG 1023) | - | 2 | Prostrate annual herb. Fl. White-pink, Mar-Jul. | Low undulating hills, valley floors, flats. Stony soils, loam, clayey sand. In shrubland or <i>Triodia</i> grassland. | Potential Two recent nearby records (2008, 2013) ~21km SE. Two older nearby records (1987-19km NW, 1997-22km SE). Suitable habitat may be present. | Unlikely Not recorded in this survey. This herb would have been observed if present. |
| <i>Triodia basitricha</i> | - | 3 | Tussock-forming perennial, non-resinous or weakly resinous, not obviously stoloniferous; tussocks compact, c. 30-40 cm high, 40-60 cm diam.; flowering culms 35-70 cm high. Fl. Jan-Mar. | Slopes or crests of rocky hills. | Potential Multiple records (1994-2018) ~30-95km SW-SE. Suitable habitat may be present. | Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. |
| <i>Triodia mollata</i> | - | 1 | Foliage non-resinous; leaves amphistomatous (hard-type); orifice and sheaths densely woolly. | Rocky hillslopes that are a mixture of metasandstone and chert. | Unlikely Two recent (2015, 2017) records ~95km SW. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Triodia pisolitcola</i> | - | 3 | Foliage non-resinous; leaf sheath surfaces glabrous or hairy; leaf blades epistomatous (soft-type), 24-59 cm long and lax. | Ironstone mesas, slopes and gullies, or sometimes on flat loam. | Unlikely Multiple records (1975-2017) mostly ~90-100km SW on rocky crests and mesas. Suitable habitat unlikely to be present. | Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area. |
| <i>Vigna triadophila</i> | - | 3 | Fine-stemmed prostrate or scrambling vine forming mats. Diminutive in all its parts. Ovate to elliptic leaves to 2.3 cm long, occasionally to 3 cm long, the small flowers 6-7 mm long, and the short pods to 2.5 cm long. The stems and peduncles are usually finer, less than 1 mm in diameter. Fl. yellow, May-Sep. | Endemic to basalt rockpile habitats in the north-west Pilbara. Grows in association with rockpiles among cobbles and boulders in shallow, red-brown or brown, clayey sand or loam. In <i>Acacia</i> shrublands over tussock ad hummock grassland. | Unlikely Multiple records (1986-2011) mostly on Burrup Peninsula but several recent records (2000-2009) ~25-35km N on rockpiles, and rocky upper slopes. Suitable habitat unlikely to be present. | Unlikely Not recorded in this survey. This vine would have been observed if present. V71 represents potential habitat in a few areas. |

Appendix E Fauna Likelihood Assessment

Search radius: DBCA 2022b (40km), DAWE 2022 (20km), ALA 2022 (20km)

| Species | Common Name | Conservation status | | | Distribution | Habitat (breeding, foraging, roosting) | Likelihood Rating | |
|---------------------------------|------------------------------|---------------------|---------------|------------------------------------|---|---|---|--|
| | | EPBC Act | BC Act / DECA | Source* | | | Pre-Survey | Post survey |
| <i>Actitis hypoleucos</i> | Common Sandpiper | MI | MI | ALA 2022, DBCA 2022b, DCCCEW 2022b | Widespread. Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. | The Common Sandpiper does not breed in Australia. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. Generally the species forages in shallow water and on bare soft mud at the edges of wetlands, often where obstacles project from substrate, e.g. rocks or mangrove roots. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. | Unlikely Four recent (2007-2014) records <40km away. Suitable habitat unlikely to be present. | Unlikely Marginal habitat restricted to ephemeral water presence in VT3 and VT4 |
| <i>Anilius ganei</i> | Gane's blind snake (Pilbara) | - | P1 | DBCA 2022b | Found only in the Pilbara region of Western Australia. | Known to inhabit gorges and gullies within rocky habitats. Possibly present in other mulga and stony habitats. | Unlikely One older (1999) record ~35km S near Millstream permanent pools. Suitable habitat may be present. | Unlikely Suitable habitat (rocky gorges and gullies) was not present. |
| <i>Antipodogomphus hodgkini</i> | Pilbara dragonfly | - | P3 | DBCA 2022b | Endemic to the Pilbara region of Western Australia. | Inhabits rivers, streams and pools. | Unlikely Two records (1958, 2007) ~35km S at Millstream permanent pools. Suitable habitat unlikely to be present. | Unlikely Suitable habitat (permanent water bodies) was not present. |
| <i>Apus pacificus</i> | Fork-tailed Swift | MI | MI | DCCCEW 2022b | Widespread. The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia. In Western Australia, there are sparsely scattered records of the Fork-tailed Swift along the south coast, ranging from near the Eyre Bird Observatory and west to Denmark. | The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. This species is known to be insectivorous. | Unlikely No records within 40 km. Pilbara records either coastal or further inland (Karrijini). | Unlikely No nearby records. |
| <i>Arenaria interpres</i> | Ruddy turnstone | MI | MI | DBCA 2022b | Widespread. Breeds in northern parts of Eurasia and North America and flying south to winter on coastlines almost worldwide. There are non-breeding records around the entire coastline of Australia. | The ruddy turnstone has a varied diet including carrion, eggs, fish and plant material but it feeds mainly on invertebrates. It also takes crustaceans, spiders, molluscs and worms. Outside the breeding season, it is found along coasts, particularly on rocky or stony shores. It is often found on man-made structures such as breakwaters and jetties. It may venture onto open grassy areas near the coast. Small numbers sometimes turn up on inland wetlands, especially during the spring and autumn migrations. | Unlikely One recent (2011) record ~13km NW on a floodplain. Pilbara records coastal or sub-coastal. Suitable habitat unlikely to be present. | Unlikely Suitable habitat restricted to ephemeral water presence in VT3 and VT4 |
| <i>Calidris acuminata</i> | Sharp-tailed Sandpiper | MI | MI | DBCA 2022b, DCCCEW 2022b | In Western Australia, scattered records occur along the Nullarbor Plain and the southern areas of the Great Victoria Desert. They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of Pilbara Region to south-west and east Kimberley Division. | The Sharp-tailed Sandpiper does not breed in Australia. In Australia, the species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. They forage at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. | Unlikely One recent (2014) record ~35km N at Harding Dam. Pilbara records either coastal or further inland (Karrijini). Suitable habitat unlikely to be present. | Unlikely Suitable habitat restricted to ephemeral water presence in VT3 and VT4 |

| Species | Conservation status | | Common Name | Source* | Distribution | Habitat (breeding, foraging, roosting) | Likelihood Rating | |
|---------------------------------|---------------------|---------------|------------------------------------|------------------------------------|---|---|---|---|
| | EPBC Act | BC Act / DECA | | | | | Pre-Survey | Post survey |
| <i>Callidris ferruginea</i> | CR, MI | VU, MI | Curlew Sandpiper | DCCEEW 2022b | Widespread. Within Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in small numbers. | The Curlew Sandpiper does not breed in Australia. Curlew sandpipers forage on mudflats and nearby shallow water. In non-tidal wetlands, they usually wade, mostly in water 15–30 mm, but up to 60 mm deep. They forage at the edges of shallow pools and drains of intertidal mudflats and sandy shores. At high tide, they sometimes forage among low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated saltflats. Curlew sandpipers roost in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. | Unlikely No records within 40 km. Pilbara records coastal or sub-coastal. Suitable habitat unlikely to be present. | Unlikely Suitable habitat restricted to ephemeral water presence in VT3 and VT4 |
| <i>Callidris melanotos</i> | MI | - | Pectoral Sandpiper | DCCEEW 2022b | In Western Australia, the species is rarely recorded, however has been observed in the Pilbara. | The Pectoral Sandpiper does not breed in Australia. In Australia, the species prefers shallow fresh to saline wetlands, coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. The species is omnivorous, consuming algae, seeds, crustaceans, arachnids and insects. | Unlikely No records within 40 km. Pilbara records all coastal. | Unlikely Coastal areas not present. Marginal ephemeral wetland habitat restricted to VT3 and VT4. |
| <i>Callidris ruficollis</i> | MI | MI | Red-necked stint | DBCA 2022b | The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable. | Coastal areas, including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. | Unlikely One recent (2014) record ~35km N at Harding Dam. Pilbara records either coastal or further inland (Karjijini). Suitable habitat unlikely to be present. | Unlikely Coastal areas not present. Marginal ephemeral wetland habitat restricted to VT3 and VT4. |
| <i>Charadrius veredus</i> | MI | MI | Oriental Plover, Oriental Dotterel | DCCEEW 2022b | The species occurs in both coastal and inland areas, mostly in northern Australia. Most records are along the north-western coast, between Exmouth Gulf and Derby in Western Australia, and there are records at a few scattered sites elsewhere. | The Oriental Plover does not breed in Australia. The species spends a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands. Oriental Plovers usually forage among short grass or on hard stony bare ground, but also on mudflats or among beachcast seaweed on beaches. Oriental Plovers sometimes roost on soft wet mud or in shallow water of beaches and tidal mudflats, and also occasionally in dry, open habitats, such as saltmarsh or paddocks. | Unlikely No records within 40 km. Most Pilbara records coastal or sub-coastal with only widely scattered records inland. Suitable habitat unlikely to be present. | Unlikely Coastal areas not present. Marginal ephemeral wetland habitat restricted to VT3 and VT4. |
| <i>Dasyurus hallucatus</i> | EN | EN | Northern Quoll | ALA 2022, DBCA 2022b, DCCEEW 2022b | In the Pilbara, the distributional boundaries of Northern Quoll are defined in the north, east and south by the Great Sandy Desert, Gibson Desert and Little Sandy Deserts. Records from the Pilbara bioregion are scattered across the four subregions; namely the Hamersley, Fortescue Plains, Chichester and Roebourne Plains subregions. The majority of recent records however have come from the Rocklea, Macroy and Robe land systems. | The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas such as in Western Australia. | Likely 215 records (1958-2019) within 40km. 191 records within 20km, most to SE. Records scattered throughout Pilbara from coast to Karjijini NP. Suitable habitat likely to be present. | Unlikely Little suitable habitat present. One rocky area was present in the study area, but it was small in area, of low relief and with only sparse surrounding vegetation. |
| <i>Erythrorhynchus radiatus</i> | VU | VU | Red Goshawk | DCCEEW 2022b | The species occurs in a patchy, widespread distribution across coastal and sub-coastal regions of northern and eastern Australia. | The Red Goshawk inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests, usually on fertile soils. The species rarely breeds in areas with fragmented native vegetation. | Unlikely No records within 40 km. No Pilbara records in ALA (2022). Suitable habitat (coastal and sub-coastal areas) unlikely to be present. | Unlikely Suitable habitat (coastal habitat, forests and woodlands) was not present. |

| Species | Conservation status | | Common Name | Distribution | Habitat (breeding, foraging, roosting) | Likelihood Rating | |
|---------------------------------|---------------------|---------------|-----------------------------|---|---|---|---|
| | EPBC Act | BC Act / DECA | | | | Pre-Survey | Post survey |
| <i>Falco hypoleucos</i> | VU | VU | Grey Falcon | Widespread. The distribution of this species is restricted largely to areas of the highest annual average temperatures where there is an average annual rainfall of less than 500 mm. | The Grey Falcon favours lightly timbered and untimbered lowland plains that are crossed by tree-lined watercourses, but frequents other habitats including grassland and sand dune habitats. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter. | Potential One recent (2012) record ~30km NE. Pilbara records distributed from coast to Newman. Suitable habitat likely to be present. | Potential Some suitable habitat present. A narrow strip of plains sparsely vegetated by shrubs and grassland was present in the study area and a seasonal tributary watercourse runs through the southern end of the study area. |
| <i>Gelochelidon nilotica</i> | MI | MI | Gull-billed Tern | The Gull-billed Tern occurs on all continents except Antarctica. | Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean. The diet of the Gull-billed Tern is extremely varied, consisting mainly of small fish, reptiles, amphibians, crustaceans, small mammals, insects and their larvae. | Unlikely One older (1999) record ~30km N. Pilbara records either coastal or further inland (Karijini). Suitable habitat may be present. | Unlikely Suitable habitat restricted to ephemeral water presence in VT3 and VT4 |
| <i>Glaucola maldivarum</i> | MI | MI | Oriental Pratincole | Within Australia the Oriental Pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. | The Oriental Pratincole does not breed in Australia. The species inhabits open plains, floodplains or short grassland, often with extensive bare areas. Often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, saltworks and sewage farms, especially around the margins. | Potential Two recent (2007, 2011) records ~15km SW. Pilbara records distributed from Millstream NP to the coast. Suitable habitat may be present. | Potential Several nearby records, marginal ephemeral wetland habitat restricted to VT3 and VT4. |
| <i>Hirundo rustica</i> | MI | MI | Barn Swallow | The Barn Swallow usually occurs in northern Australia, and patchily along the north coast of the mainland from the Pilbara region, Western Australia. | Open country in coastal lowlands, often near water, towns and cities, also in or over freshwater wetlands, paper-bark Melaleuca woodland, mesophyll shrub thickets and tussock grassland. | Unlikely No records within 40 km. Suitable habitat (coastal lowlands) unlikely to be present. | Unlikely Suitable habitat (coastal lowlands) was not present. |
| <i>Hydroprogne caspia</i> | MI | MI | Caspian Tern | Widespread. Within WA, Caspian Tern is widespread in coastal regions, from the Great Australian Bight to the Dampier Peninsula. There are sparse records on the coasts east of King Sound and in eastern regions. | This species is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. | Unlikely 12 recent (1998-2014) records ~35km N at Harding Dam and Lake Poongkalyarra. Pilbara records coastal or sub-coastal with only widely scattered records further inland. Suitable habitat unlikely to be present. | Unlikely Suitable habitat restricted to ephemeral water presence in VT3 and VT4 |
| <i>Leggadina lakedownsensis</i> | - | P4 | Northern short-tailed mouse | The Lakeand Down's short-tailed mouse occurs across northern Australia, from Cape York to the Pilbara (Western Australia), with one population on Thevenard Island (Western Australia). | Known to occur on sandy soils and cracking clays in Western Australia. | Potential 26 recent (2004-2011) records <20km S and two additional <40km S. Pilbara records distributed from coast to Newman. Suitable habitat may be present. | Unlikely Suitable habitat (sandy soil, cracking clay) was not present. |
| <i>Lelopotherapon aheneus</i> | - | P4 | Fortescue Grunter | Known only from the Ashburton River to upper reaches of the Fortescue River, in the Pilbara region of Western Australia. | Inhabits slow to fast flowing clear freshwater streams and pools over sandy and rocky bottoms. | Unlikely Nine older (1958-1980) records ~35km S at Millstream permanent pools. Pilbara records distributed from coast to Karijini. Suitable habitat unlikely to be present. | Unlikely Suitable habitat (permanent water bodies) was not present. |

| Species | Common Name | Conservation status | | | Source* | Distribution | Habitat (breeding, foraging, roosting) | Likelihood Rating | |
|----------------------------------|------------------------------------|---------------------|---------------|--------------------------|---|--|--|---|--|
| | | EPBC Act | BC Act / DECA | Pre-Survey | | | | Post survey | |
| <i>Liasis olivaceus barroni</i> | Olive Python (Pilbara subspecies) | VU | VU | DBCA 2022b, DCCEEW 2022b | The Olive Python (Pilbara subspecies) is restricted to ranges within the Pilbara region, north-western Western Australia, such as the Hamersley Range, and islands of the Dampier Archipelago. It is known to occur at 17 locations within the Pilbara. Four populations occur at Panawonica, Millstream, Tom Price and Burrup Peninsula. | The Olive Python (Pilbara subspecies) prefers escarpments, gorges and water holes in the ranges of the Pilbara region. | Potential One recent (2019) record ~35km S at Millstream NP and two older records ~35km S and E. Pilbara records distributed from coast to Newman. Suitable habitat may be present. | Unlikely Suitable habitat (escarpments, gorges and water holes) was not present. | |
| <i>Macroderma gigas</i> | Ghost Bat | VU | VU | DBCA 2022b, DCCEEW 2022b | The species' current range is discontinuous, with geographically disjunct colonies occurring in the Pilbara, Kimberley (including several islands), northern Northern Territory, the Gulf of Carpentaria, coastal and near coastal eastern Queensland from Cape York to near Rockhampton, and western Queensland. | They currently occupy habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. During the daytime they roost in caves, rock crevices and old mines. Roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°-28°C and a moderate to high relative humidity of 50-100 percent. This species generally forages within 1-2km of the roost site, with most of the prey comprising large invertebrates, bats, birds, reptiles and frogs. | Potential One older (1958) record ~35km S at Millstream NP. Suitable habitat may be present, with rocky slopes and breakaways just above the study area. | Unlikely No suitable habitat present. While there were steep rocky slopes just above the study area, no caves were observed. | |
| <i>Macrotis lagotis</i> | Greater Bilby | VU | VU | DCCEEW 2022b | The Gibson Desert, Little Sandy Desert, Great Sandy Desert and parts of the Pilbara and Southern Kimberley. | The remaining populations of the greater bilby occupy three main habitats: open tussock grassland on uplands and hills, <i>Acacia aneura</i> (mulga) woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas. | Potential No records within 40 km. Suitable habitat may be present. | Unlikely Some suitable habitat present but no nearby records. A narrow strip of plains sparsely vegetated by shrubs and grassland was present in the study area. | |
| <i>Motacilla cinerea</i> | Grey Wagtail | MI | MI | DCCEEW 2022b | This species is a vagrant to northern Australia. | This species inhabits fast-flowing mountain streams and rivers with riffles and exposed rocks or shoals, often in forested areas. It is also found in more lowland watercourses, even canals, where there are artificial waterfalls, weirs, millraces or lock gates. Outside of the breeding season it occupies a wider variety of habitats, including farmyards, sewage farms, forest tracks, tea estates and even town centres. | Unlikely No records within 40 km. Suitable habitat (fast flowing water courses) unlikely to be present. | Unlikely Suitable habitat (fast-flowing water courses) was not present. | |
| <i>Motacilla flava</i> | Yellow Wagtail | MI | MI | DCCEEW 2022b | This species is a vagrant to northern Australia. | Inhabits fast-flowing mountain streams and rivers with riffles and exposed rocks or shoals, often in forested areas. It is also found in more lowland watercourses where there are artificial waterfalls, weirs, millraces or lock gates. | Unlikely No records within 40 km. Suitable habitat (fast flowing water courses) unlikely to be present. | Unlikely Suitable habitat (fast-flowing water courses) was not present. | |
| <i>Nososticta pilbara</i> | Pilbara Threadtail | - | P2 | ALA 2022, DBCA 2022b | Damselfly that has only been found in the Pilbara region of Western Australia. | Inhabits streams and pools. | Unlikely Six recent (2002-2007) records ~35km S at Millstream permanent pools. Suitable habitat unlikely to be present. | Unlikely Suitable habitat (permanent water bodies) was not present. | |
| <i>Notoscinus butleri</i> | Lined Soil-crevice Skink | - | P4 | ALA 2022, DBCA 2022b | Widespread throughout the Pilbara region. | The preferred natural habitat is stony spinifex grassland. | Potential 23 records (1969-2011) <40km away. Suitable habitat likely to be present. | Potential Suitable habitat was present. Stony spinifex grassland occurred throughout the study area. | |
| <i>Numenius madagascariensis</i> | Eastern Curlew, Far Eastern Curlew | CR, MI | VU, MI | DCCEEW 2022b | Widespread. Within Australia, Eastern Curlew primarily has a coastal distribution. | The Eastern Curlew does not breed in Australia. The eastern curlew mainly forages during the non-breeding season on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. The birds are rarely seen on near-coastal lakes or in grassy areas. The eastern curlew roosts during high tide periods on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. | Unlikely No records within 40 km. Suitable habitat (coastal areas) unlikely to be present. | Unlikely Coastal areas not present. Marginal ephemeral wetland habitat restricted to VT3 and VT4. | |

| Species | Conservation status | | Common Name | Distribution | Habitat (breeding, foraging, roosting) | Likelihood Rating | |
|--|---------------------|---------------|--------------------------|--|---|--|--|
| | EPBC Act | BC Act / DECA | | | | Pre-Survey | Post survey |
| <i>Pandion haliaetus</i> | MI | - | Osprey | The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW. | Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. | Unlikely No records within 40 km. Suitable habitat (extensive areas of open water) unlikely to be present. | Unlikely Suitable habitat (extensive areas of open water) unlikely to be present. |
| <i>Pezoporus occidentalis</i> | EN | CR | Night Parrot | The current distribution of the night parrot is not known. Historic records and observations are scanty and anecdotal with few substantiated records since 1935. There are accepted historical records from remote arid and semi-arid inland regions of Western Australia, Northern Territory, South Australia and Queensland. It is possible that the night parrot may continue to occur throughout much of this range. | Most habitat records are of Tridodia (Spinifex) grasslands and/or chenopod shrublands in the arid and semi-arid zones, and <i>Astrelbia</i> spp. (Mitchell grass), shrubby samphire and chenopod associations, scattered trees and shrubs, <i>Acacia</i> aenea (Muiga) woodland, treeless areas and bare gibber. Roosting and nesting sites are consistently reported as within clumps of dense vegetation, primarily old and large Spinifex clumps, but sometimes other vegetation types. | Unlikely No records within 40 km. However, the search area is within the medium priority study area for night parrots (DBCA 2022b). Suitable habitat may be present. | Unlikely Some suitable habitat was present. Spinifex grasslands occurred throughout the study area but the vegetation had been degraded by previous clearing and earthworks. |
| <i>Plegadis falcinellus</i> | MI | MI | Glossy ibis | Within Australia, the Glossy Ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. | The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. | Unlikely Three recent (2011-2013) records ~35km N at Harding Dam. Suitable habitat unlikely to be present. | Unlikely Suitable habitat (fresh water marshes) was not present. |
| <i>Pseudomys chapmani</i> | - | P4 | Pebble-mound Mouse | The species is restricted to the non-coastal, central and eastern parts of the Pilbara. | Pebbly soils in arid tussock grassland and <i>Acacia</i> woodland. The vegetation at the preferred habitat, hummock grasslands, is <i>Tridodia</i> basedonii, <i>Cassia</i> , <i>Acacia</i> and <i>Philotus</i> and it is associated with eroding sands at natural features which expose small stones (pebbles). | Likely Two recent (2004) records ~13km S. Seven older (1992-1997) records <20km SE. Suitable habitat likely to be present. | Unlikely No Mounds were recorded in the study area. Suitable habitat was present. Stony spinifex grassland occurred with sparse <i>Acacia</i> and <i>Senna</i> shrubs occurred throughout the study area. |
| <i>Rhinonictes aurantia (Pilbara form)</i> | VU | VU | Pilbara Leaf-nosed Bat | <i>Rhinonictes aurantia</i> is endemic to Australia, and ranges throughout the Pilbara and Kimberley regions of Western Australia, the Top End of the Northern Territory, and parts of several bioregions across the Gulf of Carpentaria in the Northern Territory and western Queensland. | The Orange Leaf-nosed bat is found in large caves cohabiting with others bat species. The preferred cave environ is warm and humid, other opportunities for roosting sites include tree hollows. | Potential One record ~35km S at Millstream NP. Suitable habitat may be present, with rocky slopes and breakaways just above the study area. | Unlikely No suitable habitat present. While there were steep rocky slopes just above the study area, no caves were observed. |
| <i>Rostratula australis</i> | EN | EN | Australian Painted Snipe | Widespread. The Australian Painted Snipe has been recorded at wetlands in all states and territories and is most common in eastern Australia. | The Australian painted snipe occurs in shallow freshwater (occasionally brackish) wetlands, both ephemeral and permanent, such as lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains, generally with a good cover of grasses, rushes and reeds, low scrub, <i>Muehlenbeckia</i> spp. (lignum), open timber or samphire. | Unlikely Two recent (2011) records ~10km N. Suitable habitat unlikely to be present. | Potential Nearby records, marginal ephemeral wetland habitat restricted to VT3 and VT4. |
| <i>Tringa glareola</i> | MI | MI | Wood sandpiper | The Wood Sandpiper has its largest numbers recorded in north-west Australia, with all areas of national importance located in Western-Australia. | Well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially <i>Melaleuca</i> and <i>River Red Gums</i> <i>Eucalyptus camaldulensis</i> and often with fallen timber. The Wood Sandpiper forages on moist or dry mud at the edges of wetlands, either along shores, among open scattered aquatic vegetation, or in clear shallow water. | Unlikely One recent (2015) record ~35km N at Harding Dam. Suitable habitat unlikely to be present. | Unlikely Suitable habitat limited VT3 and VT4, area too small for use except as a brief stop-over. |

Appendix F Ecological communities likelihood assessment

| Community ID | Community name | Conservation status | | Description | Likelihood rating | |
|------------------------------------|---|---------------------|---------------|--|--|---|
| | | EPBC Act | BC Act / DBCA | | Pre-Survey | Post survey |
| Wona System | Four plant assemblages of the Wona Land System (previously 'Cracking clays of the Chichester and Mungaroona Range') | - | P1 | <p>DBCA 2022c</p> <ul style="list-style-type: none"> Cracking clays of the Chichester and Mungaroona Range. This shrubless plain of stony gibber community occurs on the tablelands with very little vegetative cover during the dry season, however during the wet a suite of ephemerals/annuals and short-lived perennials emerge, many of which are poorly known and range-end taxa. Annual Sorghum grasslands on self-mulching clays with a moderate-dense overlay of rocks. This community appears very rare and restricted to the Panawonika-Robe valley end of Chichester Range. Naturally species poor when dry. Mitchell grass plains (<i>Astrelba</i> spp.) on gilgai. Mitchell grass and Roebourne Plain grass (<i>Eragrostis xerophila</i>) plain on gilgai. <i>Astrelba pectinata</i>, <i>A. elymoides</i>, <i>E. xerophila</i>, <i>Aristida latifolia</i>, <i>Eriachne</i> and <i>Sida fibulifera</i>. | <p>Pre-Survey</p> <p>Unlikely</p> <p>Several records <10km to the S and multiple records <20km S. Suitable habitat (cracking clay plains) unlikely to be present.</p> | <p>Post survey</p> <p>Does not Occur</p> <p>Cracking clay plains were not present in the study area. Sorghum grasslands, Mitchell grass and Roebourne Plain grass were not present.</p> |
| Horseflat System | Horseflat Land System of the Roebourne Plains | - | P3 | <p>DBCA 2022c</p> <p>(Does not include priority ecological communities 'Roebourne Plains coastal grasslands with gilgai microrelief on cracking clays' and the 'Chenopod vegetation associations of the Roebourne Plains').</p> <p>The Horseflat Land System of the Roebourne Plains are extensive, weakly gilgated clay plains dominated by tussock grasslands on mostly alluvial non-gilgated, red clay loams or heavy clay loams. Perennial tussock grasses include <i>Eragrostis xerophila</i> (Roebourne Plains grass) and other <i>Eragrostis</i> spp., <i>Eriachne</i> spp. and <i>Dichanthium</i> spp. The community also supports a suite of annual grasses including <i>Sorghum</i> spp. and rare <i>Astrelba</i> spp. The community extends from Peedamulla to Baila Balla surrounding the towns of Karratha and Roebourne. This community incorporates Unit 3 (gilgai plains), Unit 5 (alluvial plains) with some Unit 7 (drainage depressions) of the Horseflat land system as described in van Vreeswyk, A M, Leighton, K A, Payne, A L, and Hennig, P. (2004), An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture and Food, Western Australia, Perth. Technical Bulletin 92.</p> | <p>Pre-Survey</p> <p>Unlikely</p> <p>Several records <20km to the N and multiple records <70km N. Suitable habitat (weakly gilgated clay plains) unlikely to be present.</p> | <p>Post survey</p> <p>Does not Occur</p> <p>Clay plains were not present in the study area. <i>Eragrostis xerophila</i> and <i>Dichanthium</i> spp. were not present, though minor coverage of <i>Eragrostis tenellula</i>, <i>Eriachne mucronata</i> and <i>E. pulchella</i> was recorded. <i>Sorghum</i> and <i>Astrelba</i> spp. grasses were not present.</p> |
| Kajenje LS | Kajenje Land System | - | P3 | <p>DBCA 2022c</p> <p>Stony clay plains supporting snakewood shrublands with tussock grasses. Supports tall shrublands of mulga, snakewood and other acacias with understory of low shrubs or perennial grasses. Some parts support tussock grasslands of Mitchell grass or Roebourne Plains grass with few shrubs.</p> | <p>Pre-Survey</p> <p>Unlikely</p> <p>Multiple records ~40km to the S. Suitable habitat (plains) unlikely to be present.</p> | <p>Post survey</p> <p>Does not Occur</p> <p>Stony clay plains with snakewood or mulga shrublands were not present in the study area. Tall <i>Acacia</i> shrublands were not present, though <i>Acacia</i> mid sparse shrublands of <i>A. trachycarpa</i>, <i>A. bivenosa</i>, <i>A. coriacea</i> subsp. <i>pendens</i>, <i>A. inaequilatera</i> and <i>A. pyrifolia</i> were recorded.</p> |
| Riparian Springs and Pools Pilbara | Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region | - | P2 | <p>DBCA 2022c</p> <p>The community includes flora with restricted distributions or populations that are highly disjunct or are major range extensions from northern and eastern Australia. These include <i>Imperata cylindrica</i>, <i>Cladium procerum</i>, <i>Schoenus falcatus</i> and <i>Fimbristylis sieberiana</i> (P3). In the Pilbara these taxa are almost exclusively restricted to the riparian zones of permanent wetlands with high soil moisture maintained by groundwater flows. Occurrences are disjunct with sites typically associated with groundwater discharge in gorge and valley wetlands that are often coupled with significant shading.</p> | <p>Pre-Survey</p> <p>Unlikely</p> <p>Three records ~35km to the S adjacent to permanent pools in Millstream NP. Suitable habitat (riparian zones of permanent wetlands) unlikely to be present.</p> | <p>Post survey</p> <p>Does not Occur</p> <p>Riparian zones of permanent wetlands were not present in the study area.</p> |

Appendix G Flora species list

| Family | Species | Conservation Status | | Introduced Species Status |
|-----------------|--|---------------------|---------------|---------------------------|
| | | EPBC Act | BC Act / DBCA | |
| Aizoaceae | <i>Trianthema triquetrum</i> | | | |
| Amaranthaceae | <i>Aerva javanica</i> | | | Permitted-s11 |
| Amaranthaceae | <i>Alternanthera nana</i> | | | |
| Amaranthaceae | <i>Alternanthera nodiflora</i> | | | |
| Amaranthaceae | <i>Gomphrena cunninghamii</i> | | | |
| Amaranthaceae | <i>Ptilotus auriculifolius</i> | | | |
| Amaranthaceae | <i>Ptilotus exaltatus</i> | | | |
| Amaranthaceae | <i>Ptilotus fusiformis</i> | | | |
| Apocynaceae | <i>Leichhardtia australis</i> | | | |
| Asteraceae | <i>Centipeda minima</i> subsp. <i>macrocephala</i> | | | |
| Asteraceae | <i>Pluchea rubelliflora</i> | | | |
| Asteraceae | <i>Pseudognaphalium luteoalbum</i> | | | |
| Asteraceae | <i>Pterocaulon</i> sp. (indet.) | | | |
| Boraginaceae | <i>Ehretia saligna</i> var. <i>saligna</i> | | | |
| Boraginaceae | <i>Trichodesma zeylanicum</i> | | | |
| Capparaceae | <i>Capparis spinosa</i> | | | |
| Caryophyllaceae | <i>Polycarpha longiflora</i> | | | |
| Chenopodiaceae | <i>Dysphania plantaginella</i> | | | |
| Chenopodiaceae | <i>Dysphania rhadinostachya</i> | | | |
| Chenopodiaceae | <i>Salsola australis</i> | | | |
| Cleomaceae | <i>Arivela viscosa</i> | | | |
| Combretaceae | <i>Terminalia canescens</i> | | | |
| Combretaceae | <i>Terminalia circumalata</i> | | | |
| Convolvulaceae | <i>Bonamia pilbarensis</i> | | | |
| Convolvulaceae | <i>Ipomoea ?muelleri</i> | | | |
| Convolvulaceae | <i>Ipomoea muelleri</i> | | | |
| Convolvulaceae | <i>Ipomoea plebeian</i> | | | |
| Convolvulaceae | <i>Ipomoea polymorpha</i> | | | |
| Convolvulaceae | <i>Operculina aequisepala</i> | | | |
| Convolvulaceae | <i>Polymeria mollis</i> | | | |
| Cucurbitaceae | <i>Cucumis argenteus</i> | | | |
| Cucurbitaceae | <i>Cucumis variabilis</i> | | | |
| Cucurbitaceae | <i>Cucumis</i> sp. | | | |
| Cucurbitaceae | <i>Trichosanthes cucumerina</i> | | | |
| Cyperaceae | <i>Cyperus difformis</i> | | | |
| Cyperaceae | <i>Cyperus vaginatus</i> | | | |
| Cyperaceae | ? <i>Schoenoplectus subulatus</i> | | | |
| Cyperaceae | <i>Schoenoplectus subulatus</i> | | | |
| Euphorbiaceae | <i>Euphorbia australis</i> | | | |

| Family | Species | Conservation Status | | Introduced Species Status |
|---------------|---|---------------------|---------------|---------------------------|
| | | EPBC Act | BC Act / DBCA | |
| Euphorbiaceae | <i>Euphorbia biconvexa</i> | | | |
| Euphorbiaceae | <i>Euphorbia careyi</i> | | | |
| Euphorbiaceae | <i>Euphorbia vaccaria</i> var. <i>vaccaria</i> | | | |
| Fabaceae | <i>Acacia bivenosa</i> | | | |
| Fabaceae | <i>Acacia coriacea</i> subsp. <i>pendens</i> | | | |
| Fabaceae | <i>Acacia inaequilatera</i> | | | |
| Fabaceae | <i>Acacia maitlandii</i> | | | |
| Fabaceae | <i>Acacia pyrifolia</i> | | | |
| Fabaceae | <i>Acacia stellaticeps</i> | | | |
| Fabaceae | <i>Acacia trachycarpa</i> | | | |
| Fabaceae | <i>Alysicarpus muelleri</i> | | | |
| Fabaceae | <i>Cajanus cinereus</i> | | | |
| Fabaceae | <i>Crotalaria medicaginea</i> var. <i>neglecta</i> | | | |
| Fabaceae | <i>Cullen lachnostachys</i> | | | |
| Fabaceae | <i>Indigofera colutea</i> | | | |
| Fabaceae | <i>Indigofera linifolia</i> | | | |
| Fabaceae | <i>Indigofera</i> aff. <i>Monophylla</i> | | | |
| Fabaceae | <i>Indigofera rugosa</i> | | | |
| Fabaceae | <i>Rhynchosia minima</i> | | | |
| Fabaceae | <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | | | |
| Fabaceae | <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | | | |
| Fabaceae | <i>Senna notabilis</i> | | | |
| Fabaceae | <i>Senna venusta</i> | | | |
| Fabaceae | <i>Sesbania cannabina</i> | | | |
| Fabaceae | <i>Swainsona formosa</i> | | | |
| Fabaceae | <i>Tephrosia rosea</i> var. <i>clementii</i> | | | |
| Fabaceae | <i>Tephrosia rosea</i> | | | |
| Gentianaceae | <i>Schenkia clementii</i> | | | |
| Goodeniaceae | <i>Goodenia lamprosperma</i> | | | |
| Goodeniaceae | <i>Goodenia stobbsiana</i> | | | |
| Lythraceae | <i>Ammannia multiflora</i> | | | |
| Malvaceae | <i>Brachychiton acuminatus</i> | | | |
| Malvaceae | <i>Corchorus tectus</i> | | | |
| Malvaceae | <i>Corchorus</i> sp. Hamersley Range hilltops (S. van Leeuwen 3826) | | | |
| Malvaceae | <i>Gossypium austral</i> | | | |
| Malvaceae | <i>Hibiscus sturtii</i> var. <i>platyklamys</i> | | | |
| Malvaceae | <i>Sida echinocarpa</i> | | | |
| Malvaceae | <i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543) | | | |
| Malvaceae | <i>Sida</i> sp. spiciform panicles (E. Layland s.n. 14/8/90) | | | |
| Malvaceae | <i>Triumfetta clementii</i> | | | |
| Marsileaceae | <i>Marsilea</i> sp. (indet.) | | | |

| Family | Species | Conservation Status | | Introduced Species Status |
|-----------------------|---|---------------------|---------------|---------------------------|
| | | EPBC Act | BC Act / DBCA | |
| Menispermaceae | <i>Tinospora smilacina</i> | | | |
| Myrtaceae | <i>Corymbia hamersleyana</i> | | | |
| Myrtaceae | <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> | | | |
| Myrtaceae | <i>Eucalyptus victrix</i> | | | |
| Myrtaceae | <i>Melaleuca linophylla</i> | | | |
| Nyctaginaceae | <i>Boerhavia coccinea</i> | | | |
| Phyllanthaceae | <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> | | | |
| Phyllanthaceae | <i>Nellica maderaspatensis</i> | | | |
| Phyllanthaceae | <i>Notoleptopus decaisnei</i> | | | |
| Plantaginaceae | <i>Stemodia grossa</i> | | | |
| Poaceae | <i>Aristida contorta</i> | | | |
| Poaceae | <i>Cenchrus ciliaris</i> | | | Permitted-s11 |
| Poaceae | <i>Cenchrus setiger</i> | | | Permitted-s11 |
| Poaceae | <i>Cymbopogon ambiguous</i> | | | |
| Poaceae | <i>Dactyloctenium radulans</i> | | | |
| Poaceae | <i>Enneapogon caerulescens</i> | | | |
| Poaceae | <i>Eragrostis tenellula</i> | | | |
| Poaceae | <i>Eriachne mucronata</i> | | | |
| Poaceae | <i>Eriachne pulchella</i> | | | |
| Poaceae | <i>Eriachne ?tenuiculmis</i> | | | |
| Poaceae | <i>Iseilema membranaceum</i> | | | |
| Poaceae | <i>Themeda triandra</i> | | | |
| Poaceae | <i>Triodia epactia</i> | | | |
| Poaceae | <i>Triodia wiseana</i> | | | |
| Polygonaceae | <i>Rumex vesicarius</i> | | | Alien (unlisted) |
| Portulacaceae | <i>Portulaca oleracea</i> | | | |
| Proteaceae | <i>Grevillea wickhamii</i> | | | |
| Proteaceae | <i>Grevillea pyramidalis</i> | | | |
| Proteaceae | <i>Hakea chordophylla</i> | | | |
| Proteaceae | <i>Hakea loreus</i> (ex. <i>Hakea lorea</i>) | | | |
| Solanaceae | <i>Nicotiana obliqua</i> | | | |
| Typhaceae | <i>Typha orientalis</i> | | | |
| Violaceae | <i>Afrohybanthus aurantiacus</i> | | | |

Appendix H Species by Relevé Matrix

| Family | Species | Relevé | | | | | | | | | |
|------------------------|--|---------|---------|---------|---------|----------|----------|----------|----------|-----------|--|
| | | ELA R01 | ELA R02 | ELA R03 | ELA R04 | ELA oppo | RTIO R01 | RTIO R02 | RTIO R03 | RTIO oppo | |
| Aizoaceae | <i>Trianthema triquetrum</i> | | | | | X | | | | | |
| Amaranthaceae | <i>*Aerva javanica</i> | | X | | X | X | X | X | X | X | |
| Amaranthaceae | <i>Alternanthera nana</i> | X | | | | | | | | | |
| Amaranthaceae | <i>Alternanthera nodiflora</i> | | | | | | X | | | | |
| Amaranthaceae | <i>Gomphrena cunninghamii</i> | | | | | X | X | X | X | | |
| Amaranthaceae | <i>Ptilotus auriculifolius</i> | | | | | | X | | X | | |
| Amaranthaceae | <i>Ptilotus exaltatus</i> | | | | | X | X | X | X | | |
| Amaranthaceae | <i>Ptilotus fusiformis</i> | | | | | | | | | X | |
| Apocynaceae | <i>Leichhardtia australis</i> | | | | | | | | X | | |
| Asteraceae | <i>Centipeda minima</i> subsp. <i>macrocephala</i> | X | | X | | | | | X | | |
| Asteraceae | <i>Pluchea rubelliflora</i> | | | | | | | | X | | |
| Asteraceae | <i>Pseudognaphalium luteoalbum</i> | | | | | | | | X | | |
| Asteraceae | <i>Pterocaulon</i> sp. (indet.) | | | | | | | | | X | |
| Boraginaceae | <i>Ehretia saligna</i> var. <i>saligna</i> | | | X | | | | | | | |
| Boraginaceae | <i>Trichodesma zeylanicum</i> | | X | | | | X | X | X | X | |
| Capparaceae | <i>Capparis spinosa</i> | | X | | | | | | | | |
| Caryophyllaceae | <i>Polycarpha longiflora</i> | | | | | | X | X | X | X | |
| Chenopodiaceae | <i>Dysphania plantaginella</i> | | | X | | | X | X | X | X | |
| Chenopodiaceae | <i>Dysphania rhadinostachya</i> | | | | | | | | X | | |
| Chenopodiaceae | <i>Salsola australis</i> | | | X | | | X | X | X | X | |
| Cleomaceae | <i>Arivela viscosa</i> | | | | | | X | X | X | | |
| Combretaceae | <i>Terminalia canescens</i> | | | | | | | | | X | |
| Combretaceae | <i>Terminalia circumalata</i> | | | | X | | | | X | X | |
| Convolvulaceae | <i>Bonamia pilbarensis</i> | | | | | | | X | | X | |

| Family | Species | Relevé | | | | | | | | | | | | |
|----------------|--|---------|---------|---------|---------|----------|----------|----------|----------|-----------|---|---|---|---|
| | | ELA R01 | ELA R02 | ELA R03 | ELA R04 | ELA oppo | RTIO R01 | RTIO R02 | RTIO R03 | RTIO oppo | | | | |
| Convolvulaceae | <i>Ipomoea ?muelleri</i> | X | | | | | | | | | | | | |
| Convolvulaceae | <i>Ipomoea muelleri</i> | | | | | | | | | X | | | | |
| Convolvulaceae | <i>Ipomoea plebeian</i> | | | | | | | | | X | | | | |
| Convolvulaceae | <i>Ipomoea polymorpha</i> | | | X | | | | | | | | | | |
| Convolvulaceae | <i>Operculina aequiseipala</i> | | | | | X | | | | | | | | X |
| Convolvulaceae | <i>Polymeria mollis</i> | | | | | | | | | | | X | | |
| Cucurbitaceae | <i>Cucumis argenteus</i> | | | | | | | | | X | | | | X |
| Cucurbitaceae | <i>Cucumis variabilis</i> | | | | | | | | | X | | | X | |
| Cucurbitaceae | <i>Cucumis sp.</i> | | | | | | | | | X | | | | |
| Cucurbitaceae | <i>Trichosanthes cucumerina</i> | | | | | | | | | | | X | | |
| Cyperaceae | <i>Cyperus difformis</i> | | | | | | | | | X | | | | |
| Cyperaceae | <i>Cyperus vaginatus</i> | | | | | | | | | X | | | | |
| Cyperaceae | <i>?Schoenoplectus subulatus</i> | | | | | | | | | X | | | | |
| Cyperaceae | <i>Schoenoplectus subulatus</i> | | | | | | | | | X | | | | |
| Euphorbiaceae | <i>Euphorbia australis</i> | | | | | | | | | | | | | X |
| Euphorbiaceae | <i>Euphorbia biconvexa</i> | | | | | | | | | | X | | | |
| Euphorbiaceae | <i>Euphorbia careyi</i> | | | | | | | | | | | | | |
| Euphorbiaceae | <i>Euphorbia vaccaria</i> var. <i>vaccaria</i> | | | | | | | | | X | | | X | |
| Fabaceae | <i>Acacia bivenosa</i> | | | | | | | | | X | | | | X |
| Fabaceae | <i>Acacia coriacea</i> subsp. <i>pendens</i> | | | | | | | | | X | | X | X | X |
| Fabaceae | <i>Acacia inaequilatera</i> | | | | | | | | | X | | X | | |
| Fabaceae | <i>Acacia maitlandii</i> | | | | | | | | | X | | | | |
| Fabaceae | <i>Acacia pyrifolia</i> | | | | | | | | | X | | X | X | X |
| Fabaceae | <i>Acacia stellaticeps</i> | | | | | | | | | X | | | X | |
| Fabaceae | <i>Acacia trachycarpa</i> | | | | | | | | | X | | X | X | X |
| Fabaceae | <i>Alysicarpus muelleri</i> | | | | | | | | | X | | | X | |
| Fabaceae | <i>Cajanus cinereus</i> | | | | | | | | | X | | | | X |

| Family | Species | Relevé | | | | | | | | | |
|--------------|---|---------|---------|---------|---------|----------|----------|----------|----------|-----------|---|
| | | ELA R01 | ELA R02 | ELA R03 | ELA R04 | ELA oppo | RTIO R01 | RTIO R02 | RTIO R03 | RTIO oppo | |
| Fabaceae | <i>Crotalaria medicaginea</i> var. <i>neglecta</i> | | | | | | X | | | | |
| Fabaceae | <i>Cullen lachnostachys</i> | | | | | | | | | X | |
| Fabaceae | <i>Indigofera colutea</i> | | | | | | | | | X | |
| Fabaceae | <i>Indigofera linifolia</i> | | | | | X | X | X | | X | |
| Fabaceae | <i>Indigofera</i> aff. <i>monophylla</i> | | | | | | X | | | X | |
| Fabaceae | <i>Indigofera rugosa</i> | | | | | | | | | | X |
| Fabaceae | <i>Rhynchosia minima</i> | | | | | | X | X | X | | X |
| Fabaceae | <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | | | | X | | X | | | | |
| Fabaceae | <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | | X | X | | | X | | | X | |
| Fabaceae | <i>Senna notabilis</i> | | | | | | X | | | | |
| Fabaceae | <i>Senna venusta</i> | | | | | | | | | X | |
| Fabaceae | <i>Sesbania cannabina</i> | | | | | | X | X | X | | X |
| Fabaceae | <i>Swainsona formosa</i> | | | X | | | X | X | X | X | |
| Fabaceae | <i>Tephrosia rosea</i> var. <i>clementii</i> | | | | | | X | | X | | |
| Fabaceae | <i>Tephrosia rosea</i> | | | | | | X | | | | |
| Gentianaceae | <i>Schenkia clementii</i> | | | | | | | | X | | |
| Goodeniaceae | <i>Goodenia lamprosperma</i> | | | | | | X | X | X | | X |
| Goodeniaceae | <i>Goodenia stobbsiana</i> | | | | | | X | | | | |
| Lythraceae | <i>Ammannia multiflora</i> | | | | | | | | X | | |
| Malvaceae | <i>Brachychiton acuminatus</i> | | | | | | | | X | | |
| Malvaceae | <i>Corchorus tectus</i> | | | | | | | X | | X | |
| Malvaceae | <i>Corchorus</i> sp. Hamersley Range hilltops (S. van Leeuwen 3826) | | | X | | | | | X | | X |
| Malvaceae | <i>Gossypium australe</i> | | | | | | X | X | X | | X |
| Malvaceae | <i>Hibiscus sturtii</i> var. <i>platyclamys</i> | | | | | | X | | | | |
| Malvaceae | <i>Sida echinocarpa</i> | | | | | | X | | | | X |
| Malvaceae | <i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543) | | | | | | | | | X | |

| Family | Species | Relevé | | | | | | | | | |
|----------------|--|---------|---------|---------|---------|----------|----------|----------|----------|-----------|---|
| | | ELA R01 | ELA R02 | ELA R03 | ELA R04 | ELA oppo | RTIO R01 | RTIO R02 | RTIO R03 | RTIO oppo | |
| Malvaceae | <i>Sida</i> sp. spiciform panicles (E. Layland s.n. 14/8/90) | | | | | | X | | | | |
| Malvaceae | <i>Triumfetta clementii</i> | | | | | X | | | | | |
| Marsileaceae | <i>Marsilea</i> sp. (indet.) | | | | | | | X | | | |
| Menispermaceae | <i>Tinospora smilacina</i> | | | | | | X | | X | | |
| Myrtaceae | <i>Corymbia hamersleyana</i> | | X | | | | | | | | |
| Myrtaceae | <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> | | | | | | | | X | | |
| Myrtaceae | <i>Eucalyptus victrix</i> | | | X | | | | | | | |
| Myrtaceae | <i>Melaleuca linophylla</i> | | | | | X | | | X | | X |
| Nyctaginaceae | <i>Boerhavia coccinea</i> | | | X | | | | X | | X | |
| Phyllanthaceae | <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> | | | | | | | | X | | |
| Phyllanthaceae | <i>Nellica maderaspatensis</i> | X | | | | | | | | | |
| Phyllanthaceae | <i>Notoleptopus decaisnei</i> | | | | | | | | X | | |
| Plantaginaceae | <i>Stemodia grossa</i> | | X | | | | | | | X | X |
| Poaceae | <i>Aristida contorta</i> | | | | | | | | X | | |
| Poaceae | * <i>Cenchrus ciliaris</i> | X | X | X | X | X | X | X | X | X | X |
| Poaceae | * <i>Cenchrus setiger</i> | X | | | | | | | X | X | X |
| Poaceae | <i>Cymbopogon ambiguus</i> | | | | | | | | | | X |
| Poaceae | <i>Dactyloctenium radulans</i> | | | | | | | | X | | |
| Poaceae | <i>Enneapogon caerulescens</i> | | X | X | | | | X | X | X | X |
| Poaceae | <i>Eragrostis tenellula</i> | | X | | | | | | X | X | X |
| Poaceae | <i>Eriachne mucronata</i> | | | | | | | | | X | |
| Poaceae | <i>Eriachne pulchella</i> | | | X | | | | | X | | |
| Poaceae | <i>Eriachne ?tenuiculmis</i> | | | X | | | | | | | |
| Poaceae | <i>Iseilema membranaceum</i> | | | | | | | | X | | |
| Poaceae | <i>Themeda triandra</i> | | | | | | | | X | | |
| Poaceae | <i>Triodia epactia</i> | X | X | X | X | X | X | X | X | X | X |
| Poaceae | <i>Triodia wiseana</i> | | X | X | X | X | X | X | X | X | X |

| Family | Species | Relevé | | | | | | | | | |
|---------------|---------------------------------------|---------|---------|---------|---------|----------|----------|----------|----------|-----------|---|
| | | ELA R01 | ELA R02 | ELA R03 | ELA R04 | ELA oppo | RTIO R01 | RTIO R02 | RTIO R03 | RTIO oppo | |
| Polygonaceae | <i>*Rumex vesicarius</i> | | | | | X | X | | | | X |
| Portulacaceae | <i>Portulaca oleracea</i> | | | | | X | | | | | |
| Proteaceae | <i>Grevillea wickhamii</i> | | X | | | X | | | | | |
| Proteaceae | <i>Grevillea pyramidalis</i> | | | | | X | X | | | | |
| Proteaceae | <i>Hakea chordophylla</i> | | | | | X | | | | | |
| Proteaceae | <i>Hakea loreus (ex. Hakea lorea)</i> | | | | | X | | | | X | |
| Solanaceae | <i>Nicotiana obliqua</i> | | | | | X | | | X | | |
| Typhaceae | <i>Typha orientalis</i> | | | | | X | | | | | |
| Violaceae | <i>Afrohybanthus aurantiacus</i> | | X | | | X | | | | | |

Appendix I Relevé Data

| Relevé: | ELA R01 | Site: | Southern polygon | Date: | 15/08/2022 |
|-------------------------|------------------------------------|--|------------------------------|------------------|------------|
| Vegetation Unit: | VT1 | Location (UTM): | 50 K 507505 m E, 7648289 m S | | |
| Condition: | Poor | Dominant species | Height (m) | Cover (%) | |
| Disturbance: | Tracks, Weeds | <i>Acacia coriacea</i> subsp. <i>pendens</i> | 4 | 5 | |
| Soil: | Grey-brown cracking clay/clay loam | <i>Acacia trachycarpa</i> | 3 | 5 | |
| Landform: | Gully between rail and road | <i>Acacia pyrifolia</i> | 3 | 1 | |
| Rock Type: | N/A | <i>Triodia epactia</i> | 1 | 20 | |
| Outcropping: | 0% | * <i>Cenchrus ciliaris</i> | 1 | 40 | |
| Age since fire: | >20 years | | | | |
| Fauna habitat: | Low Hills and Slopes | Other species | | | |
| | | <i>Alternanthera nana</i> | | | |
| | | * <i>Cenchrus setiger</i> | | | |
| | | <i>Centipeda minima</i> subsp. <i>macrocephala</i> | | | |
| | | <i>Ipomoea ?muelleri</i> | | | |
| | | <i>Nellica maderaspatensis</i> | | | |
| Photograph: | | | | | |



| Relevé: | ELA R02 | Site: | Southern polygon | Date: | 16/08/2022 |
|-------------------------|---|--|------------------------------|------------------|------------|
| Vegetation Unit: | VT1 | Location (UTM): | 50 K 507542 m E, 7648420 m S | | |
| Condition: | Poor | Dominant species | Height (m) | Cover (%) | |
| Disturbance: | Historical clearing, Weeds | <i>Acacia trachycarpa</i> | 2.5 | 3 | |
| Soil: | Orange-brown clay loam, gravelly surface | <i>Acacia pyrifolia</i> | 2 | 1 | |
| Landform: | Rocky rise in gully between road and rail embankments | <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 1 | 2 | |
| Rock Type: | Ironstone/Basalt | * <i>Cenchrus ciliaris</i> | 0.6 | 35 | |
| Outcropping: | <1% | <i>Triodia epactia</i> | 0.4 | 15 | |
| Age since fire: | Long unburned | <i>Triodia wiseana</i> | 0.3 | 25 | |
| Fauna habitat: | Low Hills and Slopes | Other species | | | |
| | | <i>Acacia coriacea</i> subsp. <i>pendens</i> | | | |
| | | * <i>Aerva javanica</i> | | | |
| | | <i>Afrohybanthus aurantiacus</i> | | | |
| | | <i>Capparis spinosa</i> | | | |
| | | <i>Enneapogon caerulescens</i> | | | |
| | | <i>Eragrostis tenellula</i> | | | |
| | | <i>Euphorbia biconvexa</i> | | | |
| | | <i>Grevillea pyramidalis</i> | | | |
| | | <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | | | |
| | | <i>Stemodia grossa</i> | | | |
| Photograph: | | <i>Trichodesma zeylanicum</i> | | | |



| Relevé: | ELA R03 | Site: | Southern polygon | Date: | 16/08/2022 |
|-------------------------|-------------------------|---|------------------------------|------------------|------------|
| Vegetation Unit: | VT2 | Location (UTM): | 50 K 507463 m E, 7648033 m S | | |
| Condition: | Good | Dominant species | Height (m) | Cover (%) | |
| Disturbance: | Tracks, Weeds | <i>Corymbia hamersleyana</i> | 4 | 4 | |
| Soil: | Orange-brown sandy loam | <i>Corchorus sp. Hamersley Range hilltops (S. van Leeuwen 3826)</i> | 1 | 1 | |
| Landform: | Rocky rise | <i>Eriachne mucronata</i> | 0.2 | 1 | |
| Rock Type: | Weathered basalt | <i>Triodia epactia</i> | 0.5 | 25 | |
| Outcropping: | 10-20% | <i>Triodia wiseana</i> | 1.5 | 25 | |
| Age since fire: | >20 years | | | | |
| Fauna habitat: | Low Hills and Slopes | Other species | | | |
| | | <i>Boerhavia coccinea</i> | | | |
| | | * <i>Cenchrus ciliaris</i> | | | |
| | | <i>Centipeda minima</i> subsp. <i>macrocephala</i> | | | |
| | | <i>Dysphania rhadinostachya</i> | | | |
| | | <i>Ehretia saligna</i> var. <i>saligna</i> | | | |
| | | <i>Enneapogon caeruleus</i> | | | |
| | | <i>Eriachne pulchella</i> | | | |
| | | <i>Ipomoea polymorpha</i> | | | |
| | | <i>Salsola australis</i> | | | |
| | | <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | | | |
| | | <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | | | |
| | | <i>Swainsona formosa</i> | | | |
| Photograph: | | | | | |



| Relevé: | ELA R04 | Site: | Southern polygon | Date: | 16/08/2022 |
|-------------------------|-----------------------|------------------------|--|-------------------|------------------|
| Vegetation Unit: | VT3 | Location (UTM): | 50 K 507444 m E, 7647906 m S | | |
| Condition: | Good | | Dominant species | Height (m) | Cover (%) |
| Disturbance: | Weeds, infrastructure | | <i>Eucalyptus victrix</i> | 12 | 2 |
| Soil: | Sandy stony river bed | | <i>Terminalia canescens</i> | 8 | 5 |
| Landform: | Drainage line | | <i>Acacia pyrifolia</i> | 2.5 | 5 |
| Rock Type: | Basalt? | | <i>Acacia coriacea</i> subsp. <i>pendens</i> | 3 | 2 |
| Outcropping: | 5% | | * <i>Cenchrus ciliaris</i> | 0.6 | 20 |
| Age since fire: | >20 years | | <i>Triodia epactia</i> | 0.6 | 5 |
| | | | <i>Triodia wiseana</i> | 0.6 | 5 |
| Fauna habitat: | Major Drainage | | Other species | | |
| | | | <i>Acacia trachycarpa</i> | | |
| | | | * <i>Aerva javanica</i> | | |
| | | | <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | | |

Photograph:

| | | | | | |
|-------------------------|-----------------------|------------------------------|-------------------------------|-------------------|------------------|
| Relevé: | RTIO R01 | Site: | Northern polygon | Date: | 28/09/2022 |
| Vegetation Unit: | VT2 | Location (UTM): | 50 K, 507544 m E, 7648539 m S | | |
| Condition: | Good | Dominant species | | Height (m) | Cover (%) |
| Disturbance: | Infrastructure, weeds | <i>Corymbia hamersleyana</i> | | 0.1 | 4.1 |
| Soil: | Red clay loam | <i>Acacia trachycarpa</i> | | 0.5 | 2.5 |
| Landform: | Rocky hill | <i>Triodia wiseana</i> | | 0.3 | 45 |
| Rock Type: | Basalt | * <i>Cenchrus ciliaris</i> | | 0.5 | 12 |
| Outcropping: | 0% | | | | |
| Age since fire: | 5-10 years | | | | |
| Bare Ground: | 25% | | | | |
| Fauna habitat: | Low Hills and Slopes | | | | |

Photograph:

| Other Species | Height | Cover |
|--|--------|-------|
| <i>Acacia coriacea</i> subsp. <i>pendens</i> | 1 | 0.1 |
| <i>Acacia inaequilatera</i> | 0.5 | 0.1 |
| <i>Acacia maitlandii</i> | 1.5 | 0.1 |
| <i>Acacia pyrifolia</i> | 2.5 | 0.1 |
| <i>Acacia trachycarpa</i> | 2 | 0.1 |
| <i>Aerva javanica</i> | 0.5 | 0.1 |
| <i>Alysicarpus muelleri</i> | 0.3 | 0.1 |
| <i>Aristida contorta</i> | 0.2 | 0.1 |
| <i>Arivela viscosa</i> | 0.2 | 0.1 |
| <i>Boerhavia coccinea</i> | <Null> | 0.1 |
| <i>Bonamia pilbarensis</i> | <Null> | 0.1 |
| <i>Corchorus tectus</i> | 0.8 | 0.1 |
| <i>Crotalaria medicaginea</i> var. <i>neglecta</i> | 0.2 | 0.1 |
| <i>Dysphania rhadinostachya</i> | 0.2 | 0.1 |
| <i>Enneapogon caerulescens</i> | 0.2 | 0.1 |
| <i>Eriachne ? tenuiculmis</i> | 0.2 | 0.1 |

| Other Species | Height | Cover |
|--|--------|-------|
| <i>Euphorbia vaccaria</i> var. <i>vaccaria</i> | 0.2 | 0.1 |
| <i>Gomphrena cunninghamii</i> | 0.2 | 0.1 |
| <i>Goodenia stobbsiana</i> | 0.8 | 0.1 |
| <i>Gossypium australe</i> | 1 | 0.1 |
| <i>Grevillea wickhamii</i> | 1.2 | 0.1 |
| <i>Hakea chordophylla</i> | 2 | 0.1 |
| <i>Hibiscus sturtii</i> var. <i>platyklamys</i> | 0.2 | 0.1 |
| <i>Indigofera linifolia</i> | 0.2 | 0.1 |
| <i>Indigofera</i> aff. <i>Monophylla</i> | 0.5 | 0.1 |
| <i>Polycarpaea longiflora</i> | 0.2 | 0.1 |
| <i>Ptilotus auriculifolius</i> | 0.3 | 0.1 |
| <i>Ptilotus exaltatus</i> | 0.4 | 0.1 |
| <i>Rhynchosia minima</i> | <Null> | 0.1 |
| <i>Rumex vesicarius</i> | 0.4 | 0.1 |
| <i>Salsola australis</i> | 0.3 | 0.1 |
| <i>Senna artemisioides</i> subsp. <i>oligophylla</i> | 1 | 0.1 |
| <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | 1.3 | 0.1 |
| <i>Senna notabilis</i> | 0.2 | 0.1 |
| <i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90) | 1.5 | 0.1 |
| <i>Swainsona formosa</i> | 0.1 | 0.1 |
| <i>Tephrosia rosea</i> var. <i>clementii</i> | 0.5 | 0.1 |
| <i>Terminalia circumalata</i> | 5 | 0.1 |
| <i>Tinospora smilacina</i> | <Null> | 0.1 |
| <i>Trichodesma zeylanicum</i> | 0.5 | 0.1 |
| <i>Triumfetta clementii</i> | 0.3 | 0.1 |

| Relevé: | RTIO R02 | Site: | Northern polygon | Date: | 28/09/2022 |
|-------------------------|---|---|------------------------------|------------------|------------|
| Vegetation Unit: | VT4 | Location (UTM): | 50 K 507567 m E, 7648595 m S | | |
| Condition: | Poor | Dominant species | Height (m) | Cover (%) | |
| Disturbance: | Culvert, Road, Weeds | <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> | 10 | 8 | |
| Soil: | sandy, grey | <i>Brachychiton acuminatus</i> | 5 | 1 | |
| Landform: | Drainage | <i>Melaleuca linophylla</i> | 3 | 3 | |
| Rock Type: | Basalt | <i>Terminalia circumalata</i> | 2 | 1 | |
| Outcropping: | 0% | <i>Cyperus vaginatus</i> | 1 | 2 | |
| Age since fire: | >10 years | <i>Cyperus vaginatus</i> | 0.1 | 0.7 | |
| Bare Ground: | 25% | * <i>Cenchrus setiger</i> | 0.5 | 5 | |
| Fauna habitat: | Major Drainage, Temporary ephemeral pool | * <i>Cenchrus ciliaris</i> | 0.3 | 3 | |
| | | <i>Marsilea</i> sp. (indet,) | 0.1 | 2 | |
| | | <i>Ammannia multiflora</i> | 0.3 | 2 | |
| | | <i>Schoenoplectus subulatus</i> | 2 | 0.5 | |

Photograph:

| Other Species | Height | Cover |
|--|--------|-------|
| <i>Acacia coriacea</i> subsp. <i>pendens</i> | 1 | 0.1 |
| <i>Acacia pyrifolia</i> | 0.8 | 0.1 |
| <i>Acacia trachycarpa</i> | 2 | 0.1 |
| * <i>Aerva javanica</i> | 0.6 | 0.1 |
| <i>Alternanthera nodiflora</i> | 0.2 | 0.1 |
| <i>Ammannia multiflora</i> | 0.2 | 0.1 |
| <i>Arivela viscosa</i> | 0.3 | 0.1 |
| <i>Centipeda minima</i> subsp. <i>macrocephala</i> | 0.1 | 0.1 |
| <i>Cucumis variabilis</i> | CR | 0.1 |
| <i>Cyperus difformis</i> | 0.4 | 0.1 |
| <i>Dysphania plantaginella</i> | 0.3 | 0.1 |

| Other Species | Height | Cover |
|---|--------|-------|
| <i>Eragrostis tenellula</i> | 0.2 | 0.1 |
| <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> | 0.4 | 0.1 |
| <i>Goodenia lamprosperma</i> | 0.4 | 0.1 |
| <i>Ipomoea muelleri</i> | CR | 0.1 |
| <i>Ipomoea plebeia</i> | CR | 0.1 |
| <i>Nicotiana obliqua</i> | 0.3 | 0.1 |
| <i>Pluchea rubelliflora</i> | 0.2 | 0.1 |
| <i>Pseudognaphalium luteoalbum</i> | 0.3 | 0.1 |
| <i>Rhynchosia minima</i> | CR | 0.1 |
| <i>Schenkia clementii</i> | 0.3 | 0.1 |
| ? <i>Schoenoplectus subulatus</i> | 0.3 | 0.5 |
| <i>Sesbania cannabina</i> | 1 | 0.1 |
| <i>Stemodia grossa</i> | 0.1 | 0.1 |
| <i>Stemodia grossa</i> | 0.2 | 0.5 |
| <i>Swainsona formosa</i> | 0.2 | 0.1 |
| <i>Tephrosia rosea</i> var. <i>clementii</i> | 1 | 0.1 |
| <i>Terminalia circumalata</i> | 1.2 | 0.1 |
| <i>Trichodesma zeylanicum</i> | 0.5 | 0.1 |
| <i>Trichosanthes cucumerina</i> | CR | 0.1 |
| <i>Triodia epactia</i> | 0.8 | 0.1 |

| Relevé: | RTIO R03 | Site: | Northern polygon | Date: | 28/09/2022 |
|-------------------------|-------------------------|---------------------------------------|------------------------------|------------------|------------|
| Vegetation Unit: | VT1 | Location (UTM): | 50 K 507488 m E, 7648835 m S | | |
| Condition: | Poor | Dominant species | Height (m) | Cover (%) | |
| Disturbance: | Track, Rail, Weeds | <i>Acacia coriacea subsp. pendens</i> | 2.5 | 0.5 | |
| Soil: | grey-red Clay sand loam | <i>Acacia trachycarpa</i> | 2 | 0.5 | |
| Landform: | Hill slope | * <i>Cenchrus ciliaris</i> | 0.6 | 5 | |
| Rock Type: | basalt | <i>Triodia wiseana</i> | 0.5 | 25 | |
| Outcropping: | 0% | <i>Triodia epactia</i> | 0.5 | 3 | |
| Age since fire: | >10 years | | | | |
| Bare Ground: | 40% | | | | |
| Fauna habitat: | Low Hills and Slopes | | | | |

Photograph:

| Other Species | Height | Cover |
|--|--------|-------|
| <i>Acacia pyrifolia</i> | 1.1 | 0.1 |
| <i>Acacia stellaticeps</i> | 0.7 | 0.1 |
| <i>Aerva javanica</i> | 0.5 | 0.1 |
| <i>Alysicarpus muelleri</i> | 0.1 | 0.1 |
| <i>Boerhavia coccinea</i> | CR | 0.1 |
| <i>Corchorus tectus</i> | 0.5 | 0.1 |
| <i>Cucumis variabilis</i> | CR | 0.1 |
| <i>Cullen lachnostachys</i> | 2 | 0.1 |
| <i>Dysphania rhadinostachya</i> | 0.2 | 0.1 |
| <i>Enneapogon caerulescens</i> | 0.3 | 0.1 |
| <i>Euphorbia vaccaria</i> var. <i>vaccaria</i> | 0.3 | 0.1 |
| <i>Gomphrena cunninghamii</i> | 0.2 | 0.1 |
| <i>Gossypium australe</i> | 1.2 | 0.1 |
| <i>Hakea lorea</i> | 0.9 | 0.1 |
| <i>Indigofera colutea</i> | 0.1 | 0.1 |
| <i>Indigofera linifolia</i> | 0.3 | 0.1 |
| <i>Indigofera linifolia</i> | 0.1 | 0.1 |
| <i>Indigofera</i> aff. <i>monophylla</i> | 0.5 | 0.1 |
| <i>Indigofera</i> aff. <i>monophylla</i> | 0.6 | 0.1 |

| Other Species | Height | Cover |
|--|--------|-------|
| <i>Leichhardtia australis</i> | CR | 0.1 |
| <i>Polycarpaea longiflora</i> | 0.3 | 0.1 |
| <i>Polymeria mollis</i> | CR | 0.1 |
| <i>Pterocaulon</i> sp. (indet.) | 0.2 | 0.1 |
| <i>Ptilotus auriculifolius</i> | 0.3 | 0.1 |
| <i>Ptilotus exaltatus</i> | 0.4 | 0.1 |
| <i>Salsola australis</i> | 0.3 | 0.1 |
| <i>Senna glutinosa</i> subsp. <i>glutinosa</i> | 0.9 | 0.1 |
| <i>Senna venusta</i> | 1.5 | 0.1 |
| <i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543) | 0.45 | 0.1 |
| <i>Swainsona formosa</i> | 0.2 | 0.1 |
| <i>Tinospora smilacina</i> | 0.1 | 0.1 |
| <i>Trichodesma zeylanicum</i> | 0.5 | 0.1 |

Appendix J Introduced flora species location data

| Species name | Common Name | Weed Status (WAOL) | location | Count | Easting | Northing |
|--------------------------|--------------|--------------------|------------------|-------|---------|----------|
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 10 | 507527 | 7648273 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 2 | 507504 | 7648225 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 3 | 507513 | 7648375 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507487 | 7648428 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 2 | 507538 | 7648309 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 10 | 507547 | 7648344 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 10 | 507537 | 7648357 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 10 | 507553 | 7648376 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507545 | 7648410 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507457 | 7648360 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 5 | 507457 | 7648330 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507451 | 7648310 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507470 | 7648319 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507451 | 7648265 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507463 | 7648226 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 50 | 507454 | 7648178 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 5 | 507454 | 7648120 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507460 | 7648108 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 8 | 507456 | 7648085 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 6 | 507450 | 7648060 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 30 | 507438 | 7648041 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 2 | 507446 | 7648037 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507431 | 7647992 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 50 | 507427 | 7647970 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 50 | 507427 | 7647925 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 5 | 507491 | 7648006 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507501 | 7647959 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 5 | 507498 | 7647907 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507498 | 7647934 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507501 | 7648025 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507508 | 7648034 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 2 | 507492 | 7648119 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507485 | 7648134 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 10 | 507489 | 7648139 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507518 | 7648191 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Southern polygon | 1 | 507532 | 7648211 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507525 | 7648267 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 30 | 507492 | 7648242 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507494 | 7648252 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507496 | 7648265 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507504 | 7648300 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507516 | 7648300 |

| Species name | Common Name | Weed Status (WAOL) | location | Count | Easting | Northing |
|--------------------------|----------------|--------------------|------------------|-------|---------|----------|
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507505 | 7648358 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 20 | 507516 | 7648364 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 10 | 507499 | 7648419 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507499 | 7648434 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507482 | 7648417 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507481 | 7648372 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507484 | 7648300 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507547 | 7648321 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507526 | 7648327 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507548 | 7648366 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507532 | 7648386 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507530 | 7648407 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507557 | 7648416 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507549 | 7648433 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507464 | 7648403 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507459 | 7648369 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507456 | 7648325 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 30 | 507472 | 7648331 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507454 | 7648294 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 20 | 507471 | 7648303 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 10 | 507466 | 7648272 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507450 | 7648253 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507465 | 7648262 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507453 | 7648214 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 1 | 507470 | 7648167 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507454 | 7648166 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507452 | 7648112 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 50 | 507463 | 7648120 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507440 | 7648047 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 20 | 507451 | 7648056 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507433 | 7647997 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507440 | 7647973 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507427 | 7647954 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507432 | 7647936 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507425 | 7647902 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507461 | 7648016 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507492 | 7648000 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507502 | 7647958 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507497 | 7647902 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 150 | 507498 | 7648018 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507511 | 7648064 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 20 | 507486 | 7648133 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Southern polygon | 100 | 507508 | 7648125 |
| <i>Cenchrus setiger</i> | Birdwood Grass | Permitted - s11 | Southern polygon | 10 | 507524 | 7648266 |
| <i>Cenchrus setiger</i> | Birdwood Grass | Permitted - s11 | Southern polygon | 5 | 507517 | 7648403 |

| Species name | Common Name | Weed Status (WAOL) | location | Count | Easting | Northing |
|--------------------------|----------------|------------------------|------------------|----------|---------|----------|
| <i>Cenchrus setiger</i> | Birdwood Grass | Permitted - s11 | Southern polygon | 5 | 507523 | 7648342 |
| <i>Cenchrus setiger</i> | Birdwood Grass | Permitted - s11 | Southern polygon | 100 | 507507 | 7648023 |
| <i>Cenchrus setiger</i> | Birdwood Grass | Permitted - s11 | Southern polygon | 1 | 507508 | 7648075 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 2 | 507523 | 7648280 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 4 | 507525 | 7648266 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 1 | 507516 | 7648363 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 1 | 507500 | 7648372 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 10 | 507540 | 7648302 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 3 | 507526 | 7648347 |
| <i>Rumex vesicarius</i> | Ruby Dock | Alien (not classified) | Southern polygon | 1 | 507466 | 7648365 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507414 | 7649054 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507424 | 7649021 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507419 | 7649012 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507471 | 7648806 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507427 | 7648888 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507416 | 7648924 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507419 | 7649018 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507391 | 7649016 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507441 | 7648992 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507458 | 7648956 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507490 | 7648895 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507494 | 7648886 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507512 | 7648848 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507442 | 7648913 |
| <i>Aerva javanica</i> | Kapok Bush | Permitted - s11 | Northern polygon | Presence | 507410 | 7649011 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507414 | 7649037 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507419 | 7649011 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507429 | 7648980 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507482 | 7648867 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507498 | 7648830 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507478 | 7648802 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507461 | 7648813 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507454 | 7648832 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507438 | 7648866 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507425 | 7648892 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507420 | 7648914 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507412 | 7648938 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507405 | 7648968 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507420 | 7649016 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507435 | 7648999 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507441 | 7648983 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507468 | 7648942 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507483 | 7648901 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507498 | 7648877 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507502 | 7648860 |

| Species name | Common Name | Weed Status (WAOL) | location | Count | Easting | Northing |
|--------------------------|--------------|--------------------|------------------|----------|---------|----------|
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507520 | 7648828 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507490 | 7648815 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507487 | 7648824 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507477 | 7648842 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507475 | 7648854 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507470 | 7648867 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507463 | 7648883 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507452 | 7648901 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507448 | 7648912 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507438 | 7648945 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507428 | 7648972 |
| <i>Cenchrus ciliaris</i> | Buffel Grass | Permitted - s11 | Northern polygon | Presence | 507412 | 7649007 |

